TO: Randy Smith, Vice Provost for Academic Programs
FROM: Anika Anthony, Associate Dean of Academic Affairs, Graduate School
DATE: November 24, 2021
RE: Proposal for a new PhD in Immunology and Immunotherapeutics, College of Medicine

The College of Medicine is proposing a new PhD in Immunology and Immunotherapeutics.

The proposal was received by the Graduate School on October 25, 2021. The combined GS/CAA subcommittee first reviewed the proposal on October 27, 2021 and requested revisions. Revisions were received on November 11, 2021. GS/CAA conducted a second review of the proposal and recommended it for approval by the Graduate Council on November 15, 2021. The proposal was approved by the Graduate Council on November 15, 2021.

THE OHIO STATE UNIVERSITY
COLLEGE OF MEDICINE

Microbial Infection and Immunity
Eugene Oltz, PhD, Chair
Samuel Saslaw Professor of
Infectious Diseases

776A Biomedical Research Tower
460 W. 12th Avenue
Columbus, OH 43210-2210
Phone: 614-292-0918

November 1, 2021

Vice Provost W. Randy Smith
Council on Academic Affairs
Office of Academic Affairs
203 Bricker Hall
190 North Oval Mall
Columbus, OH 43210

Dear Dr. Smith,

As Chair of the Department of Microbial Infection and Immunity, I write in support of our application to establish a new graduate program offering a Doctorate of Science in Immunology and Immunotherapeutics. This program has been fashioned to provide graduates with an advanced knowledgebase and skillset promising to make them valuable additions to the academic, pharmaceutic, biotech, agriculture, government, and public health fields within the state of Ohio. Our faculty are excited by the prospect of this program and overwhelmingly approved it for submission to the Graduate School. We look forward to its review by the Council on Academic Affairs and its advancement toward approved status.

Sincerely,

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University
Wexner School of Medicine

THE OHIO STATE UNIVERSITY

Daniel M. Clinchot, MD
College of Medicine

Vice Dean for Educaiton
Associate Vice Presdient for Health Sciences Education

260 Meiling Hall
370 West 9th Ave
Columbus, OH 43210-1238

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Dan.Clinchot@osumc.edu

November 12, 2021

Alicia L. Bertone, DVM, PhD, Ph.D.
Vice Provost for Graduate Studies and
Dean of the Graduate School
250 University Hall
230 North Oval Mall
Columbus, Ohio 43210-1366

Dear Alicia:

The College of Medicine has reviewed and fully endorses the proposed PhD degree *Doctorate of Science in Immunology and Immunotherapeutics* through the department of Microbial Infection and Immunity. This proposed degree will serve the growing need for scientists trained in basic and translational immunology. I am confident you will find this proposed degree reflective of an innovative & integrated model that trains scientists to fit the workforce needs of academic, pharmaceutic, biotech, agriculture and public health fields.

Sincerely,

Daniel M. Clinchot, MD
Vice Dean for Education
Associate Vice President for Health Sciences Education
Chair, Department of Biomedical Education & Anatomy
College of Medicine

THE OHIO STATE UNIVERSITY
COLLEGE OF MEDICINE

Ph.D. Graduate Program in Immunology and Immunotherapeutics

The Ohio State University College of Medicine, Department of Microbial Infection and Immunity

Submitted October 25, 2021

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BASIC CHARACTERISTICS OF THE EDUCATIONAL PROGRAM

Brief description of the disciplinary purpose and significance of proposed degree

We are seeking approval for a graduate program to award students a Doctor of Philosophy (Ph.D.) degree in Immunology and Immunotherapeutics. The program's primary goal is to train future generations of immunological researchers, a prerequisite for advancing this critical and rapidly growing field. The Ohio State University (OSU) is exemplative of this growth, with the recruitment of over 30 faculty members in immunology in the last three years, as well as establishment of the Pelotonia Institute for Immuno-Oncology (PIIO) in 2019. The proposed program will combine focused, formal education with hands-on research training for individuals holding a bachelor or a more advanced degree, who are seeking to become recognized leaders in academic, pharmaceutical, biotech, government, and public health fields. Learners in the program will benefit from Ohio State University's environment of diversity, education, ethics, honesty, integrity, personal and professional growth, professionalism, and responsibility.

The program will be offered at the OSU-Columbus campus, located in central Ohio, and will fill a need for students who wish to pursue careers related to immunological research. Graduates of the program will gain a highly advanced knowledge base and skillset in the fundamental principles and translational aspects of immunology. Graduates will be prepared to contribute to rapidly growing fields, including basic molecular and cellular immunology research, or more applied areas, such as the development of vaccines, diagnostics, and immunotherapeutic strategies that target cancer, autoimmunity, and existing or emerging pathogens. A primary strength of the program is its location within the College of Medicine of the Ohio State University, one of the largest research universities in the nation, with more health sciences colleges and extensive laboratory and clinical infrastructure than any other university in the U.S.A.. This will ensure that students are exposed to cutting-edge fundamental and clinical research in an array of specialties related to immunology. Importantly as well, students in the program benefit from a well-developed educational environment within a college experienced in graduate-level education (a combined 15 PhD and MS degrees currently offered), a superb curriculum of established courses, and significant interaction with trainee colleagues from related PhD and Master's programs within the laboratory environment.

Definition of the program focus

The focus of the program will be to educate and train students in both fundamental and cutting-edge principles of immunology, as well as performing primary research in the field. Within this broad area, students will have the option to engage in emphasis areas related to both basic and applied aspects of immunological research. These areas include but are not limited to: (1) cellular & molecular immunology, (2) immunology of infectious diseases (host-pathogen interactions), (3) translational immunology (immunotherapeutics & immuno-oncology, vaccine development), and (4) systems immunology. The required curriculum will be a combination of didactic, journal club, seminar, and research-based coursework, culminating in the successful defense of a doctoral thesis. As noted, students will have the option to focus their curriculum through selection of a wide array of advanced electives in immunology and related courses. The curriculum will be consistent with the program's mission to provide the training and knowledge necessary for a high-level career in a research or related environment, and contribute to the betterment of human health. As contrasted with the University's many excellent MS degree options, most notably the newly approved Masters in Immunology and Microbial Pathogenesis program, successful completion of a PhD in this program is dependent on the graduate establishing themselves as a world authority in their field of research, a benchmark by which acceptance of their doctoral thesis will be judged.

Rationale for degree name

The doctorate degree name of Immunology and Immunotherapeutics was chosen for this program as it reflects the learner's completion of their doctoral thesis research in the designated area, preparing them to engage in original research pertaining to basic and/or translational aspects of immunology and other associated fields.

Duration of the program

Total Credit Hours: A minimum of 80 semester credit hours will be required to earn the Ph.D. in Immunology and Immunotherapeutics. This minimum is required by the OSU Graduate School, is consistent with statewide and regional alternatives for a Ph.D. in related fields (similar to U. of Cincinnati and U. of Toledo, see Table 3), and is reflective of the hands-on, research commitment necessary for completion of a culminating doctoral thesis document. These credit hours consist of 80 hours of core courses (including 40 from laboratory research practicum) and 13 hours of elective courses (see Table 1 and Appendix C).

Length of Time for Completion: The curriculum is designed to be completed in an estimated 15 to 18 semester terms initiating in Autumn of Year 1 (AuY1) and culminating sometime within Year 5 or 6. Students can elect to begin early by enrolling in their research laboratory rotation course during the summer term prior to AuY1. While the program will provide opportunities for up to three research rotations before selecting a thesis laboratory, it will also allow direct admits into a selected laboratory should the Graduate Studies Committee approve a request made by both student and advisor. Following matriculation into the dissertation research laboratory, students will have to successfully pass a candidacy exam to continue in the program, following completion of core coursework (sometime between AuY2 and SpY4). This exam will have both written and oral components, with the written section modeled after an NIH F31 graduate research fellowship application. Students will be expected to form a Graduate Dissertation Committee under the guidance of their research mentor and the Program Director, which will guide the student's progress, as well as administer both the candidacy exam and dissertation defense.

Table 1. – Proposed courses in required curriculum.

Immunology and Immunotherapeutics PhD Required Curriculum	
BSGP 7070 Fundamentals of Grant Writing	4 semester hours
BSGP 7000 Biomedical Sciences Survey (AU-Y1)	6 semester hours
MEDMCIM 7500 Recent Discoveries in Immunology and Microbial Pathogenesis (each semester Y1 and Y2))	4 semester hours (1hr/semester)
BIOPHRM 7510 Professional and Ethical Issues in Biomedical Science (SP-Y1)	2 semester hours
MEDMCIM 7010 Cellular and Molecular Immunology (SP-Y1)	3 semester hours
MEDMCIM 8010 Selected Topics in Advanced Immunology (Au Y2)	2 semester hours
BSGP 7900 - Cancer Immunology: Critical Journal Readings	1 semester hour
BMI 5750 Methods in Biomedical Informatics and Data Science (Su Y2)	3 semester hours
MEDMCIM (TBD) Advanced Immuno-Oncology (Sp Y2)	3 semester hours

Graduate Electives (may be in Immunology and Immunotherapeutics graduate program (I2GP) or in other programs such as BSGP, CBG, Neuroscience, Physiology, MCB). At least 6 credit hours of the 10 required elective credit hours must be in the classroom setting and the remainder may be seminars; electives may be consistent with recommended courses in the area of research emphasis.	12 semester hours
MEDMCIM 8999 Graduate Research in Microbial Infection and Immunity	40 semester hours
Total	**80 credits**

Departmental Abbreviations: BIOPHRM, Biochemistry and Pharmacology; BMI, Biomedical Informatics; BSGP, Biomedical Sciences Graduate Program; CBG, Cancer Biology and Genetics; MCB, Molecular and Cellular Biochemistry; MEDMCIM, Microbial Infection and Immunity

Admission timing

The program is expected to be implemented beginning in the autumn semester of 2023. It is anticipated that the program will admit six students each autumn. As discussed above, the number of enrollees may be amended to include approved direct admits in any given year.

Primary target audience for the program and admission requirements

The program consists of ~15-18 terms (autumn, spring, summer), delivered on campus with a required research-based component. For these reasons, we project the primary target audience to be students with proximity and availability to the Columbus campus during daytime hours, Monday-Friday. This is a full-time program, and students will be expected to dedicate one hundred percent of their academic and professional efforts to completion of this degree.

As potential dissertation focus areas are diverse, students accepted into the program are likely to have varying backgrounds of both formal education and professional experiences. Students will be expected, however, to hold a bachelor's degree in the biological sciences (or related field), be seeking to advance their knowledge and skills to increase their chances for employment and/or increase their earning potential in relevant immunological research positions. Highly competitive applicants will also have a proven history of research experience and lab skills developed as a student, volunteer, or employee. In lieu of demonstrated basic laboratory skills, an optional course, MEDMCIM 7050 - Laboratory Scientific and Management Skills, maybe recommended to be taken during the student's initial term). Prior to applying to the program, applicants are encouraged to reach out to the Program Director to discuss how well their individual academic and professional experiences align with the curriculum.

Recruitment and admissions are to be handled through the OSU Office of Graduate Education, and adhere to an application process with the following qualifications:

- A personal statement of why the applicant is applying to the program
- A 1-2 page written description of past research experiences (to include types of research and duration of research experience) listing all poster presentations, research talks, and publications
- An official transcript with proof of completed bachelor's degree (or higher) in any of the biological sciences or related areas, or a combination of related major along with successful completion of relevant prerequisites (as defined by the course description in the OSU Registrar's course catalog,

e.g. MEDMCIM 7010 prerequisites are listed as "graduate standing or by permission of instructor") for the required core curriculum (see Table 1 for core-course listings). A minimum GPA of 3.0 will be required for admission to the I2GP.

- Three letters of recommendation
- All international applicants whose native language is not English will be required to take the Test of English as a Foreign Language (TOEFL) and have an official score report sent directly to the Associate Dean for Graduate Studies from Educational Testing Service. The recommended minimum TOEFL scores are 560 (written) or 220 (electronic) or 89 (internet based)

Evaluation of applicants for admission to the program will adhere to the principles of individualized holistic review. Therefore, GPA and test scores will be considered as but single metrics in the admissions process, with no score considered as a sole criterion for admission into the program.

Special efforts to enroll and retain underrepresented groups

According to 2019 NSF report, "Women, Minorities, and Persons with Disabilities in Science and Engineering", only 7 percent of science and engineering doctorate holders employed as full-time, full professors at all institutions were from underrepresented racial and ethnic groups. This number decreases at research intensive institutions, falling to only four percent. We plan to work with our college, university, and collaborating institutions to facilitate recruitment and retention of underrepresented and minoritized groups. These groups include, but are not limited to, those minoritized by race, gender, and socio-economic status. With regards to race, special efforts will be made to recruit Blacks or African Americans, Hispanics or Latinos, American Indians or Alaska Natives, Native Hawaiians and other Pacific Islanders which constitute the most underrepresented doctoral awardees as of 2021 (as reported by NSF-funded National Center for Science and Engineering Statistics). For example, efforts will be made to attend and recruit at conferences that focus on underrepresented groups (e.g. ABRCMS, SACNAS). Furthermore, the OSU Office for Diversity and Inclusion is committed to enhancing the recruitment, admission and retention of students from underrepresented groups. This office currently offers services including professional and personal guidance, summer research opportunities, career development and pipeline programs, visiting student programs, interaction with other minoritized groups, and networking and mentorship opportunities throughout the Institution's affiliations. Finally, program faculty have and will continue to actively seek NIH diversity supplements, which will provide valuable resources to both support and retain students from underrepresented groups. It is important to note that our faculty have already been successful in obtaining this type of funding.

INSTITUTIONAL PLANNING FOR THE PROGRAM

Physical facilities, equipment and staff needed to support the program

OSU is one of the largest research universities in the nation, with more health sciences colleges and extensive laboratory and clinical infrastructure located in proximity to each other than any other university in the U.S.A. The Immunology and Immunotherapeutics Graduate Program (I2GP) will be housed in The Ohio State University College of Medicine and implemented through the Department of Microbial Infection and Immunity. The department currently has 31 principal investigator-led laboratories, which will serve as a major component of the physical research needs of the program. Other immunology researchers throughout the College of Medicine (e.g., housed in the PIIO, Clinical Divisions, or OSUCCC) will also provide training environments for students of the I2GP program. Below is a description of the physical facilities, equipment, and researchers that provide a rich resource and intellectual environment at OSU.

The **Department of Microbial Infection and Immunity (MI&I)** is located within the Biomedical Research Tower of the Wexner Medical Center at The Ohio State University (OSUMC). The MI&I laboratories occupy approximately 23,000 sq. feet on the seventh floor of the Biomedical Research Tower, a 403,000-square-foot state-of-the-art building, across the street from the Medical Center. Major themes of the department are respiratory infectious diseases, intracellular parasitism, granulomatous inflammation, immunology, and epigenetic control of innate and adaptive immunity. MI&I space includes several common user areas, with 2 cold rooms and multiple procedure rooms outfitted for molecular and tissue culture work, as well as rooms dedicated to microscopy (including confocal and live imaging microscopy), flow cytometry & cell sorting.

Core MI&I equipment in the BRT includes: Class IIA 6 feet Biosafety Cabinets, double water-jacketed CO_2 incubators, multiple incubators and shakers for bacteria culture, a Sheldon Bactron anaerobic chamber, a Beckman Optima L-100 XP Ultracentrifuge with numerous rotors, a Beckman Optima™ TLX Ultracentrifuge, an Avanti J-25I High Performance centrifuge, a Beckman J2-21 centrifuge, low-speed Beckman Coulter X-14R/X15R refrigerated centrifuges, refrigerated microcentrifuges, several non-refrigerated microcentrifuges, a Molecular Devices SPECTRAmax M2e and a Molecular Devices SPECTRAmax M5 Multi-Mode spectrophotometer/luminometer/fluorometer microplate reader, a BioRad Bioplex Luminex-based multiplex system, a BioRad Tetrad 2 thermocycler, three eppendorf Mastercycler gradient thermocyclers, two BioRad MyCycler thermocyclers, BioRad iCycler thermocycler, two BioRad CFX96 and one Applied Biosystems real-time PCR systems, a BioRad Molecular Imager ChemiDoc XRS Imaging system, a Fotodyne Imaging system, a BD FACS Canto II Flow Cytometer, a Purelab and a Millipore Ultra water purification systems, a Beckman Biomek 2000 robotic system, two NanoDrop Spectrophotometers, a Savant speed-vac and gel dryer system, a size-exclusion chromatography system consisting of a HPLC connected to different sizing columns to perform lipoglycan purifications, silica gel column chromatography systems for lipid purifications, thin layer chromatography systems to allow for visualization and identification of lipids and carbohydrates, inverted microscopes with cameras, Olympus fluorescence microscope with DIC optics and software for camera, a Nikon high-speed live-cell fluorescence imaging platform, an IVIS Lumina Camera system, an Olympus FV10i confocal camera capable of life cell imaging, liquid nitrogen storage system, ATR/Heto Freeze-dryer lyophilizer, a BioRad Experion Automated Electrophoresis Station, liquid chromatography systems, a UV-crosslinking oven, UV transilluminator, a blue light transilluminator, two electroporators, two pH meters, water baths, shaking incubators, refrigerators, -20ºC and -80ºC freezers, balances, phosphoroimager, two autoclaves, and two automated dishwashers.

Pelotonia Institute for Immuno-Oncology (PIIO). Established in 2019 by the Ohio State University Comprehensive Cancer Center – James Cancer Hospital and Solove Research Institute (OSUCCC – James), the PIIO is a comprehensive bench-to-clinical-trial research institution that accelerates advanced immunotherapies to fight cancer under the direction of founding director, Zihai Li, MD, PhD. The PIIO's goal is to be the world's leader in basic and translational immuno-oncology through the creation of IO Centers of Excellence; establishing top-notch immune discovery and monitoring platforms to support existing and new cutting-edge clinical trials; training the next generation of IO researchers; and promoting IO collaborations with industries and other Immuno-Oncology centers across the nation.

Current members of the PIIO include over 100 active OSU researchers who are leaders in their respective fields (www.cancer.osu.edu/PIIO). The institute is actively recruiting, bringing more than 30 additional investigators to the PIIO and the OSUCCC-James over the next 5 years. The PIIO collaborates with multiple OSU colleges and stakeholders, including the Colleges of Medicine, Engineering, Veterinary Medicine, Arts and Sciences, Pharmacy, Public Health, as well as the James Cancer Hospital, and Nationwide Children's Hospital (NCH). The PIIO focuses on Systems Immuno-Oncology (Fundamental Cancer Immunology and Cancer Immunogenomics) and Translational Immuno-Oncology (Cell Therapy and Clinical Immuno-Oncology). Complementing and supporting these programs are the PIIO's education and research development initiatives which include IO workshops, seminars and retreats; IO training opportunities for fellows and graduate students; and pilot immunotherapy projects designed to move promising innovative therapies from the laboratory to the clinics. The PIIO occupies the 5th floor of

the Biomedical Research Tower (~21,000 sq. ft), with contiguous space for laboratories and research cores to create a highly collaborative environment to advance its mission.

The PIIO has developed the Immune Monitoring and Discovery Platform (IMDP) to provide comprehensive cell- and molecule-based immunoassay services to support basic, translational, and clinical immuno-oncology (IO) studies. The IMDP is no standard shared resource core. Rather, it operates as a technological hub for innovative IO research, paving the way for advanced immune phenotyping and functional analyses as well as multiplexed biomarker detection discovery methods. The platform's mission is to mix state-of-the-art instrumentation, high levels of expertise, and exceptional customer service to create an environment that fosters creativity, collaboration, and productivity (Figure 1). The IMDP delivers high-content spectral flow cytometry and cell sorting, mass cytometry, highly-multiplexed tissue imaging, monoclonal antibody production and purification, single cell proteomics and genomics services as well as related accessory equipment with an emphasis on automation. The platform offers QA/QC for all instrumentation, training, experimental design, troubleshooting, and general assistance to users for all services, from the point of experimentation to publication and/or grant application. The IMDP has five specific aims: 1) Provide cutting-edge IO focused technology that gives researchers a panoramic view of the immune system with regard to cancer research and treatment; 2) In concert with the PIIO's Immuno-Informatics Group, provide data analytics for flow cytometry, CyTOF, scRNA-seq, scATAC-seq, single-cell proteomics and genomics, bulk RNA-seq, ChIP-seq, ATAC-seq, cytokine data, and spatial imaging; 3) With experts in antibody and protein production, generate novel and high-quality immune reagents, including therapeutic antibodies and recombinant fusion proteins, which will facilitate development of next generation IO biologicals; 4) Develop and maintain an IO Bank as a comprehensive platform for collecting and preserving fresh cells and tissue from IO trial patients and routine clinical care patients, all linked to clinical and research data in real time; and 5) Train and mentor investigators on advanced immune phenotyping and multiplex technologies and novel immunoassay reagent generation.

Additional Core Research Resources - The Department of Microbial Infection and Immunity has access to many state-of-the-art shared core research facilities (see https://medicine.osu.edu/research/resources/core-facilities for a full listing). Some examples relevant to the proposed degree program are:

OSU BSL-3 Research Core - Research projects involving risk group 3 (RG3) pathogens, such as ongoing SARS-CoV-2 research takes place in the BSL3 facilities/resources available at The Ohio State University and the OSU College of Medicine (OSU COM). The BSL3 Facility focuses on RG3 respiratory pathogens including emerging pathogens (e.g. SARS-CoV-2), and pathogens that can cause worldwide chronic and antibiotic-resistant infections (e.g. *Mycobacterium tuberculosis)*. BSL3 facilities available for research include: a 3350 sq. ft lab space located in OSU Biomedical Research Tower (BRT), which consists of 6 separate laboratories for safely handling and processing infected tissues and cultures. These laboratories contain biosafety cabinets, centrifuges, microcentrifuges, light and fluorescent microscopes, ELISA and microplate readers, CO_2 and humidified incubators. Computer stations facilitate the safe removal of notes and data from the facility.

Access to BSL3 facilities is granted only when personnel receive thorough biosafety training and appropriate on-site training. Training materials are reviewed by the BSL3 Program leadership, Institution Biosafety Officer, and EH&S leadership. Biosafety training emphasizes the facility design and systems in place and the current rules for best practices and regulations that users must follow. Refresher training is provided on an annual basis and time sensitive issues are discussed in the monthly BSL3 user group (BUG). Further emphasis on administrative controls (e.g. BSL3 protocols), alongside on-site training focused on demonstrating proper application of personal protective equipment (PPE), facility features, and proper usage of equipment is given before authorization. Junior scientists must be accompanied and supervised by senior scientists who are experienced in BSL3-related techniques to ensure proper handling of infectious materials. The BSL3 program at OSU ensures that all BSL3 users are fully trained and supported by operational staff.

OSU University Laboratory for Animal Resources (ULAR) - Animals to be used for this study are covered by an institutional protocol. The basement level of the BRT houses the animal facility. This facility provides resources for the performance of experiments involving animal models of human diseases. ULAR is responsible for the animal care program that is AAALAC-accredited since 1962 (Accreditation # 028). Over 100,000 sq. ft of animal housing space in 15 facilities can accommodate rodents, rabbits, swine, ruminants, and dogs as well as other species. Rodent facilities have over 70 dedicated rooms, which include barrier housing, sterile housing, phenotyping, and GEM production facilities. ULAR consists of 3 veterinary ACLAM diplomats, 4 clinical veterinarians, and over 70 fulltime animal care staff.

OSU Flow Cytometry Shared Resource (FSCR) - This core facility assists in the analysis and sorting of cell populations according to the expression of selective cellular markers. Software available for use offline includes: WinMDI, Modfit, Cellquest Pro and FACSDiva. Imaging output software used is Microsoft office for both PC and Macintosh systems. Instrumentation includes the BD FACS Aria, and FACS Vantage and i-Cyt Reflection. Bectin-Dickinson FACS Caliber, equipped with 4 MPT's allowing for 4 color-analysis, using a 488 nm air-cooled Argon and 633 nm helium-neon laser as excitation wavelengths. The Becton-Dickinson FACS Vantage SE, capable of 6-color analysis, utilizing a Krypton 302C Inova laser for multi-line excitation 350-600 nm. This instrument has a turbo-sort option and a CLONECYT single-cell or multi-cell deposition system for microtiter plates or microscopy slides.

Campus Microscopy and Imaging Facility (CMIF, www.cmif.osu.edu) on the 2nd floor of the BRT offers a full range of microscopes, and support instrumentation allows cell and tissue preparation with immunocytochemistry, in situ hybridization, freeze-fracture, cryo-ultramicrotomy, scanning and transmission electron microscopy (FEI Nova 400 Nano SEM, FEI Tecnai G2 Bio Twin TEM). This facility also has a Zeiss LSM510 Scanning Confocal Microscope, an Olympus FV1000 Multiphoton, and a Visitech Infinity 3 Live-Cell Confocal Microscope. All microscopes are staff-operated or self-operated after training.

Laser Microdissection Pressure Catapulting Molecular Analysis Facility - This core facility contains a robotized PALM MicroLaser system with PALM MicroBeam IV instrument from Carl Zeiss MicroImaging GmbH and PALM RoboStage/RoboMover for high throughput sample collection. The facility enables molecular analyses of laser captured tissue material. Services include standardization of novel techniques related to tissue processing, staining, fixation and capture, with the goal of preserving nucleic acid and protein integrity of the laser-captured tissue. Capture and analysis of tissue down to the resolution of a single cell population (cutting precision 0.6 micron) from *in vivo* tissue sections is routinely performed. In addition, the facility has developed a way to rapidly identify and capture human blood vessels from clinical samples in a manner that makes high-density screening of the transcriptome possible.

The Genomics Shared Resource - This resource occupies about 2,400 square feet on the 2nd floor of the BRT. The Genomics Shared Resource provides both Nucleic Acid services and Microarray services. It offers instrumentation and expertise for DNA and RNA analysis using sequencing, genotyping, real-time PCR, Affymetrix GeneChips, nCounter Analysis, next-generation sequencing, DNA synthesis support and genome-wide analysis using the Illumina NGS platform and Affymetrix and customizable gene chips. Affymetrix GeneChip System including two GeneChip Hyb-Station Oven 320/640, Two Affy. Fluidics Station 450 and One Affy. GeneChip Scanner 3000. The system for in-house custom microarray including GeneMachine OminiGrid 100 Arrayer; Tecan TeMo Liquid Handling Workstation and four Tecan HS4800 Hybridization Stations; two Axon 4000B and 4200A Microarray Scanners, two MJ Tetrad thermocycler and PE 9700 PCR Machines. Applied Biosystems 3730 DNA Analyzers, Illumina Genome Analyzers IIx, 4 Applied Biosystems 7900HT sequence detection systems, NanoString Technologies' nCounter System, Sequenom Compact MassArray, Transgenomic Wave DHPLC Systems, Beckman Biomek FX liquid handler, Typhoon 9410 imager and Personal Densitometer from GE Healthcare, and Agilent Bioanalyzer.

The OSU Campus Chemical Instrument Center (CCIC, www.ccic.ohio-state.edu) - located on the 2nd floor of the BRT, provides state-of-the-art research facilities in three areas: Nuclear Magnetic Resonance (NMR), Mass Spectrometry (MS) and Proteomics Facility. The Mass Spectrometry and Proteomics facility is directed by Dr. Liwen Zhang and is equipped to offer a broad range of services with seven state-of-the-art mass spectrometers: a Thermo LTQ-Orbitrap, a Thermo LTQ, a Bruker Esquiere LC/MS, a Micromass LC-TOF, a Bruker Reflex III MALDI-TOF, a Thermo Trace GCMS, and a Micromass Q-TOF II. The lab is also equipped with an Ettan Spot Handling Workstation and a Dalt12 system for complete proteomic analysis including gel electrophoresis separation and subsequent protein identification, post-translational modification analysis and MudPIT. These instruments provide for accurate mass determination, sequence determination of biomolecules, oligonucleotides analysis, molecular weight analysis by mass assignment (ESI, EI, MALDI), quantification using GC-MS, and peak detection and identification by LC/MS.

Comparative Pathology & Mouse Phenotyping Shared Resource (CPMPSR) Facilities - The CPMPSR provides expert, readily available and affordable experimental pathology support to investigators utilizing animal models to study human disease. Comparative pathologists affiliated with the CPMPSR are familiar with normal anatomy and physiology, as well as background-, age-, and strain-related lesions of various animal models. Recognition of lesions and their interpretation in the context of individual investigations provides a critical component to research incorporating animal models. Services include comprehensive macroscopic and microscopic examinations of various species of laboratory animals with an emphasis on the phenotypic characterization of newly produced lines of genetically engineered mice. Additional services include hematology, clinical chemistry, radiography, routine frozen and paraffin slide preparation as well as tissue microarray preparation and special histochemical and immunohistochemical staining.

The main laboratory for the CPMPSR is located on the 4th floor (467/471) of the Veterinary Medicine Academic Building (VMAB). The core has: a Euthanex SMARTBOX unit; 7' TBJ, Inc. 36-84-S down-draft, height-adjustable necropsy table; a 4' Pacific Southwest Prep Station Lab down-draft tissue trimming station; necropsy equipment; an Olympus SZ-6145TR stereozoom microscope with attached Altra 20 digital camera; Hewlett Packard Faxitron Series Cabinet Xray System; and, photographic equipment (Nikon D90 digital SLR with Nikon 60 2.8 micro lens, photo stand and lighting). The necropsy room is also equipped with a MOPEC LD500 ventilated tissue storage cabinet. The clinical pathology laboratory is equipped with automated benchtop hematology (FORCYTE Autosampler 10 with OSI Data Management System) and chemistry (VetAce) analyzers, as well as an Aerospray hematology slide stainer-centrifuge with Cytopro rotor. The laboratory also includes a Fisher double door refrigerator, 2 Thermo Forma freezers (-70ºC), and, 2 refrigerated centrifuges (Beckman Allegra X-22, Eppendorf). In addition, the lab has a doubled-headed Olympus BX41 light microscope with attached Altra 20 digital camera for performing blood differential counts and evaluation of urine/fluid/cytology samples. The histology laboratory (302 Goss Laboratory) occupies approximately 1160 sq. ft. and includes Tissue Tek VIP and Fischer Histomatic 266 MP tissue processors; Shandon HistoCentre 2 and Tissue Tek embedding stations; 6 microtomes (Olympus 4055 micro, Leitz 1512, HM315); a Dako Universal Training Center autostainer with Seymour slide labeler; a Leica IPS modular histology slide printer; Microm HM500 OM and Leica CM1950 cryostats; and, an Olympus BH2 immunofluorescence light microscope. Other support equipment includes pH meter, balances, centrifuges, FG-311 refractometer and vortex mixers. Room 933 in the Biomedical Research Tower is used for image analysis and discussing pathologic findings with investigative staff. The room includes a 6-headed Olympus BX51 light microscope with attached Altra 20 digital camera and MicroSuite software linked to a 42" Panasonic plasma television. Reference laboratories, including AniLytics, Incorporated in Gaithersburg, MD and Rules Based Medicine in Austin, TX provide specialized testing such as hormone and cytokine assays.

OSU Human Tissue Resource Network (HTRN), Pathology Core Facility - The core has: Microtomes (4), Cryostat (1), Tissue Processor (1), Water Baths (5), Automated Slide Stainer (1), Automated

Immunohistochemistry Instrument (DAKO) (2), Automated Slide Labeler (TBS) (1), Tissue Matrix Array (Beecher Instruments) (1), Vacuum Processor (1), Refrigerators (2), Freezers (3), Real(time PCR (Roche) (1), ABI(3130XL DNA Sequencer (1), Microcentrifuge (2), Balances (2), Bioview Accord Semi(automated Scanning System (1), Biosafety Hood (1), Incubators (3), Drying Oven (1), Thermomixers (2).

The Center for Biostatistics - Department of Biomedical Informatics, is located at 1800 Kenny Rd, Columbus, OH, 43210. The Center for Biostatistics is equipped with a diverse palette of statistical software including SAS 9.4 (SAS Institute Inc., Cary, NC), STATA 13 (StataCorp, College Station, TX), Minitab (Minitab, Inc., State College, PA), R (open resource) and PASS 12 (NCSS, Kaysville, UT),) and specialized freeware Bio-conductor. The support of the office management software includes site-licensed Microsoft Office Professional. Through the Medical Center computer network, statisticians are provided with e-mail support, access to the Internet, and immediate back- up of all files.

Within the BRT is The Ohio State University **Comprehensive Cancer Center** (www.osuccc.osu.edu). Located on the 8th and 9th floors, and part of the 10th floor, the OSUCCC houses core facilities for DNA sequencing radiochemistry, biostatistics and informatics, real-time PCR, Transgenic Animal Shared Resources, microarray, spectroscopy, electrophoresis, centrifugation, liquid scintillation counters, gamma counter chromatography (including HPLC), and microscopy.

The BRT is connected by an enclosed walking bridge with the **Dorothy M. Davis Heart and Lung Research Institute (DHLRI)**, which contains several additional core research laboratories (Bioinformatics, Microarray-Genetics, EPR-NMR, Proteomics, and Integrative Cardiovascular Physiology). Each of these Cores is directed by a faculty scientist who is a leading expert in the specific technology of the Core. Each also has an experienced full-time manager who supports the application needs of the scientific users. **DHLRI Animal Core**- This core offers support for mouse colony management as well as performing specialized procedures and providing technical assistance for experiments. Our faculty member, Dr. Amer oversees the breeding of transgenic animals. Services also provided, but not limited to, include administration of reagents via various routes; tissue, blood, and bone marrow isolation; procedure training; genotyping; and special feeding. **DHLRI Microscopy Core-** This microscopy core laboratory with several fluorescent microscopes, time-lapse video microscopy and multi-channel visualization of fluorescence cellular antigens and other cell markers. (Nikon Eclipse 800 with DIC optics microscope and a Zeiss LSM510 multiphoton confocal inverted microscope).

Finally, the Research Institute at **Nationwide Children's Hospital** (10 minutes from OSU) has a Vaccine and Immunity Research Group with core facilities containing DNA sequencing, Microarray, and Transgenic capabilities.

Program Leadership and Administration

Dr. Ken Oestreich, PhD (Associate Professor, Department of Microbial Infection and Immunity, OSU College of Medicine) will serve as the Program Director and will oversee and administer the program. One full-time (100% FTE) Administrative Assistant will be needed to help with program-related responsibilities such as general communications, course and room scheduling, recruiting, and training grant preparation. Several committees composed of faculty from the program will be formed to guide the I2GP program, including a Graduate Studies Committee that will oversee sub-committees such as the Admissions, Student Affairs, Curriculum, Career Development, and Retreat committees. It is expected that students from the program will also be selected to serve on committees where appropriate (e.g., Student Affairs, Retreat, etc.). For the purposes of full transparency and clarity of pertinent information, details regarding program administration and activities will be outlined in the I2GP graduate student handbook.

Projected additional costs associated with the program and evidence of institutional commitment and capacity to meet these costs.

We have developed a five-year budget projection for I2GP, with assistance from the OSU College of Medicine (Appendix D). The budget includes the standard state subsidy for graduate programs.

Availability and adequacy of the faculty and facilities for the new degree program

OSU is one of the largest research universities in the nation, with more health sciences colleges and extensive laboratory and clinical infrastructure located in close proximity to one another than any other U.S. university. The I2GP will have an outstanding infrastructure of support for training and research. The OSU College of Medicine's Department of Microbial Infection and Immunity is currently located within the Biomedical Research Tower on the Medical Center Campus. Our teaching and research operations are at the intersection of all fields relevant to immunology, including but not limited to, bacterial, viral, and parasitic infectious diseases, emerging pathogens, cancer immunotherapies, systems immunology, transplant immunology, autoimmune diseases, basic immunology, and neurodegenerative diseases. Many of the Department's researchers work in close collaboration with clinical faculty from, among others, the Departments of Internal Medicine, Pathology, Biomedical Engineering, and the College of Veterinary Medicine, as well as with industrial partners in all relevant fields (see appendices A and B for detailed descriptions of the facilities and faculty). Additionally, numerous trans-institutional entities, such as the NCI-designated Comprehensive Cancer Center, the Infectious Disease Institute, the Pelotonia Institute for Immuno-Oncology, the Dorothy M. Davis Heart & Lung Research Institute, the Center for Biostatistics, the Center for Retrovirus Research, and the Battelle Center for Science, Engineering and Public Policy all have research efforts that will complement and support I2GP.

Students will also have access to the OSU Medical Library, providing physical and electronic resources that include many of the books, periodicals, journals, and other learning resources needed to support the teaching and scholarly activities of this proposed program.

Evidence that a market exists for a new program

Future health and human service challenges dictate the dire necessity for immunologists at the PhD level (Bishop, 2015). The threat of current and future global pandemics, the necessity to broaden the application of immune checkpoint blockade (ICB) as a cancer immunotherapy, and an increase in allergic and autoimmune conditions (Bishop, 2015) are important areas for which immunologists are required.

The market for immunology is growing rapidly. According to Fortune Business Insights, the global immunology market stood at $86 billion in 2020 and is expected to reach $159 billion by 2028, with a compound annual growth rate of 8.1% (Fortune Business, 2021). In the state of Ohio, there are over 4,000 biological science companies in operation, providing more than 80,000 jobs, and generating nearly $7 billion in annual payroll, with an average annual wage of $83,310 (BioOhio, 2020). With a list that includes pharma companies such as AstraZeneca, Battelle, Johnson & Johnson, and Procter & Gamble, to name a few, the report categorizes this industry into six areas, all of which employ workers trained in the fields of immunology: agricultural biotechnology, medical and testing laboratories, medical devices & equipment, medical product distribution, pharmaceuticals & therapeutics, and research & development. In addition, there has been explosive growth in immuno-oncology (IO) medicine. As of June 2020, the global IO drug development pipeline grew 233% over 3 years (CancerResearch.org, 2021). The 2011 approval of ipilimumab, which is a checkpoint inhibitor targeting the CTLA-4 protein to fight advanced melanoma, was a major milestone that changed the landscape of cancer care and propelled investments into IO.

Knowledge growth in immunology is essential for supplying this heightened demand. The Ohio State University Graduate School supports this growth of knowledge by providing strategic leadership and empowering faculty to develop programs that support the university's educational mission and meet societal needs. In addition, the College of Medicine's strategic plan focuses "on learner centeredness, education innovation, inter-professional education, and inclusive excellence to implement an innovative, multidisciplinary education model to educate the most diverse and sought-after health professionals in the world" (OSUWMC Strategic Plan, 2017).

Career opportunities for immunology PhD graduates abound, driven by a rise in immunological diseases, such as the current SARS-CoV-2 pandemic, as well as an increased awareness of immunotherapies against cancer. Examples of postings and hiring organizations listed online as of September 2021 are shown in Table 2:

Table 2. – Examples of Job Postings and Hiring Organizations

Posting	Organization
Postdoctoral position in gene regulation and neuroimmunology	National Institute of Health (NIH)
Postdoctoral Fellow, Cancer Immunology Discovery	Pfizer
Tenure-track Faculty Position	Memorial Sloan Kettering Cancer Center
Associate to Full Professor, Cancer Biology / Immunology	Baylor University
Senior Scientist, Immunology	GSK
Director, Flow Cytometry Core	National Heart, Lung, and Blood Institute
Sr. Leaders for Immuno-Oncology (IO) Research Centers for Cancer Immunogenomics, Cell Therapy, Systems IO, and Translational IO	OSUCCC – James, Pelotonia Institute for Immuno-Oncology (PIIO)

In fact, the PIIO, fueled by a $100 million pledge to advance cancer immunotherapy, has already recruited 17 immuno-oncology faculty as of September 2021, and plans to recruit 20+ more over the next two to three years.

STATEWIDE ALTERNATIVES

Statewide alternatives offered through University System of Ohio Institutions include Cincinnati Children's Hospital Medical Center, Immunology Graduate Program and Case Western Reserve University School of Medicine, Immunology Training – PhD (Table 3). The two programs differ; however, from I2GP, which is designed specifically with foci on translation of cancer immunotherapeutics, virology, and systems immunology, which can be broadly described as immunological research rooted in data generation and its integrative analysis to gain actionable insights. The University of Toledo, College of Medicine may also serve as an alternative; however, its Medical Microbiology and Immunology Track is part of the biomedical sciences program in University of Toledo's College of Medicine and Life Sciences, and not a stand-alone program focused on immunology.

Regional alternatives include the University of Michigan Medical School Graduate Program in Immunology and the University of Indiana, School of Medicine PhD Degree in Microbiology and Immunology. Their specialty areas include molecular and cellular immunology, pathogenesis, and translational immunology, including cancer. The proposed PhD program is unique in its deep partnerships with research institutes focused on infectious disease, cancer immunotherapy, and drug development (the OSU Institute for Infectious Disease, PIIO and the OSUCCC Drug Development Institute respectively).

Links to a major academic medical center, as well as a freestanding cancer hospital, will afford trainees significant opportunities in translational research. Collaboration will be a cornerstone of this program. One ongoing example of collaboration is the BIG10 Electronic Health Records Consortium project. Indiana University, University of Iowa, University of Michigan, Northwestern University, The Ohio State University, and Rutgers University are partnering to communicate and coordinate with the NCI and EHR vendors to facilitate and harmonize rapid implementation of EHR investigational or interventional treatment plans for NCTN clinical trials.

Table 3. – Related Statewide and Regional Alternatives

Statewide Alternative Institution	**Degree Designation**	**Required Credit Hours**	**Total # Current Students**
Cincinnati Children's Hospital Medical Center	PhD, Immunology Graduate Program	99	35
Case Western Reserve University School of Medicine	Immunology Training – PhD	58	34
University of Toledo College of Medicine	Medical Microbiology and Immunology Track	90	13
Regional Alternative Institutions	**Degree Designation**	**Required Credit Hours**	**# of Students**
University of Michigan Medical School	Graduate Program in Immunology	64	29
University of Indiana, School of Medicine	PhD Degree in Microbiology and Immunology	90	34

GROWTH OF THE PROGRAM

Current and future demand

Given the proximity to some of the state's largest bioscience employers (e.g., OSU, Abigail Wexner Research Institute at Nationwide Children's Hospital, Abbott, Battelle, Cardinal Health), we expect our program to be in demand. Based on estimates of laboratory space, classroom availability, and the 34 full-time faculty conducting research within the program, we believe we are well-positioned to achieve a running average enrollment of 30 students (by year 5 of the program). To meet these projections, we do not anticipate the need for additional faculty, staff, or space. However, If the program interest exceeds expectations, further review of enrollment limits and institutional needs will take place.

Program assessment

To maximize the success of each enrolled student, graduate, and future student, the program will maintain an active self-assessment process (see Table 4). This will include: annual recording of application and admission data; student academic performance indices; student evaluations of instruction (course satisfaction), semester-based student performance evaluations (reviewed by the program director and a committee of program faculty); annual evaluations of the program by member faculty; annual student evaluations of the program; exit surveys; time-to-degree tracking; and career recording of alumni. These assessment data will be reviewed annually by the program committee and used to continually refine I2GP. These data will also serve as support of applications seeking program funding.

CURRICULUM AND INSTRUCTIONAL DESIGN

Curricular content

The coursework for the proposed Ph.D. in Immunology and Immunotherapeutics is designed to deliver both a foundational and current knowledge base in these areas through a defined set of required core courses (Table 1) delivered within the pre-candidacy period, with an optional early summer start to

laboratory rotations. The curriculum will further concentrate areas of research interest through recommended elective courses offered at OSU in departments and programs, such as the Biomedical Sciences Program, Cancer Biology and Genetics, Microbiology, Neuroscience, and Biomedical Informatics.

All dissertation research, instruction, and mentorship will be provided by program faculty (Appendices A and B). Therefore, the curriculum is designed to provide a solid educational, technical, and experiential foundation for graduate students entering their choice of academic, medical, industrial, regulatory, or related work forces. To accommodate the individual scheduling and health-related needs of each student, with the exception of the necessary lab-based learning, all coursework is compatible with meeting OSU guidelines for optional, remotely accessed asynchronous learning should that be necessary.

Mixed mode of delivery

Given the hands-on, research experience mission of I2GP, a full distance-learning option will not be offered, and the preferred mode of delivery for the program is designed as an on campus, in-person learning format. In the event, however, that in-person learning is limited due to University regulations, some lecture-based courses can be offered via an online, synchronous mode of delivery. Currently, some existing lecture-based core courses are being taught in a synchronous, online format following the OSU Office of Distance Education and eLeanrning's Best Practices For Online Teaching Checklist (https://odee.osu.edu/instructors/distance-education/best-practices-online-teaching). In-person, laboratory research courses, which are an essential component of the intent of this program, will be necessary and coordinated with guidance from the OSU College of Medicine and the Graduate School.

Description of a required integrated, or culminating learning, experience

All students will be required to complete the OSU CARE Training in Responsible Conduct of Research Program (https://cehv.osu.edu/caretrainingprogram) or equivalent. This is a workshop-format program involving 8 discussion-based training sessions led and moderated by faculty ethicists from the OSU Center for Ethics and Human Values with expertise in research ethics and integrity. Participants will watch a video of a related CARE panel discussion and read a curated set of readings prior to engaging in substantive face-to-face (or remotely-arranged equivalent) discussions of case studies that highlight the distinctive ethical challenges facing researchers. Topics covered in this training include: Conflicts of interest, protection of human subjects, mentorship relationships, collaborative research, authorship and publication, data sharing and privacy, the researcher as a responsible member of society, and environmental and societal impacts of research.

A thesis project culminating with a written dissertation and successful defense will be required to educate students in research, professional writing, and continued self-education to promote their personal and professional growth. As part of the core curriculum, students will enroll in three laboratory rotations (MI&I Laboratory Rotations, MEDMCIM 7930) throughout their first year to aid in choosing a research mentor who will direct their project and guide them in developing their thesis. A fundamentals of grant writing course will be required as well (BSGP7070).

Should a student not be able to successfully complete their curriculum requirements during the 15-18-term academic period, they will be allowed to petition the Immunology and Immunotherapeutics Program's Curriculum Committee to request additional time in which to complete their proposed project. If the petition is approved, the student will be required to enroll in additional laboratory research and dissertation writing courses as necessary. Their degree will not be conferred until they have completed their research project and successfully defended their thesis document.

Student Advising

Each student will be expected to meet with their graduate dissertation committee approximately every 6 months, or more often as needed. During these meetings, the graduate dissertation committee will evaluate the academic and research progress of the student and provide appropriate feedback. Additionally, an advising sheet (example below) will be completed by the student and program director/advisor for each of these meetings.

Example Advising Sheet for I2GP:

Date: _____
Student Name: _____
OSU email address: _____
Entering Term: _____

Coursework Completed

Course	Term and Year (e.g. Sp24)	Grade Earned

Coursework in Progress

Course	Term and Year	Grading Structure (letter, P/NP)

Coursework Remaining for Degree Completion

Course	Expected Year and Term	Grading Structure (letter, P/NP)

Total Credit Hours Completed to Date: _____
Cumulative GPA to Date: _____
Total Credit Hours Remaining for Graduation _____
Expected Date of Graduation _____

Brief Summary of Research Accomplishments:

Student Signature: _____
Date: _____

Program Advisor Signature _____
Date: _____

Program Goals and Plan for Program Assessment

The primary goal of the I2GP Ph.D. Program is to train the future generations of immunological researchers that are necessary to advance this critical and rapidly growing field. This goal will be accomplished by combining focused, formal education with hands-on research training. Upon completion of this program, it is our expectation that graduates will be prepared to contribute their expertise to fields including basic molecular and cellular immunology research, and to more applied areas, such as the development of diagnostics and immunotherapeutic strategies that target cancer, autoimmunity, and pathogenic infection.

The program will have an active self-assessment process as outlined in Table 4, with data to be maintained in a secure database administered by the program, accessible by only the Program Director and Administrative Assistant. Relevant public data will also be posted on the program's website. These assessment data will be reviewed annually by the program committee to continually refine I2GP, and to identify weaknesses in meeting the program's overall goal of providing a student the highest possible chance for a rewarding career following graduation. These data will also serve as support for applications seeking program funding, in the form of student scholarships. The program will track direct measures of student learning (e.g., course and cumulative GPA, graduation rates, time-to completion) to serve as indicators of ongoing program performance and program quality. For example, research-related measures of student authorship on scientific publications, as well as oral and poster-based research presentations will be collected and evaluated as an indicator of both student and program faculty performance. Similarly, advisors and program leadership will monitor student academic performance regularly through advisory one-on-one meetings each semester with both the student and research mentor. Advising sheets will be completed to summarize and record these meetings and signed by the student, their research advisor (if applicable), and the program director.

Table 4 – Program Assessment

Assessment	Primary Metrics	Reporting/Review Frequency	Administered by	Reviewed by	Alignment between Program Goals and Assessments
Program application and enrollment data	Tracking of of applications, applicant GPAs, applicant diversity, offer and acceptance rates	Annually, Sp term	Program Director/Administrative Assistant	Program Faculty Committee and posted on Program website	Assessment of program strengths and weaknesses in recruitment (e.g. low applicant diversity, trends in average GPA) to help meet program enrollment goals
Program academic performance	Time-to-degree tracking, average GPA, publication and presentation data	Annually, Sp term	Program director/Administrative Assistant	Program Faculty Committee	Assessment to evaluate program performance (e.g. employment/placement rates) to meet quality of program
Student academic performance	GPA, research advisor and thesis committee evaluations	Beginning of each academic term (Au, Sp, Su)	Administrative Assistant	Program Director	Assessment of student progress to meet GPA and expected graduation date.
Student satisfaction	Student evaluations of instruction (SEIs), one-on-one advisory meetings, exit surveys	Beginning of each academic term (Au, Sp, Su) and upon graduation (exit surveys)	Administrative Assistant and Program Director	Program Faculty Committee	Assessment used by the program to provide feedback to the program and course directors to ensure student expectations are met
Faculty satisfaction	Program faculty reviews	Annually, Sp term	Administrative Assistant	Program Faculty Committee	Assessment to monitor and maintain faculty enthusiasm and support of the program to continually improve the student course and lab research experience
Program Performance	Alumni career recording	Annually, Au term	Administrative Assistant	Program Faculty Committee, Posted on Program website	Assessment to evaluate program graduate employment success to

					help meet the overall goal of the program.

Appendices

Appendix A: Faculty Matrix

Instructor Name	Rank or Title	Degree Title, Discipline, Institution, Year	Years of Teaching Experience in the Discipline/Field	Currently teaches in the proposed program
Nandini Acharya	Assistant Professor	PhD, University of Connecticut, Immunology, 2015	1	New Faculty
Brian Ahmer	Professor	PhD, Microbiology, Washington State University, 1994	21	Yes
Billur Akkaya	Assistant Professor	MD, D.Phil, University of Oxford, Immunology, 2013	1	New faculty
Munir Akkaya	Assistant Professor	MD, D.Phil, Hacettepe University (MD, Medicine, 2007), Oxford (D.Phil, Immunology/Pathology, 2012)	1	New faculty
Amal Amer	Professor	PhD, Microbiology University of Western Ontario, 2002 MD, Cairo University, 1986	24	Yes
Ephraim Ansa-Addo	Assistant Professor	PhD, Cellular and Molecular Immunology Research Centre (CMIRC), London Metropolitan University, UK, Immunology and Microbiology, 2011		New Faculty
Matthew Anderson	Assistant Professor	PhD, Genetics, Stanford University, 2009	4	Yes
Megan Ballinger	Assistant Professor	PhD, Immunology, University of Michigan, 2007	6	New Faculty
Prosper Boyaka	Professor and Chair, Stanton Youngberg Professor in Veterinary Medicine	PhD, University of Denis Diderot, Paris, Toxicology/Immunotoxicology, 1994	31	Yes

Ginny Bumgardner	Professor of Surgery, Director, Medical Scientist Training Program, OSUWMC	MD, University of Virginia School of Medicine, 1983 PhD, University of Minnesota Department of Surgery Transplant Immunology Program, 1994	28	Yes
Dongjun Chung	Associate Professor	PhD, University of Wisconsin, Madison, WI., Statistics, (Minor in Computer Science), 2012	6	New Faculty
Patrick Collins	Assistant Professor	PhD, Vanderbilt, Microbiology and Immunology, 2006	6	Yes
Rajendar Deora	Associate Professor	PhD, University of Illinois at Chicago, Microbiology, 1997	24	Yes
Purnima Dubey	Associate Professor	PhD, The University of Chicago Department of Pathology, Immunology, 1996	18	Yes
Mark Drew	Assistant Professor	PhD, Biological Chemistry, Johns Hopkins University School of Medicine, 2002	29	Yes
Adriana Forero	Assistant Professor	PhD, University of Pittsburgh, Molecular Virology and Microbiology, 2014	10	Yes
Aharon Freud	Associate Professor	MD, PhD, The Ohio State University (PhD, 2006), (MD, 2008)	5	Yes
Nicholas Funderburg	Associate Professor	PhD, Case Wester Reserve University, Microbiology and Molecular Biology, 2007	7	Yes
Hazem Ghoneim	Assistant Professor	PhD, University of Tennessee Health Science Center, Microbiology and Immunology, 2013	16	Yes
Kymberly Gowdy	Associate Professor	PhD, North Carolina State University, Immunology and Toxicology, 2008	17	Yes
Mireia Guerau-de-Arellano	Associate Professor	PharmD, PhD (University of	22	Yes

		Barcelona, PharmD, Pharmacy 1997) (Tufts University-Sackler School, PhD, Immunology, 2005)		
Luanne Hall-Stoodley	Associate Professor	PhD, Montana State University-Bozeman, MT, Immunology, 1995	25	Yes
Emily Hemann	Assistant Professor	PhD, University of Iowa, Immunology, 2014	13	Yes
Feng Hong	Assistant Professor	M.D. in Medicine, Anhui Medical University, China (1991-1996) Ph.D. in Molecular Biology, KyungHee University, Seoul, South Korea (1999-2003)	2	New Faculty
Benjamin T. Kopp	Associate Professor	MD, MPH, The Ohio State University, The Ohio State University, (MD, 2006), (MPH, 2017)	9	Yes
Zihai Li	Director, Pelotonia Institute for Immuno-Oncology, Professor of Medical Oncology	MD, PhD (Zhengzhou University College of Medicine, MD, Medicine, 1984) (Ichan School of Medicine at Mount Sinai, PhD, Immunology, 1993)	22	Yes
Chan-Wang “Jerry” Lio	Assistant Professor	PhD, Washington University, Immunology, 2011	15	Yes
Bei Liu	Professor	MD, Tianjin Medical University, Tianjin, China, Medicine, 1986 MPH, University of Connecticut Health Center, Public Health, 2009	11	New Faculty
Namal Liyanage	Assistant Professor	PhD, University of Nebraska, Integrative Biomedical Sciences, 2010	16	Yes
Matthew Long	Assistant Professor	PhD, University of Iowa, Molecular and Cellular Biology, 2014	11	New faculty

Amy Elizabeth Lovett-Racke	Professor	PhD, University of Texas Health Science Center, Biomedical Science - Immunology, 1993	15	Yes
Ana L. Mora	Associate Director of Lung Research DHLRI Professor, Department of Internal Medicine Division of Pulmonary, Critical Care & Sleep Medicine	MD, Universidad Nacional de Colombia School of Medicine, Bogotá, Colombia, 1987	13	New Faculty
Bethany Mundy-Bosse	Assistant Professor	PhD, The Ohio State University, Integrated Biomedical Sciences, 2011	11	Yes
Fernanda Oliveira Novais	Assistant Professor	PhD, Federal University of Bahia/FIOCRUZ-BA, Brazil, Pathology, 2011	6	Yes
Ken Oestreich	Associate Professor	PhD, Microbiology and Immunology, Vanderbilt University, 2006	13	Yes
Eugene Oltz	Chair, Dept. of Microbial Infection and Immunity, Professor	PhD, Columbia University, Chemistry, 1987	27	Yes
Murugesan Rajaram	Associate Professor	PhD Microbiology, University of Madras, India, 2000	13	Yes
Richard Robinson	Associate Professor	PhD, Dartmouth Medical School, Hanover, NH, 2007	11	Yes
Mauricio Rojas	Professor, Associate Vice Chair of Research, Department of Internal Medicine Professor	MD, Universidad Nacional de Colombia, School of Medicine, Bogotá, Colombia, 1987	23	Yes
Michael Root	Clinical Professor	MD, PhD, Harvard, Medicine, Biophysics, 1997	35	Yes
Mark Rubinstein	Associate Professor	PhD, Medical University of South Carolina, Tumor Immunology, 2002	11	Yes

Brian Searle	Assistant Professor	PhD in Genome Sciences, MacCoss Lab, University of Washington – Seattle, 2018	2	New Faculty
Benjamin Segal	Chair, Dept. of Neurology; Director, Neuroscience Research Institute, Co-director, Neurological Institute, Professor of Neurology	MD, Brown University, General Medicine, 1988	22	Yes
Stephanie Seveau	Associate Professor	PhD, Université Pierre & Marie-Curie, Paris, Cell Biology, 1997	17	Yes
Ruoning Wang	Associate Professor	PhD, University of TX, M.D. Anderson Cancer Center, Gene & Development, 2007	5	Yes
Haitao Wen	Associate Professor	PhD, Molecular & Cellular Pathology, University of Michigan Medical School, 2007	13	Yes
Andreas Wieland	Assistant Professor	PhD, Human Biology, University of Ulm, Ulm, Germany, 2009	8	New Faculty
Daniel Wozniak	Professor and Vice Chair, Microbial Infection and Immunity	PhD, The Ohio State University, Microbiology, 1989	29	Yes
Hsin-Jung “Joyce” Wu	Professor	PhD, Department of Microbiology, Immunology, and Molecular Genetics University of Kentucky, 2002	8	New Faculty
Gang Xin	Assistant Professor	PhD, Imperial College London, Immunology, 2012	1	Yes
Jacob Yount	Associate Professor	PhD, Mount Sinai, Viral Immunology, 2007	13	Yes
Jian Zhu	Associate Professor	PhD, Johns Hopkins University, School of Medicine, Host-oncovirus interactions (proteomics), 2009	12	Yes

Appendix B: Faculty Vitae

Nandini Acharya, PhD
Assistant Professor, Department of Neurology
460 West 12th Avenue, BRT504
Nandini.Acharya@osumc.edu

Education

- 2007 B.S. in Microbiology, University of Calcutta, Calcutta, India 2009 M.S. in Microbiology, University of Calcutta, Calcutta, India
- 2015 PhD in Biomedical Science (Immunology), University of Connecticut, Farmington, CT
- 2015- Post Doctoral Fellow, Brigham and Women's Hospital, Harvard Medical School Mentors: Dr. Ana C. Anderson and Dr. Vijay K. Kuchroo

Positions

- 2021 Assistant Professor, Department of Neurology, OSUWMC
- 2021 Member, Pelotonia Institute for Immuno-Oncology

Narrative Report:

My research career has been focused on understanding the impact of neuro-endocrine axis on the immune system and its subsequent effect in context of diseases like type-1 diabetes (T1D) and cancer. During my Ph.D., I investigated the role of the endocannabinoid system in maintaining gut homeostasis. We discovered that stimulation of the pain receptor TRPV1 with capsaicin, the active ingredient of chili pepper, leads to the production of anandamide, an endogenous cannabinoid. Anandamide in turn acts through its receptors TRPV1 and CB2 to increase the frequency of the CX3CR1hi regulatory macrophage population in the gut. This cascade induces the regulatory T cell subset, Tr1 cells which provides protection from T1D. This work was published in Proceedings of National Academy of Science. It was picked up by 19 news outlets https://pnas.altmetric.com/details/19530577.

As a fellow at Harvard Medical School, I investigated the role of glucocorticoid signaling in CD8+ T cells in cancer and in Th17 cells in the context of autoimmune diseases such as multiple sclerosis. Cancer Immunology: We identified that Nr3c1, the gene encoding the glucocorticoid receptor (GR), was highly expressed in dysfunctional Tim3+PD1+CD8+ tumor-infiltrating lymphocytes (TILs). The GR transactivated the expression of multiple checkpoint receptors such as Tim3, PD1 and Lag3. Further, the loss of GR in CD8+ T cells improved the effector functions of CD8+ TILs resulting in improved tumor growth control. We showed that glucocorticoids are synthesized locally in the tumor microenvironment and they co-operate with the immunosuppressive cytokine IL-27 to promote the dysfunction gene program in CD8+ T cells. The presence of the glucocorticoid + IL27 gene signature in CD8+ TILs correlated with failure to respond to checkpoint blockade in melanoma patients, highlighting the relevance of this immunoregulatory glucocorticoid-cytokine circuit in tumor tissue.

Autoimmunity: CD4+ IL-17-producing T helper cells (Th17) are key mediators of autoimmune tissue inflammation in multiple sclerosis (MS). Glucocorticoids (GCs) are potent anti- inflammatory steroid hormones that are derived from the metabolic breakdown of cholesterol and are widely used to treat autoimmune inflammation. Our data indicate that the two subtypes of Th17 cells, the pathogenic Th17 and non-pathogenic Th17 cells differ in their responsiveness to GCs with different effector functions showing variable sensitivity, thus indicating greater complexity in the response of Th17 cells to GCs than previously appreciated. We are investigating the molecular basis for the differential glucocorticoid sensing in Th17 subtypes. This study will identify novel therapeutic approaches to combat steroid resistance.

Publications (selected)

- **Nandini Acharya,** Sasi Penukonda, Tatiana Shcheglova, Adam T Hagymasi, Sreyashi Basu, Pramod K Srivastava " The endocannabinoid system acts as a regulator of immune homeostasis inthe gut**" PNAS**

114 (19), 5005-5010, 2017.

- Catherine A Sabatos-Peyton, James Nevin, Ansgar Brock, John D Venable, Dewar J Tan, Nasim Kassam, Fangmin Xu, John Taraszka, Luke Wesemann, Thomas Pertel, **Nandini Acharya**, Max Klapholz, Yassaman Etminan, Xiaomo Jiang, Yu-Hwa Huang, Richard S Blumberg, Vijay K Kuchroo, Ana C Anderson. "Blockade of Tim-3 binding to phosphatidylserine and CEACAM1is a shared feature of anti-Tim-3 antibodies that have functional efficacy". **Oncoimmunology 7 (2), e1385690, 2018.**
- Norio Chihara, Asaf Madi,Takaaki Kondo, Huiyuan Zhang, **Nandini Acharya**, Meromit Singer,Jackson Nyman, Nemanja D. Marjanovic, Monika S. Kowalczyk, Chao Wang, Sema Kurtulus, Travis Law, Yasaman Etminan, James Nevin, Christopher D. Buckley, Patrick R. Burkett, Jason D. Buenrostro, Orit Rozenblatt-Rosen, Ana C. Anderson, Aviv Regev, and Vijay K. Kuchroo. "Induction and transcriptional regulation of the co-inhibitory gene module in T cells". **Nature 558(7710), 454-459, 2018**.
- **Acharya N**, Madi A, Zhang H, Klapholz M, Escobar G, Dulberg S, Christian E, Ferreira M, Dixon KO, Fell G, Tooley K, Mangani D, Xia J, Singer M, Bosenberg M, Neuberg D, Rozenblatt-Rosen O, Regev A, Kuchroo VK, Anderson AC. Endogenous Glucocorticoid Signaling Regulates CD8+ T Cell Differentiation and Development of Dysfunction in the Tumor Microenvironment. Immunity. 2020 Sep 15;53(3):658-671.e6. doi: 10.1016/j.immuni.2020.08.005. PMID: 32937153; PMCID: PMC7682805.
- Zhang H, Madi A, Yosef N, Chihara N, Awasthi A, Pot C, Lambden C, Srivastava A, Burkett PR, Nyman J, Christian E, Etminan Y, Lee A, Stroh H, Xia J, Karwacz K, Thakore PI, **Acharya N**, Schnell A, Wang C, Apetoh L, Rozenblatt-Rosen O, Anderson AC, Regev A, Kuchroo VK. An IL-27-Driven Transcriptional Network Identifies Regulators of IL-10 Expression across T Helper Cell Subsets. Cell Rep. 2020 Nov 24;33(8):108433. doi: 10.1016/j.celrep.2020.108433. PMID: 33238123; PMCID: PMC7771052.

Awards/Honors (selected)

- Pramod Srivastava, **Nandini Acharya**, Sreyashi Basu "Methods of treatment of inflammation of the gut" US Patent App. 15/147,022.
- Ana Carrizosa Anderson, Asaf Madi, **Nandini Acharya**, Vijay K. Kuchroo, Aviv Regev "Methods and compositions for enhancing anti-tumor immunity by targeting steroidogenesis" U.S. Provisional Application No. 62/911,957

Brian Ahmer, PhD
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Education

- Colorado State University, Ft. Collins CO B.S. Microbiology
- Washington State University, Pullman WA Ph.D. Genetics & Cell Biology
- Oregon Health Sciences University, Portland OR Post-doc Pathogenesis

Positions

- 06/18 - present: Professor, Department of Microbial Infection and Immunity, Ohio State University, Columbus Ohio.
- 01/15 - present: Member of the OSU Infectious Diseases Institute
- 01/14 - present: Member of the Biomedical Sciences Graduate Program admissions committee 01/13 -
- 10/12 - 06/18: Associate Professor, Department of Microbial Infection and Immunity, Ohio State University, Columbus Ohio.
- 01/10 - 12/12: Chair of the Microbiology Graduate Studies Committee
- 10/06 - 10/12: Associate Professor, Department of Microbiology, Ohio State University, Columbus Ohio.
- 09/99 - 10/06: Assistant Professor, Department of Microbiology, Ohio State University, Columbus Ohio.

Courses Taught (selected)

- 2015, Autumn: Microbial Pathogenesis, BSGP7240/Micro7724. This is a 3 credit graduate course. I am the course organizer. I taught the first six lectures and then scheduled about 20 other professors to teach their specialty.
- 2015, Autumn: Selected Topics in Microbial Pathogenesis, BSGP7400. I provided two 2-hour guest lectures.
- 2016, Spring: Microbial Pathogenesis and Immunobiology, M4110. I provided one guest lecture.
- 2017, Autumn: Microbial Pathogenesis, BSGP7240/Micro7724. This is a 3 credit graduate course. I am the course organizer. I taught the first five lectures and then scheduled about 20 other professors to teach their specialty.
- 2018, Spring: Microbial Pathogenesis and Immunobiology, M4110. I provided one guest lecture.
- 2019, Autumn: Microbial Pathogenesis, BSGP7240/Micro7724. This is a 3 credit graduate course. I am the course organizer. I taught the first six lectures and then scheduled about 20 other professors to teach their specialty.
- 2020, Autumn: Microbial Pathogenesis, BSGP7240/Micro7724. This is a 3 credit graduate course. I am the course organizer. I taught the first seven lectures and then scheduled 18 other professors to teach their specialty.

Trainees Advised (selected)

Graduate Students

- Darren Lucas, 2006 - 2013, Ph.D., "Coordinated regulation of Salmonella virulence genes by the BarA/SirA two-component system and the Csr global regulatory system." Darren was a middle author on one paper and presented a poster at the Midwest Microbial Pathogenesis conference. He went on to be a Molecular Microbiologist at Copernicus Therapeutics in Seattle WA.
- Matthew Swearingen, 2008 - 2013, Ph.D., "Phenotypes of Salmonella sdiA in mice and pigs." Matt

presented a poster at the Midwest Microbial Pathogenesis conference, and published five papers, two as first author in PLoS One and Journal of Bacteriology. He is currently a faculty member at Florida Gulf Coast University.

- Mohamed Ali, 2008 - 2014, Ph.D., "Studying the genetic determinants of Salmonella fitness in vivo." Mohamed published a first author paper in PLoS Pathogens and four middle author papers. He also presented posters at six national conferences, and won three travel awards to attend these conferences. One was from ASM, one was from our local Food Innovation Center, and another was for best poster presentation at our local CMIB annual symposium. He is currently a faculty member at Mansoura University in Egypt.
- Erin Connors, 2019 - present.
- Andrew Schwieters, 2019 - present.

Postdocs

- Jitesh A. Soares, 2008 - 2010, "Identification of CsrA binding sites among Salmonella virulence gene transcripts." Jay was a middle author on four publications from my lab, and the first author on a review article. He is currently a Managing Editor at ACS Chemical Biology, Washington DC.
- Fabien Habyarimana, 2010 - 2016, "Characterization of the SdiA-regulated gene, SrgE, of Salmonella." Fabien published first author papers in Journal of Bacteriology and Infection and Immunity, and also a first author commentary article for Journal of Bacteriology.
- Juan F. Gonzalez, 2012 - 2015, "Microbiome characterization of Nramp1-/- mice." Juan published three middle author papers in my lab, and is currently a postdoctoral researcher with Dr. John Gunn at Nationwide Children's Hospital in Columbus OH.

Publications (Selected)

- Fabien Habyarimana, Anice Sabag-Daigle, and **Brian M. M. Ahmer**. 2014. The *sdiA*-regulated gene,*srgE*, encodes a Type 3 secreted effector. *Journal of Bacteriology* 196:2301-2312. PMCID: PMC4054179
- Amber Lindsay and Brian M. M. Ahmer. 2005. The effect of *sdiA* on biosensors of *N*-acylhomoserinelactones. *Journal of Bacteriology* 187: 5054-5058. PMCID: PMC1169494
- Mohamed M. Ali, David L. Newsom, Juan F. Gonzalez, Anice Sabag-Daigle, Christopher Stahl, Brandi Steidley, Judith Dubena, Jessica L. Dyszel, Jenee N. Smith, Yakhya Dieye, Razvan Arsenescu, Prosper N. Boyaka, Steven Krakowka, Tony Romeo, Edward J. Behrman, Peter White, and **Brian M. M.Ahmer**. 2014. Fructose-asparagine is a primary nutrient during growth of *Salmonella* in the inflamed intestine. *PLOS Pathogens* 10(6): e1004209. PMID: 24967579 *(Selected by Faculty of 1000.)*
- Jikang Wu, Anice Sabag-Daigle, Thomas O. Metz, Brooke L. Deatherage Kaiser, Venkat Gopalan, Edward J. Behrman, Vicki H. Wysocki, and **Brian M. M. Ahmer**. 2018. Measurement of fructose-asparagine concentrations in human and animal foods. *Journal of Agricultural and Food Chemistry*, 66(1): 212–217. PMID: 29232127
- Jikang Wu, Anice Sabag-Daigle, Mikayla A. Borton, Linnea F. M. Kopp, Blake E. Szkoda, Brooke L. Deatherage Kaiser, Stephen R. Lindemann, Ryan S. Renslow, Siwei Wei, Carrie D. Nicora, Karl K. Weitz, Young-Mo Kim, Joshua N. Adkins, Thomas O. Metz, Prosper Boyaka, Venkat Gopalan, Kelly C.Wrighton, Vicki H. Wysocki, **Brian M. M. Ahmer.** 2018. *Salmonella*-mediated inflammation eliminates competitors for fructose-asparagine in the gut. *Infection and Immunity,* 86(5): IAI.00945–17. PMID: 29483291

Awards/Honors (selected)

- 01/19 - present: Founder and Director of OSU's iGEM team
- 01/07 - 12/15: Member of the Targeted Investment in Excellence – Public Health Preparedness for Infectious Diseases

Billur Akkaya, MD, DPhil
Assistant Professor, Neurology
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Education

- Hacettepe University, Ankara/TURKEY M.D. Medicine
- University of Oxford, Oxford/UK DPhil (PhD) Immunology
- National Institutes of Health, Maryland/USA Postdoc Immunology

Positions

- 2021-Present Assistant Professor, Department of Neurology, The Ohio State University

Seminars (selected)

- 01/2020 NIH Immunology Interest Group Seminar Series 2019, Bethesda, Maryland
- 11/2019 52nd Annual Meeting of the Society for Leukocyte Biology 2019, NIH Immunology Interest Group Symposium, Boston, Massachusetts.
- 03/2019 New Insights into Infection Biology Symposium, Max Planck Institute for Infection Biology, Berlin, Germany
- 03/2019 Department of Pathology and Immunology, Washington University, School of Medicine in St. Louis, St. Louis, Missouri
- 02/2019 Biodesign Center for Immunology, Vaccines and Virotherapy; Arizona State University, Tempe, Arizona
- 02/2019 David Smith Center for Vaccine Biology and Immunology, University of Rochester, Rochester, New York

Trainees Advised (selected)

- 08/2019- 08/2020 Mentor of Mr. Daniel Williams (postbaccalaureate IRTA fellow at NIH)
- 06/2019- 08/2019 Mentor of Ms. Emmanuela Otunuga (as part of NIH HiSTEP 2.0 Program student)
- 06/2017- 06/2019 Mentor of Mr. Jafar Al Souz (postbaccalaureate IRTA fellow)
- 06/2017- 11/2018 Mentor of Mr. Rahul Kamdar (as part of NIH HiSTEP 2.0 Program)
- 06/2016- 06/2017 Mentor of Ms. Mitra Maz (postbaccalaureate IRTA fellow)
- 06/2016- 08/2016 Mentor of Mr. Chris Isaac (NIH HiSTEP 2.0 Program student)
- 08/2015- 07/2016 Mentor of Ms. Amanda Holstein (postbaccalaureate IRTA fellow)

Publications (Selected)

- **Akkaya B***, Kamenyeva O, Kabat J, Kissinger R. Visualizing the dynamics of T cell-dendritic cell interactions in intact lymph nodes. Invited book chapter in Methods of Molecular Biology 2021; 2304:243-263.
- **Akkaya B**, Shevach EM. Regulatory T cells: Master thieves of the immune system. Review article, *Cellular Immunology* 2020 Sep;355:104160.
- **Akkaya B***, Oya Y, Akkaya M, Al Souz J, Holstein AH, Kamenyeva O, Kabat J, MatsumuraR, Dorward DW, Glass DD, Shevach EM*. Regulatory T cells mediate specific suppression by depleting peptide-MHC class II from dendritic cells. *Nature Immunology* 2019 Feb;20(2):218-231.
- *Pessolani M: F1000Prime Recommendation of [Akkaya B et al., Nat Immunol 2019 20(2):218-231]. In F1000Prime, 21 Jan 2020; 10.3410/f.734853074.793569827*
- *Thibodeau J: F1000Prime Recommendation of [Akkaya B et al., Nat Immunol 2019 20(2):218-231]. In F1000Prime, 29 May 2019; 10.3410/f.734853074.793560516*

- *Eisenlohr L: F1000Prime Recommendation of [Akkaya B et al., Nat Immunol 2019 20(2):218-231]. In F1000Prime, 25 Mar 2019; 10.3410/f.734853074.793557919*

- **Akkaya B**, Roesler AS, Miozzo P, Theall BP, Al Souz J, Smelkinson MG, Kabat J, Traba J,Sack MN, Brzostowski JA, Pena M, Dorward DW, Pierce SK, Akkaya M. Increased mitochondrial biogenesis and ROS production accompany prolonged $CD4^+$ T cell activation.*The Journal of Immunology* 2018 Dec 1;201(11):3294-3306.
- Akkaya M, Traba J, Roesler AS, Miozzo P, **Akkaya B**, Theall BP, Sohn H, Pena M,Smelkinson MG, Kabat J, Dahlstrom E, Dorward DW, Skinner J, Sack MN, Pierce SK. Secondsignals rescue B cells from activation-induced mitochondrial dysfunction and death. *Nature Immunology* 2018 Aug; 19(8):871–884.Akkaya M, **Akkaya B**, Kim AS, Miozzo P, Sohn H, Pena M, Roesler AS, Theall BP, HenkeT,Kabat J, Lu J, Dorward DW, Dahlstrom E, Skinner J, Miller LH & Pierce SK. Toll-like receptor9 antagonizes antibody affinity maturation. *Nature Immunology* 2018 Mar;19(3):255-266.
- Akkaya M, **Akkaya B**, Sheehan PW, Miozzo P, Pena M, Qi CF, Manzella-Lapeira J, BollandS, Pierce SK. T cell-dependent antigen adjuvanted with DOTAP-CpG-B but not DOTAP- CpG-A induces robust germinal center responses and high affinity antibodies in mice. *European Journal of Immunology* 2017 Nov;47(11):1890-1899.
- Akkaya M, **Akkaya B**, Miozzo P, Rawat M, Pena M, Sheehan PW, Kim AS, Kamenyeva O, Kabat J, Bolland S, Chaturvedi A, Pierce SK. B cells produce type 1 interferons in response tothe Toll-like receptor 9 agonist CpG-A conjugated to cationic lipids. *The Journal of Immunology* 2017 Aug 1;199(3):931-940.
- **Akkaya B**, Holstein AH, Isaac C, Maz MP, Glass D, Shevach EM, Akkaya M. Ex-vivo iTreg differentiation revisited: Convenient alternatives to existing strategies. *Journal of Immunological Methods* 2017 Feb;441:67-71.
- Traba J, Miozzo P, **Akkaya B**, Pierce SK, Akkaya M. An Optimized Protocol to Analyze Glycolysis and Mitochondrial Respiration in Lymphocytes. *Journal of Visualized Experiments*2016 Nov 21;(117).
- **Akkaya B**, Miozzo P, Holstein AH, Shevach EM, Pierce SK, Akkaya M**.** A Simple, VersatileAntibody-Based Barcoding Method for Flow Cytometry. *The Journal of Immunology* 2016 Sep 1;197(5):2027-38.
- Akkaya M, Aknin ML, **Akkaya B**, Barclay AN. Dissection of agonistic and blocking effects of CD200 Receptor antibodies. *PLoS One*. 2013 May 14;8(5):e63325.

Awards/Honors (selected)

- 03/2019 American Association of Immunologists (AAI) Trainee Achievement Award, Supported by Thermofisher Scientific.
- 02/2017 Summer Mentor Award by NIH (For providing mentorship for a high school graduate, fully funded by Office of Intramural Training and Education, NIH)
- 02/2016 Summer Mentor Award by NIH (For providing mentorship for a rising high school senior, fully funded by Office of Intramural Training and Education, NIH)
- 10/2011 Human Immunology Unit Research Symposium Poster Prize by University of Oxford, 2nd place
- 04/2007 Seref Zileli Intern of The Year Award by Hacettepe University Faculty of Medicine
- (This prestigious award is given to recipients of the highest grade in the multi-step exams for Internal Medicine Internship)
- 07/2002 121st rank in University Entrance Exam (Among 1.500.000 students in Turkey, 99.9th percentile)

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Education

- Hacettepe University, Ankara/TURKEY M.D. Medicine
- University of Oxford, Oxford/UK D.Phil (PhD) Immunology/Pathology
- University of Oxford, Oxford/UK Postdoc Immunology
- National Institutes of Health, Maryland/USA Postdoc Immunology
- National Institutes of Health, Maryland/USA Research Fellow Immunology

Positions

- 2021-Present Assistant Professor, Department of Internal Medicine, Division of Rheumatology and Immunology, The Ohio State University

Seminars (selected)

- 07/2019 FASEB Scientific Research Conference (The Autoimmunity Conference) Pacific Grove, California
  Title: (Antigen stimulated B cells need second signals in order to sustain their metabolic activity and avoid mitochondrial dysfunction mediated cell death.)
- 10/2018 6th Annual Meeting of International Cytokine and Interferon Society (Cytokines 2018), Boston, Massachusetts
  Title: (Type I Interferons regulate B cell development and function)
- 10/2018 Cytokine Interest Group Immunometabolism Symposium, Bethesda, MD Title: (Antigen bound B cells require a second signal in order to sustain their metabolic activity and avoid mitochondrial dysfunction)
- 09/2018 NIH Immunology Interest Group (IIG) Annual Retreat, Leesburg, VA
  Title: (TLR9 signaling antagonizes cognate B cell T cell interactions)
- 09/2018 5th Triennial meeting of European Federation of Immunological Societies (EFIS-European Congress of Immunology 2018) Amsterdam, the Netherlands Title: (Transcription factor T-bet plays a complex role in B cell mediated immune responses against Plasmodium infection)
- 05/2018 American Association of Immunologists 2018 annual meeting, Austin, Texas. Title: (Antigen binding to B cells activates a metabolic program that in the absence of a second signal leads to mitochondrial dysfunction and cell death)
- 11/2017 2017 Johns Hopkins Malaria Research Institute Future of Malaria Research Symposium
  Title: (A single nucleotide polymorphism in a Plasmodium berghei ApiAP2 transcription factor alters the development of host immunity)
- 05/2017 American Association of Immunologists 2017 annual meeting, Washington D.C.
  Title: (The Toll-like receptor ligand CpG-A induces type 1 interferons in B cells contrasting the proinflammatory inducing activity of CpG-B)
- 05/2016 American Association of Immunologists 2016 annual meeting, Seattle USA Title: (Toll-like receptor 9 signaling antagonizes the B cell receptor-dependent ability of B cells to process and present antigen to helper T cells.)
- 12/2011 2011 British Society of Immunology meeting Liverpool, UK
  Title: (Characterization of novel antibodies against members of mouse CD200R family)

Trainees Advised (selected)

- 08/2019-05/2021 Mentor of Ms. Meha Patel ((post-baccalaureate IRTA fellow at NIAID)

- 07/2019-07/2020 Mentor of Mr. John Herrick (post-baccalaureate IRTA fellow at NIAID)
- 09/2018-04/2019 Mentor of Mr. Jedidiah Acott (post-baccalaureate IRTA fellow at NIAID)
- 07/2018-05/2019 Mentor of Ms. Anisha Sharma (post-baccalaureate IRTA fellow at NIAID)
- 06/2018-08/2018 Mentor of Ms. Ashley Bailey (CSOAR summer student at NIAID)
- 06/2017-08/2017 Mentor of Ms. Yeabsera Tadesse (CCSEP summer student at NIAID)
- 06/2017-06/2018 Mentor of Ms. Clare Cimperman (post-baccalaureate IRTA fellow at NIAID)
- 05/2017-05/2019 Mentor of Mr. Brandon Theall (post-baccalaureate IRTA fellow at NIAID)

Publications (Selected)

- **Akkaya M,** Kwak K, Pierce SK "B cell memory: Building two walls of protection against pathogens" *Nature Reviews Immunology* (Apr, 2020)
- Kwak K, **Akkaya M**, Pierce SK "B cell signaling in context" review article. *Nature Immunology* (May, 2019)
- **Akkaya M*,** Pierce SK* "From Zero to Sixty and Back to Zero again: The metabolic life of B cells" review article *Current Opinion in Immunology* (Oct, 2018)
- **Akkaya M**, Akkaya B, Kim AS, Miozzo P, Sohn H, Pena M, Roesler AS, Theall BP, HenkeT, Kabat J, Lu J, Dorward DW, Dahlstrom E, Skinner J, Miller LH & Pierce SK. "Toll-like receptor 9 antagonizes antibody affinity maturation" *Nature Immunology* (Mar, 2018)
- **Akkaya M***, Traba J, Roesler AS, Miozzo P, Akkaya B, Theall BP, Sohn H, Pena M, Smelkinson M, Kabat J, Dahlstrom E, Dorward DW, Skinner J, Sack MN, Pierce SK*. "Second signals rescue B cells from activation-induced mitochondrial dysfunction and death" *Nature Immunology* (Aug, 2018)
- **Akkaya M***, Akkaya B, Sheehan P, Miozzo P, Pena M, Qi C, Manzella-Lapeira J, Bolland S, Pierce, SK* "T cell-dependent antigen adjuvanted with DOTAP-CpG-B but not DOTAP-CpG-A induces robust germinal center responses and high affinity antibodies in mice." *European Journal of Immunology* (Nov, 2017)
- Akkaya B, Miozzo P, Holstein AH, Shevach EM, Pierce SK, **Akkaya M*.** "A Simple, Versatile Antibody-Based Barcoding Method for Flow Cytometry" *The Journal of Immunology* (Sep, 2016)
- Akkaya B, Oya Y, **Akkaya M**, *et al*. "Regulatory T cells mediate specific suppression by depleting peptide-MHC class II from dendritic cells" *Nature Immunology* (Feb, 2019)
- **Akkaya M*** *et al.*"A single nucleotide polymorphism in a *Plasmodium berghei* ApiAP2 transcription factor alters the development of host immunity" *Science Advances* (Feb, 2020)
- Hart GT, **Akkaya M**, *et al.*"The Regulation of Inherently Autoreactive VH4-34-Expressing B Cells in Individuals Living in a Malaria-Endemic Area of West Africa." *The Journal of Immunology* (Nov, 2016)
- **Akkaya M**, Barclay N "Heterogeneity in the CD200R paired receptor family" *Immunogenetics* (Jan 2010)
- **Akkaya M**, Aknin ML, Akkaya B, Barclay AN "Dissection of agonistic and blocking effects of CD200 Receptor antibodies" *PLoS One* (May, 2013)
- Kwong LS, **Akkaya M**, Barclay AN, Hatherley D "Herpesvirus Orthologues of CD200 Bind Host CD200R but not Related Activating Receptors." *Journal of General Virology* (Jan, 2016)
- **Akkaya M***, Kwong LS, Akkaya E, Hatherley D, Barclay AN "Rabbit CD200R binds host CD200 but not CD200-like proteins from poxviruses." *Virology* (Jan, 2016)

Awards/Honors (selected)

- 2001-2007 Honor Scholar of The Scientific and Technological Council of Turkey (awarded for successful representation of Turkey in the 11th and 12th International Biology Olympiads and renewed each year upon consistently high GPA)
- 02/2016 NIH Summer Mentor Award
- 02/2017 NIH Summer Mentor Award
- 10/2018 Seymour and Vivian Milstein Young Investigator Award

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Education

- Postdoctoral Training University of Michigan, Michigan, USA
- Ph.D Microbiology and Immunology University of Western Ontario, London, Ontario, Canada.
- M.Sc. Clinical Pathology Cairo University, Egypt, Faculty of Medicine.
- MD Medicine Cairo University, Egypt, Faculty of Medicine.
- Post-doctoral Fellow, University of Michigan, Cancer Center, Ann Arbor.
- Post-doctoral Fellow, University of Michigan, Department of Microbiology and Immunology.

Positions

- THE OHIO STATE UNIVERSITY, Columbus, Ohio, 2007-present
- Professor (Tenured) 2016-present
  Department of Microbial Infection and Immunity
- Cystic Fibrosis Foundation RDP C3 Immune core co-director 2019-2023
- Associate Professor, Department of Microbial Infection and Immunity, Ohio State University. 2012-2016
- Assistant Professor, Department of Internal Medicine, Ohio State University. 2007-2012

Educational Activities (selected)

- Graduate
  - Lecturer Current Topics in Virus-Host Interactions MEDMCIM 7400 2021-present
  - Lecturer Nutrition department HNNTR 888 2021-present
  - Lecturer Select topics in advanced immunology Med 8010 (2hrs/semester) 2019-present
  - Lecturer Concepts in Biomedical Science IBGP7000. 2012-present
  - Course director IBGP 7400. 2011-present
  - Lecturer Cellular Mechanism and Pathogenesis of Inflammation. MVIMG847. 2010-2016
  - Lecturer Molecular pathogenesis. MICRO7724/IBGP 7240. 1 hr/semester 2010-present
  - Lecturer Signature Program Translational Science. Immunology and Inflammation. 2hr/year 2010-present
  - Lecturer Molecular Biology of Bacterial Pathogens. 2010- 2011
  - Course director IBGP795. 2009-2012
  - Lecturer Biology of human diseases. 2011-2012
  - Lecturer Microbiology 524. 2008-2011
  - Lecturer Select Topics in Microbial Pathogenesis-IBGP 740. 2008-2011
  - Lecturer Microbial Pathogenesis Course-Department of Microbiology and Immunology, The University of Louisville, Louisville, Kentucky. 2008
  - Teaching Assistant Biology of the Protists, Department of Microbiology and Immunology, University of Western Ontario, 1997-2000
- Medical
  - Lecturer Host Defense Block, Infectious Disease. E Module. 2013-present
  - Lecturer Infection and host/Pathogen Science. IBGP 8800.02. 2010-present
  - Graduate advising
    - Mostafa Eltobgy, Neuroscience program start 2022
    - Owen Whitham, BSGP program 2021-present

- Kylene Daily, MSTP program 2017-present
- Shady Estfanous, Egypt dual program 2019-2021
- Asmaa Ali Badr, BSGP program: 2016-2021
- Kaitlin Hamilton, MCDB program. 2016-2021
- Kyle Caution, IBGP Program: 2009-2015
- Mia Tazi, IBGP Program: 2011-2015
- Basant Abdulrahman, MCDB Program: 2010-2012
- Dalia Abdelaziz. Graduate student, Egypt education channel: 2009 - 2011

o Postdoctoral and Clinical Fellows
- Kyle Caution. Epigenetic regulation of autophagy in cystic fibrosis. 2015-2018

o Doctoral Students (Dissertation Committee Member)
- Mariella Mestres-Villanueva (PI: Yasuko Rikihisa) 2021-present
- Ryan Huston. BSGP (PI: Satoskar) 2021-present
- Anna Smith (PI: Amit Sharma) 2020-present

Publications (Selected)

- Arwa Abu Khweek, Marisa R. Joldrichsen, Eunsoo Kim, Zayed Attia, Kathrin Krause, Kylene Daily, Shady Estfanous, Kaitlin Hamilton, Asmaa Badr, Midhun N. K. Anne, Mostafa Eltobgy, Kara N, Corps, Cierra Carafice, Xiaoli Zhang, Mikhail A. Gavrilin, Prosper N. Boyaka and **Amal O. Amer**. 2021. Caspase-11 regulates lung inflammation in response to house dust mites. *Cellular Immunology*. *Accepted*
- Eunsoo Kim, Zayed Attia, Rachel M. Woodfint, Cong Zeng, Sun Hee Kim, Haley E. Steiner, Rajni Kant Shukla, Namal P.M. Liyanage, Shristi Ghimire, Jianrong Li, Gourapura J. Renukaradhya, Abhay A. Satoskar, **Amal O. Amer**, Shan-Lu Liu, Estelle Cormet-Boyaka and Prosper N. Boyaka. 2021. Inhibition of elastase enhances the adjuvanticity of alum and promotes anti-SARS-CoV-2 2 systemic and mucosal immunity. *PNAS. Accepted*
- Shady Estfanous, Kathrin Krause, Midhun N K Anne, Mostafa Eltobgy, Kyle Caution, Arwa Abu Khweek, Kaitlin Hamilton, Asmaa Badr, Kylene Daily, Cierra Carafice, Daniel Baetzhold, Xiaoli Zhang, Tianliang Li, Haitao Wen, Mikhail A. Gavrilin, Hesham Haffez, Sameh Soror and **Amal O. Amer**. 2020. Gasdermin D restricts *Burkholderia cenocepacia* infection *in vitro* and *in vivo*. *Nature Scientific Reports*. *Accepted.*
- Kyle Caution, Nicholas Young, Frank Robledo-Avila, Kathrin Krause, Arwa Abu-Kweek, Kaitlin Hamilton, Asmaa Badr, Anup Vaidya, Moses Gosu, Duaa Dakhlalla, Sudha Argwal, Xiaoli Zhang, Santiago Partida-Sanchez, Mikhail Gavrilin, Wael Jarjour, and **Amal O. Amer**. 2019. Caspase-11 mediates migration of neutrophils and necroptosis during acute gouty arthritis. *Frontiers in Immunology*. PMID:31803174 PMCID: PMC6874099

Awards/Honors (selected)

- R01 AI154553-01. The role of non-canonical inflammasome in innate immunity. (PI: AMER/MPI Seveau), 2021-2026
- R01 AI157205-01. Host Responses to the Pore-Forming Toxin Listeriolysin O. (PI: Seveau/MPI Amer) 2021-2026
- R01AI124121 (MPI: Amer/Cormet-Boyaka) 02/2016-01/2021 NIH/NIAID $1,759,101
- NIH administrative supplement (COVID) $460,500. Unraveling the role of the cftr ion channel in susceptibility to sars-cov-2 infection and inflammation. 2019-2022
- NIH administrative supplement (EVALI) $389,000. Administrative Supplements to Expand Vaping Research and Understand EVALI. 2019-2022
- AAI Clinical Immunology Committee member 2021-2024
- BSGP distinguished faculty mentor award 2020

Ephraim Abrokwa Ansa-Addo, PhD
Assistant Professor, Department of Internal Medicine
Division of Medical Oncology
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Education

- Postdoctoral Scholar, Medical University of South Carolina (MUSC), South Carolina, USA.
  Mentor: Zihai Li, MD, Ph.D. | Department Chair │ Cancer Immunology Program Leader
- Ph.D in Immunology and Microbiology
  Cellular and Molecular Immunology Research Centre (CMIRC), London Metropolitan University, UK.
  Mentor: Jameel Inal, Ph.D., CBiol, FRSB (Director │ CMIRC)
- BSc (Hons) in Biochemistry
  London Metropolitan University (LMU), London, UK.
  Supervisor: Prof. Jameel Inal

Positions

- 2017-2019 Research Assistant Professor, Medical University of South Carolina (MUSC), South Carolina, USA.
- 2019 – present Assistant Professor, Department of Internal Medicine, Division of Medical Oncology, OSU

Teaching Activities (selected)

- 2018-present Supervisor, Davis Borucki, MD/PhD Student, Rotation student, MUSC, USA
- 2017-present Mentor, Huai-Cheng Huang, MD., Visiting Clinical Oncologist, MUSC, USA
- 2017-present Lecturer, Advanced Immunology, MUSC, USA
- Oct 2016-Feb 2017 Supervisor, Benjamine Van peel, Rotation student, MUSC, USA
- July 2014-Sept 2014 Supervisor, Brian Riesenberg, PhD Student. Cancer Immunology Program, MUSC
- March 2013-May 2013 Supervisor, Caroline Wallace, PhD. Cancer Immunology Program, MUSC
- 2010-2014 Supervisor, Sharad Kholia, PhD. Immunology, CMIRC, UK
- 2010-2012 Supervisor, Samireh Jorfi, PhD. Immunology, CMIRC, UK
- 2007-2011 Lecturer, Graduate Assistant. Immunology and Biochemistry, Faculty of Life Sciences, LMU

Publications (selected)

- Salem M., Wallace C., Velegraki M., Li A., **Ansa-Addo E.,** Metelli A., Kwon H., Riesenberg B., Wu B., Zhang Y., Guglietta S., Sun S., Liu B and Li Z. GARP Dampens Cancer Immunity by Sustaining Function and Accumulation of Regulatory T Cells in the Colon. *Cancer Res.* 2019 Jan 23. pii: canres.2623.2018. doi: 10.1158/0008-5472.CAN-18-2623.
- Wallace C.H., Wu B.X., Salem M., **Ansa-Addo E.A.,** Metelli A., Sun S., Gilkeson G., Shlomchik M.J., Liu B and Li Z. B-lymphocytes confer immune tolerance via cell surface GARP-TGF-β complex. *JCI Insight.* 2018; 3(7). pii: 99863. doi: 10.1172/jci.insight.99863.
- **Ansa-Addo E.A.,** Zhang Y., Yang Y., Hussey G.S., Howley B.V., Salem M., Riesenberg B., Sun S., Rockey D.C., Karvar S., Howe P.H., Liu B and Li, Z. Membrane-organizing protein moesin controls Treg differentiation and antitumor immunity via TGF-β signaling. *J Clin Invest.* 2017; 127 (4), 1321-37.
- **Ansa-Addo E.A.,** Thaxton J., Hong F., Wu B.X., Zhang Y., Wallace C., Metelli A., Riesenberg B., Williams K., Liu B and Li Z. Clients and oncogenic roles of molecular chaperone gp96/grp94. *Curr Top Med Chem. Special Issue Review.* 2016; 16 (25), 2765-78.

- Wu B.X., Hong F., Zhang Y., **Ansa-Addo E** and Li Z. GRP94/gp96 in Cancer: Biology, Structure, Immunology and Drug Development. *Adv Cancer Res*. 2016; 129,165-90.
- Jorfi S., **Ansa-Addo E.A.,** Kholia S., Stratton D., Valley S., Lange S and Inal J. Inhibition of microvesiculation sensitizes prostate cancer cells to chemotherapy and reduces docetaxel dose required to limit tumor growth in vivo. *Sci Rep.* 2015; 5, 13006.
- Zhang Y., **Ansa-Addo E** and Li Z. GP96: safeguarding Treg. *Oncotarget*. 2015; 6, 19936-7.
- Zhang Y., Wu B.X., Metelli A., Thaxton J.E., Hong F., Rachidi S., **Ansa-Addo E.,** Sun, S., Vasu, C., Yang,
- Y., Liu, B and Li, Z. GP96 is a GARP chaperone and controls regulatory T cell functions. *J Clin Invest.* 2015; 125, 859-69.
- Velegraki M, Salem M, **Ansa-Addo EA**(TT), Wu BX, **Li Z**(TT). Autocrine transforming growth factor β1 in regulatory T cell biology-gone but not missed. **Immunity**. 2021; 54: 395-396. pubmed: 33691126
- Wang H, Zhang H, Wang Y, Brown ZJ, Xia Y, Huang Z, Shen C, **Hu Z**(TT), **Beane J**(TT), **Ansa-Addo EA**(TT), **Huang H**(TT), Tian D, **Tsung A**(TT). Regulatory T cell and neutrophil extracellular trap interaction contributes to carcinogenesis in non-alcoholic steatohepatitis. **J Hepatol**. 2021; Epub August: . pubmed: 34363921
- **Ansa-Addo EA**(TT), Huang HC, Riesenberg B, Iamsawat S, Borucki D, Nelson MH, Nam JH, Chung D, Paulos CM, Liu B, Yu XZ, Philpott C, Howe PH, **Li Z**(TT). RNA binding protein PCBP1 is an intracellular immune checkpoint for shaping T cell responses in cancer immunity. **Sci Adv**. 2020; 6: eaaz3865. pubmed: 32523987; PMCID: PMC7259945

Awards/Honors (selected)

- 2019 AAI Faculty Travel Award | American Association of Immunologists, AAI, USA
- 2017-2018 American Cancer Society Institutional Research Grant (ACS-IRG-18060981), MUSC,
- USA
- 2018 Helios Mass Cytometry (CyTOF) Exploratory Award, MUSC, USA
- 2017 1st Place | Southeast Cancer Immunology, Immunotherapy & Inflammation Research
- Retreat, SCIIIRR, USA
- 2016 Trainee Abstract Award | Society for Immunotherapy of Cancer, SITC, USA
- 2016 1st Place | Students Research Day, Postdoc, Residents, Fellows Category, MUSC, USA
- 2015 1st Place | Edith H. Peng Excellence in Research Award, MUSC, USA
- 2015 Trainee Abstract Award | American Association of Immunologists, AAI, USA
- 2010 Elected | Elected to the Society of Biology, MSB, UK
- 2010 Trainee Abstract Award | American Association of Immunologists, AAI, USA
- 2010 Selected | STEM for BRITAIN 2010, House of Commons, London, UK

Matthew Anderson, PhD
Assistant Professor of Microbial Infection & Immunity
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Education

- The University of Wisconsin-Madison B.S. Genetics
- Stanford University Ph.D. Genetics
- The University of Minnesota – Twin Cities Postdoc Mycology
- Brown University Postdoc Mycology

Positions

- 2016 - present Assistant Professor, Department of Microbiology, The Ohio State University
- 2016 - present Assistant Professor, Department of Microbial Infection and Immunity, The Ohio

Courses Taught (selected)

- Infectious Disease Institute Work in Progress (BSGP7950), The Ohio State University, 2017-present (Fall, Spring)
- Bacterial Genetics (Micro4130), The Ohio State University, 2017-present (Fall)
- Building a Successful Academic Career, Stanford University, 2009

Trainees Advised (selected)

- Postdoctoral researchers
    - Abhishek Mishra, The Ohio State University, Presidents Postdoctoral Scholars Program, 2021-present
- Graduate students
    - Matthew Dunn, The Ohio State University, Dept. of Microbiology, AHA fellowship, 2017-2021
    - Robert Fillinger, The Ohio State University, Biomedical Sciences Graduate Program, F31 fellowship, 2017-present
    - Andrew Woodruff, The Ohio State University, Dept. of Microbiology, 2019-presnet
    - Audra Crouch, The Ohio State University, Dept. of Microbiology, 2020-present
    - Emily Simonton, The Ohio State University, Dept. of Microbiology, 2021-present
- Rotation students
    - Charlton Lam, the Ohio State University, Spring 2021
    - Makayla Manes, The Ohio State University, Spring 2021
    - Amber Anger, The Ohio State University, Fall 2021
    - John van Dusen, The Ohio State University, Fall 2021
    - Jacqueline Wong, The Ohio State University, Spring 2019
    - Peter Brechting, The Ohio State University, Fall 2018
    - Pranav Rata, The Ohio State University, Fall 2018
    - Kyle Spencer, The Ohio State University, Summer 2018
    - Dylan Cronin, The Ohio State University, Spring 2018
    - Siavash Ansari, The Ohio State University, Fall 2017
    - Nicholas Ursini, The Ohio State University, Fall 2017
    - Alex Runyon, The Ohio State University, Spring 2017
    - Lenel Camuy-Velez, The Ohio State University, Fall 2016
- Undergraduate students
    - Chloe Elliot, The Ohio State University, 2021 - present

- Molly Rambeau, The Ohio State University, 2019-present
- Shruti Gupta, The Ohio State University, 2018-2020
- Cameron Ramos, The Ohio State University, 2018
- Brandon Holcombe, The Ohio State University, 2017-2018
- Delanie Baker, The Ohio State University, 2017
- Griffin Kinney, The Ohio State University, 2017-2020
- Laine Monsey, The Ohio State University, 2016-2019
- Joshua Wang, Brown University, 2014-2016
- Denis Huang, Brown University, 2015-2016

- Thesis committees
  - Peter Brechting, The Ohio State University (Doctorate)
  - Jingjie Ye, The Ohio State University (Masters)
  - Dylan Cronin, The Ohio State University (Doctorate)
  - Gary Trubl, The Ohio State University (Doctorate)
  - Stephanie Ray, The Ohio State University (Doctorate)
  - Devin Sindeldecker, The Ohio State University (Doctorate)
  - Lenel Camuy-Velez, The Ohio State University (Masters)

Publications (Selected)

- **Anderson, M.Z.,** Wigen, L., Burrack, L.S., and Berman, J. 2015. Real-time evolution of a subtelomeric gene family in *Candida albicans*. *Genetics*. **200**: 907-19.
- Dunn, M.J., Kinney, G., Washinton, P., and **Anderson, M.Z.** 2018. Functional diversification accompanies gene family expansion of MED2 homologs in *Candida albicans*. *PLoS Genetics*. **14**: e1007326.
- **Anderson, M.Z.*,** Thompson, G., Clark, M., Hirakawa, M.P., and Bennett, R.J.* 2019. A 'parameiosis' drives depolyploidization and homologous recombination in *Candida albicans. Nat Comm*. **10**: 4388.
- **Anderson, M.Z.**, Porman, A.P., Wang, N., Huang, D., Cuomo, C., and Bennett, R.J. 2016. A multistate toggle switch defines fungal cell fates and is regulated by synergistic genetic cues. *PLoS Genetics*. **12**: e1006353.
- Scaduto, C.M., Kabrawala, S., Scheving, W., Ly, A., **Anderson, M.Z.**, Whiteway, M., and Bennett, R.J. 2017. Epigenetic control of pheromone MAPK signaling determines sexual fecundity in *Candida albicans*. *PNAS*. .**114**: 13780-5.
- Woodruff, A.L., Wang, J.M., Dunn, M.J., Fillinger, R.J., Bennett, R.J., and **Anderson, M.Z.** 2021. Intra-species transcriptional profiling reveals key regulators of *Candida albicans* pathogenesis. *mBio*. **12**: e00586-21. PMID 33879584
- Liang, S., **Anderson, M.Z.**, Hirakawa, M.P., Wang, J.M., Ene, I.V., Frazer, C., Alaalm, L.M., Thomson, G.J., and Bennett, R.J. 2019. Hemizygosity enables a mutational transition governing fungal virulence and commensalism. *Cell Host & Microbe.* **25**: 1-14. PMID 30824263
- Serrano, J., Smith, K.R., Crouch, A.L., Sharma, V., Yi, F., Vargova, V., LaMoia, T.E., Dupont, L.M., Serna, V., Tang, F., Gomes-Dias, L., Blakeslee, J., Hatzakis, E., Peterson, S.N., **Anderson, M.**, Pratley, R.E., and Kyriazis, G.A. 2021. High-dose saccharin supplementation does not induce gut microbiota changes or glucose intolerance in healthy humans and mice. *Microbiome*. **12**: 11. PMID 33431052

Awards/Honors (selected)

- Research Supplement to Promote Diversity in Health-Related Research award, NIH, 2012-2013
- Selection for the Howard Hughes Medical Institutes (HHMI) Research Mentor program. A program to expose University of Minnesota transfer students to scientific research through directed research with selected postdoctoral fellows and graduate students. Research Supplement to Promote Diversity in Health-Related Research award competitive renewal, NIH, 2012-2013

Megan Ballinger, PhD
Assistant Professor, Division of Pulmonary, Critical Care and Sleep Medicine
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Education

- University of Toledo, Toledo, OH BS Biological Sciences
- University of Michigan, Ann Arbor, MI PhD Immunology
- University of Michigan, Ann Arbor, MI Post-doc Immunology

Positions

- 7/2017-present Assistant Professor, The Ohio State University, Columbus, OH
- 3/2014-6/2017 Research Assistant Professor, The Ohio State University, Columbus, OH
- 3/2014-6/2017 Research Assistant Professor, The Ohio State University, Columbus, OH
- 7/2012-11/2015 Parker B. Francis Fellowship

Courses Taught (selected)

- Introduction to Laboratory Research Part 1 & 2, Lecturer for Pulmonary and Critical Care Fellowship Program, OSU 1/2021
- Introduction to Laboratory Research Part 1 & 2, Lecturer for Pulmonary and Critical Care Fellowship Program, OSU 1/2020
- Innate and Adaptive Immunity in Pulmonary and Critical Care Medicine, Nationwide Children's Hospital Fellowship Program, NCH, 9/2016
- Honors Research Experience I Course (BIOMSCI1 3891H) Co-course director, OSU, Autumn 2021
- Integrated Biomedical Science Senior Seminar (BSGP 7972) Co-course director, OSU Spring 2021, Autumn 2020, Spring 2020, Autumn 2019
- Signature Program in Translation Science Curriculum (BSGP 8800.01) Autumn 2018, 2017,
- Lecturer for Pulmonary Immunology and Inflammation, OSU 2016, 2015

Trainees Advised (selected)

- Doctoral Student Dissertation Advisor: Gina Torres Matias, BS , Biomedical Sciences Graduate Program, OSU, 3/2021-present
- Doctoral Student Dissertation Committee Member: Michael Yaeger, BS, Biomedical Sciences Graduate Program, OSU, 3/2021-present
- Doctoral Student Dissertation Committee Member: Christopher Bobba, BS, Medical Scientists Training Program (MSTP), OSU, 1/2017-4/2019
- Doctoral Student Candidacy Examination Committee Member: Trica Oyster, B.S., Biomedical Engineering PhD program, OSU, 12/2019
- Faculty Mentor for Undergraduate Student: Kristina Luikart, Current position: Medical Assistant at OSU, 5/2019-6/2021
- Faculty Mentor for Pulmonary and Critical Care Fellow: Derrick Herman, M.D., Current position: Assistant Professor at OSU, 7/2017-6/2019

Publications (selected)

- **Ballinger MN**, Newstead MW, Zeng X, Bhan U, Mo XM, Kunkel SL, Moore BB, Flavell R, Christman JW, Standiford TJ. IRAK-M Promotes Alternative Macrophage Activation and Fibroproliferation in Bleomycin-Induced Lung injury. J Immunol. 2015 Jan 16 PMID:25595781
- McQuattie-Pimentel AC, Budinger GRS, **Ballinger MN**. Monocyte-derived Alveolar Macrophages: The Dark Side of Lung Repair Am J Respir Cell Mol Biol. 2018 Jan;58(1):5-6.
- Reader BR, Sethuraman S, Hay BR, Thomas Becket RV, Karpurapu M, Chung S, Lee YG, Christman JW, **Ballinger MN**. IRAK-M Regulates Monocyte Trafficking to the Lungs in Response to Bleomycin Challenge. J Immunol. 2020 May 15:204(10):2661-2670. Doi: 10.4049/jimmunol.1900466. Epub 2020 Apr 6.
- Chung S, Lee TJ, Reader BF, Kim JY, Lee YG, Park GY, Karpurapu M, **Ballinger MN,** Qian F, Rusu L, Chung HY, Unterman TG, Croce CM, Christman JW. FoxO1 regulates allergic asthmatic inflammation through regulating polarization of the macrophage inflammatory phenotype. Oncotarget. 2016 Apr 5;7(14):17532-46. doi: 10.18632/oncotarget.8162.
- Chung S, Kim JY, Song MA, Park GY, Lee YG, Karpurapu M, Englert JA, **Ballinger MN**, Pabla N, Chung HY, Christman JW. FoxO1 is a critical regulator of M2-like macrophage activation in allergic asthma. Allergy. 2018 Oct 4. doi: 10.1111/all.13626.
- Lee YG, Reader BF, Herman D, Streicher A, Englert JA, Ziegler M, Chung S, Karpurapu M, Park GY, Christman JW, **Ballinger MN**. Sirtuin 2 enhances allergic asthmatic inflammation. JCI Insight. 2019 Jan 22. pii: 124710. doi: 10.1172/jci.insight.124710.
- Standiford LR, Standiford TJ, Newstead MJ, Zeng X, **Ballinger MN**, Kovach MA, Reka AK, Bhan U. TLR4-dependent GM-CSF protects against lung injury in Gram-negative bacterial pneumonia. Am J Physiol Lung Cell Mol Physiol. 2012 Mar 1;302(5):L447-54. PMID: 22160309
- **Ballinger MN**, Newstead MW, Zeng X, Bhan U, Horowitz JC, Moore BB, Pinsky DJ, Flavell RA, Standiford TJ. TLR signaling prevents hyperoxia-induced lung injury by protecting the alveolar epithelium from oxidant-mediated death. J. Immunol Jul 1:189(1):356-64, 2012. PMID: 22661086
- Tolle L, Yu FS, Kovach MA, **Ballinger MN**, Newstead MW, Zeng X, Nunez G, Standiford TJ. Redundant and Cooperative Interactions between TLR5 and NLRC4 in Protective Lung Mucosal Immunity against Pseudomonas aeruginosa. J Innate Immun. 2015;7(2):177-86. PMID: 25402425
- Neagos, J, Standiford TJ, Newstead MW, Zeng X, Huang SK, **Ballinger MN**. Epigenetic Regulation of Tolerance to TLR Ligands in Alveolar Epithelial Cells. Am J Respir Cell Mol Biol. 2015 May 12. [Epub ahead of print] PMID: 25965198

Awards/Honors (selected)

- Research Funding
    - R01HL141217 NIH/NHLBI (PI: Ballinger), 04/01/2019 - 03/31/2024/, The pivotal role of macrophages in regulating pulmonary fibrosis
    - OSU President's Research Excellence Accelerator Award (MPI: Ballinger and Ghadiali), 07/01/2021-06/30/2022, Development of novel targets for preventing mechanically induced injury in lung fibrosis patients
- Honors
    - 3/2021 American Journal of Cell and Molecular Biology Top Reviewer Award
    - 5/2019 AII Early Career Achievement Award, American Thoracic Society
    - 5/2016 Jo Rae Wright Award for Outstanding Science, American Thoracic Society
    - 5/2005 The Miller Fund Award for Innovative Immunology Research

Prosper N. Boyaka, PhD
Professor and Chair, Stanton Youngberg Professor in Veterinary Medicine
Department of Veterinary Biosciences,The Ohio State University
207 Goss Lab, 1925 Coffey Road, Columbus, Ohio 43210
(614) 247-4671
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Education

- University of Denis Diderot, Paris 7, FRANCE M.S. Biochemistry
- University of Denis Diderot, Paris 7, FRANCE D.E.A. Toxicology
- University of Denis Diderot, Paris 7, FRANCE Ph.D. Toxicology/Immunotoxicology
- University of Alabama at Birmingham, AL, USA Postdoctoral Mucosal Immunology

Positions

- 1999-2006 Research Assistant Professor, Department of Microbiology and UAB Immunobiology Vaccine Center, Birmingham, Alabama
- 2006 Visiting Associate Professor, Department of Veterinary Biosciences, The Ohio State University, Columbus, Ohio
- 2006-2010 Associate Professor, Department of Veterinary Biosciences, The Ohio State University, Columbus, Ohio
- 2010-present Professor, Department of Veterinary Biosciences, The Ohio State University, Columbus, Ohio
- 2020-2021 Interim Chair, Department of Veterinary Biosciences, The Ohio State University, Columbus, Ohio
- 2021-present Chair, Department of Veterinary Biosciences, The Ohio State University, Columbus, Ohio

Teaching Activities

We bring to this program proposal our experience in training students and research fellows in Mucosal Immunology with a special emphasis on host interactions with the commensal microbiome, and induction and characterization of immune responses in mucosal tissues of the Gut-Associated Lymphoid Tissues, the lungs and Nasopharyngeal-Associated Lymphoid Tissues. In this regard, I have trained over 18 graduate students (Master's and PhD), including 5 PhD students, and 3 post-doctoral trainees. Several of my former trainees went on to have successful career in the industry in the USA, Belgium, Italy, France and Korea. Furthermore, 3 of my former trainees have academic positions: one as an Associate Professor and two as tenure-track Assistant Professor.

Publications (selected)

- Duverger, A., Jackson, R.J., van Ginkel, F.W., Fischer, R., Tafaro, A., Leppla, S.H., Fujihashi, K., Kiyono, H., McGhee, J.R., and **Boyaka, P.N**. 2006. *Bacillus anthracis* edema toxin acts as an adjuvant for mucosal immune responses to nasally administered vaccine antigens. J. Immunol. 176:1776-1783. PMID: 16424208
- Duverger A., J-M Carre, J. Jee, S.H. Leppla, E. Cormet-Boyaka, W-J. Tang, D. Tome, and **P.N. Boyaka**. 2010. Contributions of Edema Factor and Protective Antigen to the Induction of Protective Immunity by Bacillus anthracis Edema Toxin as an Intranasal Adjuvant. J. Immunol. 185:5943-52. PMC4053574
- Jee J, Bonnegarde-Bernard A, Duverger A, Iwakura Y, Cormet-Boyaka E, Martin TL, Steiner HE, Bachman RC, **Boyaka PN**. 2015. Neutrophils negatively regulate induction of mucosal IgA responses after sublingual immunization. Mucosal Immunol. 8:735-45. PMID: 25563500

- Rowe JC, Attia Z, Kim E, Cormet-Boyaka E, and **Boyaka PN**. 2019. A novel supplementation approach to enhance host response to sublingual vaccination. Sci Rep. 9:715. PMID: 30679470
- **Boyaka. P.N.,** M. Marinaro, R.J. Jackson, F.W. van Ginkel and J.R. McGhee. 2001. Oral QS-21 requires early IL-4 help for induction of mucosal and systemic immunity. *Journal of Immunology* 166: 2283-2290. PMID: 11160283
- Fukuiwa. T., S. Sekine, R. Kobayashi, H. Suzuki, K. Kataoka, R.S. Gilbert, Y. Kurono, **P.N. Boyaka**, A.M. Krieg, J.R. McGhee, and K. Fujihashi. 2008. A combination of Flt3 ligand cDNA and CPG ODN as nasal adjuvant elicits NALT dendritic cells for prolonged mucosal immunity. Vaccine. 26:4849-59 PMC2601556
- Martin TL, Jee J, Kim E, Steiner HE, Cormet-Boyaka E, **Boyaka PN.** 2017. Sublingual targeting of STING with 3'3'-cGAMP promotes systemic and mucosal immunity against anthrax toxins. *Vaccine.* 35:2511-2519. PMID: 28343781
- Kim E, Attia Z, Woodfint RM, Zeng C, Kim SH, Steiner HE, Shukla R, Liyanage N, Ghimire S, Li J, Renukaradhya G, Satoskar AR, Amer AO, Liu SL, Cormet-Boyaka E, and **Boyaka PN**. 2021.Inhibition of elastase enhances the adjuvanticity of alum for injected vaccines and promotes anti-SARS-CoV-2 systemic and mucosal immunity. *Proc Natl Acad Sci U S A* (In press).
- Cormet-Boyaka E, Jolivette K, Bonnegarde-Bernard A, Rennolds J, Hassan F, Mehta P, Tridandapani S, Webster-Marketon J, **Boyaka PN**. 2012, An NF-κB-independent and Erk1/2-dependent mechanism controls CXCL8/IL-8 responses of airway epithelial cells to cadmium. Toxicol Sci. 125:418-29. PMC3262857
- Bonnegarde-Bernard A., Jee j, Fial MJ, Aeffner F, Cormet-Boyaka E, Davis IC, Lin M, Tome D, Karin M, Sun Y, **Boyaka, P.N.** 2014. IKKb in intestinal epithelial cells regulates allergen-specific IgA and allergic inflammation at distant mucosal sites. Mucosal Immunol. 7(2):257-67. PMC4053573
- Kim E, Lembert M, Fallata GM, Rowe JC, Martin TL, Satoskar AR, Reo NV, Paliy O, Cormet-Boyaka E, **Boyaka PN**. 2018.Intestinal Epithelial Cells Regulate Gut Eotaxin Responses and Severity of Allergy. *Front Immunol*. 9:1692. PMC6085436.
- Kim E, Bonnegarde-Bernard A, Opiyo SO, Joldrichsen MR, Attia Z, Ahmer BH, Cormet-Boyaka E, and **Boyaka PN**. 2021. Pollutants enhance IgE sensitization in the gut via local alteration of vitamin D-metabolizing enzymes. *Mucosal Immunol.* (In press).

Awards/Honors (selected)

- Research Funding
    - NIH/NIAID R01AI145144 (PI: Boyaka) 1/1/20- 12/31/24, Targeting myeloid cells for regulation of alum-based immunity
    - NIH/ R01AI157205 (MPI: Boyaka; MPI: Stephanie Seveau) 4/1/21- 03/30/26, Host Responses to the Pore-Forming Toxin Listeriolysin O
    - Cystic Fibrosis Foundation: Research & Development Program (RDP) Pilot & Feasibility Studies grant 7/1/2019- 6/30/21, PI: Boyaka, Adaptive Immunity in CF: Understanding B Cell Functions
- Honors
    - Associate Editor: Current Immunological Reviews (2005 – present)
    - Academic Editor: PLOS One (2010-present)
    - Editorial Board Member: Frontiers in Immunology (2011-present)
    - Editorial Board Member (Committee of 100): Vaccine (2012-present)

Ginny L. Bumgardner, M.D., Ph.D., F.A.C.S.
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Phone: (614) 293-6177
E-mail: ginny.bumgardner@osumc.edu

Education

- B.S. Degree Graduation with Highest Honors Biology (Major); French (Minor) College of William and Mary Williamsburg, VA, 1979
- M.D. Degree University of Virginia School of Medicine Charlottesville, VA, 1983
- Ph.D. Degree University of Minnesota Department of Surgery Transplant Immunology Program, 1994
- Internship: University of Minnesota Department of Surgery 1983-1984
- Residency: University of Minnesota Department of Surgery 1984-1991
- Postdoctoral Research Training: University of Minnesota Department of Surgery 1986-1989
- Fellowships: Surgical Infectious Disease Fellowship Department of Surgery
    - University of Minnesota 4/87-2/88
    - Endoscopy Fellowship Department of Surgery University of Minnesota, 1/89-6/89
    - Transplantation Fellowship Department of Surgery University of California San Francisco Program Director: 8/91-7/93

Positions

- 9/93 – 7/99 Assistant Professor of Surgery Department of Surgery Division of Transplantation, OSU
- 1998 – current Member, Comprehensive Cancer Center Immunology Program The Ohio State University Medical Center
- 7/99 –10/05 Associate Professor of Surgery Department of Surgery Division of Transplantation, OSU
- 10/02-10/07 MD PhD Program Operations Committee Medical Scientist Program, OSU
- 1/03-1/07 Physician-Scientist Mentor Faculty Medical Scientist Training Program
- 7/19/02-current Department of Surgery Office of Surgical Education Director, DOS Research Training Program, OSU
- 10/05-06/18 Professor of Surgery Department of Surgery Division of Transplantation, OSU
- 1/07-9/2021 Associate Dean for Research Education, The Ohio State University & Medical Center
- 6/07-current Director, COM Masters of Medical Science Program 2/07-12/07 Dean's Women's Leadership Development Group, OSU
- 2008-2012 NIH National CTSA Consortium for Education and Career Development Steering Committee
- 2008-2012 OSU Clinical Center for Translation Science (CTSA) Community of Research Education Leader
- 2008- 2011 Ohio State University Graduate Council, Advisory Council to the Dean of the Graduate School
- 2009-current Medical Scientist Program (MSP) Executive Committee The Ohio State University & Medical Center
- 2009-current Course Director for Signature Program Translational Science Curriculum (5 modules)
- 2009-2016 Co-Director, OSU HHMI Med into Grad Scholars Program 2010-2013 Elected to AASLD Board of Governors,
- 06/2013-current Course Director, Department of Surgery Career Development for Surgeons Course
- 07/01/2013-06/2018 Internal Advisory Board, OSU CTSA Research Education Core
- 10/19/19-current OSU CCTS Executive Committee, Director, TL1 pre-doc and post-doc training program
- 11/2019-current College of Medicine Admissions Committee
- 05/2021 Director, Medical Scientist Training Program, OSUWMC

- 9/2021-current Associate Dean for Physician Scientist Education and Training, The Ohio State University College of Medicine, Columbus, Ohio

Teaching Activities (selected)

- 1993-current Clinical Attending, OSU Division of Transplantation, Department of Surgery
- 2019-current Postdoctoral Trainee Research Mentor (Jing Han MD, PGY2)
- 2019-current Predoctoral Trainee Thesis Committee (Gabriel Mirhaidi, dual degree student) 2018-current Postdoctoral Trainee, Career Development Committee (Jenny Barker MD PhD) 2007-2012 Postdoctoral Trainee Research Mentor (Jason Zimmerer, PhD)
- 2009-2011 Surgery Resident Research Mentor (Thomas Pham PhD) 2006-2008 Clinical Research Advisor (Margy Sawyer MD)
- 2006-2007 Clinical Research Advisor for Surgical Resident, (Lloyd Brown MD)
- 2007-current Director, College of Medicine Masters of Medical Science Program
- 2004-2007 Dissertation Advisor for MD PhD student (Phillip H. Horne BS, Integrated Biomedical Sciences Graduate Program)
- 2001-2005 Dissertation Advisor for MD PhD student (Keri Lunsford BS, Integrated Biomedical Sciences Graduate Program)
- 2002-current Director, Department of Surgery Research Training Program
- 2001-current Research Advisor for MD PhD students
- 2001-current Core Faculty, Category "P", Integrated Biosciences Graduate Program (IBGP) now renamed Biomedical Sciences Graduate Program (BSGP)
- 2000-current Core Faculty, Medical Scientist Training Program (MSTP) 1999-current Physiology Graduate School Faculty, Category "M"

Publications (Selected)

- Lunsford KE, Koester MA, Eiring AM, Gao D, Horne PH, and **Bumgardner GL**. Targeting LFA-1 and CD154 suppresses the in vivo activation and cytolytic development of (CD4- independent) CD8+ T cells. Journal of Immunology, 2005: 175(12); 7855-66. PMID: 16339521
- Horne PH , Zimmerer JM, Fisher M, Lunsford KE, Nadasdy G, Nadasdy T, Van Rooijen N, **Bumgardner, GL**. Critical Role of Effector Macrophages in Mediating CD4-Dependent Alloimmune Injury of Transplanted Liver Parenchymal Cells. Journal of Immunology, 2008, 181:1224-1231. PMCID: PMC3022512
- Zimmerer, J.M., Ringwald, B.A., Chaudhari, S., Han, J., Warren, R.T., Hart, M., Abdel- Rasoul, M., **Bumgardner, G.L.** Invariant NKT cells promote the development of highly cytotoxic multipotent CXCR3+CCR4+CD8+ T cells that mediate rapid hepatocyte allograft rejection. Journal of Immunology, submitted
- Zimmerer, J.M., Swamy,P., Sanghavi, P.B., Wright, C.L., Elzein, S.M., Brutkiewicz, R.R., **Bumgardner, G.L.** Critical role of NKT Cells in Posttransplant Alloantibody Production. American Journal of Transplantation. 14(11):2491-9, 2014. PMCID: PMC4207222.

Awards/Honors (selected)

- 2005 OSU College of Medicine & Department of Surgery's "Excellence in Teaching Award"
- 2014 OSU Courage to Teach Award
- 2016 Distinguished Undergraduate Research Mentor Award
- 1F32AI161844-01, Role: Mentor; (PI: Jing Han, MD), Title: The molecular and spatial interactions between antibody suppressor CD8+ T cells and B cells that regulate alloantibody production after transplant, 4/01/2021 – 8/31/2022
- NIH T32GM139784 Role: Principal Investigator, Title: Medical Scientist Training Program- the Ohio State University, 07/01/2021 – 06/30/2026
- NCATS TL1TR002735 Role:CCTS TL1 Director, Title: Advancing Today's Discoveries to Improve Health, 06/29/2018 – 05/31/2023

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Education

- 2013 – 2014 Postdoctoral Associate, Department of Biostatistics, Yale University, New Haven, CT.
- 2012 Ph.D. in Statistics, University of Wisconsin, Madison, WI.
  (Minor in Computer Science)
- 2006 MA in Statistics, Yonsei University, Seoul, South Korea.
- 2004 BA in Sociology, Yonsei University, Seoul, South Korea.

Positions

- 2020 – Present Associate Professor, Department of Biomedical Informatics, The Ohio State University
- 2014 – 2020 Tenure-track Assistant Professor, Division of Biostatistics and Bioinformatics,
- Department of Public Health Sciences, Medical University of South Carolina, Charleston, SC.
- 2017 – Present Research Member, Cancer Control Research Program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC.
- 2019 – Present Biostatistician, Biostatistics Shared Resource, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC.

Mentoring Activities (selected)

- Postdoctoral researcher:
  - Jin Hyun Nam (2017 – current).
- Computer programmer:
  - Daniel Couch (2017 – current).
- Ph.D. dissertation chair:
  - Zequn Sun (Biostatistics; 2016 – current).
  - Aastha Khatiwada (Biostatistics; 2017 – current).
  - Carter Allen (Biostatistics; 2018 – current).
- Master thesis chair:
  - Emma Kortemeier (Biostatistics; 2016 – 2017):
    Associate Data Analyst, Care Coordination Institute (Greenville Health System).
- Ph.D. dissertation committee:
  - Jaime Speiser (Biostatistics; 2015 – 2017).
  - Cameron Miller (Biostatistics; 2018 – current).
- Master thesis committee:
  - Yin Lin (Epidemiology; 2017 – 2017).
- Summer student:
  - Melissa Batson (Biostatistics; 2015).

Publications (selected)

- Yang Y, Li X, Luan HH, Zhang B, Zhang K, Nam JH, Li Z, Fu M, Munk A, Zhang D, Wang S, Liu Y, Albuquerque JP, Ong Q, Li R, Wang Q, RobertME, Perry RJ, **Chung D**, Shulman GI, Yang X. OGT suppresses S6K1-mediated macrophage inflammation and metabolic disturbance. Proc Natl Acad Sci U S A. 2020 Jul 14;117(28):16616-16625. doi: 10.1073/pnas.1916121117. Epub 2020 Jun 29. PMID:

32601203; PMCID: PMC7368321.

- Hurst KE, Lawrence KA, Robino RA, Ball LE, **Chung D**, Thaxton JE. Remodeling Translation Primes CD8⁺ T-cell Antitumor Immunity. Cancer Immunol Res. 2020 May;8(5):587-595. doi: 10.1158/2326-6066.CIR-19-0516. Epub 2020 Feb 19. PMID: 32075802.
- Nam JH, Yun J, Jin IH, **Chung D**. hubViz: A Novel Tool for Hub-centric Visualization. Chemometr Intell Lab Syst. 2020 Aug 15;203:104071. doi:10.1016/j.chemolab.2020.104071. Epub 2020 Jun 7. PMID: 32753773; PMCID: PMC7402588.
- Ansa-Addo EA, Huang HC, Riesenberg B, Iamsawat S, Borucki D, Nelson MH, Nam JH, **Chung D**, Paulos CM, Liu B, Yu XZ, Philpott C, Howe PH, Li Z. RNA binding protein PCBP1 is an intracellular immune checkpoint for shaping T cell responses in cancer immunity. Sci Adv. 2020 May 29;6(22):eaaz3865. doi: 10.1126/sciadv.aaz3865. PMID: 32523987; PMCID: PMC7259945.
- Chang Y, Allen C, Wan C, **Chung D**, Zhang C, Li Z, Ma Q. IRIS-FGM: an integrative single-cell RNA-Seq interpretation system for functional gene module analysis. Bioinformatics. 2021 Feb 17;37(18):3045–7. doi: 10.1093/bioinformatics/btab108. Epub ahead of print. PMID: 33595622; PMCID: PMC8479672.
- Cahill T, da Silveira WA, Renaud L, Williamson T, Wang H, **Chung D**, Overton I, Chan SSL, Hardiman G. Induced Torpor as a Countermeasure for Low Dose Radiation Exposure in a Zebrafish Model. Cells. 2021 Apr 14;10(4):906. doi: 10.3390/cells10040906. PMID: 33920039; PMCID: PMC8071006.
- Curran T, Sun Z, Gerry B, Findlay VJ, Wallace K, Li Z, Paulos C, Ford M, Rubinstein MP, **Chung D**, Camp ER. Differential immune signatures in the tumor microenvironment are associated with colon cancer racial disparities. Cancer Med. 2021 Mar;10(5):1805-1814. doi: 10.1002/cam4.3753. Epub 2021 Feb 9. PMID: 33560598; PMCID: PMC7940243.
- Bountress KE, Vladimirov V, McMichael G, Taylor ZN, Hardiman G, **Chung D**, Adams ZW, Danielson CK, Amstadter AB. Gene Expression Differences Between Young Adults Based on Trauma History and Post-traumatic Stress Disorder. Front Psychiatry. 2021 Apr 8;12:581093. doi: 10.3389/fpsyt.2021.581093. PMID: 33897478; PMCID: PMC8060466.
- Zhang B, Lapenta K, Wang Q, Nam JH, **Chung D**, Robert ME, Nathanson MH, Yang X. Trefoil factor 2 secreted from damaged hepatocytes activates hepatic stellate cells to induce fibrogenesis. J Biol Chem. 2021 Jul;297(1):100887. doi: 10.1016/j.jbc.2021.100887. Epub 2021 Jun 17. PMID: 34146542; PMCID: PMC8267550.

Awards/Honors (selected)

- 2017 Award of Research Excellence, Department of Public Health Sciences, Medical University of South Carolina.
- 2015 Career Development Award, Korean International Statistical Society. Dongjun Chung

Patrick L. Collins, PhD
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Education

- 2002-2006 Pre-doctoral: New Mexico Institute of Mining and Technology; Socorro, NM, Biology
- 2006-2011 Graduate: Vanderbilt University; Nashville, TN, Ph.D., Immunology.

Thesis: "Distal Regulation of the Interferon Gamma Locus" (Mentor: Tom Aune)

Positions

- 2021-Current Assistant Professor at The Ohio State University, Department of Microbial Infection and Immunity, Columbus, OH
- 2019-2021 Research Assistant Professor at The Ohio State University, Department of Microbial Infection and Immunity, Columbus, OH

Courses Taught (selected)

- 2009-2010 Teaching Assistant, Interdisciplinary Graduate Program "Foundations in Immunology" Section, VUMS: Organized and ran journal review sessions for graduate students
- 2009-2012 Trained Graduate Students and Summer Students in the Aune Lab, VUMS
- 2010-2011 Teaching Assistant, Medical Microbiology Laboratory, VUMS: Taught medical students clinically applied microbiology laboratory tests.
- 2012-2015 Mentor, Young Scientist Training Program, WUSTL: Mentored high school students in a summer research project completed alongside me in our laboratory
- 2016-2018 Led summer bioinformatics workshop, "Bioinformatics for dummies"
- 2016-2018 Organized and led monthly DNA damage and metabolism student work in progress group
- 2020-present Leads OSU Bioinformatics workshop series
- 2020-present MEDMCIM 7010/Micro7010/Cellular and Molecular Immunology

Trainees Advised (selected)

- 2021 – present Chris Gebhardt (Graduate Student)

Publications (Selected)

- Chang, Shaojing, **Patrick L. Collins**, and Thomas M. Aune. "T-bet dependent removal of Sin3A-histone deacetylase complexes at the Ifng locus drives Th1 differentiation." The Journal of Immunology 181.12 (2008): 8372-8381.
- Aune, Thomas M., **Patrick L. Collins**, and Shaojing Chang. "Epigenetics and T helper 1 differentiation." Immunology 126.3 (2009): 299-305.
- **Collins, Patrick L.,** and Thomas M. Aune. "Keeping One's Option Open." Immunity 32.5 (2010): 581-583.
- **Collins, Patrick L.,** Shaojing Chang, Melodie Henderson, Mohammed Soutto, Georgia M. Davis, Allyson G. McLoed, Michael J. Townsend, Laurie H. Glimcher, Douglas P. Mortlock, and Thomas M. Aune. "Distal regions of the human *IFNG* locus direct cell type-specific expression." *The Journal of Immunology* 185, no. 3 (2010): 1492-1501.

- Hoek, Kristen L., Laura E. Gordy, **Patrick L. Collins**, Vrajesh V. Parekh, Thomas M. Aune, Sebastian Joyce, James W. Thomas, Luc Van Kaer, and Eric Sebzda. "Follicular B cell trafficking within the spleen actively restricts humoral immune responses." *Immunity* 33, no. 2 (2010): 254-265.

- Spurlock, Charles F., Zachary T. Aune, John T. Tossberg, **Patrick L. Collins**, Jessica P. Aune, Joseph W. Huston, Philip S. Crooke, Nancy J. Olsen, and Thomas M. Aune. "Increased sensitivity to apoptosis induced by methotrexate is mediated by JNK." *Arthritis & Rheumatism* 63, no. 9 (2011): 2606-2616.
- **Collins, Patrick L**., Melodie A. Henderson, and Thomas M. Aune. "Diverse functions of distal regulatory elements at the *IFNG* locus." *The Journal of Immunology* 188, no. 4 (2012): 1726-1733.
- Collier, Sarah P., **Patrick L. Collins**, Christopher L. Williams, Mark R. Boothby, and Thomas M. Aune. "Cutting edge: influence of *Tmevpg1*, a long intergenic noncoding RNA, on the expression of Ifng by Th1 cells." *The Journal of Immunology* 189, no. 5 (2012): 2084-2088.
- **Collins, Patrick L**., Melodie A. Henderson, and Thomas M. Aune. "Lineage-specific adjacent *IFNG* and *IL26* genes share a common distal enhancer element." *Genes and immunity* 13, no. 6 (2012): 481-488.
- Aune, Thomas Martin, **Patrick L. Collins**, Sarah P. Collier, Melodie A. Henderson, and Shaojing Chang. "Epigenetic Activation and Silencing of the Gene that Encodes IFN-γ." *Frontiers in immunology* 4 (2013): 112.
- Gopalakrishnan, Suhasni, **Patrick L. Collins,** and Eugene M. Oltz. "Control of Ig gene assembly: lessons from premature activation." *The EMBO journal* 32, no. 10 (2013): 1350-1351.
- **Collins, P.L**., Kyle, K.E., Egawa, T., Shinkai, Y., Oltz, E.M., Moran, J.V. The histone methyltransferase SETDB1 represses endogenous and exogenous retroviruses in B lymphocytes (2015) Proceedings of the National Academy of Sciences of the United States of America, 112 (27), pp. 8367-8372.
- **Collins, P.L**., Purman, C., Porter, S.I., Nganga, V., Saini, A., Hayer, K.E., Gurewitz, G.L., Sleckman, B.P., Bednarski, J.J., Bassing, C.H. and Oltz, E.M., DNA double-strand breaks induce H2Ax phosphorylation domains in a contact-dependent manner. (2020) Nature communications, 11(1), pp.1-9.

Awards/Honors (selected)

- 1R21AI156411-01 (PI: Collins), 07/01/2021 - 06/30/2023, NIH/NIAID, Gene regulatory architecture of CD56bright transitional natural killer cells
- 2006 David K. Shortess Award for Outstanding Undergraduate Student
- 2007-2009 Pre-doctoral training grant, Immunobiology of Blood and Vascular Systems
- 2008-2010 Member: Microbes and Defense Academy Honor Society
- 2012-2014 Post-doctoral fellowship – NIH Training Program in Immunology and Immunogenetics
- 2020 Microbial Infection and Immunity Pilot Funding Program

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Associate Professor, Microbiology
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Education

- University of Calcutta, India M. Sc. Biochemistry
- University of Illinois at Chicago Ph.D. Microbiology
- University of California at Los Angeles Postdoctoral Microbiology

Positions

- 2017-present: Associate Professor, Department of Microbial Infection and Immunity, Ohio State University, Columbus, Ohio.
- 2010-2017: Associate Professor, Department of Microbiology and Immunology Wake Forest Univ. Health Sciences, Winston-Salem, NC.
- July 2003-June 2010: Assistant Professor, Department of Microbiology and Immunology Wake Forest Univ. Health Sciences, Winston-Salem, NC.

Teaching Activities

During my career as an independent faculty investigator, I have trained a large number of students, postdoctoral fellows and junior investigators, including those from underrepresented groups. I have directly supervised 15 post-doctoral fellows/junior faculty, 5 technicians, 8 graduate students (2 URM) and numerous undergraduate students (2 URM) and summer research trainees. Many of my PhD students and post-doctoral fellows are either faculty at universities or industry leaders. I have also served on the thesis committee of 21 PhD students and 4 MS students. In summary, I have long and successful training record, ample experience to lead this training grant and remain deeply committed to mentoring, nurturing and ensuring the development of trainees at all levels to independent scientists and faculty.

Publications (Selected)

- Fullen AR, Yount KS, Dubey P*, **Deora R***. 2020. "Whoop! There It Is: The surprising resurgence of pertussis". *Plos Pathogens*. 16(7):e1008625. PMID:32702023. ∗ **Corresponding authors.**
- Wang P, Huo CX, Lang S, Caution K, Nick ST, Dubey P, **Deora R*** and Huang X*. Chemical Synthesis and Immunological Evaluation of a Pentasaccharide Bearing Multiple Rare Sugars as a Potential Anti-pertussis Vaccine. 2020. *Angew Chem Int Ed Engl.* 59(16):6451-6458. PMID:31953912. ***Corresponding author.**
- Yount KS, Jennings-Gee J, Caution K, Fullen AR, Corps KN, Quataert S, **Deora R** *, Dubey P*. Bordetella Colonization Factor A (BcfA) elicits protective immunity against *Bordetella bronchiseptica* in the absence of an additional adjuvant. 2019. *Infect. Immun.*19:87:e00506-19. PMID:31308083. **Selected for the spotlight section of the Journal.* Corresponding authors.**
- Jennings-Gee J, Quataert S, Ganguly T, D'Agostino R Jr, **Deora R***, **Dubey P***. The adjuvant Bordetella Colonization Factor A attenuates alum-induced Th2 responses and enhances *Bordetella pertussis* clearance from mouse lungs. 2018. *Infect. Immun.* 22:86:e00935-17. PMID: 29531137. **Featured in the spotlight section of the Journal. ∗ Corresponding authors.**

Awards/Honors (selected)

- NIAID 1R21AI156732 Deora (PI) 12/4/2020-11/30/2022

Bordetella cell surface modification and pathogenesis.
The goals of this project is to elucidate the function of the *B. pertussis dra* locus in biofilm formation and pathogenesis and to identify the Bordetella surface factor that is modified by the *dra* locus.

- NIH/NIAID 1R01AI25560-01 Deora/Dubey (MPI) 06/01/2016-5/31/2021

  Enhancing efficacy of pertussis vaccines. The goals of this project are to understand the mechanism of action of the adjuvant, BcfA, and to determine its ability to improve acellular pertussis vaccine-induced protective immunity. Role: PI
- Editor, Pathogens and Disease
- Member, CSR, NIH Review Panel, ZRG1 IMM-R (12) B, Small Business: Immune Responses and Vaccines to Non-HIV Microbial Infections. 07/20.
- Member, CSR, NIH Review Panel, BACP, 06/20
- Member, Review of Centers of Biomedical Research Excellence (COBRE) P20 Applications 2019/10 ZGM1 RCB-4 (C1). 06/19.
- Member, CSR, NIH Review Panel, ZAI1-NVM-M, 03/19
- Member, CSR, NIH reviews Panel, ZRG1 IDM-R (02); 01/19
- Member, NIH Support for Conferences and Scientific Meetings (R13); 2018/05 ZAI1 TS-M (M1) 1; 2018
- Member, Topics in Bacterial Pathogenesis, NIH review panel, 2018/05 ZRG1 IDM-B (80) S. 2018.
- Invited Editor, mBIO. 2017
- Member, NIAID Adjuvant Development BAA panel; 2017
- CSR, NIH, Meeting 2017/10; ZRG1-IDM-T. 2017
- National Institute of General Medical Sciences, Special Emphasis Panel, 2017/10 ZGM1 RCB-4 (S1). SCORE applications, 2017.
- Member, Special Emphasis Panel/Scientific Review Group 2016/05 ZRG1 IMM-R (12)B. 2016
- Member, Special Emphasis Panel/Scientific Review Group 2016/05 ZRG1 IMM-R(90)B. 2016
- Member, NIH Support for Conferences & Scientific Meetings (Parent R13), 2016/01 ZAI1 NVM-M (J2) 1
- Member, Scientific organizing Committee. International *Bordetella* Symposium at Buenos Aires, Argentina. 2016
- Convener and Speaker. “Microbial Glycobiology and Glycobiotechnology”. American Society for Microbiology, 112th General Meeting

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Associate Professor, Microbial Infection and Immunity
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Education

- 1986 The University of Chicago Chicago, IL A.B. (Biology)
- 1996 The University of Chicago Department of Pathology Chicago, IL, Ph.D. (Immunology)
- 1996-1997 Postdoctoral Fellow, University of Chicago, Dept. of Pathology
- 1997-2003 Postdoctoral Fellow, University of California, Dept. of Microbiology & Molecular Genetics

Positions

- The Ohio State University
  - 9/1/2017- present: Associate Professor, Department of Microbial Infection & Immunity College of Medicine
  - 4/1/2018-present: Courtesy faculty, Department of Microbiology, Member, Microbiology Graduate Program College of Arts & Sciences
- Wake Forest School of Medicine
  - 7/2017-9/2017 Associate Professor with tenure, Department of Pathology-Comparative Medicine
  - 7/2015-9/2017 Associate Professor, Department of Pathology-Comparative Medicine
  - 2003-June 2015 Assistant Professor, Department of Pathology-Tumor Biology
  - 10/2003-9/2017 Cross-appointed faculty, Department of Microbiology & Immunology
  - 7/2005-9/2017 Associate faculty, Molecular Medicine and Translational Science Graduate Program
  - 7/2007-9/2017 Cross-appointed faculty, Department of Cancer Biology

Educational Activities (selected)

- Courses: The Ohio State University
  - 2018 CBG7010/MICR7010: Cellular and Molecular Immunology
  - 2019 CBG7010/MICR7010: Cellular and Molecular Immunology
  - 2020 MII7010/MICR7010: Cellular and Molecular Immunology
  - 2021 MEDMCIM 7010: Cellular and Molecular Immunology
  - Oct 2018--2020 Co-director CBG7010/MICR7010: Cellular and Molecular Immunology (Lafuse/Dubey)
  - October 2020-present Co-director MEDMCIM 7010/MICR 7010: Cellular and Molecular Immunology (Dubey/Ghoneim)
  - Fall 2019 IBGP7400 Selected Topics in Microbial Pathogenesis (facilitator for a 2 week block)
  - Fall 2019 Systems and Integrated Biology Journal Club Facilitator for 2 sessions
  - Fall 2019, 2020, 2021 MICR 7110 Microbial Pathogenesis and Immunobiology
- Trainees: The Ohio State University
  - Kacy Yount (Biological Sciences Graduate Program, OSU) (2017-2021) Co-mentor
  - Kyle Caution, PhD (Postdoctoral fellow, 3/2018-9/2021)
  - Jessica Brown (Biological Sciences Graduate Program) October 2018-present
  - Mohamed Shamseldin (Microbiology program) August 2019-present
  - Michael Haught Undergraduate student, 8/2018-12/2019
  - Pranav Rajan Undergraduate student, 6/2019-06/2020
  - Rahul Rodrigues Undergraduate student, 6/2019-8/2019
  - Yash Gupta Undergraduate student, 6/2021-present
  - Emily Thaman Undergraduate student, 6/2021-9/2021
  - Serena Brough MD Class of 2024 5/2021-8/2021

Publications (Selected)

- Seung LP, Rowley DA, **Dubey P** and Schreiber H. 1995. Synergy between T-cell immunity and

inhibition of paracrine stimulation causes tumor rejection. Proc Natl AcadSci USA 1995;92:6254-6258.

- **Dubey P**, Hendrickson RC, Meredith SC, Siegel CT, Skipper JCA, Engelhard VH, Shabanowitz, J, Hunt DF Schreiber H. The immunodominant antigen of an ultraviolet-induced regressor tumor is generated by a somatic point mutation in the DEAD box helicase p68. J Exp Med 1997;185:695-705.
- Wick M, **Dubey P**, Koeppen H, Siegel CT, Fields PE, Fitch FW, Chen L, Bluestone JAand Schreiber H. Antigenic cancer cells can grow progressively in immune hosts without evidence for T cell exhaustion or systemic anergy. J Exp Med 1997;186:229- 238.
- **Dubey P**, Meredith SC, Siegel CT and Schreiber H. Tumor cells induce cytolytic T cellsto a single immunodominant mutant peptide. J Immunother 1998; 21:277-282.
- Ide H, Seligman DB, Memarzadeh S, Xin L, Horvath S, **Dubey P**, Flick MB, KacinskiBM, Palotie A, Witte ON. Expression of colony stimulating factor 1 receptor during prostate development and prostate cancer progression. Proc Natl Acad Sci USA 2002;11:14404-14409.
- **Dubey P**, Su H, Adonai N, Du S, Braun J, Rosato A, Gambhir SS, and Witte ON. Quantitative imaging of the T cell anti-tumor response by positron emission tomography.Proc Natl Acad Sci USA 2003;100:1232-1237.
- Xin L, Ide H, Kim Y, **Dubey P**, Witte ON. In vivo regeneration of murine prostate from dissociated cell populations of postnatal epithelia and urogenital sinus mesenchyme. Proc Natl Acad Sci USA 2003;100:11896-11903.
- Akins, EJ, Moore ML, Tooze JA, Willingham, MC, **Dubey P**. Sequestration of effector cytolytic T cells in prostate tumor stroma is alleviated by concomitant castration and regulatory T cell depletion. *Cancer Research,* 2010. 70:3473-82. Epub April 20th 2010.
- Tang S, Moore ML, Grayson JM, **Dubey P**. Increased CD8+ T cell function followingcastration and immunization is countered by parallel expansion of regulatory T cells.Cancer Res 2012; 72:1975-85. Epub 2012 Feb 28
- Cattelan N, Jennings-Gee J**, Dubey P**, Yantorno O, Deora R. Hyperbiofilm formation by Bordetella pertussis strains correlates with enhanced virulence traits. *Infect Immun.* 2017 Sep 11. pii: IAI.00373-17. doi: 10.1128/IAI.00373-17. Print 2017 Dec
- Caution K, Yount K, Deora R, **Dubey P.** Evaluation of Host-Pathogen Responses andVaccine Efficacy in Mice. *J Vis Exp*. 2019 Feb 22;(144). doi: 10.3791/5893
- Yount KS, Jennings-Gee J, Caution, K. Quataert S, Deora R, **Dubey P**. Bordetella Colonization Factor A (BcfA) elicits protective immunity against Bordetella bronchiseptica in the absence of an additional adjuvant. *Infect Immun*. 2019 Jul 15. pii: IAI.00506-19. doi: 10.1128/IAI.00506-19. [Epub ahead of print] ***Selected for Spotlight**

Awards/Honors (selected)

- NIH/NIAID Dubey, Deora MPI 6/07/2021-5/31/2026 "Identification of novel immunogenic proteins from B. pertussis"
- NIAID, 1R01AI157205-01 4/01/2021-3/31/2026, Amer, Boyaka, Dubey, Seveau (contact) (PIs) "Host Responses to the Pore-Forming Toxin Listeriolysin O"
- Centers for Disease Control Contract 9/01/2020-8/31/2022 75D301-20-R-67837
- NIH/NIAID 3/05/2020-3/04/2022, 1R21AI151867, "Subunit TB vaccines adjuvanted with BcfA"
- NIH/NIAID 6/01/2016-5/31/2022 NCE, 1R01AI125560-04 (Dubey (contact), Deora, M.P.I.) "Enhancing efficacy of pertussis vaccines" PI (contact)
- 2012-2013 Career Development for Women Leaders, Office for Women in Medicine & Science, Wake Forest University
- 2017-2018 FAME Program, The Ohio State University

Adriana Forero, PhD
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Education

- Wesleyan College, Macon, GA BA Biology
- University of Pittsburgh, Pittsburgh, PA PhD Molecular Virology and Microbiology
- University of Washington, Seattle, WA postdoc Bioinformatics/Virology
- University of Washington, Seattle, WA postdoc Immunology

Positions

- 2020-Present Assistant Professor, The Ohio State University, Department of Microbial Infection and Immunity.
- 2020-Present Infectious Disease Institute, The Ohio State University, Columbus, OH, Member.
- 2020-Present Comprehensive Cancer Center, The Ohio State University, Columbus, OH, Member.
- 2019-2020 Immunology Diversity, Equity, and Inclusion Committee, U. of Washington, Seattle, WA

Teaching Activities (selected)

- 2021 Lecturer, MEDMCIM7010 Cell and Molecular Immunology, Cytokine Receptor Signaling, The Ohio State University, Columbus, OH
- 2020-Present Molecular, Cellular and Developmental Biology Graduate Program, The Ohio State University, Columbus, OH
- 2020-Present Biomedical Sciences Graduate Program, The Ohio State University, Columbus, OH
- 2020 - 2021 Rotation Mentor - BGSP 7930, The Ohio State University, Columbus OH
- 2020 International Cytokines and Interferon Society Annual Meeting, Early Career Networking Event, co-organizer
- 2020 International Cytokines and Interferon Society Annual Meeting Symposium Moderator
- 2020 Guest Lecturer, The Ohio State University, Columbus, OH Viruses and Emerging Pathogens Program
- 2019 Guest Lecturer, Seattle Pacific University, Seattle, WA, Biology 3898 - Women in Science
- 2011-2012 Admissions Committee, Interdisciplinary Biomedical Graduate Program (IBGP), School of Medicine, U. of Pittsburgh, Pittsburgh, PA

Publications (Selected)

- Schwerk J, Soveg FW, Ryan AR, Thomas KR, Hatfield LD, Ozarkar S, **Forero A**, Kell AM, Roby JA, So L, Hyde JL, Gale Jr. M, Daugherty MD, Savan R. RNA-binding protein isoforms ZAP-S and ZAP-L have distinct antiviral and immune resolution functions. Nature Immunology. 2019 20,1610–1620. PubMed PMID: 31740798; PubMed Central PMCID: PMC7240801.
- **Forero A**, Ozarkar S, Li H, Lee CH, So L, Hemann EA, Nadjsombati MS, Green R, Roy CN, Sarkar SN, von Moltke J, Anderson SK, Gale Jr. M, Savan, R. Differential activation of the transcription factor IRF1 underlies the distinct immune responses elicited by type I and type III interferons. Immunity. 2019 *51* (3), pp. 451-464.e6. ** Cover and Highlighted article. PubMed PMID: 31471108; PubMed Central PMCID: PMC7447158.
- Joslyn, RC, **Forero A**, Green R, Parker SE, Savan R. Long noncoding RNA signature induced by TLR7 and type I IFN signaling in activated human plasmocytoid dendritic cells. JICR. *2018*

Sep;38(9):388-405. PubMed PMID: 30230983; PubMed Central PMCID: PMC6157384.

- Zhu J, Zhang Y, Gosh A, Cuevas RA, **Forero A**, Dhar J, Ibsen MS, Schmid-Burgk JL, Schmidt T, Ganapathiraju MK, Fujita T, Hartmann R, Barik S, Hornung V, Coyne CB, Sarkar SN. Antiviral activity of human OASL protein is mediated by enhancing signaling of the RIG-I RNA sensor. Immunity. 2014 Jun 19; 40(6):936-48. PubMed PMID: 24931123; PubMed Central PMCID: PMC4101812.
- Olejnik J, **Forero A**, Deflubé LR, Hume AJ, Manhart WA, Nishida A, Marzi A, Katze MG, Ebihara H, Rasmussen AL, Mühlberger E. Ebolaviruses Associated with Differential Pathogenicity Induce Distinct Host Responses in Human Macrophages. Journal of Virology. 2017 91: e00179-17. PubMed PMID: 28331091; PubMed Central PMCID: PMC5432886.
- Koday MT, Leonard JA, Munson P, **Forero A**, Koday M, Bratt DL, Fuller JT, Murnane R, Qin S, Reinhart TA, Duus K, Messaoudi I, Hartman AL, Stefano-Cole K, Morrison J, Katze MG, Fuller DH. Multigenic DNA vaccine induces protective cross-reactive T cell responses against heterologous influenza virus in nonhuman primates. PLoS One. 2017 Dec 21;12(12): e0189780. PubMed PMID: 29267331; PubMed Central PMCID: PMC5739435.
- **Forero A**, Fenstermacher K, Wohlgemuth N, Nishida A, Carter V, Smith EA, Peng X, Hayes M, Francis D, Treanor J, Morrison J, Klein SL, Lane A, Katze MG, Pekosz A. Evaluation of the innate immune responses to influenza and live-attenuated influenza vaccine infection in primary differentiated human nasal epithelial cells. Vaccine. 2017 Oct 27;35(45):6112-6121. PubMed PMID: 28967519; PubMed Central PMCID: PMC5647870.
- **Forero A**, Tisoncik-Go J, Watanabe T, Zhong G, Hatta M, Tchitchek N, Selinger C, Chang J, Barker K, Morrison J, Berndt JD, Moon RT, Josset L, Kawaoka Y, Katze MG. The 1918 Influenza Virus PB2 Protein Enhances Virulence through the Disruption of Inflammatory and Wnt-Mediated Signaling in Mice. Journal of Virology. 2015 90:2240-2253. PubMed PMID: 26656717; PubMed Central PMCID: PMC4810726.
- **Forero A**, McCormick KD, Giacobbi NS, Gjoerup OV, Bakkenist CJ, Pipas JM, Sarkar SN. Simian virus 40 large T antigen induces IFN-stimulated genes through ATR kinase. Journal of Immunology. 2014 Jun 15; 192(12):5933-42. PubMed PMID: 24799566; PubMed Central PMCID: PMC4078001.
- **Forero A**, McCormick KD, Jenkins F, Sarkar SN. Downregulation of IRF4 induces lytic reactivation of KSHV in primary effusion lymphoma cells. Virology. 2014 Jun; 458-459:4-10. PubMed PMID: 24928034; PubMed Central PMCID: PMC4058074.
- **Forero A**, Moore PS, Sarkar SN. Role of IRF4 in IFN-stimulated gene induction and maintenance of Kaposi sarcoma-associated herpesvirus latency in primary effusion lymphoma cells. Journal of Immunology. 2013 Aug 1; 191(3):1476-85. PubMed PMID: 23804715; PubMed Central PMCID: PMC3740746.

Awards/Honors (selected)

- 2017 Keystone Symposia Scholarship, Mitochondria, Metabolism and Heart, Santa Fe, NM
- 2013 National Graduate Student Research Conference, National Institutes of Health, Bethesda MD, Oct 6-8
- Minneapolis, MN
- 2003 Mortar Board, National Senior Honor Society, Wesleyan College, Macon, GA
- 2002 Tri-Beta National Biological Honor Society, Wesleyan College, Macon, G

Aharon Freud, MD, PhD
Associate Professor, Department of Pathology
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Education

- University of Wisconsin, Madison, WI BS Genetics
- The Ohio State University, Columbus, OH PHD Immunology
- The Ohio State University, Columbus, OH MD Medicine
- Stanford University, Stanford, CA Resident Anatomic Pathology
- Stanford University, Stanford, CA Fellow Hematopathology
- Stanford University, Stanford, CA Resident Clinical Pathology

Positions

- 2020 - Present Associate Professor, Department of Pathology, The Ohio State University, Columbus, OH
- 2020 - Present Member, The Ohio State University Comprehensive Cancer Center Pelotonia Institute for Immuno-Oncology, Columbus, OH
- 2018 - Present Member, Scientific Review Committee, Oncology Research Information Exchange Network
- 2013 - 2020 Assistant Professor, Department of Pathology, The Ohio State University, Columbus, OH
- 2012 - 2013 Chief Resident for Clinical Pathology, Department of Pathology, Stanford University, Stanford, CA

Courses Taught (selected)

- 2016 – present BSGP-8999, Dissertation Research, Biomedical Sciences Graduate, Program, The Ohio State University, Columbus, Ohio

Trainees Advised (selected)

- 09/2021 – present Candidacy Committee Member for Erin Jeremy, Mundy-Bosse Lab, Biomedical Sciences Graduate Program, The Ohio State UniversityMedical Scientist Training Program, Columbus, Ohio.
- 05/2021 – present **Graduate Thesis Advisor** and Committee Member for Michael Ruesch, Biomedical Sciences Graduate Program, The Ohio StateUniversity Medical Scientist Training Program, Columbus, Ohio.
- 10/2020 – present **Graduate Thesis Advisor** and Committee Member for Caprice Eisele, Biomedical Sciences Graduate Program, The Ohio State University, Columbus, Ohio.
- 03/2018 – present **Graduate Thesis Advisor** and Committee Member for Matthew Lordo, Biomedical Sciences Graduate Program, The Ohio State University Medical Scientist Training Program, Columbus, Ohio.
- 09/2017 – 02/2020 Candidacy Committee and Thesis Committee Member for Brooke Benner, Carson Lab, Biomedical Sciences Graduate Program, TheOhio State University, Columbus, Ohio.
- 09/2016 – 10/2017 Thesis Committee Member for Hannah Komar, Lesinski Lab, Biomedical Sciences Graduate Program, The Ohio State University,Columbus, Ohio.
- 07/2016 – 03/2019 **Graduate Thesis Advisor** and Committee Member for Luxi Chen (Thesis successfully defended March 1, 2019), Biomedical SciencesGraduate Program, The Ohio State University Medical Scientist Training Program, Columbus, Ohio.
- 05/2016 – present Mentor, Medical Scientist Training Program Mentor Academy, The Ohio State

University, Columbus, Ohio. MSTP Mentees:
  - Megan Pino (07/2017 – present).
  - Aaren Kettelhut (05/2016 – present).

- 05/2016 – 02/2021 **Graduate Thesis Advisor** and Committee Member for Ansel P. Nalin (Thesis successfully defended February 11, 2021), Biomedical Sciences Graduate Program, The Ohio State University Medical Scientist Training Program, Columbus, Ohio.

Publications (Selected)

- Scoville SD, Mundy-Bosse BL, Zhang MH, Chen L, Zhang XL, Keller KA, Hughes T, Cheng S, Bergin SM, Mao HY, McClory S, Carson, WE III, Caligiuri MA, **Freud AG**. A Progenitor Cell Expressing Transcription Factor RORyt Generates All Human Innate Lymphoid Cell Subsets. ***Immunity***. 2016 May 17;44(5):1140-50. PMID: 27178467.
- **Freud, AG***, Keller, K, Scoville S, Mundy-Bosse, BL, Cheng, S, Hughes, T, Zhang, X, Mo, X, Porcu, P, Baiocchi, R, Yu, J, Carson, WE, Caligiuri, MA. NKp80 defines a Critical Step during Human Natural Killer Cell Development. ***Cell Reports***. 2016 Jul 12;16(2):379-91. (***corresponding**) PMID: 27373165.
- Chen L, Youssef Y, Robinson C, Ernst GF, Carson MY, Young KA, Scoville SD, Zhang X, Harris R, Sekhri P, Mansour AG, Chan WK, Nalin AP, Mao HC, Hughes T, Mace EM, Pan Y, Rustagi N, Chatterjee SS, Gunaratne PH, Behbehani GK, Mundy-Bosse BL, Caligiuri MA, **Freud AG**. CD56 expression marks human group 2 innate lymphoid cell divergence from a shared NK cell and group 3 innate lymphoid cell developmental pathway. ***Immunity.*** 2018 Sep 18;49(3):464-476. PMID: 30193847.
- Nalin AP, Kowalski JJ, Sprague AC, Schumacher BK, Gerhardt AG, Youssef Y, Vedantam KV, Zhang X, Siebel CW, Mace EM, Caligiuri MA, Mundy-Bosse BL, **Freud AG**. Notch Regulates Innate Lymphoid Cell Plasticity during Human NK Cell Development. ***J Immunol***. 2020 Nov 15;205(10):2679-2693. PMID: 33020148.
- Lordo MR, Wu KG, Altynova E, Shilo N, Kronen P, Nalin AP, Weigel C, Zhang X, Yu J, Oakes CC, Caligiuri MA, **Freud AG***, Mundy-Bosse BL*. Acute Myeloid Leukemia Alters Group 1 Innate Lymphoid Cell Differentiation from a Common Precursor. *J Immunol*. 2021 Aug 20:ji2100023. doi: 10.4049/jimmunol.2100023. Online ahead of print. (**shared correspondence**) PMID: 34417259.
- Moreno-Nieves UY, Tay JK, Saumyaa S, Horowitz NB, Shin JH, Mohammad IA, Luca B, Mundy DC, Gulati GS, Bedi N, Chang S, Chen C, Kaplan MJ, Rosenthal EL, Holsinger FC, Divi V, Baik FM, Sirjani DB, Gentles AJ, Newman AM, **Freud AG**, Sunwoo JB. Landscape of innate lymphoid cells in human head and neck cancer reveals divergent NK cell states in the tumor microenvironment. *Proc Natl Acad Sci USA*. 2021 Jul 13;118(28):e2101169118. PMID: 34244432.

Awards/Honors (selected)

- Research Grants
  - L30 CA199447-06, Freud (PI), 7/01/15-06/30/22, Human innate lymphoid cell development in health and cancer (Role: PI)
  - R01 CA208353-01, Freud (PI), 02/01/17-01/31/22, Elucidation of Human Natural Killer Cell Development (Role: PI)
- Honors
  - 2020 Distinguished Research Mentor Award, Biomedical Sciences Graduate Program, The Ohio State University
  - 2018 Clinical Pathology Faculty Teaching Award, Department of Pathology, The Ohio State University

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Education

- Virginia Polytechnic Institute and State University, Blacksburg, VA., B.S., Biology
- Case Western Reserve University, Cleveland, OH. Dept of Molecular Biology and Microbiology Ph.D., Microbiology and Molecular Biology
- Case Western Reserve University, Cleveland, OH. Division of Infectious Diseases and HIV Research Postdoctoral Training, Immunology/Infectious Diseases

Positions

- Fall 2013-Summer 2018 Assistant Professor-Tenure track Department of Health and Rehabilitation Sciences, Division of Medical Laboratory Science, Ohio State University College of Medicine
- Summer 2018-Current Associate Professor- with Tenure Department of Health and Rehabilitation Sciences, Division of Medical Laboratory Science, Ohio State University College of Medicine

Courses Taught (selected)

- Co-Course Director: Phlebotomy (MLS 4505)
  School of Health and Rehabilitation Sciences, Division of Medical Laboratory Science, The Ohio State University, Fall Semester 2019
  Laboratory course on the proper technique for drawing venous blood samples from human subjects.
- Course Director: Responsible Conduct of Research and Biomedical Ethics (HTHRHSC 7883)
  School of Health and Rehabilitation Sciences, Division of Medical Laboratory Science, The Ohio State University, Summer Semester 2017-Current
  Discussion of ethical issues in scientific research. Topics include: research misconduct, clinical trial design, human and animal subjects training, and managing conflicts of interest.
- Co-Course Director: Clinical Immunology (MEDLBS 5200)
  School of Health and Rehabilitation Sciences, Division of Medical Laboratory Science, The Ohio State University, Spring Semester 2016-Current
  Introduce Medical Laboratory Science students to the core concepts of Immunology, their application to disease pathogenesis, and their usage in the monitoring of immunologic status in health and disease.
- Co-Course Director: Molecular Diagnostics Lecture and Laboratory courses (MEDLBS 5400/5405)
  School of Health and Rehabilitation Sciences, Division of Medical Laboratory Science, The Ohio State University, Spring Semester 2014-2015, Fall 2015- 2018
  Introduce Medical Laboratory Science students to the core concepts of Molecular Biology Techniques, their application to disease diagnosis in the Clinical Laboratory Diagnostic tests. In the laboratory section, students will perform various common molecular biology techniques/applications in the lab section of the course.

Trainees Advised (selected)

- **Advising:**
  Sahera Dirajlal-Fargo NICHD K23/Research Mentor Fall 2016 -Fall 2021

Emily Bowman	Postdoctoral Fellow	Spring 2015-Spring '21

- **Student Advising: Ohio State University**

Aya Cannon	Undergraduate Researcher	Fall 2021-
Kayla Hudson	Undergraduate Researcher	Spring 2020-Fall 2021
Aveen Saeed	Undergraduate Researcher	Spring 2019-Spring '21
Aaren Kettlehut	M.D. Ph.D. Student	Spring 2018-
Lane Hornsby	Undergraduate Researcher	Fall 2018-Spring 2019
Frances Avila-Sota	Undergraduate Honors Student	Spring 2017- Fall 2019
Chloe Smith	Undergraduate Researcher	Spring 2017-Spr 2018
Peter Yeager	Undergraduate Researcher	Sum 2016-Sum 2017
Sylvia Phimsouay	Master's Thesis Student	Fall 2015-Sum 2017
Taylor Amburgy	Undergraduate Researcher	Fall 2014-Spring 2015
Morgan Boucher	Master's Thesis Student	Sum 2014-Spring 2015

Publications (selected)

- E. Bowman, M. Kulkarni, J. Gabriel, M. Cichon, K. Riedl, M. Belury, J. Lake, B. Richardson, C. Cameron, M. Cameron, S. Koletar, M. Lederman, S. Sieg, **N. Funderburg** 2019 "Altered Lipidome Composition is Related to Markers of Monocyte and Immune Activation in Antiretroviral Therapy Treated Human Immunodeficiency Virus (HIV) infection and in Uninfected Persons." *Front. Immunol*. 10:785. doi: 10.3389/fimmu.2019.00785
- Belury, M. Bowman, E. Gabriel, J. Snyder, B. Kulkarni, M. Palettas, M, Mo, X. Lake, J.E. Zidar, D.A. Sieg, S.F. Rodriguez, B. Playford, M.P. Andrade, A. Kuritzkes, D. R. Mehta, N.N. Lederman, M.M., **Funderburg, N.T.** Prospective Analysis of Lipid Compositional Changes with Antiretroviral Therapy and Immune Activation in Persons Living with HIV. *Pathogens and Immunity*. 2017;2(3):376-403. doi: 10.20411/pai.v2i3.218
- **Funderburg, N.T**. Clagett, B. Xu, D. Playford, M. Andrade, A. Kuritzkes, D. Lederman, M.L. Mehta, N.N. Treatment of HIV Infection with a raltegravir-based regimen increases LDL levels, but Improves HDL cholesterol efflux capacity. *Antiviral Therapy*. 2017; 22(1):71-75.; PMID: 27740536
- **Funderburg N**, Mayne E, Sieg S, Asaad R, Jiang W, Kalinowska M, Luciano A, Stevens W, Rodriguez B, Brenchley J, Douek D, and Lederman M. Increased tissue factor expression on circulating monocytes in chronic HIV infection: relationship to *in vivo* coagulation and immune activation. (Plenary paper) *Blood* 2010 Jan14;115(2):161-7.PMC19828697.
- **Funderburg N**, Zidar DA, Shive S, Lioi A, Mudd J, Musselwhite LW, Simon DI, Costa MA, Rodriguez B, Sieg SF, Lederman MM. Shared monocyte phenotype linked to predictors of mortality in HIV-1 infection and the acute coronary syndrome in uninfected subjects. *Blood.* 2012 Nov 29;120(23):4599-608. doi: 10.1182/blood-2012-05-433946. Epub 2012 Oct 11. PMC3512236

Awards/Honors (selected)

- Research Funding
  - R01 HL158592 (multi-PI: Funderburg), 09/15/2021-08/31/2025, Ohio State University, Plaque and blood derived macrophages: a multi-omic assessment of CVD pathogenesis in PLWH

- Honors
  - Keystone Symposia Conference on HIV Pathogenesis
  - 2016 School of Health and Rehabilitation Sciences Outstanding Young Investigator Award Ohio State University

Hazem Ghoneim, PhD
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Education

- College of Pharmacy, Cairo University B.Sc. Pharm. Pharmaceutical Sciences
- University of Tennessee Health Science Center Ph.D Microbiology and Immunology
- St. Jude Children's Research Hospital Post-Doc Immunology

Positions

- Apr 2019–Present, Assistant Professor, Department of Microbial Infection and Immunity, College of Medicine, the Ohio State University, Columbus, OH, USA

Courses Taught (selected)

- Co-Director of "Cellular and Molecular Immunology"- MEDMCIM 7010 (Spring 2021)
- "Immunology and Inflammation" course, the Signature Program Translational Science- BSGP 8800.01 (Fall 2019-present)
- "Cellular and Molecular Immunology"- MEDMCIM 7010 (Spring 2020-present)
- MEDMCIM 8010 "Selected Topics in Advanced Immunology" (Fall 2020)
- BSGP 7000 "Concepts in Biomedical Science—Block 3: Host Defense" (Fall 2020)

Trainees Advised (selected)

- Dec 2019–Present Kaitlin Read, PhD Student in the Biomedical Sciences Graduate Program, the Ohio State University, Columbus, OH (Thesis and Mentorship Committees)
- Dec 2019–Present Anqi Li, PhD Student in the Biomedical Sciences Graduate Program, the Ohio State University, Columbus, OH (Thesis Committee)
- Jul 2020–Present Shihyoung Kim, PhD Student in the Veterinary Biosciences Program, the Ohio State University, Columbus, OH (Thesis Committee)
- Jul 2020–Present Weiwei Liu, PhD Student in the Molecular, Cellular, and Developmental Biology Program, the Ohio State University, Columbus, OH (Thesis Committee)
- Oct 2020–Present Devin Jones, PhD Student in the Biomedical Sciences Graduate Program, the Ohio State University, Columbus, OH (Thesis Committee)
- Apr 2021–Present Rhiannon Bates, PhD Student in the Biomedical Sciences Graduate Program, the Ohio State University, Columbus, OH (Thesis Committee)
- Mar 2021–Present Roya Shahinfar, Undergraduate Student, Health Sciences Program, the Ohio State University, Columbus, OH
- Aug 2019–Present Parker Bauman, Undergraduate Student, Honors Neuroscience Program-Pre-Medical Track, the Ohio State University, Columbus, OH
- Aug 2019–July 2021 Nicole Osborne, Undergraduate Student, Microbiology Program, the Ohio State University, Columbus, OH

Publications (selected)

- **Ghoneim, H. E.**; and McCullers, J. A. (**2014**) "Adjunctive Corticosteroid Therapy Improves Lung Immunopathology and Survival during Severe Secondary Pneumococcal Pneumonia in Mice." ***Journal of Infectious Diseases***; 209(9): 1459-68.

- **Ghoneim, H. E.**; Thomas, P. G.; and McCullers, J. A. (**2013**). "Depletion of Alveolar Macrophages during Influenza Infection Facilitates Bacterial Superinfections." ***Journal of Immunology***; 191(3): 1250-59. PMCID: PMC4907362
- Marcelin, G.; Aldridge, J. R.; Duan, S.; **Ghoneim, H. E.**; Rehg, J.; Marjuki, H.; Boon, A. C.; McCullers, J. A.; and Webby, R. J. (**2011**). "Fatal Outcome of Pandemic H1N1 2009 Influenza Virus Infection is Associated with Immunopathology and Impaired Lung Repair, Not Enhanced Viral Burden, in Pregnant Mice." ***Journal of Virology***; 85(21):11208-19. PMCID: PMC3194964
- Ellebedy, A. H.; Lupfer, C.; **Ghoneim, H. E.**; DeBeauchamp, J.; Kanneganti, T. D.; and Webby, R. J. (**2011**). "Inflammasome-Independent Role of the Apoptosis-associated Speck-like Protein Containing CARD (ASC) in the Adjuvant Effect of MF59." ***Proc Natl Acad Sci USA***; 108(7):2927-32. PMCID: PMC3041074
- Yousif, A.; **Ghoneim, H. E.** (**2021**) "T Cell Exhaustion-A Memory Locked Behind Scars." ***Nature Immunology***; 22(8):938-940.
- Alfei, F.; Kanev, K.; Hofmann, M.; Wu, M.; **Ghoneim, H. E**.; Roelli, P.; Utzschneider, D.T.; von Hösslin, M.; Cullen, J.; Fan, Y.; Eisenberg, V.; Wohlleber, D.; Steiger, K.; Merkler, D.; Delorenzi, M.; Knolle, P.A.; Cohen, C. J.; Thimme, R.; Youngblood, B.; and Zehn, D. (**2019**) "Tox Reinforces the Phenotype and Longevity of Exhausted T-Cells in Chronic Viral Infection." ***Nature***; 571(7764): 265-269.
- **Ghoneim, H. E.**; Fan, Y.; Moustaki, A.; Abdelsamed, H. A.; Dash, P.; Dogra, P.; Carter, R.; Awad, W.; Neale, G.; Thomas, P. G.; and Youngblood, B. (**2017**) "De Novo Epigenetic Programs Inhibit PD-1 Blockade-Mediated T-Cell Rejuvenation." ***Cell***; 170(1): 142-157. PMCID: PMC5568784
- **Ghoneim, H. E.**; Zamora, A.; Thomas, P. G.; and Youngblood, B. (**2016**) "Cell-Intrinsic Barriers of T Cell-Based Immunotherapy." ***Trends in Molecular Medicine***; 22(12): 1000-1011. PMCID: PMC5135632
- Fonseca, R.; Beura, L.K.; Quarnstrom, C.F.; **Ghoneim, H.E.**; Fan, Y.; Zebley, C.C.; Scott, M.C.; Fares-Frederickson, N.J.; Wijeyesinghe, S.; Thompson, E.A.; Borges da Silva, H.; Vezys, V.; Youngblood, B.; Masopust, D. "Developmental Plasticity Allows Outside-In Immune Responses by Resident Memory T Cells." ***Nature Immunology***; 21(4):412-421. PMCID: PMC7096285
- Abdelsamed, H. A.; Zebley, C.C.; Nguyen, h.; Rutishauser, R.L.; Fan, Y.; **Ghoneim, H. E.**; Crawford, J.C.; Alfei, F.; Alli, S.; Ribeiro, S.P.;, Castellaw, A.; McGargill, M.A.; Jin, H.; Boi, S.K.; Speake, C.; Serti, E.; Turka, L.A.; Busch, M.E.; Stone, M.; Deeks, S.G.; Sekaly, R.P.; Zehn, D.; James, E.; Nepom, G.T; Youngblood, B. "Beta Cell-Specific CD8 T Cells Maintain Stem Cell Memory-Associated Epigenetic Programs during Type 1 Diabetes." ***Nature Immunology***; **21(5):578-87. PMCID: PMC7183435**
- Youngblood, B.; Hale, J. S.; Kissick, H. T.; Ahn, E.; Xu, X.; Wieland, A.; Araki, K; West, E. E.; **Ghoneim, H. E.**; Fan, Y.; Dogra, P.; Davis, C. W.; Konieczny, B. T.; Antia, R.; Cheng, X; and Ahmed, R. (**2017**) "Effector CD8 T Cells Dedifferentiate into Long-Lived Memory Cells." ***Nature***; 552(7685): 404-409. PMCID: PMC5965677
- Abdelsamed, H. A.; Moustaki, A.; Fan, Y.; Dogra. P.; **Ghoneim, H. E.**; Zebley, C.; Triplett, B.; Sekaly, R. P.; Youngblood, B. (**2017**) "Human Memory CD8 T-Cell Effector-Potential is Epigenetically Preserved during In Vivo Homeostasis" ***Journal of Experimental Medicine***; 214(6): 1593-1606. PMCID: PMC5461005

Awards/Honors (selected)

- Apr 2018, Young Scientist Award, The World Academy of Sciences for the advancement of science in developing countries (TWAS)/BioVision Alexandria.NXT 2018 Conference, Alexandria, Egypt
- Oct 2016, Keynote Speaker, Statewide Communicable and Environmental Diseases and Emergency Preparedness (CEDEP) Meeting, Nashville, TN, USA

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Education

- Virginia Tech, Blacksburg, VA BS Animal Science and Chemistry
- North Carolina State University, Raleigh, NC MS Poultry Science and Immunology
- North Carolina State University, Raleigh, NC PHD Immunology and Toxicology
- Duke University Medical Center (S.M. Palmer) Postdoctoral Transplant Immunology
- NIEHS/NIH (M.B. Fessler) Postdoctoral Respiratory Biology

Positions

- 2020 – present Associate Professor with tenure, Division of Pulmonary, Allergy, Critical Care, and Sleep Medicine, Department of Internal Medicine, Ohio State University, Columbus, OH
- 2020 – present Courtesy faculty member of the Department of Microbial Infection and Immunity, Department of Medicine, Ohio State University, Columbus, OH
- 2020 – present Adjunct faculty member of the Division of Environmental Health Sciences, College of Public Health, Ohio State University, Columbus, OH
- 2014- 2020 Assistant Professor, Department of Pharmacology and Toxicology, East Carolina University, Brody School of Medicine, Greenville, NC.

Courses Taught (selected)

- Lecturer in Biomedical Sciences Graduate Program Immunology Block (BSGP 7000) at Ohio State University (Fall 2020- present).
- Lecturer in Biochemistry/Bioenergetics II: Regulation of Metabolism (BIOC/KINE 8320) - "Lipid Metabolism, Inflammation & Immunity" at East Carolina University under the direction of Dr. Carol Witzack (Spring 2018- Spring 2020).
- Lecturer in Physiological Proteogenomics (PHYS 7704) – "Principles of Flow Cytometry" at East Carolina University under the direction of Dr. Joesph McClung (Spring 2016- Spring 2019).
- Lecturer in Cell Biology (BIOL 7480/7481) - "Principles of Flow Cytometry" at East Carolina University under the direction of Dr. Elizabeth Ables (Fall 2015).
- Lecturer in Fundamentals of Toxicology (TOX 701) - "Immunotoxicology" at North Carolina State University under the direction of Dr. Seth Kullman (Fall 2012 and 2013).
- Lecturer in Principles of Toxicology (PHAR 7680) - "Immunotoxicology" at East Carolina University under the direction of Dr. Jamie DeWitt (Fall 2012).
- Primary Coordinator for Advanced Topics in Immunology (IMM 816) at North Carolina State University- Lead and coordinated the schedule on Dendritic Cell Biology (Spring 2007).

Trainees Advised (selected)

- Dr. Katelyn Dunigan-Russell, Ohio State University, June 2020-present. Michael Yaeger, PhD student, Ohio State University, May 2020-present.
- Hannah Hartlzer, PhD student, Ohio State University, May 2021-present.
- Dr. Brita Kilburg-Basnyat, Postdoctoral Associate, East Carolina University, March 2015-June 2018 (currently a project manager at Covance Inc).
- Christine Psaltis, PhD student, East Carolina University, October 2016-January 2020, PhD obtained in Pharmacology and Toxicology at East Carolina University (currently employed at Rho, Inc).

- Myles Hodge, PhD student, East Carolina University, May 2015-March 2020, PhD obtained in Pharmacology and Toxicology at East Carolina University (currently employed at United States Environmental Protection Agency).
- Michael Yaeger, Masters Student, East Carolina University, May 2015-May 2018, Biomedical Engineering at East Carolina University. Recipient of Undergraduate Research and Creativity Award Fall 2015 (currently a PhD student at Ohio State University).

Publications (selected)

- **Gowdy K**, Krantz QT, Daniels M, Linak WP, Jaspers I, Gilmour MI. Modulation of pulmonary inflammatory responses and antimicrobial defenses in mice exposed to diesel exhaust. Toxicol Appl Pharmacol. 2008 Jun 15;229(3):310-9. PubMed PMID: 18343473.
- **Gowdy KM**, Krantz QT, King C, Boykin E, Jaspers I, Linak WP, Gilmour MI. Role of oxidative stress on diesel-enhanced influenza infection in mice. Part Fibre Toxicol. 2010 Nov 22;7:34. PubMed PMID: 21092162; PubMed Central PMCID: PMC3001415.
- **Gowdy KM**, Martinu T, Nugent JL, Manzo ND, Zhang HL, Kelly FL, Holtzman MJ, Palmer SM. Impaired CD8(+) T cell immunity after allogeneic bone marrow transplantation leads to persistent and severe respiratory viral infection. Transpl Immunol. 2015 Jan;32(1):51-60. PubMed PMID: 25446809; PubMed Central PMCID: PMC4277946.
- **Gowdy KM**, Cardona DM, Nugent JL, Giamberardino C, Thomas JM, Mukherjee S, Martinu T, Foster WM, Plevy SE, Pastva AM, Wright JR, Palmer SM. Novel role for surfactant protein A in gastrointestinal graft-versus-host disease. J Immunol. 2012 May 15;188(10):4897-905. PubMed PMID: 22508928; PubMed Central PMCID: PMC3373011.
- **Gowdy KM**, Nugent JL, Martinu T, Potts E, Snyder LD, Foster WM, Palmer SM. Protective role of T-bet and Th1 cytokines in pulmonary graft-versus-host disease and peribronchiolar fibrosis. Am J Respir Cell Mol Biol. 2012 Feb;46(2):249-56. PubMed PMID: 21960548; PubMed Central PMCID: PMC3297167.
- **Gowdy KM**, Madenspacher JH, Azzam KM, Gabor KA, Janardhan KS, Aloor JJ, Fessler MB. Key role for scavenger receptor B-I in the integrative physiology of host defense during bacterial pneumonia. Mucosal Immunol. 2015 May;8(3):559-71. PMID:25336169. PMCID: PMC4406784.
- Draper DW, **Gowdy KM**, Madenspacher JH, Wilson RH, Whitehead GS, Nakano H, Pandiri AR, Foley JF, Remaley AT, Cook DN, Fessler MB. ATP binding cassette transporter G1 deletion induces IL-17-dependent dysregulation of pulmonary adaptive immunity. J Immunol. 2012 Jun 1;188(11):5327-36. PubMed PMID: 22539789.

Awards/Honors (selected)

- Research Funding
  - R01ES031378, Gowdy (PI), Shaikh (Co-PI), 05/20/2020-02/28/2025, Dietary DHA mitigates ozone induced pulmonary inflammation
  - R01ES028829, Gowdy (PI), 06/01/2018-05/31/2023, Novel role for CD163 in ozone induced alterations of pulmonary immunity
- Honors
  - 2021 President and Provost's Leadership Institute, The Ohio State University
  - 2021 Honorary Membership Award in Research Excellence, Graduate Women in Science
  - 2020 Editorial board for Journal of Immunology
  - 2016 Outstanding Young Investigator Award, Immunotoxicology Specialty Section, Society of Toxicology
  - 2015 Walter A. Rosenblith New Investigator Award, Health Effects Institute
  - 2015 Travel for Techniques, American Association of Immunologists

Mireia Guerau-de-Arellano, PharmD, PhD
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Education

- University of Barcelona, Barcelona, Barcelona PharmD Pharmacy
- Tufts University-Sackler School, Boston, MA PhD Immunology
- Harvard University, Boston, MA Postdoctoral Fellow Immunology
- Ohio State University, Columbus, OH Postdoctoral Fellow Neuroimmunology

Positions

- 2018 – Present Associate Professor with tenure, Division of Medical Laboratory Science-Health and Rehabilitation Sciences, Department of Microbial Infection and Immunity & Department of Neuroscience, The Ohio State University, Columbus, OH
- 2016 – Present Member, Institute of Behavioral Medicine Research, The Ohio State University, Columbus, OH
- 2018 – Present Biomedical Sciences Graduate Program (BSGP), Immunology Emphasis Co-Leader and BSGP Graduate Studies Committee
- 2018-Present Standing member, NIH HAI Study Section
- 2017-Present American Association of Immunologists Minority Affairs Committee
- 2013 – 2018 Assistant Professor (tenure-track), Division of Medical Laboratory Science-Health and Rehabilitation Sciences, Department of Microbial Infection and Immunity & Department of Neuroscience, The Ohio State University, Columbus, OH
- 2012 – 2013 Research Assistant Professor, Neurology Dpt., The Ohio State University, Columbus, OH

Teaching Activities (selected)

- My training is rigorous and founded on both institutional and in-lab unbiased experimental design and data/statistical analysis training. My training plan for each student is based on their career trajectory and goals and is founded on evidence-based information gathered through an Individual Development Plan updated yearly. Among graduate mentee accomplishments, BSGP student Lindsay Webb was awarded the Systems Integrative Biology (SIB) and Presidential fellowship, the most prestigious graduate student fellowship at OSU, and graduated within 4 years. A second graduate student is slated to defend in Fall 2021, with at least three first-author publications and additional co-author publications. Overall, my experiences and environment are aligned to provide a nurturing and diverse environment and develops excellent, diverse and resilient scientists that lead the next generation of human health discoveries

Publications (Selected)

- **Guerau-de-Arellano M**, Smith KM, Godlewski J, Liu Y, Winger R, Lawler SE, Whitacre CC, Racke MK, Lovett-Racke AE. Micro-RNA dysregulation in multiple sclerosis favours pro-inflammatory T-cell-mediated autoimmunity. Brain. 2011 Dec;134(Pt 12):3578-89. PMCID: PMC3235556.
- Lindsay Webb, Stephanie Amici, Kyle Jablonski, Himanshu Savardekar, Amanda Panfil, Linsen Li, Wei Zhou, Kevin Peine, Vrajesh Karkhanis, Eric Bachelder, Kristy Ainslie, Patrick Green, Chenlong Li, Robert Baiocchi and **Mireia Guerau-De-Arellano**. PRMT5-Selective Inhibitors Suppress Inflammatory T Cell Responses and Experimental Autoimmune Encephalomyelitis. The Journal of Immunology. 2017 Feb 15;198(4):1439-1451. PMCID: PMC5292587. This article was featured on the cover.

- Lindsay Webb, Shouvonik Sengupta, Claudia Edell, Zayda Piedra-Quintero, Stephanie Amici, Janiret Narvaez-Miranda, Makenzie Bevins, Austin Kennemer, Georgios Laliotis, Philip Tsichlis and **Mireia Guerau-de-Arellano**. Protein arginine methyltransferase 5 promotes cholesterol biosynthesis-mediated Th17 responses and autoimmunity. The Journal Of Clinical Investigation. J Clin Invest 2020. PMCID: PMC7108896.
- Jablonski KA, Gaudet AG, Amici SA, Popovich P, **Guerau-de-Arellano M**. Control of the Inflammatory Macrophage Transcriptional Signature by miR-155. PLoS One. 2016; 11(7):e0159724. PMCID: PMC4957803.
- Amici SA, Young NA, Narvaez-Miranda J, Jablonski KA, Arcos J, Rosas L, Papenfuss TL, Torrelles JB, Jarjour WN, **Guerau-de-Arellano M**. CD38 Is Robustly Induced in Human Macrophages and Monocytes in Inflammatory Conditions. Frontiers Immunology 2018; 9:1593. PMCID: PMC6048227.
- Jablonski KA, Amici SA, Webb LM, Ruiz-Rosado Jde D, Popovich PG, Partida-Sanchez S, **Guerau-de-Arellano M**. Novel Markers to Delineate Murine M1 and M2 Macrophages. PLoS One. 2015;10(12):e0145342. PMCID: PMC4689374.
- **Guerau-de-Arellano M**, Huber BT. Development of autoimmunity in Lyme arthritis. Curr Opin Rheumatol. 2002 Jul;14(4):388-93. PMID: 12118172.
- **Guerau-de-Arellano M**, Alroy J, Huber BT. Beta2 integrins control the severity of murine Lyme carditis. Infect Immun. 2005 Jun;73(6):3242-50. PMCID: PMC1111855.
- Iliopoulou BP, **Guerau-de-Arellano M**, Huber BT. HLA-DR alleles determine responsiveness to Borrelia burgdorferi antigens in a mouse model of self-perpetuating arthritis. Arthritis Rheum. 2009 Dec;60(12):3831-40. PMCID: PMC2828865.

Awards/Honors (selected)

- 2019 OSUWMC Research Day Mentor of the Year Award
- 2019 Careers in Immunology Postdoctoral Fellowship (supports Postdoctoral Fellow), AAI
- 2019 Travel For techniques Travel Award, American Association of Immunologists
- 2018 Outstanding Young Investigator Award, School of Health and Rehabilitation Sciences, College of Medicine, The Ohio State University
- 2016 International Congress of Immunology Travel Award, American Association of Immunologists
- 2016 Faculty Travel Award, AAI
- 2015 European Congress Of Immunology Travel Award, AAI
- 2015 Undergraduate & Faculty Travel Award, AAI
- 2014 Excellence in Technology Education Award, The Ohio State Fair
- 2013 Undergraduate & Faculty Travel Award, American Association of Immunologists (AAI)
- 2012 REACH for Commercialization Fellowship, The Ohio State University
- 2012 Ray Owen Award, Midwinter Conference of Immunologists

Luanne Hall-Stoodley, PhD
Associate Professor, Microbial Infection and Immunity
Director, Biosafety Level 3 Program
Vice Chair of Diversity, Equity, and Inclusion, Microbial Infection and Immunity
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Education

- St. Olaf College, Northfield, MN B.A. Philosophy/History
- Montana State University-Bozeman, MT B.S. Microbiology
- Montana State University-Bozeman, MT Ph.D. Immunology
- University of Exeter, United Kingdom Post-doc Microbiology
- Center for Biofilm Engineering, Bozeman, MT Post-doc Microbiology

Positions

- 2021-present Vice Chair of Diversity, Equity, and Inclusion (DEI), Microbial Infection and Immunity, College of Medicine, The Ohio State University, Columbus, OH
- 2020-present Co-Director, Training Program, Cure CF Columbus, Cystic Fibrosis Foundation Research Development Program, Columbus, OH
- 2020-present Director, College of Medicine BSL3 Program, The Ohio State University (launched research initiative for pandemic SARS-CoV-2)
- 2013-present Associate Professor of Research, Department of Microbial Infection & Immunity, The Ohio State University, College of Medicine, Columbus, OH
- 2009-2017 Honorary Lecturer, Faculty of Medicine, Division of Inflammation, Infection and Immunity, University of Southampton, Translational Scientist, Southampton NIHR-Wellcome Trust Clinical Research Facility, University Hospital Southampton, United Kingdom 1997-1999 Lecturer (Immunology) and Wellcome Trust Post-doctoral Fellow, Department of Biological Sciences, University of Exeter, United Kingdom
- 2004-2009 Assistant Professor, Center for Genomic Sciences, Allegheny-Singer Research Institute, Pittsburgh, PA and Dept. Microbiology and Immunology, Drexel University College of Medicine, Philadelphia, PA
- 2000-2003 Assistant Research Professor, Dept. Microbiology & Center for Biofilm Engineering, Montana State University-Bozeman, MT
- 2003 Assistant Research Professor, Veterinary Molecular Biology, Montana State University-Bozeman, MT

Teaching Activities

- 2021 Organizing Committee, Many Hosts of Mycobacteria 9, The Ohio State University
- 2018-2021 Core Faculty, International Course on Antibiotic Resistance (ICARe), Microbial Biofilms, Institut Pasteur, Les Pensières, Annecy, France
- 2020 Invited Discussion Leader, NTM Physiology, Colorado Mycobacteria Conference 2020: Focus on Nontuberculous Mycobacteria, May 31-June 3, 2020. Colorado State University, Fort Collins, CO (postponed to June 13-16 2021 due to Covid-19)
- 2019 - Panel Leader, Nontuberculous mycobacteria - M. ulcerans and M. abscessus, Many Hosts of Mycobacteria 8, Mar 3-6, 2019, Albert Einstein College of Medicine, NY.
- - Discussion leader, The Future of Biofilms Conference, May 9-11, 2019, Leavenworth, WA.

- - Invited Panelist, Macrophages from CF Patients Are Susceptible to Rough Mycobacterium abscessus, Pathogenesis of Infection Workshop, North American CF Conference, October 31, 2019, Nashville, TN
- 2018 - Invited speaker, NTM Workshop, 2018 International Rare Lung Diseases Research Conference, Cincinnati, September 6-9, 2018, Cincinnati, OH.
- - Faculty Expert, 28th European Congress of Clinical Microbiology and Infectious Diseases, 21-24 April 2018, Madrid, Spain.
- 2017 Invited Panelist, Many Hosts of Mycobacteria 7, August 9-11, 2017, Fort Collins, CO.
- 2016 Invited Keynote speaker, International Conference on Cholesteatoma & Middle Ear Surgery, June 2016, Edinburgh, Scotland.
- 2015 - Faculty expert, European Congress Clin Microbiology & Infect Dis (ECCMID), Copenhagen, DK.
- - Invited speaker/Session Chair, 5th European Congress on Microbial Biofilms, June 2015, Brno, Czech Republic.
- - Invited speaker, International Biofilm Symposium, September 2015, Chongqing, China

Publications (selected)

- **Hall-Stoodley L**, Watts G, Crowther J, Balagopal A, Torrelles JB, Robison-Cox J, Bargatze R, Harmsen AG, Crouch EC, LS Schlesinger. 2006. *Mycobacterium tuberculosis* Binding to Human Surfactant Proteins A and D, Fibronectin and Small Airway Epithelial Cells Under Shear. *Infect Immun.* **74**(6):3587-96. PMID: 16714591.
- **Hall-Stoodley L**, Hu F, Gieseke A, Nistico L *et al*. 2006. Direct Detection of Bacterial Biofilms on the Middle-Ear Mucosa of Children with Chronic Otitis Media. *JAMA*. **296**(2):202-211. PMID: 16835426.
- Nistico L, Kreft R, Gieseke A, Coticchia JM, Burrows A, Khampang P, Liu Y, Kerschner JE, Post JC, Lonergan S, Sampath R, Hu FZ, Ehrlich GD, Stoodley P, **Hall-Stoodley L***. 2011. Adenoid reservoir for pathogenic biofilm bacteria. *J Clin Microbiol.* **49**(4):1411-20. PMID: 21307211
- Walker WT, Jackson CL, Allan R, Collins SA, Kelso MJ, Rineh A, Yepuri NR, Nicholls B, Lau L, Johnston D, Lackie P, Faust SN, Lucas JS, **L Hall-Stoodley***. 2017. Primary Ciliary Dyskinesia Ciliated Airway Cells Show Increased Susceptibility to *Haemophilus influenzae* Biofilm Formation. *Eur Respiratory J.* **50**(3). pii: 1700612. *Shared Corresponding author. PMID: 28890436
- Howlin RP, Cathie K, **Hall-Stoodley L**, Cornelius V, Duignan C, Allan RN, *et al*. 2017. Low-Dose Nitric Oxide as Targeted Anti-biofilm Adjunctive Therapy to Treat Chronic *Pseudomonas aeruginosa* Infection in Cystic Fibrosis. *Molecular Therapy.* **25**(9):2104-2116. PMID: 28750737

Awards/Honors (selected)

- Research Funding
  - Cystic Fibrosis Foundation Research Grant, Role (PI), 11/01/2018 - 10/31/2021 (NCE)
    Title: "Xenophagy and clearance of nontuberculous mycobacteria in CF macrophages"
  - Cure CF Columbus (C3) Research Pilot Award, Role: Co-Investigator, 01/01/2019 - 12/31/2021
    C3 Research Development Program, Nationwide Children's Hospital
    Title: "T cell dysfunction in CF patients with nontuberculous mycobacteria infection"
- Honors
  - 2008 Who's Who in America, Who's Who of American Women
  - 2007 Carnegie Science Emerging Female Scientist Award Nominee
  - 1997-1999 Wellcome Trust Sir Henry Wellcome Award for Innovative and Speculative Research (Showcase Award)

Emily Hemann, PhD
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Education

- South Dakota State University, Brookings, SD N/A Biology
- College of Saint Benedict, St. Joseph, MN B.A. Biology
- University of Iowa, Iowa City, IA Ph.D. Immunology
- University of Washington, Seattle, WA Postdoc Immunology

Positions

- 2020-Present: Assistant Professor, Department of Microbial Infection and Immunity, The Ohio State University, Columbus, OH
- 2021: Executive Co-Director, BSGP 7000. Concepts in Biomedical Science: Host Defense Block. The Ohio State University.

Courses Taught (selected)

- 2021: Immunology 2021: AAI Annual Meeting Block Symposia Co-Moderator: "Mechanisms of viral sensing and Innate immune responses"
- 2021: Lecturer: MEDMCIM 7010. Cellular and Molecular Immunology. The Ohio State University. 1 lecture
- 2020: Lecturer: Infectious Disease Institute Viruses and Emerging Pathogens Seminar. The Ohio State University. 1 lecture
- 2018: Lecturer: Introduction to Microbiology. Center for Innate Immunity and Immune Disease Summer Lecture Series. 1 lecture
- 2016-2017: Discussion Leader: Biomedical Research Integrity Program, University of Washington. 3 groups/year
- 2016: Lecturer: Microbiology. Seattle University, Department of Biology. 7 lectures
- 2011-2012: Lecturer: Introduction to Animal Viruses. University of Iowa Department of Microbiology. 1-2 lectures/year
- 2010: Teaching Assistant: Introduction to Animal Viruses. University of Iowa, Department of Microbiology
- 2008-2009: Teaching Assistant: Genetics, College of St. Benedict/St. John's University, Department of Microbiology

Publications (Selected)

- **Hemann EA**, Green R, Turnbull JB, Langlois RA, Savan R, and Gale M Jr. 2019. Interferon- λ modulates dendritic cells to facilitate T cell immunity during infection with influenza A virus. *Nat Immunol.* 20(8):1035-45. PMID: 31235953.
- Forero A, Ozarkar S, Lee CH, So L, **Hemann EA**, Nadjsombati M, Green R, Sarkar SN, von Moltke J, Gale M Jr., and Savan R. Distinct immune responses to type I and III interferons are regulated by interferon regulatory factor 1. *Immunity.* 51(3): 451-464. PMID: 31471108.
- **Hemann EA**, Gale M Jr, and Savan R. 2017. Interferon lambda genetics and biology in regulation of viral control. *Front Immunol*. **8**:1707. PMID: 29270173.
- **Hemann EA**, Schwerk J, and Savan R. 2017. IFN-λ 'guts' neutrophil-mediated inflammation. *Nat Immunol*. **18**(10): 1061-2. PMID: 28926532.

- Kell AM, **Hemann EA**, Turnbull JB, Gale M Jr. 2020. RIG-I-like receptor activation drives type I IFN and antiviral signaling to limit Hantaan orthohantavirus replication. *PlosPath.* 16(4):e1008483. PMID: **32330200.**
- Roby JA, Esser-Nobis K, Dewey-Verstelle EC, Fairgrieve MR, Schwerk J, Lu AY, Soveg FW, **Hemann EA**, Hatfield LD, Keller BC, Shapiro A, Forero A, Stencel-Baerenwald JE, Savan R, Gale M Jr. 2020: Flavivirus Nonstructural Protein NS5 Dysregulates HSP90 to Broadly Inhibit JAK/STAT Signaling. *Cells.* 9(4):899. PMID: 32272626.
- Stone AEL, Green R, Wilkins C, **Hemann EA**, Gale M Jr. 2019. RIG-I-like receptors direct inflammatory macrophage polarization against West Nile virus infection. *Nat Comm*. 10(1):3649. PMID: 31409781.
- McGuckin Wuertz K, Treuting PM, **Hemann EA**, Esser-Nobis K, Snyder AG, Graham JB, Daniels BP, Wilkins C, Snyder JM, Voss KM, Oberst A, Lund J, Gale M Jr. 2019. STING is required for host defense against neuropathological West Nile virus infection. *PlosPath*. 15(8):e1007899. PMID: 31415679.
- Erasmus JH, Khandhar AP, O'Connor MA, Walls AC, **Hemann EA**, Murapa P, Archer J, Leventhal S, Fuller JT, Lewis TB, Draves KE, Randall S, Guerriero KA, Duthie MS, Carter D, Reed SG, Hawman DW, Feldmann H, Gale M Jr, Veesler D, Berglund P, Heydenburg Fuller D. 2020. An alphavirus-derived replicon RNA vaccine induces SARS-CoV-2 neutralizing antibody and T cell responses in mice and nonhuman primates. *Sci Transl Med*. PMID: 32690628.
- Rodda LB, Netland J, Shehata L, Pruner KB, Morawski PA, Thouvenel CD, Takehara KK, Eggenberger J, **Hemann EA**, Waterman HR, Fahning ML, Chen Y, Hale M, Rathe J, Stokes C, Wrenn S, Fiala B, Carter L, Hamerman JA, King NP, Gale M Jr, Campbell DJ, Rawlings DJ, Pepper M. 2021. Functional SARS-CoV-2-specific immune memory persists after mild COVID-19. *Cell*. 184(1):169-183.e17. DOI: 10.1016/j.cell.2020.11.029. PMID: 33296701.
- Rathe JA*, **Hemann EA**,* Eggenberger J, Li Z, Knoll ML, Stokes C, Hsiang TY, Netland J, Takehara KK, Pepper M, Gale M. 2020. SARS-CoV-2 Serologic Assays in Control and Unknown Populations Demonstrate the Necessity of Virus Neutralization Testing. *J Infect Dis*. 223(7):1120-1131. DOI: 10.1093/infdis/jiaa797. PMID: 33367830. *Equal Contribution.
- **Hemann EA**, Kang SM, and Legge KL. 2013. Protective CD8 T cell mediated immunity against influenza A virus infection following influenza virus-like particle vaccination. *J Immunol.* **191**(5): 2486-94. PMID: 23885108*
- *<u>*Commentary:*</u> "In This Issue: Universal Flu Vaccines?" *J Immunol.* **191**(5): 2023-4.
- **Hemann EA**, Sjaastad LE, Langlois RA, and Legge KL. 2016. Plasmacytoid dendritic cells require direct infection to sustain the pulmonary influenza A virus-specific CD8 T cell response. *J Virol*. **90**(6): 2830-2837. PMID: 26719269.
- **Hemann EA** and Legge KL. 2014. Peripheral regulation of T cells by dendritic cells during infection. *Immunol Res*. 59(1-3): 66-72. PMID: 24838143

Awards/Honors (selected)

- K22 A146480 Hemann (PI) 3/1/2021-2/28/2023, Mechanisms of Interferon-Lambda Programming at the Innate-Adaptive Immune Interface for Protection Against Virus Infection
- OSU Program for Advancing Research in Infection and Immunity Pilot Award, Hemann (PI), 07/01/2021-06/30/2022, Immune modulatory roles of MDA5 in influenza A virus infection
- American Heart Association Postdoctoral Fellowship 17POST33660907, Hemann (PI), 7/1/2017-6/30/2019, Regulation of dendritic cell function and protective respiratory immunity by interferon-lambda

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Education

- M.D. in Medicine, Anhui Medical University, China (1991-1996)
- Ph.D. in Molecular Biology, KyungHee University, Seoul, South Korea (1999-2003)
- Post-doctoral Fellow Associate, Sylvester Comprehensive Cancer Center, University of Miami (2005~2006)
- Post-doctoral Fellow Associate, University of Connecticut Health Center (2009~2011)

Positions

- Research Assistant, Department of Molecular Biology, School of Medicine, Kyung Hee University (2003~2004)
- Senior Research Associate III, Sylvester Comprehensive Cancer Center, University of Miami. (2007~2009)
- Research Assistant Professor, Department of Microbiology and Immunology, Medical of University of South Carolina (2011~ 2019)
- Assistant Professor, Department of Internal Medicine, Division of Medical Oncology, The Ohio State University (2019 – present)

Mentoring Activities (selected)

- Ouyang, Yuli Research Assistant
- Kim, Doyeon Postdoctoral Scholar

Publications (selected)

- **Hong F**, Liu B, Wu BX, Morreall J, Roth B, Davies C, Sun S, Diehl JA, Li Z. CNPY2 is a key initiator of the PERK-CHOP pathway of the unfolded protein response. Nat Struct Mol Biol. 2017 Oct;24(10):834-839. doi: 10.1038/nsmb.3458. Epub 2017 Sep 4. PubMed PMID: 28869608; PubMed Central PMCID: PMC6102046.
- Huck JD, Que NL, **Hong F**, Li Z, Gewirth DT. Structural and Functional Analysis of GRP94 in the Closed State Reveals an Essential Role for the Pre-N Domain and a Potential Client-Binding Site. Cell Rep. 2017 Sep 19;20(12):2800-2809. doi: 10.1016/j.celrep.2017.08.079. PubMed PMID: 28930677; PubMed Central PMCID: PMC5608278.
- **Hong F**, Mohammad Rachidi S, Lundgren D, Han D, Huang X, Zhao H, Kimura Y, Hirano H, Ohara O, Udono H, Meng S, Liu B, Li Z. Mapping the Interactome of a Major Mammalian Endoplasmic Reticulum Heat Shock Protein 90. PLoS One. 2017 Jan 5;12(1):e0169260. doi: 10.1371/journal.pone.0169260. eCollection 2017. PubMed PMID: 28056051; PubMed Central PMCID: PMC5215799.
- Maharaj KA, Que NL, **Hong F**, Huck JD, Gill SK, Wu S, Li Z, Gewirth DT. Exploring the Functional Complementation between Grp94 and Hsp90. PLoS One. 2016 Nov 8;11(11):e0166271. doi: 10.1371/journal.pone.0166271. eCollection 2016. PubMed PMID: 27824935; PubMed Central PMCID: PMC5100913.
- Fugle CW, Zhang Y, **Hong F**, Sun S, Westwater C, Rachidi S, Yu H, Garret-Mayer E, Kirkwood K, Liu B, Li Z. CD24 blunts oral squamous cancer development and dampens the functional expansion of myeloid-derived suppressor cells. Oncoimmunology. 2016 Sep 26;5(10):e1226719. eCollection 2016. PubMed PMID: 27853649; PubMed Central PMCID: PMC5087297.

- Ansa-Addo EA, Thaxton J, **Hong F**, Wu BX, Zhang Y, Fugle CW, Metelli A, Riesenberg B, Williams K, Gewirth DT, Chiosis G, Liu B, Li Z. Clients and Oncogenic Roles of Molecular Chaperone gp96/grp94. Curr Top Med Chem. 2016;16(25):2765-78. Review. PubMed PMID: 27072698; PubMed Central PMCID: PMC5041304.
- Wu BX, **Hong F**, Zhang Y, Ansa-Addo E, Li Z. GRP94/gp96 in Cancer: Biology, Structure, Immunology, and Drug Development. Adv Cancer Res. 2016;129:165-90. doi: 10.1016/bs.acr.2015.09.001. Epub 2015 Sep 28. Review. PubMed PMID: 26916005.
- Zhang Y, Wu BX, Metelli A, Thaxton JE, **Hong F**, Rachidi S, Ansa-Addo E, Sun S, Vasu C, Yang Y, Liu B, Li Z. GP96 is a GARP chaperone and controls regulatory T cell functions. J Clin Invest. 2015 Feb;125(2):859-69. doi: 10.1172/JCI79014. Epub 2015 Jan 20. PubMed PMID: 25607841; PubMed Central PMCID: PMC4319419.
- Seidler PM, Shinsky SA, **Hong F**, Li Z, Cosgrove MS, Gewirth DT. Characterization of the Grp94/OS-9 chaperone-lectin complex. J Mol Biol. 2014 Oct 23;426(21):3590-605. doi: 10.1016/j.jmb.2014.08.024. Epub 2014 Sep 3. PubMed PMID: 25193139; PubMed Central PMCID: PMC4188734.
- Morales C, Rachidi S, **Hong F**, Sun S, Ouyang X, Wallace C, Zhang Y, Garret-Mayer E, Wu J, Liu B, Li Z. Immune chaperone gp96 drives the contributions of macrophages to inflammatory colon tumorigenesis. Cancer Res. 2014 Jan 15;74(2):446-59. doi: 10.1158/0008-5472.CAN-13-1677. Epub 2013 Dec 9. PubMed PMID: 24322981; PubMed Central PMCID: PMC4002507.
- **Hong F**, Wu BX, Li Z. Molecular regulation of macrophages in unleashing cancer-related inflammation. Oncoimmunology. 2014 Jan 1;3(1):e27659. Epub 2014 Jan 10. PubMed PMID: 24778928; PubMed Central PMCID: PMC3997517.

Awards/Honors (selected)

- Science Research Scholarships, Kyung Hee University, Seoul, South Korea (1999-2001)
- Juwon Kim Excellent Scholarship, Kyung Hee University, Seoul, South Korea (1999)
- President Scholarships, Kyung Hee University, Seoul, South Korea (2001-2003)

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Education

- Miami University, Oxford, OH B.A. Zoology
- The Ohio State University, Columbus, OH M.D. Medicine
- Nationwide Children's Hospital (NCH) Residency Pediatrics
- Nationwide Children's Hospital Fellowship Pediatric Pulmonology
- The Ohio State University, Columbus, OH MPH Public Health

Positions

- 2021 – Present Associate Professor of Pediatrics, The Ohio State University, Columbus, OH
- 2021 – Present Director of Pulmonary Research, Nationwide Children's Hospital (NCH), Columbus, OH
- 2020 – Present Faculty, Center for Microbiome Science, The Ohio State University (OSU/NCH) 2020 –
- 2017 – Present Co-Director, Cure CF Columbus (C3) Immune Core, NCH/OSU, Columbus, OH
- 2017 – Present Faculty, Infectious Disease Institute, OSU/NCH, Columbus, OH
- 2012 – Present Principal Investigator, Center for Microbial Pathogenesis, Abigail Wexner Research, Institute at NCH, Assistant Professor of Pediatrics, OSU, Columbus, OH, Faculty, Division of Pulmonary Medicine, NCH, Columbus, OH, Courtesy appointment, Dept. Microbial Infection & Immunity, OSU, Columbus, OH

Courses Taught (selected)

- 2019, Faculty, Sickle cell Post-Graduate Course, American Thoracic Society Conference
- 2019 – present, Faculty, BSGP 8800.01 Immunology and Inflammation - Signature Program Translational, The Ohio State University
- 2016, Faculty, PUBHEPI 5438, Tobacco and cardiopulmonary health – Cardiovascular Disease Epi, The Ohio State University
- 2015, Faculty, BSGP 7950 Host-pathogen interactions in cystic fibrosis, The Ohio State University
- 2012 – present, Faculty, Pulmonary Medical Student Clerkship, Nationwide Children's Hospital
- 2012 – present, Attending Physician Teaching, Inpatient Ward and Consult Services, Nationwide Children's Hospital

Trainees Advised (selected)

- Graduate Students
  - 2018, Amelia Cephas, (Transferred from program due to family health issues), Ohio State University Biomedical Sciences Graduate Program
- Doctoral Students (Committee Member)
  - 2017 – present, Mark Hahn (PI, J. Gunn), Ohio State University Biomedical Sciences Graduate Program
- Undergraduate Students
  - 2020 – present, Courtney Pugh, Ohio State ASPIRE scholar, Ohio State STEP fellowship
  - 2019 – 2021, Nevian Brown (Accepted Temple University Graduate School)

- 2018 (summer), Kristina Myers (Accepted Ohio University Heritage College of Osteopathic Medicine), Ohio Northern Capstone
- 2018 – 2020, Emily McCauley (Accepted, The Ohio State University College of Medicine)
- 2016 – 2018, Abena Minta (Accepted, The Ohio State University College of Medicine)
- 2016 – 2018, Robert Konstan (Accepted, The Ohio State University College of Medicine)
- 2016 – 2018, Abdul Bah (Accepted, Icahn School of Medicine at Mount Sinai)

- Medical Students (Mentor)
  - 2015 – 2018, Jeeho Kim (Accepted, Navy Residency)

Publications (selected)

- Assani K, Shrestha CL, Robledo-Avila F, Rajaram MV, Partida-Sanchez S, Schlesinger LS, **Kopp BT.** "Human Cystic Fibrosis Macrophages Have Defective Calcium-Dependent Protein Kinase C Activation of the NADPH Oxidase, an Effect Augmented by Burkholderia cenocepacia". J Immunol. 2017 Jan 16. PMID: 28093527.
- Zhang, S, Shrestha CL, Wisniewski B, Pham H, Hou X, Li W, Dong Y, **Kopp BT**. "Consequences of CRISPR-Cas9-mediated CFTR knockout in human macrophages." Frontiers in Immunology. 2020 July. PMID: 32973772
- Shrestha CL, Assani KD, Rinehardt H, Albastroiu F, Zhang S, Shell R, Amer AO, Schlesinger LS, **Kopp BT**. Cysteamine-mediated clearance of antibiotic-resistant pathogens in human cystic fibrosis macro-phages. PLoS One. 2017 Oct 5;12(10). PMID: 28982193.
- Zhang S, Shrestha CL, **Kopp BT**. Cystic fibrosis transmembrane conductance regulator (CFTR) modula-tors have differential effects on cystic fibrosis macrophage function. Sci Rep. 2018 Nov 20;8(1):17066. PMID: 30459435.
- Creary S, Loman BR, Kotha K, Shrestha CL, Minta A, Zhang S, Pinto S, Thompson R, Mejias A, Bailey MT, and **Kopp BT**. Upper airway microbiome changes in children with sickle cell during acute chest syn-drome. Am J Hematology. 2020 July 9. PMID: 32644239.
- Creary S, Shrestha CL, Kotha K, Minta A, Fitch J, Jaramillo L, Zhang S, Pinto S, Thompson R, Rami-lo O, White P, Mejias A, **Kopp BT**. Baseline and disease-induced transcriptional profiles in children with sickle cell disease. Sci Reports (Nature). 2020 Jun. PMID: 32487996

Awards/Honors (selected)

- Research Funding
  - R01 HL148171-01A1, NIH NHLBI Kopp (PI), Wozniak (Co-I), Partida-Sanchez (Co-I), 04/01/2020 – 03/31/2025, The role of CFTR during macrophage-mediated killing of bacteria
  - MCCOY19R0, Cystic Fibrosis Foundation, Kopp, Amer (Core PIs), 07/01/2019 - 06/30/2023, Cure CF Columbus (C3) Immune Core,
  - KOPP20I0, Cystic Fibrosis Foundation, Kopp (PI), Bai (Co-I), 11/01/2020 – 10/31/2022, The role of ENaC in CF macrophage function
  - KOPP20P0, Cystic Fibrosis Foundation, Kopp/Reynolds (PIs), Bai (Co-I), 06/01/2021 – 05/31/2022, Impact of secondhand vape exposure upon CFTR and infection
- Honors
  - 2016 John and Ruth Weimer Mount Award, OSU
  - 2016 Best Mentor, Center for Microbial Interface Biology, OSU
  - 2015 Outstanding Mentor Award for Basic Research, Research Institute at NCH

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Education

- Zhengzhou University College of Medicine, Zhengzhou, China MD Medicine
- Peking Union Medical College, Beijing, China MS Immunology
- Ichan School of Medicine at Mount Sinai, New York, NY PhD Immunology
- Montefiore-Einstein Medical Center, Albert Einstein College of Medicine, New York, NY Residency, Medicine
- Fred Hutchinson Cancer Research Center and University of Washington, Seattle, WA Fellowship, Medical Oncology

Positions

- 1999-2005 Assistant Professor, University of Connecticut Health Center, Farmington, CT
- 2005-2010 Associate Professor with tenure, Department of Immunology, University of Connecticut Health Center, Farmington, CT
- 2010-2019 Professor and Attending Physician, Division of Hematology and Oncology/Department of Medicine, Medical University of South Carolina (MUSC), Charleston, SC
- 2010-2017 Leader, Cancer Immunology Program, Hollings Cancer Center, MUSC, SC
- 2010-2019 Professor and Chair, Department of Microbiology & Immunology, MUSC, Charleston, SC
- 2017-2019 Co-Leader, Cancer Immunology Program, Hollings Cancer Center, MUSC, Charleston, SC
- 2019- Professor of Medicine and Founding Director, The OSU Pelotonia Institute for Immuno-Oncology (PIIO)

Teaching Activities

- Courses (selected)
  - 2006-2009 Course director and organizer of the Advanced Immunology course for graduate students of the Immunology Graduate Program (MEDS335.40), UCHC
  - 2008 Lecturer on Tumor Immunology (2 hours) as the Cancer Biology course for Ph.D. students (Introduction to Cancer Biology MEDS 6413), UCHC
  - 2011-2015 Advanced Immunology (Toll-like Receptor Biology), MUSC 2013-2015 Immunology I (Innate Immune Sensors), MUSC
  - 2013-2014 Immunology Method (Genetic Engineering of Mice), MUSC
  - 2013-2015 Immunity and Human Diseases (Graduate program core course), MUSC 2015-present Cancer Immunotherapy: Lessons Learned and the Path Forward, MUSC
  - 2016 TGFβ In Immune Response, M&I Advanced Immunology course, MUSC 2016 UPR and Stress Chaperone in Immunity, M&I Advanced Immunology course,
  - 2017 The Anatomy and Physiology of the Immune System, Graduate Course, MUSC 2018Debate on the Roles of Macrophage and MHC I in Tumor Immunity, Graduate
  - 2019 The Anatomy, Physiology and the Power of the Immune System, Graduate Course, MUSC
  - 2020 Signature Program Translational Science Curriculum “Immunology and Inflammation”, The Ohio State University
- Doctor of Philosophy Candidate (selected) Relationship Dr. Li
  - Caroline Wallace (primary mentor, graduated 2018)

- Alessandra Metelli (primary mentor, graduated 2018)
- Brian Riesenberg (primary mentor, graduated 2019)
- Hyunwoo Kwon (primary mentor, graduated 2020)
- Anqi Li (primary mentor, 2017-present)
- Hannah Knochelmann (advisor, 2018-present)
- Yuzhou Chang (co-primary mentor, 1/2020 – present)
- Tong Xiao (primary mentor, 2020-present)
- Weiwei Liu (primary mentor, 2020-present)
- Carter Allen (advisor, 2021-present)
- Yi Wang (primary advisor, 2021-present)

Publications (selected)

- BX Wu, Song N-J, Riesenberg BP and **Li Z** (2019) Development of Molecular and Pharmacological Switches for Chimeric Antigen Receptor T Cells. ***Exp Hematol Oncol***, 8:27 doi:10.1186/s40164-019-
- Johnson CB, Wrangle J, Mehrotra S, **Li Z**, Paulos CM, Cole DJ, Surh CD and RubinsteinMP (2016) Harnessing the IL-7/IL-7Rα axis to improve tumor immunotherapy. ***OncoImmunology*** 5(5):e1122865. doi: 10.1080/2162402X.2015.1122865.
- Velegraki M, Salem M, Ansa-Addo EA, Wu BX, **Li Z**. (2021) Autocrine transforming growthfactor β1 in regulatory T cell biology-gone but not missed. ***Immunity***. Mar 9;54(3):395- 396. doi: 10.1016/j.immuni.2021.02.007. PMID: 33691126
- Ahmed-Hassan H, Sisson B, Shukla RK, Wijewantha Y, Funderburg NT, **Li Z**, Hayes D Jr,Demberg T, Liyanage NPM (2020) Innate Immune Responses to Highly Pathogenic Coronaviruses and Other Significant Respiratory Viral Infections. ***Front Immunol***. 11:1979. doi: 10.3389/fimmu.2020.01979. eCollection 2020
- Guan Z, Ding Y, Liu Y, Zhang Y, Zhao J, Li C, **Li Z**, Meng S (2020) Extracellular gp96 is a crucial mediator for driving immune hyperactivation and liver damage. ***Sci Rep*** 10(1):12596. doi: 10.1038/s41598-020-69517-7
- Ansa-Addo EA, Huang H-C, Riesenberg B, Lamsawat S, Borucki D, Nelson MH, Nam JH,Chung D, Paulos CM, Liu B, Yu X-Z, Philpott C, Howe PH and **Li Z** (2020) RNA-binding protein PCBP1/hnRNP E1 is an intracellular checkpoint for shaping effector versus regulatory T cells in immunity and cancer. ***Sci Adv*** 6(22):eaaz3865. doi: 10.1126/sciadv.aaz3865

Awards/Honors (selected)

- Research Funding
  - R01 DK105033 (NIH/NIDDK) **PI: Li** 12/10/2015-11/30/2021 (*NCE*) **Title:** Novel Mechanisms of UPR Sensing and Nonalcoholic Fatty Liver Disease
  - R01 AI077283 (NIH/NIAID) **PI: Li** 03/01/2009-02/28/2022 **Title:** Molecular Chaperones and Immune Tolerance
  - R01 CA213290 (NIH/NCI) **PI: Li** 01/01/2017-12/31/2022 **Title:** Integration of Inflammation and Cancer by Molecular Chaperone
  - R01 CA255334 (NIH/NCI) **MPI:** Denko/**Li** 12/15/2020-11/30/2025 **Title:** Overcoming Hypoxic Resistance to Anti-Cancer Therapy
  - T32 Program in Immunology Research & Entrepreneurship (PIRE) – Past Co-Director
- Honors
  - 2002 Selected by Marquis Who's Who in America
  - 2010-2019 South Carolina SmartState Endowed Chair in Stem Cell Biology & Therapy
  - 2014 Elected to Southern Society for Clinical Investigation (SSCI)
  - 2016 Peggy Schachte Research Mentor Award, MUSC
  - 2018 Elected to the Association of American Physicians (AAP)

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Education

- National Yang-Ming University, Taiwan B.S. Life Science
- National Yang-Ming University, Taiwan M.S. Microbiol. Immunol.
- Washington University, St. Louis, MO Ph.D. Immunology
- La Jolla Institute, San Diego, CA Postdoc Epigenetics; Immunology
- La Jolla Institute, San Diego, CA Instructor Epigenetics; Immunology

Positions

- 2020-Present Assistant Professor (Tenure-track), Department of Microbial Infection and Immunity, Ohio State University, Columbus, OH
- 2020-Present Member, Ohio State Comprehensive Cancer Center, Ohio State University, Columbus, OH
- 2020-Present Member, American Society of Hematology
- 2019-Present Member, American Association of Immunologists
- 2019-2020 Independent Young Investigator, La Jolla Institute, San Diego, CA
- 2016-2019 Instructor, La Jolla Institute, San Diego, CA (Advisor: Dr. Anjana Rao)

Teaching Activities (selected)

- 2018-20: advisor to Torrey Pine High School iGEM scientific competition, San Diego, CA.
- 2011-present: mentored seven research technicians, one high-school student, three undergraduate students, three graduate students, one junior post-doc; La Jolla Institute, San Diego, CA.
- 2007 Teaching assistant for Protein Biochemistry lab (Bio 4522), Washington University in St. Louis, St. Louis, MO.
- 2006-2011: mentored two research technicians, an undergraduate student, two junior graduate students; Washington University in St. Louis, MO.
- Lio CW. "Validation of siRNAs screens using CRISPR". Mesa-wide CRISPR Resources Workshop. San Diego. 2014.
- Lio CW. "Whole genome RNAi screening of cytosolic DNA sensing pathway". Dept. of Path. and Immunol., Washington University, St. Louis. 2014.
- Lio CW. Essential Role of TET-mediated DNA Hydroxymethylation in Normal and Malignant B cells. Graduate Institute of
- Immunology, National Taiwan University (Taiwan). 2017.

Publications (Selected)

- Chen HY, Alamonte-Loya A, Lay FY, Johnson E, Gonzalez-Avalos E, Yin J, Ma Q, Wozniak DJ, Harrison FE, **Lio CW**§. Epigenetic remodeling by vitamin C potentiates the differentiation of mouse and human plasma cells. ***2021.*** *Biorxiv* (under review). DOI: 10.1101/2021.09.15.460473. (§corresponding)
- Takahashi M*, **Lio CW***, Ay F, Jain M, Campeau A, Gonzalez D, Steger M, Mann M, Sharma S. The tumor suppressor kinase DAPK3 drives tumor-intrinsic immunity through the STING-IFNβ pathway. ***Nat Immunol. 2021***. 22:485-496. (*co-first Authors)

- **Lio CW§** and Huang SC§. Circles of Life: linking metabolic and epigenetic cycles to immunity. ***Immunology***. **2020**. PMID: 32418209 (§corresponding; invited review)
- **Lio CW*§**, Shukla V*, Samaniego-Castruita D, González-Avalos E, Chakraborty A, Yue X, Schatz D, Ay F, Rao A§. TET enzymes augment AID expression via 5hmC modifications at the Aicda superenhancer. ***Sci Immunol. 2019***. 4(34). PMID: 31028100 (*co-first Authors; §corresponding)
- **Lio CW***, Zhang J*, González-Avalos E, Hogan PG, Chang X, Rao A. *Tet2* and *Tet3* cooperate with B-lineage transcription factors to regulate DNA modification and chromatin accessibility. ***eLife***. **2016**; 5. PMID: 27869616 (*co-first Authors)
- **Lio CW***, Zhang J*, González-Avalos E, Hogan PG, Chang X, Rao A. Tet2 and Tet3 cooperate with B-lineage transcription factors to regulate DNA modification and chromatin accessibility. ***eLife*. 2016**; 5. PMID: 27869616
- **Lio CW*§**, Shukla V*, Samaniego-Castruita D, González-Avalos E, Chakraborty A, Yue X, Schatz D, Ay F, Rao A§. TET enzymes augment AID expression via 5hmC modifications at the Aicda superenhancer. ***Sci Immunol***. **2019**. 4(34). PMID: 31028100 (*co-first Authors; §corresponding)
- Chen HY, Alamonte-Loya A, Lay FY, Johnson E, Gonzalez-Avalos E, Yin J, Ma Q, Wozniak DJ, Harrison FE, **Lio CW§**. Epigenetic remodeling by vitamin C potentiates the differentiation of mouse and human plasma cells. ***Biorxiv. 2021.*** (under review). DOI: 10.1101/2021.09.15.460473. (§corresponding)
- **Lio CW**, Hsieh CS. A two-step process for thymic regulatory T cell development. ***Immunity*. 2008**; 28(1):100-11. PMID: 18199417
- Perry JSA*, **Lio CJ* (co-first author)**, Kau AL, Nutsch K, Yang Z, Gordon JI, Murphy KM, Hsieh CS. Distinct contributions of Aire and antigen-presenting-cell subsets to the generation of self-tolerance in the thymus. ***Immunity*. 2014**; 41(3):414-426. PMID: 25220213
- Hsieh CS, Lee HM, **Lio CW**. Selection of regulatory T cells in the thymus. ***Nat. Rev. Immunol.*** **2012**. 12:157-67.
- Pereira RM, Martinez GJ, Engel I, Cruz-Guilloty F, Barboza BA, Tsagaratou A, **Lio CW**, Berg LJ, Lee Y, Kronenberg M, Bandukwala HS, Rao A. Jarid2 is induced by TCR signalling and controls iNKT cell maturation. ***Nat. Comm.*** **2014**; 5:4540. PMID: 25105474
- Tsagaratou A, Äijö T, **Lio CW**, Yue X, Huang Y, Jacobsen SE, Lähdesmäki H, Rao A. Dissecting the dynamic changes of 5-hydroxymethylcytosine in T-cell development and differentiation. ***Proc. Natl. Acad. Sci. U.S.A*. 2014**; 111(32):E3306-15. PMID: 25071199
- Yue X, Trifari S, Äijö T, Tsagaratou A, Pastor WA, Zepeda-Martínez JA, **Lio CW**, Li X, Huang Y, Vijayanand P, Lähdesmäki H, Rao A. Control of Foxp3 stability through modulation of TET activity. ***J. Exp. Med*. 2016**; 213(3):377-97. PMID: 26903244
- Takahashi M*, **Lio CW***, Ay F, Jain M, Campeau A, Gonzalez D, Steger M, Mann M, Sharma S. The tumor suppressor kinase DAPK3 drives tumor-intrinsic immunity through the STING-IFNβ pathway. ***Nat Immunol. 2021***. 22(4):485-496. PMID 33767426 (*co-first Authors)

Awards/Honors (selected)

- R01AI134972, PI: Oestreich, 05/23/18 – 04/30/23, Identifying novel regulatory pathways underlying T helper 1 cell immune responses
- R56AI127800, PI: Oestreich, 08/01/17 – 07/31/18,Regulation of T helper cell differentiation by integrated STAT and Ikaros zinc finger transcription factor mechanisms

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Education

- Tianjin Medical University, Tianjin, China MD Medicine
- Tianjin Central Hospital of Obstetrics and Gynecology, Residency Obstetrics & Gynecology
- Beijing Medical University, Beijing, China MS Tumor Immunology
- Univ. of Connecticut School of Medicine, Farmington, CT Postdoctoral Immunology
- Univ. of Connecticut School of Medicine, Farmington, CT MPH Public Health

Positions

- 2006-2010 Research Associate, Department of Immunology, Neag Comprehensive Cancer Center, University of Connecticut School of Medicine, Farmington, CT
- 2010-2011 Research Assistant Professor, Department of Microbiology & Immunology, Medical University of South Carolina (MUSC), Charleston, SC
- 2011-2016 Assistant Professor (tenure track), Department of Microbiology & Immunology, MUSC
- 2016-2019 Graduate Program Director, Department of Microbiology & Immunology, MUSC
- 2016-2020 Associate Professor (tenure track), Department of Microbiology & Immunology, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC
- 2020- Professor (with tenure), Division of Hematology, Department of Internal Medicine, The Ohio State University, Columbus, OH

Teaching Activity (selected)

- Trainees
  - 2014 - 2018 Committee Member on Ph.D. thesis for Caroline Wallace Committee Member Medical University of South Carolina
  - 2013 - 2018 Committee Member on Ph.D. thesis for Fahmin Basher Committee Member Medical University of South Carolina
  - 2013 - 2018 Committee Member on Ph.D. thesis for Bethany Herbert Committee Member Medical University of South Carolina
  - 2012 - 2013 Committee Member on M.S. thesis for Eva Karam. Committee Member Medical University of South Carolina
  - 2012 - 2013 Committee Member on M.S. thesis for Danielle Brandon Committee Member Medical University of South Carolina
  - 2011 - 2012 Committee Member on Ph.D. thesis for Crystal Morales. Committee Member Medical University of South Carolina
- Courses
  - 2015 - Present Cancer Immunotherapy Lessons (MBIM 786)
  - 2013 - Present Co-director for Intro Micro Immuno Methods (MBIM 738) 2011 - Present Experimental Techniques
  - 2011 - Present M&I Seminar series: Attendance and Presentation at Weekly M&I Seminar series
- Mentoring
  - 2017 – pres Soo Ngoi, PhD Research Assistant Professor, MUSC and OSU
  - 2016 – 2020 Stephen Iwanowycz, PhD, Postdoctoral fellow, MUSC
  - 2015 Xingtong Liu, undergraduate student at New York University, MUSC
  - 2014 Shikha Patel, rotation student, M.D., Ph.D. candidate

- 2013 - 2014 Yuan Yan, M.D.,Ph.D., Postdoctoral fellow, MUSC
- 2013 Shai White-Gilbertson, Ph.D., Postdoctoral fellow, MUSC
- 2012 - 2014 Yunpeng Hua, M.D., Ph.D., Postdoctoral fellow, MUSC
- 2010 - 2011 Jianping Chen, Ph.D. Postdoctoral fellow, MUSC

Publications (selected)

- **Liu B**, Staron M, Hong F, Wu BX, Sun S, Morales C, Crosson CE, Tomlinson S, Kim I, Wu D, Li Z. Essential roles of grp94 in gut homeostasis via chaperoning canonical Wnt pathway. *Proc Natl Acad Sci U S A.* 2013; 110(17):6877-82. PMCID: PMC3637754.
- Chhabra S, Jain S, Wallace C, Hong F, **Liu B*.** High expression of endoplasmic reticulum chaperone grp94 is a novel molecular hallmark of malignant plasma cells in multiple myeloma. *J Hematol Oncol*. 2015; 8(1):77. PMCID: PMC4483199. *Corresponding author.
- **Liu B**, Yang Y, Qiu Z, Staron M, Hong F, Li Y, Wu S, Li Y, Hao B, Bona R, Han D, Li Z. Folding of Toll-Like receptors by the HSP90 paralogue gp96 requires a substrate-specific cochaperone. *Nat Commun.* 2010; 1:79. PMCID: PMC2982182. *This was the first study demonstrating that CNPY3 is a TLR-specific co-chaperone of grp94.*
- **Liu B**, Yang Y, Dai J, Medzhitov R, Freudenberg MA, Zhang PL, Li Z. TLR4 up-regulation at protein or gene level is pathogenic for lupus-like autoimmune disease. J Immunol. 2006; 177(10): 6880-8.

Awards/Honors (Selected)

- 1R01 CA193939 Liu (PI) 04/01/2016-03/31/2021 NIH/NCI
- Mechanism of gp96/grp94 in regulating plasma cells and myeloma
- 1U01AI125859 Liu (PI) 06/21/2016-05/31/2021 NIH/NIAID
- Extrinsic and intrinsic factors regulating commensal-specific T helper-17 cells
- 2013 Certificate of achievement in recognition of commitment to excellence in teaching and successful completion of requirements of “Foundations in Teaching and Learning”, The Apple Tree Society, MUSC

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Education

- University of Nebraska - Lincoln. M.Sc. Biomedical Science
- University of Nebraska - Lincoln. Ph.D. Integrative Biomedical Science
- The Food and Drug Administration Bethesda, MD. ORISE Fellow RSV pathogenesis and Vaccine development
- National Institutes of Health / NCI, Bethesda, MD. CRTA Fellow HIV/ SIV pathogenesis, Immunology and vaccine development

Positions

- 2017-Present Assistant professor of Microbial Infection and Immunity, The Ohio State University, Columbus, OH.
- 2017-Present Assistant professor of Veterinary Bioscience (secondary appointment), Collage of Veterinary Medicine, The Ohio State University, Columbus, OH.
- 2017-Present Investigator, Infectious Disease Institute, The Ohio State University, Columbus, OH.
- 2017-Present Special Volunteer, Vaccine Branch/ NCI, National Institutes of Health, Bethesda MD.

Courses Taught (selected)

- BIOMSCI 4810H
- BSGP8010
- BSGP7000
- CBG7010
- BSGP7240

Trainees Advised (selected)

- Ph.D. Thesis Advisory Committees
  - Aaren Kettelhut (MD. Ph.D. candidate- BSGP) (Advisor: Nicholas T. Funderburg)
  - Rosas Mejia (Ph.D. candidate- BSGP) (Advisor: Richard Robinson)
  - Taiwei Li (Ph.D. candidate-MCDB) (Advisor: Jian Zhu)
  - Tiffany Claeys (Ph.D. candidate BSGP) (Advisor: Richard Robinson) – Graduated 2021
- Post-doctoral Trainees:
  - 2020- Hanaa Salah Ph.D.
  - 2018-2021 Rajni Kant Shukla Ph.D.
  - 2017- 2018 Amila Hatharasinghe MB.BS (Currently surgery resident)
- Pre-doctoral graduate trainees:
  - 2019 - Manuja Gunasena BS. (VBS - PhD student)
- Medical Student trainees:
  - 2020- Jeongwon Choi BS.
  - 2019 - Nancy Tian BS.
- Undergraduate student trainees:
  - 2017 - 2019 Nicole Reinhold-Larsson (Currently a Ph.D. student at Harvard Medical School)
  - 2017- 2020 Sam Cray
  - 2017- 2020 Miguel de Real
  - 2019 Jerra Furay
  - 2019 Tatum Skladany
  - 2019 Will Mulhern

Publications (Selected)

- Vaccari M*,Gordon S*, Fourati S*, Schifanella L*, **Liyanage NP***, CameronM, Keele BF, Shen X, Tomaras G, Billings E, Rao M, Chung A, Dowell K, Bailey-Kellogg C, Brown E, Ackerman M, Vargas-Inchaustegui D, Whitney S, Doster M, Binello N, Pegu P, Montefiori D, Foulds K, Quinn D, Donaldson M, Liang F, Loré K, Roederer M, Koup R, McDermott A, Ma Z, Miller C, Phan T, Forthal D, Blackburn M, Caccuri F, Bissa M, Ferrari G, Kalyanaraman V, Ferrari M., Thompson D, Robert-Guroff M, Kim S, Kim J, Michael N, Phogat S, Barnett S, Tartaglia J, Venzon D, Stablein D, Alter G, Sekaly R* & Franchini G*. Adjuvant dependent innate and adaptive immune signatures of risk of SIV_{mac251} acquisition. Nat.Med.2016 Jul;22(7):762-70. **(*Equally contributed)**
- Vaccari M, Fourati S, Gordon SN, Brown DR, Bissa M, Schifanella L, Silva de Castro I, Doster MN, Galli V, Omsland M, Fujikawa D, Gorini G, **Liyanage NP**, Trinh HV, McKinnon KM, Foulds KE, Keele BF, Roederer M, Koup RA, Shen X, Tomaras GD, Wong MP, Munoz KJ, Gach JS, Forthal DN, Montefiori DC, Venzon DJ, Felber BK, Rosati M, Pavlakis GN, Rao M, Sekaly RP and Franchini G. HIV vaccine candidate activation of hypoxia and inflammasome in CD14+ monocytes is associated with a decreased risk of SIV_{mac251}. Nat.Med.2018 Jun;24(6):847-856
- Gordon SN, **Liyanage NP**, Doster MN, Vaccari M, Vargas-Inchaustegui D, Pegu P, Fourati S*, Schifanella L, Shen X, Tomaras GD, Rao M, Billings EA, Schwartz J, Prado l, Bobb K, Zhang W, Montefiori DC, Foulds KE, Ferrari G, Robert-Guroff M, Roederer M, Phan TB, Forthal DN, Stablen DM, Phogat S, Venzon D, Fouts T, Franchini G. Boosting of ALVAC-SIV Vaccine-Primed Macaues with CD4-SIVgp120 Fusion Protein Elicits Antibodies to V2 Associated with Decreased Risk of SIVmac251 Acquisition. J Immunol. 2016 OCT 1;197(7):2726-3
- Gorini G, Fourati S, Vaccari M, Rahman MA, Gordon SN, Brown DR, Law L, Chang J, Green R, Barrenäs F, **Liyanage NPM**, Doster MN, Schifanella L, Bissa M, Silva de Castro I, Washington-Parks R, Galli V, Fuller DH, Santra S, Agy M, Pal R, Palermo RE, Tomaras GD, Shen X, LaBranche CC, Montefiori DC, Venzon DJ, Trinh HV, Rao M, Gale M Jr, Sekaly RP, Franchini G. Engagement of monocytes, NK cells, and CD4+ Th1 cells by ALVAC-SIV vaccination results in a decreased risk of SIVmac251 vaginal acquisition. PLoS Pathog. 2020 Mar;16(3):e1008377. doi: 10.1371/journal.ppat.1008377

Awards/Honors (selected)

- IDI Host Defense and Microbial Biology Grant Application Support Award 07/01/2021 – 06/31/2022
  Retooling NK cells for an effective HIV vaccines.
- K22 A1127072 Role: PI 04/01/2018 – 03/31/2021
  Retooling NK cells and mucosal ILCs for an effective HIV vaccine. NIH/NIAID
- WNPRC Pilot Project Grant Role: Co-PI 08/01/18 - 07/31/21
  Neisseria colonization of the female reproductive tract. Wisconsin National Primate Research Center
- CF Pilot Project Grant Role: Co-PI 01/15/19 – 01/14/21
  T cell dysfunction in CF patients with nontuberculous mycobacterial infection. NCH Investigate the Immune responses in CF patients' lungs
- 2013 Young Investigator Award. AIDS Vaccine meeting Barcelona-Spain.
- 2014 Young Investigator Award. The Annual Conference on Retroviruses and Opportunistic Infections (CROI). Boston. MA
- 2014 Young Investigator Award. HIV R4P 2014 meeting Cape Town, South Africa.
- 2014 Fellows Award for Research Excellence (FARE). NIH Scientific Directors/ OITE.
- 2014 Intramural AIDS Research Fellowship. Award from the Office of AIDS Research and Office of Intramural Research & Training in the National Institutes of Health.
- 2019 Young Investigator Award, HIV Vaccine Trial Network, Washington DC
- 2021 HVTN Translational HIV Vaccine Early Stage Investigator (ESI) Award

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Education

- Northern Illinois University, DeKalb, IL B.S. Biological Sciences
- University of Iowa, Iowa City, IA Ph.D. Molecular and Cellular Biology
- University of Washington, Seattle, WA Postdoc Pulmonary & Critical Care Medicine

Positions

- 2020 - Current Assistant Professor, The Ohio State University, Columbus, OH

Teaching Activities (selected)

- 2010 Teaching Assistant: Principles of Infectious Diseases Laboratory. University of Iowa, Department of Microbiology
- 2010-2013 Lecturer: Continuing Medical Education- Special Infectious Diseases Grand Rounds and Integrated Topics in Infectious Diseases Seminar. University of Iowa, Carver College of Medicine
- 2015 Volunteer Instructor: 6th Annual Paws-on Science: Husky Weekend at the Pacific Science Center. University of Washington, Center for Innate Immunity and Immune Diseases Education Core.
- 2015 Volunteer for University of Washington South Lake Union Group at Pacific Science Center Life Sciences Research Weekend
- 2016-2017 Discussion Group Facilitator: Biomedical Research Integrity Program, University of Washington
- 2017 ASBMB The Art of Science Communication Small Group Instructor

Publications (Selected)

- Hisert KB, Birkland TP, Schoenfelt KG, **Long ME**, Grogan B, Carter S, Liles WC, McKone EF, Becker L, Manicone AM, and Gharib SA. CFTR Modulator Therapy Enhances Peripheral Blood Monocyte Contributions to Immune Responses in People With Cystic Fibrosis. *Frontiers in Pharmacology*. 2020; 11:1219. PMID 33013356.
- Hisert KB, Birkland TP, Schoenfelt KQ, **Long ME**, Grogan B, Carter S, Liles WC, McKone EF, Becker L, and Manicone AM. Ivacaftor decreases monocyte sensitivity to IFNγ in people with cystic fibrosis. *European Respiratory Journal Open Research* 2020; 6(2): 00318-2019. PMID: 32337217
- Gharib SA, McMahan RS, Eddy WE, **Long ME**, Parks WC, Aitken ML, and Manicone AM. Transcriptional and functional diversity of human macrophage repolarization. *The Journal of Allergy and Clinical Immunology*; 2019, 143(4): 1536-1548. PMID 30445062
- **Long ME**, Gong KQ, Eddy WE, Volk JS, Morrell ED, Mikacenic C, West TE, Skerrett SJ, Charron J, Liles WC, and Manicone AM. MEK1 regulates pulmonary macrophage inflammatory responses and resolution of acute lung injury. *JCI Insight*. 2019; 4(23):e132377. PMID: 31801908
- **Long ME**, Eddy WE, Lovelace-Macon LL, Gong KQ, McMahan RS, Charron J, Liles WC, and Manicone AM. MEK1/2 Inhibition Promotes Macrophage Reparative Properties. *The Journal of Immunology*; 2017, 198: 862-872. PMID: 28003382
- **Long ME**, Gong KQ, Eddy WE, Liles WC, and Manicone AM. Pharmacologic Inhibition of MEK1/2

Reduces Lung Inflammation without Impairing Bacterial Clearance in Experimental Pseudomonas aeruginosa pneumonia. *Pneumonia*; 2017, 9:13. PMID: 28879065

- **Long ME** and Manicone AM. Loss of C/EBPa in Chronic Cigarette Smoke Exposure: A SAD Day for COPD. *American Journal of Respiratory Cellular and Molecular Biology*; 2020, 63(1):9-10. PMID: 32176852
- **Long ME**, Gong KQ, Volk JS, Eddy WE, Chang MY, Frevert CW, Altemeier WA, Gale M Jr, Liles WC and Manicone AM. Matrix metalloproteinase 28 is regulated by TRIF- and type I IFN-dependent signaling in macrophages. *Innate Immunity*; 2018, 24: 357-365. PMID: 30068264
- Manicone AM, Gong KQ, Eddy WE, **Long ME**, Frevert CW, Altemeier WA, Parks WC, and Houghton AM. MMP28 is a key contributor to emphysema pathogenesis. *The American Journal of Pathology*; 2017, 187: 1288-1300. PMID: 28399390
- **Long ME**, Lindemann SR, Rasmussen JA, Jones BD, and Allen L-A H. Disruption of *Francisella tularensis* Schu S4 *iglI, iglJ,* and *pdpC* genes results in attenuation for growth in human macrophages and *in vivo* virulence in mice and reveals a unique phenotype for *pdpC*. *Infection and Immunity*; 2013, 81(3): 850-861. PMID: 23275090
- Rasmussen JA, Fletcher JR, **Long ME**, Allen L-A H, and Jones BD. Characterization of Francisella tularensis Schu S4 mutants identified from a transposon library screened for O-antigen and capsule deficiencies. *Frontiers in Microbiology*; 2015, 6: 338. PMID: 25999917
- Schwartz JT, Barker JH, **Long ME,** Kauffman J, McCracken J, and Allen L-A H. Natural IgM mediates complement dependent uptake of *Francisella tularensis* by human neutrophils via CR1 and CR3 in nonimmune serum. *The Journal of Immunology*; 2012, 189(6): 3064-3077. PMID: 22888138
- Lindemann SR, Peng K, **Long ME**, Hunt JR, Apicella MA, Monack DM, Allen L-A H, and Jones BD. *Francisella tularensis* Schu S4 mutants in O-Antigen and capsule biosynthesis induce early cell death in human macrophages. *Infection and Immunity*; 2011, 79(2): 581-594. PMID: 21078861

Awards/Honors (selected)

- CFF LONG19F5-CI Cystic Fibrosis Foundation Postdoc-to-faculty Transition Award. 07/01/19-06/30/23. "Anti-Bacterial and Anti-Inflammatory Strategies for CF Lung Disease"
- CFF LONG21R3 Cystic Fibrosis Foundation Research Development Program Junior Faculty Recruitment Award 05/01/21-04/30/24, "Anti-Bacterial and Anti-Inflammatory Strategies for CF Lung Disease"
- 2007 University Honors, Northern Illinois University
- 2015 Nominated for the D.C. Sprietserbach Dissertation Award, University of Iowa
- 2017 Charlie Moore Endowed Fellowship for Cystic Fibrosis Research

Amy Elizabeth Lovett-Racke, Ph.D.
Professor
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Education

- Texas A&M University, College Station, TX, B.S. in Microbiology August
- University of Texas Health Science Center, Houston, TX Graduate School of Biomedical Sciences, Ph.D. in Biomedical Science – Program in Immunology

Positions

- Instructor, University of Texas Southwestern Medical Center – Dallas, TX Department of Neurology, July 1999 – October 2002
- Assistant Professor, University of Texas Southwestern Medical Center – Dallas, TX Department of Neurology, October 2002 – May 2006
- Assistant Professor, The Ohio State University Medical Center – Columbus, OH Department of Molecular Virology, Immunology and Medical Genetics July 2006 – September 2010
- Associate Professor, The Ohio State University Medical Center – Columbus, OH Department of Molecular Virology, Immunology and Medical Genetics October 2010 – August 2011
- Associate Professor, The Ohio State University Medical Center – Columbus, OH Department of Microbial Infection and Immunity (primary) Department of Neuroscience (secondary), September 2011 – 2016
- Professor, The Ohio State University Medical Center – Columbus, OH Department of Microbial Infection and Immunity (primary) Department of Neuroscience (secondary), June 2016 – present

Courses Taught (selected)

- 2016 MVIMG 7010 – Cellular and Molecular Immunology, Lecturer (4%), NeuroSC 4100 – Basic and Clinical Foundations of Neurological Disease (3%) NeuroSC 7050 – Neurobiology of Disease, Lecturer (3%), Medical School Host Defense, Lecturer (5%) BSGP 7000 - Biomedical Sciences Survey BSGP 7080 - Grant Writing, IBGP 8800 – Signature Program Translational Science Curriculum 'Immunology and Inflammation', Medical School Host Defense, Lecturer (5%) Medical School Foundations 2, Lecturer (15%)
- 2017 MVIMG 7010 – Cellular and Molecular Immunology, Lecturer (4%), NeuroSC 4100 – Basic and Clinical Foundations of Neurological Disease (3%) NeuroSC 7050 – Neurobiology of Disease, Lecturer (3%), NeuroSC 7500 – Principles of Neuroimmunology, Lecturer (8%) Medical School Host Defense, Lecturer (5%), BSGP 7000 – Biomedical Sciences Survey, Lecturer (5%), Medical School Foundations 2, Lecturer (15%), IBGP 8800 – Signature Program Translational Science Curriculum 'Immunology and Inflammation'
- 2018 MVIMG 7010 – Cellular and Molecular Immunology, Lecturer (4%), NeuroSC 4100 – Basic and Clinical Foundations of Neurological Disease (3%) NeuroSC 7050 – Neurobiology of Disease, Lecturer (3%), Medical School Host Defense, Lecturer (5%), BSGP 7000 – Biomedical Sciences Survey, Lecturer (5%) Medical School Foundations 2, Lecturer (15%), BSGP 8800 – Signature Program Translational Science Curriculum 'Immunology and Inflammation', MEDMCIM 8010 – Selected Topics in Advanced Immunology (10%)
- 2019 MVIMG 7010 – Cellular and Molecular Immunology, Lecturer (4%), NeuroSC 4100 – Basic and Clinical Foundations of Neurological Disease (3%) NeuroSC 7050 – Neurobiology of Disease, Lecturer (3%), NeuroSC 7500 – Principles of Neuroimmunology, Lecturer (8%) Medical School Host Defense, Lecturer (5%), BSGP 7000 – Biomedical Sciences Survey, Lecturer (5%) Medical School Foundations 2, Lecturer (15%), BSGP 8800 – Signature Program Translational Science Curriculum

'Immunology and Inflammation'

- 2020 MVIMG 7010 – Cellular and Molecular Immunology, Lecturer (4%), NeuroSC 4100 – Basic and Clinical Foundations of Neurological Disease (3%) NeuroSC 7050 – Neurobiology of Disease, Lecturer (3%), Medical School Host Defense, Lecturer (5%) Medical School Foundations 2, Lecturer (15%), BSGP 8800 – Signature Program Translational Science Curriculum 'Immunology and Inflammation', BSGP 7000 – Biomedical Sciences Survey, Lecturer (5%) MEDMCIM 8010 – Selected Topics in Advanced Immunology (10%)
- 2021 MEDMCIM 7010 – Cellular and Molecular Immunology, Lecturer (4%) NeuroSC 7050 – Neurobiology of Disease, Lecturer (3%), Medical School Host Defense, Lecturer (5%), NeuroSC 7500 – Principles of Neuroimmunology, Lecturer (8%)

Trainees Advised (selected)

- Pre-doctoral
  - 2002-2006 Anne Rocchini Gocke, PhD – Program in Immunology, University of Texas
  - 2008-2011 David J. Huss, PhD candidate – MCDB Graduate Program, OSU
  - 2008-2011 Alan J. Smith, MD/PhD candidate – Integrated BSGP OSU
  - 2011-2015 Mary Severin, PhD candidate – Integrated BSGP OSU
  - 2011-2015 Priscilla Lee, PhD candidate – MCBP OSU
  - 2013-2014 Patrick Nuro-Gyina – Discovery Prep Program, OSU
  - 2020-present Cora Petersen – BSGP OSU
- Post-doctoral
  - 2004-2006 Petra Cravens, PhD – University of Texas Southwestern Medical Center,
  - 2006-2011 Yuhong Yang, MD – The Ohio State University Medical Center, Columbus, OH 2008-2011 Mireia Guerau de Arellano Vilanova, PhD – The Ohio State University
  - 2016-2017 Priscilla Lee, PhD – The Ohio State University, Columbus, OH
  - 2016-2019 Sara Gombash Lampe, PhD - The Ohio State University, Columbus, OH 2020-
  - Present Christina Rau, PhD – The Ohio State University, Columbus, OH

Publications (Selected)

- Lee PW, Smith AJ, Yang Y, Selhorst AJ, Liu Y, Racke MK and **Lovett-Racke AE**. IL-23R- activated STAT3/STAT4 is essential for Th1/Th17-mediated CNS autoimmunity. *JCI Insight*2017;2: pii: 91663
- Lee PW, Severin ME and **Lovett-Racke AE**. TGF-β regulation of T cells in multiple sclerosis. *EurJ Immunol* 2017;47:446-453.
- Lee PW, Xin M, Wei P, Yang Y, and **Lovett-Racke AE**. IL-3 is a marker of encephalitogenic Tcells, but not essential for CNS autoimmunity. *Front Immunol.* 2018;9:1255, doi: 10.3389/fimmu.2018.01255.
- **Lovett-Racke AE**, Gormley M, Liu Y, Yang Y, Graham C, Wray S, Racke MK, Shubin R, Twyman C, Alvarez E, Bass A, Eubanks JL, and Fox E. B cell depletion with ublituximab reshapes the T cell profile in multiple sclerosis patients. *J Neuroimmunol* 2019;332:187-197.
- **Lovett-Racke AE**, Yang Y, Liu Y, Gormley M, Kraus E, Graham C, Wray S, Racke MK, Alvareq E, Fox E. B cell depletion changes the immune cell profile in multiple sclerosis patients: one-yearreport. *J Neuroimmunol. 2021 Oct 15:359:577676.*

Awards/Honors (selected)

- 2013 OSU College of Medicine Distinguished Educator Award
- 2015 OSU COM Faculty Achievement Award
- 2020 OSU Women in Medicine and Science 'COVID Warrior'
- 2020 OSU COM Award for Best Teaching and Learning Methods

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Education

- 1981-1987 Universidad Nacional de Colombia School of Medicine, Bogotá, Colombia, MD / 1987, Medicine
- 1987-1994 Dept. of Molecular Biology, Institute of Immunology, HJSD, School of Medicine, National University, Santafe de Bogota, Colombia, Research Fellow, Immunology
- 1994-1995 Dept. of Microbiology and Immunology, Vanderbilt University School of Medicine Nashville, Tennessee, Postdoctoral Fellow, Molecular Immunology
- 1995-1999 Dept. of Microbiology and Immunology, Vanderbilt University School of Medicine, Postdoctoral Fellow, Molecular Immunology

Positions

- 1999-2002 Dept of Microbiology and Immunology, Vanderbilt University School of Medicine, Research Instructor
- July 2002 – July 2010 Division of Pulmonary, Allergy, and Critical Care, Emory University School of Medicine, Atlanta, GA, Assistant Professor
- Aug 2010 – Jan 2016 Division of Pulmonary, Allergy, and Critical Care Medicine, Vascular Medicine Institute, University of Pittsburgh School of Medicine, Assistant Professor
- Feb 2016 – Jan 2021 Division of Pulmonary, Allergy, and Critical Care Medicine, Aging Institute, Vascular Medicine Institute, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, Director, Small Animal Hemodynamic Core, Vascular Medicine Institute
- 2014-Jan 2021 Director of Education, Aging Institute, Associate Professor
- Feb 2021- present Division of Pulmonary, Critical Care and Sleep Medicine, Associate Director of Lung Research, DHLRI, Professor

Educational Activities (selected)

- Medical Student Teaching
  - 2014, Spanish for Medical and Dental Students University of Pittsburgh (10) weekly/ 4 sessions/year.
  - Graduate Student Teaching
  - 2009-2012, Committee Member Graduate School Emory University- PhD Candidate Smita Iyer. Currently, Assistant Professor at University of California, Davis.
  - 2018, External advisor, PhD program "Targets in Toxicology", Comprehensive Pneumology Center (CPC), Ludwig-Maximilians-University, Asklepios Fachkliniken München-Gauting, and Helmholtz Zentrum München, Germany.
  - 2020, Graduate Training Status, Molecular Pharmacology Graduate Program, University of Pittsburgh.Committee Member Graduate School, University of Pittsburgh, PhD Candidate Molecular Pharmacology, Angela Hinchie.
- Undergraduate Students Mentored:
  - 2018-2019, Nneoma Uzoukwu, Undergraduate student, University of Pittsburgh, PURDiP summer program.

- 2019-2020, Alexander Azar, Undergraduate student, University of Pittsburgh
- 2019-2020 August Robert Mathien,Undergraduate student, University of Pittsburgh
- 2019-2020, Jack Noto, Undergraduate student, University of Pittsburgh

- International Graduate Students (mentored):
  - 2013-2016, Yair Romero. Graduate student, National Autonomous University of Mexico. Currently, post-doctoral fellow, National Autonomous University of Mexico.
  - 2015, Ilona Kammerl, Graduate student, Ludwig-Maximilians-Universität, Helmholtz-Zentrum Munchen. Currently, junior faculty Comprehensive Pneumology Center (CPC) Munich, Germany.
- Fellows (mentored):
  - 2013-2016, Karin Potoka, MD. Neonatal-Perinatal Medicine Fellow, PGY 6 Children's Hospital of Pittsburgh Magee Women's Hospital University of Pittsburgh Medical Center Research Fellow Vascular Medicine Institute. Currently faculty at the Pediatrics Department, Children's Hospital of Pittsburgh.
  - 2017-2018, Daniel Zank, MD, Fellow Division of Pulmonary Allergy and Critical Care, University of Pittsburgh. T32 program Division of Pulmonary. Currently Assistant Professor, National Jewish Health Center,Pulmonary Division. Director, Sarcoidosis Program.
- Post-doctoral Students (mentored):
  - 2010-2021, Marta Bueno, PhD. Post-doctoral fellow. Currently Research Assistant Professor at the Aging Institute, University of Pittsburgh.
  - 2014-2016, Judith Brands, PhD. Post-doctoral fellow. Currently Research Assistant Professor at the McGee Women Hospital, University of Pittsburgh.
  - 2017-2018, Lan Tu, PhD. Post-doctoral fellow. Currently, post-doctoral fellow, University of Washington, Seattle.
  - 2018-present, Diana Alvarez Villa, MD, T32 Scholar - Geriartrics, Aging Institute, University of Pittsburgh.
  - 2019-present, Jazmin Calyeca, PhD, Post-doctoral fellow, Aging Institute, University of Pittsburgh. Division of Pulmonary, Critical Care and Sleep Medicine, The Ohio State University
  - 2021-present, Timur Khaliullin, PhD, Postdoctoral fellow, Division of Pulmonary, Critical Care and Sleep Medicine, The Ohio State University

Publications (Selected)

- Krug LT, Torres-Gonzalez E, Qin Q, Sorescu D, Rojas M, Stecenko A, Speck SH, **Mora AL**. *Inhibition of NF-kappaB signaling reduces virus load and gammaherpesvirus-induced pulmonary fibrosis.* Am J Pathol. 2010 Aug; 177(2):608-21. PMID: 20566741. PMCID: PMC2913377.
- Boothby M, **Mora AL**, Aronica MA, Youn J, Sheller JR, Goenka S, Stephenson L. *IL-4 signaling, gene transcription regulation, and the control of effector T cells.* Immunol Res. 2001; 23(2-3):179-91. PMID: 11444383.
- Boothby M, **Mora AL**, Stephenson LM. *Lymphokine-dependent proliferation of T-lymphoid cells: regulated responsiveness and role in vivo*. Crit Rev Immunol. 2001; 21(6):487-522. PMID:12058862.
- Cardenes N, Alvarez D, Sellares J, Corey C, Wecht S, Hanumanthu VS, Nouraie M, Shanker S, Sembrat J, Bueno M, Shiva S, Armanios M, **Mora AL**, Rojas M. *Senescence of bone marrow-derived mesenchymal stem cells from patients with idiopathic pulmonary fibrosis*. 2018 Stem Cell Res Ther. 9(1) 257. PMID: 30257725. PMCID: PMC6158816.

Awards/Honors (selected)

- R01 HL131789-03 Signaling Mechanisms by Which Mitochondria Regulates Fibrosis in the Lung (PI),2015-2021, NIH, NHLBI
- P01 HL103455-08Therapeutic Targeting of Vascular Subphenotypes of Lung Disease (PI), Core B 2016-2021 NIH, NHLBI

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Education

- Indiana University BA Biology
- The Ohio State University PhD Integrated Biomedical Sciences
- The Ohio State University Postdoctoral Tumor Immunology

Positions

- 2020-Present Assistant Professor, Courtesy Appointment, Department of Microbial Infection, The Ohio State University
- 2018-Present Assistant Professor, Division of Hematology, The Ohio State University
- 2017-2018 Research Assistant Professor, Division of Hematology, The Ohio State University

Teaching Activities (selected)

- Lecturer: BIOMSCI 4830H. The Ohio State University. (2020-Present)
- Cancer Research- Towards Personalized Medicine Undergraduate Course. Designed and instructed section on leukemia and immune therapy. (2019-Present)
- Advanced seminars in Immunology. Designed and instructed section on innate immunology (2017)
- Journal Club and Career Development Series Leader. Designed program for undergraduate fellowship recipients to learn appropriate journal review techniques and invited speakers to discuss career options within the field of biomedical sciences. (2014-2015)

Trainees Advised (selected)

- Cristina Jaime-Ramirez, PhD –National Institute of Health F32 Award Recipient. The Ohio State University, Columbus, OH – Graduate Student, Project Mentor (2010-2012)
- Kyle Steinour - The Ohio State University, Columbus, OH – Lab Mentor. Undergraduate (2012)
- Kelsey Chatman, BS – R01 Minority Supplement Award. The Ohio State University, Columbus, OH. Undergraduate, Lab Mentor (2014-2015)
- Ansel Nalin, BS – The Ohio State University Presidential Scholarship. The Ohio State University Hospital, Columbus, OH. Med Student-PhD Student, Project Mentor (2016-Present)
- Luxi Chen, BS – Pelotonia Fellow. The Ohio State University Hospital, Columbus, OH. Medical Student- PhD Student, Project Mentor (2017-2019)
- Gabrielle Ernst - Pelotonia Fellow. The Ohio State University, Columbus, OH. Undergraduate, Mentor (2017-2019)
- Alex Sprague - Pelotonia Fellow. The Ohio State University, Columbus, OH. Undergraduate, Co-Mentor (2019)
- Naima Hashi, BS – The Ohio State University College of Medicine Medical Research Award Recipient; American Society of Hematology Medical Minority Award. Medical Scientist Training Program Student. Co-Advisor (2018-Present)
- Matthew Lordo, BS – The Ohio State University Presidential Scholarship. The Ohio State University, Columbus, OH. Medical Student, PhD. Co-Advisor (2018-Present)
- Thinh (Sarah) Dinh – The Ohio State University, Columbus, OH. The Ohio State University, Biomedical Sciences Graduate Program. Advisor (2020-Present)
- Erin Jeremy, BS - The Ohio State University, Columbus, OH. The Ohio State University, Medical

Scientist Training Program Student. Co-Advisor (2021-Present)

Publications (Selected)

- **Mundy-Bosse BL*** B, Denlinger N, McLaughlin E, Chakravarti N, Hwang S, Chen L, Mao HC, Kline D, Youssef Y, Kohnken R, Lee DA, Lozanski G, Freud AG, Porcu P, William B, Caligiuri MA, Mishra* A. Highly cytotoxic natural killer cells are associated with poor prognosis in patients with cutaneous T-cell lymphoma. ***Blood Adv***. 2018 Aug 14;2(15):1818-1827. PMID:30054309.
- Scoville SD, Nalin AP, Chen L, Chen L, Zhang M, McConnell K, Beceiro Casas S, Ernst G, Traboulsi AA, Hashi N, Williams M, Zhang X, Hughes T, Mishra A, Benson DM, Saultz JN, Yu J, Freud AG, Caligiuri MA, **Mundy-Bosse BL**. Human AML activates the AHR pathway to impair NK cell development and function. ***Blood***. 2018 Aug 29. pii: blood-2018-03-838474. doi: 10.1182/blood-2018-03-838474. PMID: 30158248.
- Lordo MR, Wu KG, Altynova E, Shilo N, Kronen P, Nalin AP, Weigel C, Zhang X, Yu J, Oakes CC, Caligiuri MA, Freud AG, **Mundy-Bosse BL**. Acute Myeloid Leukemia Alters Group 1 Innate Lymphoid Cell Differentiation from a Common Precursor. ***J Immunol***. 2021 Aug 20:ji2100023. doi: 10.4049/jimmunol.2100023. Epub ahead of print. PMID: 34417259.
- Scoville SD, **Mundy-Bosse BL**, Zhang MH, Chen L, Zhang XL, Keller KA, Hughes T, Cheng S, Bergin SM, Mao HY, McClory S, Carson, WE III, Caligiuri MA, and Freud AG. A Progenitor Cell Expressing Transcription Factor RORyt Generates All Human Innate Lymphoid Cell Subsets. ***Immunity***. 2016 May 17;44(5):1140-50. PMCID: PMC4893782.
- Wang Y, Zhang Y, Yi P, Dong W, Nalin AP, Zhang J, Zhu Z, Chen L, Benson DM, **Mundy-Bosse BL**, et al. The IL-15-AKT-XBP1s signaling pathway contributes to effector functions and survival in human NK cells. ***Nat Immunol***. 2019 Jan;20(1):10-17. PMID: 30538328
- Chen L, Youssef Y, Robinson C, Ernst GF, Carson MY, Young KA, Scoville SD, Zhang X, Harris R, Sekhri P, Mansour AG, Chan WK, Nalin AP, Mao HC, Hughes T, Mace EM, Pan Y, Rustagi N, Chatterjee SS, Gunaratne PH, Behbehani GK, **Mundy-Bosse BL**, Caligiuri MA, Freud AG. CD56 Expression Marks Human Group 2 Innate Lymphoid Cell Divergence from a Shared NK Cell and Group 3 Innate Lymphoid Cell Developmental Pathway. ***Immunity***. 2018 Sep 18;49(3):464-476.e4. PMID: 33020148.
- **Mundy-Bosse, BL.,** Lesinski GB., Jaime-Ramirez, AC., Benninger, K., Khan, M., Kuppusamy, P., Guenterberg, K., Kondadasula, SV., Ray Chaudhury, A., La Perle, KM., Kreiner, M., Young, G., Guttridge, DC., Carson, WE 3rd. (2011). Myeloid-derived suppressor cell inhibition of the IFN response in tumor-bearing mice. ***Cancer Research***. 71(15), 5101-10. PMCID: PMC3148319.
- **Mundy-Bosse BL**, Young GS, Bauer T, Binkley E, Bloomston M, Bill MA, Bekaii-Saab T, Carson WE 3rd, Lesinski GB. Distinct myeloid suppressor cell subsets correlate with plasma IL-6 and IL-10 and reduced interferon-alpha signaling in $CD4^+$ T cells from patients with GI malignancy. **Cancer Immunol Immunother**. 2011 Sep;60(9):1269-79. doi: 10.1007/s00262-011-1029-z. Epub 2011 May 21. PubMed PMID: 21604071; PubMed Central PMCID: PMC3521517.
- **Mundy-Bosse BL**, Thornton LM, Yang HC, Andersen BL, Carson WE. Psychological stress is associated with altered levels of myeloid-derived suppressor cells in breast cancer patients. **Cell Immunol.** 2011;270(1):80-7. doi: 10.1016/j.cellimm.2011.04.003. 2011 Apr 23. PubMed PMID: 21600570; PubMed Central PMCID: PMC3129455.

Awards/Honors (selected)

- 1R01CA255860-01A1, 2021-2026, National Institutes of Health, NCI, Role: Principal Investigator, Multi-PI, Dysregulation of Innate Lymphoid Immunity in Acute Myeloid Leukemia
- American Cancer Society Research Scholar Award, 2020-2024, Role: PI: Bethany Mundy-Bosse
- R21 AI156411, 2021-2023, Role: Co-Investigator, Gene regulatory architecture of CD56 bright natural killer cells
- 2015 Gabrielle's Foundation, Foundation Medical Advisory Board Award

Fernanda Novais, PhD
Assistant Professor, Microbial Infection and Immunity
720 Biomedical Research Tower (BRT)
460 W 12th Ave, Columbus OH 43210
Fernanda.Novais@osumc.edu

Education

- Federal University of Bahia, Brazil Bachelor's Degree Ecology
- Federal University of Bahia/FIOCRUZ-BA, Brazil MSc Pathology
- Federal University of Bahia/FIOCRUZ-BA, Brazil PhD Pathology
- University of Pennsylvania Postdoctoral training Immunoparasitology

Positions

- 2020-present Assistant Professor, Wexner Medical Center, The Ohio State University, Columbus, Ohio
- 2020 Research Assistant Professor, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania
- 2016-2019 Research Associate, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

Courses Taught (selected)

- 2021 Faculty Lecturer: MICRO 7724 and BSGP 7240 - Microbial Pathogenesis, Ohio State University, Columbus, OH. Immunity to Leishmania.
- 2021 Instructor: BSGP 7972 - BIOMED Senior Seminar, Ohio State University, Columbus, OH.
- 2021 Faculty Lecturer: BSGP 8800.02 - Signature Program in Translational Sciences: Host- Pathogen Interactions, Ohio State University, Columbus, OH. Disease Manifestations in Leishmaniasis.
- 2020 Faculty Lecturer: CAMB 706 - Parasitology Segment, University of Pennsylvania, Philadelphia, PA. Immunity to Leishmania.
- 2019 Faculty Lecturer: CAMB 706 – Parasitology Segment, University of Pennsylvania, Philadelphia, PA. Student paper presentation.
- 2019 Faculty Lecturer: CAMB 706 – Parasitology Segment, University of Pennsylvania, Philadelphia, PA. Disease Manifestations in Leishmaniasis.
- 2018 Faculty Lecturer: CAMB 706 – Parasitology Segment, University of Pennsylvania, Philadelphia, PA. Student paper presentation.
- 2017 Faculty Lecturer: CAMB 706- Parasitology Segment, University of Pennsylvania, Philadelphia, PA. Disease Manifestations in Leishmaniasis.
- 2017 Faculty Lecturer: CAMB 706 – Parasitology Segment, University of Pennsylvania, Philadelphia, PA. Student paper presentation.
- 2017 Faculty Lecturer: CAMB 549 - Parasites and Parasitism, University of Pennsylvania, Philadelphia, PA. Immunity to Leishmania.
- 2016 Faculty Lecturer: CAMB 617 – Emerging Infectious Diseases, University of Pennsylvania, Philadelphia, PA. Disease Manifestations in Leishmaniasis.
- 2015 Faculty Lecturer: CAMB 549 - Parasites and Parasitism, University of Pennsylvania, Philadelphia, PA. Disease Manifestations in Leishmaniasis.

Trainees Advised (selected)

- Current Erin Fowler, PhD candidate Biomedical Sciences Graduate Program Current Allison Yan, MD candidate
- Current Amy Dong, undergraduate student at School of Arts and Sciences

- 2016 Pedro Carneiro, sandwich graduate student at University of Pennsylvania 2015 Leonardo Marrone, undergraduate researcher at University of Pennsylvania 2014 Megan Clark, undergraduate researcher at University of Pennsylvania
- 2011 Anna Hammer, undergraduate researcher at University of Pennsylvania 2006-2010 Rômulo Santiago, undergraduate researcher at FIOCRUZ, BA, Brazil

Publications (selected)

- Amorim CF, **Novais, FO**, Nguyen, B, Misic, AM, Carvalho, LP, Carvalho, EM, Beiting, DP, Scott, P. 2019. Variability in immune gene expression correlates with parasite load and predicts treatment outcome in cutaneous leishmaniasis. Science Translational Medicine v.11, 519 PMCID: PMC7068779
- **Novais, FO**, Santiago, RC, Bafica, A, Khouri, R, Afonso, L, Borges, VM, Brodskyn, C, Barral-Netto, M, Barral, A, de Oliveira, CI. 2009. Neutrophils and Macrophages Cooperate in Host Resistance against Leishmania braziliensis Infection. The Journal of Immunology v.183, 8088-8098.
- **Novais, FO**, Nguyen, BT, Beiting, DP, Carvalho, LP, Glennie, ND, Passos, S, Carvalho, EM, Scott, P. 2014. Human classical monocytes control the intracellular stage of Leishmania braziliensis by reactive oxygen species. The Journal of Infectious Diseases v.209, 1288-96. PMCID: PMC3969552
- **Novais, FO***, Wong, AC, Villareal, DO, Beiting, DP, Scott, P*. 2018. CD8 T Cells Lack Local Signals to Produce IFN-□In the Skin During Infection. Journal of Immunology V.200, Ji1701597 *co-corresponding authors. PMCID: PMC6178231
- Moura, TR*, **Novais, FO***, Clarêncio, J, Noronha, A, Barral, A, Brodskyn, C, de Oliveira, CI, 2005. Towards an experimental model of infection to study American Cutaneous Leishmaniasis. Infection and Immunity v.73, 5827-5834 *co-first authors PMCID: PMC1231065
- de Moura, TR, Oliveira, F, Rodrigues, GC, Carneiro, MW, Fukutani, KF, **Novais, FO**, Miranda, JC, Barral-Netto, M, Brodskyn, C, Barral, A, de Oliveira, CI. 2010. Immunity to Lutzomyia intermedia Saliva Modulates the Inflammatory Environment Induced by Leishmania braziliensis. Plos Neglected Tropical Diseases v.4, e712. PMCID: PMC2886072
- Crosby, EJ, Clark, M, **Novais, FO**, Wherry, EJ, Scott, P. 2015. Lymphocytic Choriomeningitis Virus Expands a Population of NKG2D+CD8+ T Cells That Exacerbates Disease in Mice Coinfected with Leishmania major. The Journal of Immunology v.195, 3301-3310. PMCID: PMC4575880
- Gimblet, C, Meisel, JS, Loesche, MA, Cole, SD, Horwinski, J, **Novais, FO**, Misic, AM, Bradley, CW, Beiting, DP, Rankin, SC, Carvalho, LP, Carvalho, EM, Scott, P, Grice, EA. 2017. Cutaneous Leishmaniasis Induces a Transmissible Dysbiotic Skin Microbiota that Promotes Skin Inflammation. Cell Host & Microbe v.22, 13 PMCID: PMC5555377

Awards/Honors (selected)

- Research Funding
  - Host Defense and Microbial Biology Support Award (NOVAIS: PI), 06/30/21-12/31/21, OSU Distinct functions for CD8 T cells in cutaneous leishmaniasis
  - Infectious Disease Institute Interdisciplinary Seed Grant (NOVAIS: Co-PI), 06/01/21-06/30/22, OSU, Murine model for the immunopathogenic role of type III IFNs (IFN) in cutaneous leishmaniasis
- Honors
  - 2013 Best oral presentation, Woods Hole Immunoparasitology Meeting 2010 Fellowship by CNPq, Brazil
  - 2007 Zigman Brenner, Brazilian Society of Protozoology
  - 2007 Fellowship by CAPES, Brazil
  - 2005 Best poster, Brazilian Society of Immunology

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Education

- Tennessee Tech University, Cookeville, TN BS Chemistry
- Vanderbilt University, Nashville, TN PhD Immunology
- Emory University, Atlanta, GA Postdoc Immunology
- University of Washington, Seattle, WA Postdoc Immunology

Positions

- 2013-2019 Assistant Professor, Virginia Tech Carilion Research Institute, Roanoke, VA, Virginia Tech School of Medicine, Department of Biomedical Sciences and Pathobiology, Virginia-Maryland Regional College of Veterinary Medicine, Virginia Tech, Blacksburg, VA, Faculty of Health Sciences, Virginia Tech, Blacksburg, VA
- 2019-present Associate Professor, Department of Microbial Infection and Immunity, The Ohio State University College of Medicine, Columbus, OH
- 2019-present Member, The Ohio State University Comprehensive Cancer Center, Columbus, OH
- 2019-present Member, The Pelotonia Institute for Immuno-oncology (PIIO), OSU, Columbus, OH

Courses Taught (selected)

- 2020-present Co-Director, BSGP 7000 Host Defense block, BSGP Graduate program
- 2020-present MEDMCIM 8010 Advanced Topics in Immunology (Graduate level)
- 2020-present MEDMCIM 7010 Cellular and Molecular Immunology (Graduate level)
- 2016-2019 Co-Director, Immunity and Infectious Disease Track, TBMH Graduate program
- 2016-2019 TBMH 5004 Introduction to Immunity and Infectious Disease (Graduate level)
- 2015-2019 TBMH 5054 Fundamentals of Immunity and Infectious Disease (Graduate level)
- 2014-2019 BMVS 6714 Immunology in Health and Disease (Graduate level)
- 2014-2019 VTCSOM/TBMH Methods in Logic (Graduate/Medical school level)

Trainees Advised (selected)

- 2020-Present Jasmine Tuazon, MD/Ph.D Student, Medical Scientist Training Program (OSU)
- 2020-Present Melissa Leonard, Graduate Student, Vet. Path. Residency/Ph.D. Program (OSU)
- 2020-Present Srijana Pokhrel, Postdoctoral fellow (OSU)
- 2019-Present Devin Jones, Graduate Student, Biomedical Sciences Graduate Program (OSU)
- 2018-Present Kaitlin Read, Graduate Student, Biomedical Sciences Graduate Program (OSU)
- 2017-2020 Mustafa Rasheed, Medical Student, Virginia Tech Carilion School of Medicine (Current position: Medical resident, Emory University)
- 2017-2020 Simran “Nikki” Sandhu, Medical Student, Virginia Tech Carilion School of Medicine (Current position: Medical resident, George Washington University)

- 2017-2020 Sol Moon, Medical Student, Virginia Tech Carilion School of Medicine (Current position: Medical resident, University of Alabama-Birmingham)
- 2015-2019 Bharath Sreekumar, Graduate Student, Translational Biology Medicine and Health graduate program (Current position: Postdoctoral Fellow, Gladstone Institute, UCSF)
- 2015-2019 Shah "Jawad" Zafar, Medical Student, Virginia Tech Carilion School of Medicine (Current position: Medical resident, University of Maryland-Baltimore)
- 2014-2019 Michael Powell, Graduate Student, Tranlational Biology Medicine and Health graduate program (Current position: Postdoctoral Fellow, Emory University)
- 2014-2017 Emily Martin, Undergraduate Student, Virginia Tech (Current position: Graduate student, Cellular and Molecular Biosciences, Wake Forest University)
- 2013-2017 Ian Cooley, Medical Student, Virginia Tech Carilion School of Medicine (Current position: Rheumatology Fellow, Mass. General Hospital, Harvard University)
- 2014-2016 Ashlyn Anderson, Undergraduate Student, Roanoke College (Current position: Graduate student, Dept. of Microbiology and Immunology, UAB School of Medicine)
- 2013-2016 Paul McDonald, Senior Post-doctoral fellow (Current position: Senior Analyst, Proactive worldwide)

Publications (Selected)

- **Oestreich KJ**, Weinmann AS. Master regulators or lineage-specifying? Changing views on $CD4^+$ T cell transcription factors. *Nat. Rev. Immunol.* 2012 Nov; 12(11):799-804. Epub 2012 Oct 12. PMCID: PMC3584691.
- McDonald PW, Read KA, Baker CE, Anderson AE, Powell MD, Ballesteros-Tato A, **Oestreich KJ**. IL-7 signaling represses Bcl-6 and T_{FH} gene program. *Nature Communications.* 2016 Jan 8; 7:10285. PMCID: PMC4729877.
- Read KA*, Powell MD*, Baker CE, Sreekumar BK, Ringel-Scaia VM, Bachus H, Martin RE, Cooley ID, Allen IC, Ballesteros-Tato A, **Oestreich KJ**. Integrated STAT3 and Ikaros Zinc Finger Transcription factor activities regulate Bcl-6 expression in $CD4^+$ T helper cells. *J. Immunol*. 2017 Oct 1; 199(7):2377-87. PMCID: PMC5657606. **Equal contributors*
- Powell MD, Read KA, Sreekumar BK, Jones DM, and **Oestreich KJ**. IL-12 signaling drives the differentiation and function of a T_H1-derived T_{FH1}-like cell population. *Sci. Rep.* 2019 Sep; 9(1):13991, 2019. PMCID: PMC6769002.
- Read KA*, Jones DM*, Freud AF, and **Oestreich KJ**. Established and emergent roles for Ikaros transcription factors in lymphoid cell development and function. *Immunological Reviews.* 2020 Dec; 10.1111/imr.12936. PMID: 33331000.
  **Equal contributors*

Awards/Honors (selected)

- R01AI134972, PI: Oestreich, 05/23/18 – 04/30/23, Identifying novel regulatory pathways underlying T helper 1 cell immune responses
- R56AI127800, PI: Oestreich, 08/01/17 – 07/31/18,Regulation of T helper cell differentiation by integrated STAT and Ikaros zinc finger transcription factor mechanisms

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Education

- Columbia University, New York, NY Ph.D. Chemistry
- Dept. of Biochemistry, Columbia University College of Physicians & Surgeons Postdoctoral Fellow
- Children's Hospital & Dept. of Genetics, Harvard University, Postdoctoral Fellow

Positions

- 1993-2000 Assistant Professor, Dept. of Microbiology & Immunology, Vanderbilt University Medical School
- 2000-2005 Associate Professor, Dept. of Microbiology & Immunology, Vanderbilt University Medical School
- 2005-2009 Professor, Dept. of Microbiology & Immunology, Vanderbilt University Medical School
- 2009-2018 Professor, Dept. of Pathology & Immunology, Washington University School of Medicine
- 2015-2017 Co-Leader, DNA Metabolism and Repair Group, Siteman Cancer Center, WUSM
- 2018-2023 Editor-In-Chief, The Journal of Immunology
- 2019- Professor, Chair, and Samuel Saslaw Professor in Infectious Disease, Department of Microbial Infection & Immunity, Ohio State University Wexner School of Medicine

Teaching Activities

- Courses
  - 1994-2009 Lecturer, Interdisciplinary Graduate Program "Defense Mechanisms" Section, VUMS
  - 1994-1997 Coordinator, Research-In-Progress Seminar Series, Dept. of Microbiology and Immunology, VUMS
  - 1995-2000, 2006-2009 Director, "Molecular and Cellular Immunology", Dept. of Microbiology and Immunology, VUMS
  - 2009-2018 Lecturer, Immunobiology I, Dept. of Pathology & Immunology, WUSTL
  - 2010-2013 Lecturer, Contemporary Molecular Immunology, WUSTL Medical School
  - 2010-2018 Lecturer & Co-Director, Advanced Topics in Immunology, Dept. of Pathology & Immunology, WUSTL
  - 2010-2012 Lecturer, Pillars in Immunology, Dept. of Pathology & Immunology, WUSTL
  - 2013-2015 Lecturer, Medical School Immunology, WUSTL
  - 2015-2016 Co-Director, Immunobiology I, Dept. of Pathology & Immunology, WUSTL
  - 2015-2019 Co-Director, Advanced Topics in Immunology, Dept. of Pathology & Immunology, WUSTL
  - 2016-2017 Co-Director, Immunobiology II, Dept. of Pathology & Immunology, WUSTL
  - 2019-present. Lecturer, Cellular and Molecular Immunology, OSU
  - 2020-present. Lecturer, Selected Topics in Advanced Immunology, OSU
  - 2021. Lecturer, Systems Immunology, OSU

- Trainees
    - Rachel Brown, Graduate Student
    - Matthew Estrada, Undergraduate Student
    - Vincent Nganga, Post Doctoral Scholar
    - Ankita Saini, Post Doctoral Scholar

Publications (selected)

- Majumder, K, Koues, OI, Chan, EAW, Kyle, KE, Horowitz, JE, Yang-Iott, K, Bassing, CH, Taniuchi, I, Krangel, MS, and Oltz, EM: Lineage-Specific Compaction of *Tcrb* Requires a Chromatin Barrier To Protect the Function of a Long-range Tethering Element. *J. Exp. Med.* 2015. 212(1):107-120. PMID:25512470
- Majumder K, Rupp LJ, Yang-Iott KS, Koues OI, Kyle KE, Bassing CH*, Oltz EM*: Domain-specific and stage-intrinsic changes in *Tcrb* conformation during thymocyte development. *J. Immunol.* 2015. 195(3):1262-1272. PMID:26101321
- Barajas-Mora EM, Kleiman E, Xu J, Carrico NC, Lu H, Oltz EM, Murre C, & Feeney AJ: A B-Cell-Specific Enhancer Orchestrates Nuclear Architecture to Generate a Diverse Antigen Receptor Repertoire. Mol. Cell, 2019. 73(1): 48-60. PMID: 30449725.
- Koues OI, Kowalewski R, Chang L-W, Pyfrom S, Schmidt JA, Luo H, Sandoval LE, Hughes TB, Bednarski JJ, Cashen A, Payton JE*, Oltz EM*: Enhancer Sequence Variants and Transcription Factor Deregulation Synergize to Construct Pathogenic Regulatory Circuits in B cell Lymphoma. *Immunity*. 2015. 41(1):186-198. PMID:25607463
- Koues OI, Collins PL, Cella M, Robinette ML, Porter SI, Pyfrom SC, Payton JE, Colonna M*, Oltz EM*: Distinct Gene Regulatory Pathways for Human Innate Versus Adaptive Lymphoid Cells. *Cell*, 2016. 165(5):1134-1146. PMID:27156452
- Collins PL, Cella M, Porter SI, Li S, Gurewitz GL, Hong HS, Johnson RP, Oltz EM*, & Colonna M*: Gene Regulatory Programs Conferring Phenotypic Identities to Human NK Cells. *Cell*, 2019, 176(1-2):348-360. PMID:30595449
- Wang Q, Robinette ML, Billon C, Collins PL, Bando JK, Fachi JL, Sécca C, Porter SI, Saini A, Gilfillan S, Solt LA, Musiek ES, Oltz EM, Burris TP, Colonna M. Circadian rhythm-dependent and circadian rhythm-independent impacts of the molecular clock on type 3 innate lymphoid cells. *Sci Immunol*. 2019 Oct 4;4(40). pii: eaay7501. doi: 10.1126/sciimmunol.aay7501

Awards/Honors (selected)

- Research Funding
    - 1 R01 AI118852 (Oltz), 3/1/15-2/29/21, NIH/NIAID, Topological Mechanisms of DNA Break Repair in Lymphocytes (*Converted to R37 Merit Award)*
    - 1 R01 CA188286, Oltz/Payton (Co-PIs), 5/1/15 – 4/30/20, NIH/NCI, Sequence-Specific Chromatin Modifiers; Novel Protein Therapeutics For B Cell Lymphoma
    - 1R01AI130231, Oltz/Bassing (Co-PIs), 09/25/17-08/31/22, NIH/NIAID, Topological Control of Antigen Receptor Loci During Lymphocyte Development
    - 1R01AI134035-01, (Oltz/Colonna; Co-PI), 09/13/18-09/12/23, NIH/NIAID, Cis-Regulatory Circuits for ILC Function and Plasticity
- Honors
    - 1984: Distinguished Teaching Award, Columbia University.
    - 1990: Cancer Research Institute Postdoctoral Fellow.
    - 2009: Impact Award, Vanderbilt-Ingram Cancer Center
    - 2010 Transformative Research Grant, NIH Director's Fund
    - 2017 Distinguished Service Award, American Association of Immunology
    - 2018-2023 Editor-in-Chief, The Journal of Immunology

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Education

- 1987-1990 B.Sc. Biology, Madurai Kamaraj University, India
- 1990-1992 M.Sc. Biology, Madurai Kamaraj University, India
- 1992-1994 M.Phil. Biology, Madurai Kamaraj University, India
- 1994-2000 Ph.D. Microbiology, University of Madras, India.
- 2000- 2001 Post-Doctoral Researcher, Institute De Molecular Biology & Genetics, University of Paris XI, France.

Positions

- 2019-present Associate Professor
- 2012 –2019 Research Assistant Professor
- Additional OSU Appointments: Center for Microbial Interface Biology (Member); Davis Heart and Lung Research Institute (Member); Public Health Preparedness for Infectious Diseases Program (Member); Infectious Diseases Institute (Member).
- 2017 –present Faculty Director, BSL3 Program
- 2008- 2012 Research Scientist, Center for Microbial Interface Biology,
- Department of Internal Medicine, College of Medicine, The Ohio State University, Columbus, OH.
- 2004- 2008 Research Associate 2
- Division of Pulmonary Critical Care and Sleep Medicine,
- Department of Internal Medicine, College of Medicine, The Ohio State University, Columbus, OH.

Educational Activities (selected)

- Other Student Training:
  - Served as a Co-Advisor for Bret Betz Medical student and recipient of Roessler's grant for summer training -2009.
- Post Doctoral Researchers and graduate students:
  - Michelle N. Brooks- Graduate Student, 2008- 2011- Role Co-Advisor
  - Bin Ni- MD, Ph.D student, 2008- Present - Role Co-Advisor
  - Jessica Morris- Research Associate, 2008-2009- Role Co-Advisor
  - Bret Betz- MD Student Summer Training, 2009- Role Co-Advisor
  - Huy Nguyen- Research Associate, 2009-2011- Role Co-Advisor
  - Daniel House – Graduate Student, 2011- present- Role Co-Advisor
  - Alaric W. D'Souza- MSTP Summer training student, 2012
  - Ky Hoang- Post Doctoral Researcher- 2013- present- Role Co-Advisor
  - Claire Dood- Graduate student- 2013- present- Role Co-Advisor
  - Eusondia Arnett- Post Doctoral Researcher- 2014- present
  - Abigail Gerberick- Undergraduate Student -2015-present-Role Advisor
  - Sumiran Mehta- Undergraduate Student -2015-present-Role Advisor
  - Current Student Mentoring:
  - Sonali Patel- Undergraduate student 2018- present- Role Advisor
  - Cameron Kashef- Undergraduate student 2018- present- Role Advisor
  - Noushin Saljoughian- Post Doctoral Researcher- 2018- Present- Role Advisor

Publications (Selected)

- Esfahani NS, Wu Q, Kumar N, Ganesan LP, Lafuse WP, **Rajaram MVS.** Aging influences the cardiac macrophage phenotype and function during steady state and during inflammation. Aging

Cell. 2021 Aug; 20(8):e13438. doi: 10.1111/acel.13438. Epub 2021 Aug 2.PMID: 34342127

- Lafuse WP, Wozniak DJ, **Rajaram MVS.** Role of Cardiac Macrophages on Cardiac Inflammation, Fibrosis and Tissue Repair. Cells. 2020 Dec 31;10(1):51. doi: 10.3390/cells10010051.PMID: 33396359
- William P. Lafuse**, **Rajaram MVS** **, Qian Wu, Juan I. Moliva, Jordi B. Torrelles, Joanne Turner and Larry S. Schlesinger. Identification of an increased alveolar macrophage subpopulation in old mice that displays unique inflammatory characteristics and is permissive to *Mycobacterium tuberculosis* infection. J Immunol. 2019 Oct 15;203(8):2252-2264. doi: 10.4049/jimmunol.1900495. Epub 2019 Sep 11.PMID: 31511357.
- Qian Wu, Austin Hossfeld, Abigail Gerberick, Noushin Saljoughian , Charu Tiwari, Smriti Mehra, Latha Prabha Ganesan, Daniel J. Wozniak, and **Rajaram MVS**. *Mycobacterium tuberculosis* enhances macrophage P-glycoprotein (MDR-1) expression and activity to promote intracellular survival.
- Adam D. Kenney, Temet M. McMichael, Lizhi Zhang, Lisa Dorn, Qian Wu, Foued Amara, Min Chen, Federica Accornero, Vincenzo Coppola, **Rajaram MVS****, and Jacob S. Yount**. IFITM3 protects the heart during influenza virus infection. Accepted for Publication (08-01-19)*, PNAS.*
- Headley C, Turner J, **Rajaram MVS**. Aging heart and Infection. Aging (Albany NY). 2019 Jul 25. doi: 10.18632/aging.102128; PMID: 31346150.
- Colwyn A. Headley, Abigail Gerberick, Sumiran Mehta, Qian Wu, Lianbo Yu, Paolo Fadda, Mahmood Khan, Latha Prabha Ganesan, Joanne Turner and **Rajaram MVS**. Nontuberculous mycobacterium *M. avium* infection predisposes aged mice to cardiac abnormalities and inflammation. Aging Cell, DOI: 10.1111/acel.12926
- Guirado E, **Rajaram MVS**, Chawla A, Daigle J, La Perle KM, Arnett E, Turner J, Schlesinger LS. Deletion of PPARγ in lung macrophages provides an immunoprotective response against M. tuberculosis infection in mice. Tuberculosis (Edinb). 2018 Jul;111: 170-177. doi: 10.1016/j.tube.2018.06.012. Epub 2018 Jun 21.
- Hoang KV, **Rajaram MVS**, Curry HM, Gavrilin MA, Wewers MD, Schlesinger LS. Complement Receptor 3-Mediated Inhibition of Inflammasome Priming by Ras GTPase-Activating Protein During *Francisella tularensis* Phagocytosis by Human Mononuclear Phagocytes. Front Immunol. 2018 Mar 26;9:561. doi: 10.3389/fimmu.2018.00561. eCollection 2018.PMID:29632532.
- ** **Rajaram MVS**, Arnett E, Azad AK, Guirado E, Ni B, Gerberick AD, He LZ, Keler T, Thomas LJ, Lafuse WP, Schlesinger LS**. *M. tuberculosis*-Initiated Human Mannose Receptor Signaling Regulates Macrophage Recognition and Vesicle Trafficking by FcRγ-Chain, Grb2, and SHP-1.Cell Rep. 2017 Oct 3;21(1):126-140. doi: 10.1016/j.celrep.2017.09.034.PMID:28978467.

Awards/Honors (selected)

- R01AI146252-01, Murugesan Rajaram (PI), 07-01-2019 to 06-30-2024, Molecular Mechanism of cardiac inflammation and dysfunction in Pseudomonas aeruginosa infection
- R21 AI146690-01, Murugesan Rajaram (PI), 06-01-2019 to 05-30-2021, Mechanisms of Cardioprotection by the Innate Immune System during Influenza Virus Infections
- C3CF Translational and feasibility grant Murugesan Rajaram (PI), 07-01-2021 to 06-30-23, Molecular mechanism of cardiac dysfunction during infection in Cystic Fibrosis
- 2014 American Association of Immunologist Early Career Faculty Travel Award
- 2014 CMIB Young Faculty Mentor Award
- 2015 - 2019 American Association of Immunologist Early Career Faculty Travel Award

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Education

- 9/1997 - 5/2001 BS, Anderson College, Anderson, SC
- 9/2002 - 5/2007 PhD, Dartmouth Medical School, Hanover, NH
- 5/2007 - 8/2009 Postdoctoral Fellow, Mentor: Dr. Andrea Cooper, The Trudeau Institute, Saranac Lake, NY 9/2009 - 9/2010 Ruth L. Kirschstein NRSA Postdoctoral Fellow, The Trudeau Institute, Saranac Lake, NY

Positions

- 1/2011 - 6/2017 Assistant Professor, Medical College of Wisconsin (MCW), Dept of Microbiology & Immunology, Milwaukee, WI
- 7/2017 - 4/2018 Associate Professor, MCW Dept of Microbiology & Immunology, Milwaukee,WI
- 5/2018 - present Associate Professor, OSU Dept of Microbial Infection & Immunity, Columbus, OH

Educational Activities (selected)

- MCW Medical School Education
  - 2012 – 2014 Advisor and Discussion Leader, Global Health Pathway (MCW Medical Course # PWY-P02GH).
  - 2012 – 2014 Advisor and Discussion Leader, Physician Scientist Pathway (MCW Medical Course # PWY-P04PS).
  - 2012 – 2017 Lecturer, Infection and Host Immunity (MCW Medical Course #280-M1D102).
  - 2015 – 2016 Lecturer, Endocrinology & Reproduction (MCW Medical Course #999-M2D208).
- MCW Graduate School Education
  - 2011 – 2015 Lecturer, Mucosal Pathogenesis (MCW Graduate Course # 25260).
  - 2015 – 2017 Lecturer, Cell Signaling (MCW Graduate Course #16250).
  - 2013 – 2017 Lecturer, Cellular and Molecular Immunology (MCW Graduate Course # 25234).
- OSU Graduate School Education
  - 2019 – Present Course Director and Lecturer, Concepts in Biomedical Science: Host Defense block (BSGP 7000).
- OSU Medical School Education
  - 2021 – Present Lecturer, Clinical Foundations II – Host Defense Block (MED COLL 7763).
- PhD/MS Students Advised
  - Allison Reeme, MCW Graduate School, 2012 – 2016 (PhD Student; Graduated 5/16)
  - Ahmed Al-Muhairi, MCW Graduate School, 2015-2017 (MS Student; Graduated 5/18)*
  - Tiffany Claeys, OSU Graduate School, 2016 - Present (PhD Student; Graduated 5/21)*
  - Oscar Rosas Mejia, OSU Graduate School, 2018 – Present (PhD Student)*
  - Marisa Ruane-Foster, OSU Graduate School, 2020 – Present (PhD Student)*
  - Marlena Merling, OSU Graduate School, 2020 – Present (PhD Student)
  - * indicates an Under-Represented Minority
- PhD Committees

- Kaitlin Schmitz, MCW Graduate School, 2016 – 2019
- Tiffany Claeys, OSU Graduate School (College of Medicine), 2016 – 2021
- Oscar Rosas Mejia, OSU Graduate School (College of Medicine), 2016 – Present
- Jenny Resiliac, OSU Graduate School (College of Medicine) 2019 – Present
- Manuja Gunasena (College of Veterinary Medicine), 2020 – Present
- Yijing Liu, OSU Graduate School (College of Engineering), 2020 – Present
- Marisa Ruane-Foster, OSU Graduate School (College of Medicine), 2020 – Present
- Marlena Merling, OSU Graduate School (College of Medicine), 2020 – Present
- Jasmine Tuazon, OSU MSTP (College of Medicine), 2021 – Present

- Postdoctoral Fellows/Visiting Scholars
  - Nicole Ford (PhD, Princeton University, Princeton, NJ), 2011 – 2013
  - Agumas Shibabaw (PhD Candidate, University of Gondar, Gondar, Ethiopia), 2018-2019
  - Naiquan Yao (PhD, Jilin Agricultural University, Changchun, China), 2019
  - Ayesha Zafar (PhD, University of the Punjab, Lahore, Pakistan), 2019

Publications (Selected)

- Oscar Rosas Mejia, Erin S. Gloag, Jianying Li, Marisa Ruane-Foster, Tiffany A. Claeys, Daniela Farkas, LaszloFarkas, Gang Xin, **Richard T. Robinson**. "Mice infected with Mycobacterium tuberculosis are resistant to secondary infection with SARS-CoV-2." *Submitted, Journal of Experimental Medicine.*
- Mostafa Eltobgy, Ashley Zani, Adam D. Kenney, Shady Estfanous, Eunsoo Kim, Asmaa Badr, Eman Abdelhamid,Cierra Carrafice, Kylene Daily, Owen Whitham, Maciej Pietrzak, Amy Webb, Jeffrey Kawahara, Adrian Eddy, Parker Denz, Mijia Lu, Mahesh KC, Mark E. Peeples, Jianrong Li, Jian Zhu, Jianwen Que, **Richard Robinson**, Oscar Rosas Mejia, Luanne Hall-Stoodley, Stephanie Seveau, Mikhail Gavrilin, Andrea Tedeschi, Santiago Partida-Sanchez, Frank Roberto, Emily A. Hemann, Adriana Forero, Shahid Nimjee, Prosper Boyaka, Estelle Cormet-Boyaka, Jacob S. Yount and Amal O. Amer. *In review, Nature.*
- Reeme, A.E. and **R.T. Robinson**. (2016) "Dietary Vitamin D3 suppresses pulmonary immunopathologyassociated with late stage tuberculosis in C3HeB/FeJ mice." Journal of Immunology 196:1293-304.
- Turner, A.J., P. Aggarwal, H.E. Miller, J. Waukau, J.M. Routes, U. Broeckel, and **R.T. Robinson**. (2015) "The introduction of RNA-DNA differences underlies inter-individual variation in the human *IL12RB1* mRNA repertoire."Proceedings of the National Academy of Sciences 112:15414-15419.
- Orme, I.M., **R.T. Robinson**, A.M. Cooper. (2015) "The balance between protective and pathogenic immuneresponses in the TB-infected lung." Nature Immunology 16:57-63.

Awards/Honors (selected)

- Grants
  - Title: Acellular TB vaccines adjuvanted with BcfA Source: NIH – NIAID (R21 AI151867),Role: MPI (Purnima Dubey, Kara Corps, Rajendar Deora, **Richard Robinson**) Dates: 04/01/2020-03/31/2022
  - Title: Center for serological testing to improve outcomes from pandemic COVID19 (STOP-COVID) Source: NIH – NIAID (U54 CA260582), Role: Co-I (PI: Eugene Oltz, Ann McAlearney, Ashish Panchal, Linda Saif) Dates: 09/30/2020-09/29/2025
- Honors
  - 2013, 2014 Medical College of Wisconsin Excellence in Medical Education Award – Immunology

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Education

- Universidad Nacional de Colombia, School of Medicine, Bogotá, Colombia M.D. Medicine

The International Center for Genetic Engineering and Biotechnology. New Delhi, India, Immunology and Molecular Virology

- Institute of Immunology, Universidad Nacional de Colombia, Bogotá, Colombia Fellow Immunology

Synthetic Vaccines

- Vanderbilt University, Department of Microbiology and Immunology, Nashville, TN Fellow Molecular Immunology

Positions

- 1998-2002 Research Instructor, Division of Rheumatology and Clinical Immunology, Vanderbilt University
- 2002-2010 Assistant Professor Division of Pulmonary and Critical Care. Emory University
- 2010-2016 Assist. Professor Division of Pulmonary, Allergy and Critical Care. University of Pittsburgh
- 2010-2021 Faculty, Dorothy P. & Richard P. Simmons Center for ILD, University of Pittsburgh
- 2015-2021 Scientific Director, Dorothy P. & Richard P. Simmons Center for ILD, University of Pittsburgh
- 2016-2021 Associate Professor, Division of Pulmonary, Allergy and Critical Care. University of Pittsburgh
- 2017-2021 Associate Professor Clinical and Translational Science Institute, University of Pittsburgh
- 2020-2021 Visiting Professor Department of Internal Medicine, the Ohio State University
- 2021- Professor Department of Internal Medicine, the Ohio State University
- 2021- Scientific Director Surgical Biorepository, the Ohio State University
- 2021- Associate Vice-Chair of Research, Department of Internal Medicine, the Ohio State University
- 2021- Co-Director Lung Aging Center, the Ohio State University
- 2021- Professor Department of Microbial Infection and Immunology, the Ohio State University

Publications (selected)

- Amador R, Moreno A, Valero V, Murillo L, Mora AL, **Rojas M**, Rocha C, Salcedo M, Guzman F. Espejo F, et al. The first field trial of the chemically synthesized malaria vaccine SPf66: safety, immunogenecity and protectivity. *Vaccine.* 1992;10(3):179-84. PMID: 1557934
- Patarroyo G, Franco L, Amador R, Murillo LA, Rocha CL, **Rojas M**, Patarroyo ME. Study of safety and immunogenicity of the synthetic malaria SPf66 vaccine in children aged 1-14 years. *Vaccine* 1992;10(3):175-8. PMID: 1557933
- Amador R, Moreno A, Murillo LA, Sierra O, Saavedra D**, Rojas M**, Mora AL, Rocha CL, Alvarado F, Falla JC, et al. Safety, immunogenicity of the synthetic malaria vaccine SP66 in a large field trial. *J. Infect. Dis.* 1992 Jul;166(1):139-44. PMID: 1607685
- Valero MV, Amador LR, Galindo C, Figueroa J, Bello MS, Murillo LA, Mora AL, Patarroyo G, Rocha CL, **Rojas M**, et al. Vaccination with SPf66, a chemically synthesised vaccine, against Plasmodium falciparum malaria in Colombia. *Lancet.* 1993 Mar 20;341(8847):705-10. PMID: 8095622
- **Rojas M**, Yao S, and Lin YZ. Controlling epidermal growth factor (EGF)- stimulated Ras activation in intact cells by a cell-permeable peptide mimicking phosphorylated EGF receptor. *J. Biol. Chem*. 1996 Nov 1;271(44):27456-61. PMID: 8910327

- **Rojas M**, Yao S, Donahue JP, and Lin YZ. 1997. An alternative to phosphotyrosine-containing motifs for binding to an SH2 domain. *Biochem. Biophys. Res. Cummun*. 1997 May 29;234(3):675-80. PMID: 9175774
- **Rojas M**, Donahue JP, Tan Z, and Lin YZ. Genetic engineering of proteins with cell membrane permeability. *Nat Biotechnol*.. 1998 Apr;16(4):370-5. PMID: 9555729
- Mora AL, LaVoy J, McKean M., Stecenko A., Brigham KL, Parker R and **Rojas M**. Prevention of NF-kB Activation *In vivo* by a Cell Permeable NF-□B Inhibitor Peptide. *Am J Physiol Lung Cell Mol Physiol*. *2005* Oct;289(4):L536-44 Epub 2005 Jun 10. PMID: 15951331
- **Rojas M**, Xu J, Woods CR, Mora AL, Spears W, Roman J, and Brigham KL. Bone Marrow Derived Mesenchymal Stem Cells in Repair of the Injured Lung. *Am J Respir Cell Mol Biol.* 2005 Aug;33(2):145-52. Epub 2005 May 12. PMID: 15891110
- Xu J, Woods CR, Mora AL, Joodi R, Brigham KL, Iyer S, **Rojas M.** Prevention of Endotoxin-Induced Systemic Response by Bone Marrow- Derived Mesenchymal Stem Cells in Mice. *Am J Physiol Lung Cell Mol Physiol*. 2007 Jul;293(1):L131-41. PMID: 17416739
- Huleihel L, Sellares J, Cardenes N, Alvarez D, Sakamoto K, Guoying Y, Kapetanaki MG, Kaminski N, **Rojas M**. Modified mesenchymal stem cells using miRNA transduction alter lung injury in a bleomycin model. *Am J Physiol Lung Cell Mol Physiol.* 2017 Jul 1;313(1):L92-L103. PMID: 28385811.
- Lee EU, Cárdenes N, Álvarez D, Sellarés J, Sembrat J, Aranda P, Peng T, Bullock j, Nouraie SM, Mora AL and **Rojas M**. Mesenchymal Stem Cells Reduce ER Stress Via PERK-Nrf2 Pathway In An Aged Mouse Model.

Awards/Honors (selected)

- Research Funding
  - Mapping Age-Related Changes in the Lung (Rojas), 10/01/19-09/30/23 NHLBI 1U01 HL14555-01
  - Therapeutic ECM Resorption in Cellular Systems and Precision Cut Lung Slices (Tschumperlin-Rojas), 12/01/20-11/30/24 1U01 HL152967-01
  - Tissue Mapping Center for the Cellular Senescence Network SenNet (U Pittsburgh-OSU-U Rochester), 9/30/2021 – 8/31/2026 U54 AG075931
- Honors
  - 2006 President's Commission on Race and Ethnicity (PCORE) award, Emory University
  - 2008 PLoS ONE. Editor
  - 2009 Early Career Faculty Basic Research Award, Emory University Department of Medicine in recognition of the most outstanding publication by an early career faculty member.
  - 2009 Dorothy Dillon Eweson Lecture. American Federation for Aging Research
  - 2011 Founder and Director, Aging in the Lung. Working Group RCMB- American Thoracic Society
  - 2012 Honors Recognition University of Pittsburgh
  - 2013 Albert Rose Established Investigator Awards, Pulmonary Fibrosis Foundation
  - 2014 ATS Assembly on Respiratory Cell and Molecular Biology Carol Basbaum Award

Michael Root, PhD
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Education

- Harvard University A.B. Chemistry and Physics
- Harvard Medical School M.D. Medicine
- Harvard Graduate School of Arts and Sciences Ph.D. Biophysics
- Whitehead Institute for Biomedical Research, MIT Postdoc Biochemistry, Virology

Positions

- 2001-2005 Assistant Professor, Department of Microbiology & Immunology, Kimmel Cancer Center, Thomas Jefferson University, Philadelphia, PA
- 2004-2008 Director, Structural Biology and Bioinformatics Program, Kimmel Cancer Center, Thomas Jefferson University, Philadelphia, PA
- 2005-2011 Assistant Professor, Department of Biochemistry & Molecular Biology, Kimmel Cancer Center, Thomas Jefferson University, Philadelphia, PA
- 2012-2020 Associate Professor, Department of Biochemistry & Molecular Biology, Kimmel Cancer Center, Thomas Jefferson University, Philadelphia, PA
- 2012-2018 Director, Ph.D. Program in Biochemistry and Molecular Pharmacology, Thomas Jefferson University, Philadelphia, PA
- 2017-2020 Assistant Dean for Ph.D. Affairs, Jefferson College of Life Sciences, Thomas Jefferson University, Philadelphia, PA
- 2020-pres Professor (Clinical), Department of Microbial Infection and Immunity, Ohio State University Medical College, The Ohio State University, Columbus, OH

Courses Taught (selected)

- (TJU) Jefferson College of Life Sciences, Thomas Jefferson University
  - 2003-2007 Lecturer, Microbiology (MI600), "Viral Attachment and Entry" (3 hrs)
  - 2018-2020 Course Director, Lecturer and Facilitator, Preparing and Writing a Research Grant (GC 730), "Asking and Answering an Appropriate Research Question" (9 hours)
- (TJU) Sidney Kimmel Medical College, Thomas Jefferson University
  - 2017- 2020 Facilitator, Case-based Learning for JeffMD, Block 1 (Introduction to Medical Studies), Block 2 (Host Defense and Blood), and Block 3 (Cardiovascular and Pulmonary) (6 hours per week, 28 weeks)
  - 2017- 2019 Lecturer, JeffMD Phase 1 Block 2, "HIV/Host Interactions" (1 hr)
- (OSU) College of Medicine, The Ohio State University
  - 2020- Tutor, Year 1 Medical Students
- (OSU) Department of Biomedical Education, The Ohio State University
  - 2021 Facilitator, BSGP-7040 Journal Club (10 hours)
  - 2021 (fall) Course Director, BIOMSCI-3891H Honors Research Experience 1 (20 hours)

Trainees Advised (selected)

- Undergraduate student trainees
  - 2009 Danielle Pilla (Cedar Crest College, TJU UROP Student)
  - 2011 Tim Lukenbill (Villanova University, Internship and TJU UROP Student)
- Medical student trainees
  - 2017 Emily Bollinger (TJU)

- 2021 Eileen Tsai (OSUMC Medical Student Research Scholar)

- Pre-doctoral graduate trainees
  - 2008-2010 Swetha Uppalapati, Masters program, M.S. 2010 Current position: Associate Investigator, Dupont
  - 2009-2013 Konstantine Halkidis, BMB program, M.D.-Ph.D. 2014 Current position: Assistant Professor of Hematology/Oncology, University of Kansas College of Medicine
  - 2012-2017 Mukta Khasnis, MPSB Program, Ph.D. 2017 Current position: Postdoctoral Fellow, University of Alabama (laboratory of Michael Niederweis)
  - 2016-2018 Maria Cilento, Masters program, M.S. 2018 Current position: Ph.D. Student, Biochemistry Program, School of Medicine, Emory University
  - 2017-2018 Alexander Koch, Masters program, M.S. 2018
- Post-doctoral trainees
  - 2002-2004 Jagdeep Kaur, Ph.D. Current position: Assistant Professor, Panjab University, India
  - 2003-2005 Indira Unnikrishnan, Ph.D.
  - 2005-2008 R. Mark Jones, Ph.D. Current position: Senior Scientist, Fraunhofer Center for Molecular Biotechnology
  - 2011-2014 Amanda Siglin, Ph.D. Current position: Health Professions Program Director, Juniata College
  - 2012-2014 John Patton, Ph.D. Current Position: Research Associate (Advisor: D. Abraham, Thomas Jefferson University)

Publications (selected)

- Welch, B.D., J. Redman, S. Paul, J.N. Francis, M.T. Weinstock, F.G. Whitby, P.M. Mesquita, J.D. Reeves, Y.S. Lie, B.C. Herold, D.M. Eckert, C.P. Hill, **M.J. Root**, and M.S. Kay. (2010) Design of a potent d-peptide HIV-1 entry inhibitor with a strong barrier to resistance. **J. Virol. 84**, 11235-11244. (PMCID: PMC2953169)
- Danial, M*, A Stauffer, FR Wurm, **MJ Root*** and HA Klok. (2016) Site-specific Polymer Attachment to HR2 Peptide Fusion Inhibitors against HIV-1 Decreases Binding Association Rates and Dissociation Rates rather than Binding Affinity. **Bioconj. Chem.** 28, 701-712. (PMCID: PMC5352488)
- Khasnis, MD, K Halkidis, A Bhardwaj, MJ Root. (2016) Receptor Activation of HIV-1 Env Leads to Asymmetric Exposure of the gp41 Trimer. **PLoS Pathogens 12**: e1006098. (PMCID: PMC5222517).
- Ahn, KW and MJ Root. (2017) Complex Interplay of Kinetic Factors Governs the Synergistic Properties of HIV-1 Entry Inhibitors. **J. Biol. Chem. 292**, 16498-16510. (PMCID: PMC5633110).
- Halkidis, K. and **M.J. Root**. Mathematical Framework for Analyzing Multisite Intermediate-State Inhibition of Viral Fusion Glycoproteins. (submitted to **PLoS Computational Biol.**, in revision)

Awards/Honors (selected)

- Research Funding
  - 2 R01 AI150490-13 (Root), 7/1/02-5/31/21, NIH, Mechanisms of HIV-1 Env-mediated membrane fusion
- Honors
  - 2013 Dean's Award for Excellence in Medical Education
  - 2014 Professor Frederic Rieders Faculty Prize in Graduate Education
  - 2018 Sidney Kimmel Cancer Center Director's Award for Achievement in Mentoring
  - 2018 Dean's Award for Excellence in Medical Education
  - 2020- Diversity, Equity and Inclusion Committee
  - 2020- Education Committee
  - 2021- MII Master's Program Subcommittee

Mark P Rubinstein, PhD
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Education

- University of Virginia (Charlottesville) B.A. 1995 Biology and Economics
- Medical University of South Carolina Ph.D. 2002 Tumor Immunology
- The Scripps Research Institute, Postdoctoral Fellow, Dec 2002 – Mar 2006
- University of California, San Diego, Postdoctoral Fellow, Apr 2006 – Dec 2009

Positions

- Dec 2009 – Dec 2018 Assistant Professor, Departments of Surgery, and Microbiology & Immunology, Medical University of South Carolina
- Jan 2019 – Jan 2021 Associate Professor, Departments of Surgery, and Microbiology & Immunology, Medical University of South Carolina
- Jan 2021 – presentAssociate Professor, Departments of Medicine, Division of Medical Oncology, The Ohio State University
- Jan 2021 – presentLeader of Priority Research, Pelotonia Institute of Immuno-Oncology, The Ohio State University Comprehensive Cancer Center

Teaching Activities (selected)

- 2016 - 2021 Director of the M&I journal club, Responsible for grading and moderating the discussion of this weekly class.
- 2015 - 2021 Lecturer - Cancer Immunotherapy: Lessons Learned and the Path Forward - 1 lecture/year and seperately facilitate grant review discussion among students
- 2013 - Present lecturer - Immunology Core Curriculum - 3 lectures/year 2012 - 2014 lecturer - MBIM 735 (immunology course) - 2 lectures/year
- 2012 - 2016 Co-director of the M&I journal club, Responsible for grading and moderating the discussion of this weekly class.

Trainees Advised (selected)

- 2021 – Joseph Azar mentor (Postdoctoral Scholar)
- 2017 - 2021 David Bastian thesis committee member (Ph.D. student)
- 2015 - 2020 Brian Riesenberg thesis committee member (Ph.D. student)
- 2014 - 2015 Marhsall Diven thesis committee member (master's student)
- 2013 - Present Fahmin Basher thesis committee member (M.D./Ph.D. student)
- 2013 - 2017 Alessandra Metelli thesis committee member (Ph.D. student)
-
- 2013 - 2014 Alicia Patterson mentor for surgery resident while in laboratory
- 2012 - 2016 Daniel Neitzke co-mentor for Ph.D./M.D. student
- 2011 - 2014 Bryce Johnson co-mentor for Ph.D./M.D. student
- 2011 - 2013 Kristin Midgett thesis committee member (Ph.D. student)
- 2010 - Present numerous students (~1-2 at any one time) mentor for undergraduate students working part-time in the laboratory
- 2010 - 2012 Telma Martins da Palma thesis committee member (Ph.D. student)

Publications (selected)

- **Rubinstein MP**, Kadima AN, Mohamed SL, Nguyen CL, Gillanders WE, and Cole DJ. Systemic administration of IL-15 augments the antigen-specific primary CD8+ T cell response following vaccination with peptide-pulsed dendritic cells. Journal of Immunology, 169 (9) 4928-4935 (2002).
- **Rubinstein MP**, Kadima AN, Nguyen CL, Nishimura MI, Gillanders WE, and Cole DJ. Maintenance of parental T cell avidity following TCR gene transfer into mature T cells. Journal ofImmunology, 170 (3) 1209-1217 (2003).
- Roszkowski JJ, Yu DC, **Rubinstein MP**, McKee MD, Cole DJ, and Nishimura MI. CD8- independent tumor cell recognition is a property of the T cell receptor and not the T cells. Journalof Immunology 170 (5) 2582-2589 (2003).
- Nguyen CL, Salem ML, **Rubinstein MP**, Demcheva M, Vournakis JN, Cole DJ, and Gillanders,WE. Mechanisms of enhanced antigen-specific T cell responses following vaccination with a novelpeptide-based vaccine and systemic interleukin-2 (IL-2). Vaccine. 21(19-20):2318-2328 (2003).
- Salem ML, Kadima AN, Zhou Y, Nguyen CL, **Rubinstein MP**, Demcheva M, Vournakis JN, Cole DJ, and Gillanders, WE. Paracrine release of IL-12 stimulates IFN-gamma production and dramatically enhances the antigen-specific T cell response after vaccination with a novel peptide-based cancer vaccine. Journal of Immunology. 172(9):5159-5167 (2004).
- McKay D, Shigaoka A, **Rubinstein M**, Surh C., and Sprent J. Simultaneous deletion of MyD88and Trif delays major histocompatibility and minor antigen mismatch allograft rejection. EuropeanJournal of Immunology, 36(8):1994-2002 (2006).
- Boyman O, Kovar M, **Rubinstein MP**, Surh C., and Sprent J. Selective stimulation of T cell subsets with antibody-cytokine immune complexes. Science, 311(5769): 1924-1927 (2006).
- **Rubinstein, MP**, Kovar M, Purton J, Boyman O, Surh C., and Sprent J. Converting IL-15 to a superagonist by binding to soluble IL-15Rα. PNAS, 103(24):9166-71 (2006).
- Salem ML, Kadima AN, EL-Naggar SA, **Rubinstein MP**, Gillanders, WE, and Cole DJ. Defining the ability of cyclophosphamide preconditioning to enhance the antigen-specific CD8+ Tcell response to peptide vaccination: creation of a beneficial host microenvironment involving typeI IFNs and myeloid cells. Journal of Immunotherapy. 30(1): 40-53 (2007).
- Cho JH, Boyman O, Kim HO, Ham B, **Rubinstein MP**, Ramsey C, Kim DM, Surh CD, and Sprent J. An intense form of homeostatic proliferation of naïve CD8+ cells driven by IL-2. Journalof Experimental Medicine. 204(8):1787-1801 (2007).
- Purton JF, Tan JT, **Rubinstein MP**, Kim DM, Sprent J, and Surh CD. Antiviral CD4+ memoryT cells are IL-15 dependent. Journal of Experimental Medicine. 204(4):951-961 (2007).
- Cole DJ and **Rubinstein MP**. [inside blood commentary] Soluble IL-15/IL-15R□complexes in human serum. Blood 120(1):1-2 (2012)

Awards/Honors (selected)

- Research Funding
    - NIH/NCI Rubinstein/Wrangle (PI) 04/01/2019-03/31/2024 3 CM R01CA22281, Lymphocyte and inflammatory cytokine markers of response in the first-in-human combination of anti-PD-1 mAb and IL-15/IL-15Ra complexes and investigation of mediators of anti-tumor immune responses
- Honors
    - 2013-2015 T32 Development Committee (Department of Surgery, MUSC)
    - 2012 AAI (American Association of Immunologists) – Public Policy Fellow (2012-2013)
    - 2014 lab member Bryce Johnson – MUSC student research day – first place (Ph.D. oral cat.)
    - 2013 AAI Early Career Faculty Travel Grant
    - 2019 Research Excellence Award – MUSC College of Medicine

Brian Searle, PhD
Assistant Professor, Department of Biomedical Informatics
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Education

- 2018 – PresentTranslational Research Fellow, Institute for Systems Biology – Seattle, WA Independent translational position, including salary and research funding
- 2014 – 2018 PhD in Genome Sciences, MacCoss Lab, University of Washington – Seattle, WA NIH Ruth L. Kirschstein NRSA Predoctoral Fellow (F31)
- Dissertation: "Development of Data Independent Acquisition Methods to Systematically Analyze the Human Proteome"
- 1997 – 2001 BA in Chemistry, Glasfeld Lab, Reed College – Portland, OR
- Experiment-based thesis: "Glycerol-Based Nucleoside Analogs: The synthesis of 3-(alkoxymethyl)pyrimidines and their implications for the prebiotic world"

Positions

- 2021 – Present Assistant Professor, Department of Biomedical Informatics, OSU
- 2016 – Present Chairman of the Board of Directors, Proteome Software Inc. – Portland, OR Primary focus on scientific direction and long-term planning
- 2004 – 2016 Founder and Principal Scientist, Proteome Software Inc. – Portland, OR
- 2001 – 2004 Research Assistant, Pediatrics Dept, Oregon Health & Science University – Portland, OR
- 1998 – 2001 Research Assistant, Physiology Dept, Dartmouth Medical School – Lebanon, NH

Invited Lectures (selected)

- US HUPO 16th Annual Conference, Seattle, WA. March 8-11, 2020. "Measuring phosphorylation state in the human proteome"
- Cascadia Proteomics Symposium, Seattle, WA. July 8-9, 2019. "Generating high-quality libraries with empirically corrected peptide predictions"
- Proteomic Big Data Symposium, Westlake University, Hangzhou, China, June 30, 2019. "Generating high- quality chromatogram libraries for DIA-MS with empirically corrected peptide predictions"
- EuBIC Winter School, Zakopane, Poland, January 15-18, 2019. "XCorDIA: a new database search engine to detect genetic variants from DIA data"

Publications (selected)

- Johnson RS, **Searle BC**, Nunn BL, Gilmore JM, Phillips M, Amemiya CT, Heck MC, MacCoss MJ.
  Assessing protein sequence database suitability using de novo sequencing.
- *Mol Cell Proteomics*. 2020 Jan;19(1):198-208.

- **Searle BC**, Lawrence RT, MacCoss MJ, Villén J.
  Thesaurus: Quantifying phosphopeptide positional isomers.
  Nat Methods. 2019 Aug;16(8):703-706.
- **Searle BC**, Yergey AL.

  An efficient solution for resolving iTRAQ and TMT channel crosstalk.
  J Mass Spectrom. 2019 Mar 18. doi: 10.1002/jms.4354.
- Seitzer PM, **Searle BC**.

  Incorporating in-source fragment information improves metabolite identificationaccuracy in untargeted LC-MS datasets.
  J Proteome Res. 2019 Feb 1;18(2):791-796.

- Kim, YJ, Sweet SMM, Egertson JD, Sedgewick AJ, Woo S, Liao W, Merrihew GE, **Searle BC**, Vaske C, Heaton R, MacCoss MJ, Hembrough T.
  Data-independent acquisition mass spectrometry to quantify protein levels in FFPEtumor biopsies for molecular diagnostics.
  J Proteome Res. 2019 Jan 4;18(1):426-435.

- **Searle BC**, Pino LK, Egertson JD, Ting YS, Lawrence RT, MacLean BX, Villén J,MacCoss MJ.
  Comprehensive peptide quantification for data independent acquisition mass spectrometry using chromatogram libraries. *Nat Commun*. 2018 Dec 3;9(1):5128.

- Pino LK, **Searle BC**, Huang EL, Noble WS, Hoofnagle AN, MacCoss MJ.
  Calibration using a single-point external reference material harmonizes quantitativemass spectrometry proteomics data between platforms and laboratories.
  Anal Chem. 2018 Nov 6;90(21):13112-13117.

- Ting YS, Egertson JD, Bollinger JG, **Searle BC**, Payne SH, Noble WS, MacCoss MJ. PECAN: Library-free peptide detection for data-independent acquisition tandem mass spectrometry data. *Nat Methods*. 2017 Sep;14(9):903-908.

  Pino LK, **Searle BC**, Bollinger JG, Nunn B, MacLean B, MacCoss MJ.
  The Skyline Ecosystem: Informatics for quantitative mass spectrometry proteomics.
  Mass Spectrom Rev. 2017 Jul 9.

Awards/Honors (Selected)

- Honors:
  - 2016 – 2018 NIH/NIGMS, F31 GM119273 (NRSA Individual Predoctoral Fellowship)
  - Awarded for "Methods to elucidate quantitative phosphorylation dynamics in the IGF-1 signaling pathway"
  - Impact Score: 18 Percentile: 3
  - 2016 NSF Graduate Research Fellowship Program (GRFP), Honorable Mention
- Research Support:
  - 2019 – 2023 NIH/NIGMS, 1 R01 GM133981 (Swaney), Role: Co-Investigator ($75,091 direct/year) Awarded for "A universal multiplexing approach to unlock the hidden proteome" Impact Score: 38 Percentile: 21
  - 2019 – 2020 IARPA Proteos Contract (MacCoss/Rudnick), Role: Sub-Contractor ($33,329 direct/year)
  - 2018 – 2021 ISB Translational Research Fellowship Award, ($203,316 direct/year)

Benjamin Segal, MD
Chair and Professor, Department of Neurology
Director, The Neuroscience Research Institute
Co-Director, The Neurological Institute
Stanley D. and Joan H. Ross Chair of Neuromodulation
Segal.66@osu.edu

Education

- Brown University, BS, Biochemistry
- Brown University Medical School, MD, General Medicine
- University Chicago Hospitals, Pritzker Medical School, Internship Internal Medicine
- Cornell University Medical Center, New York Hospital and Memorial Sloan Kettering Cancer Center, Residency, Neurology

Positions

- 07/2019-present Chair and Professor of Neurology, and Director of the Neuroscience Research Institute, Department of Neurology, The Ohio State University, Columbus, OH
- 2007-06/2019 Director, University of Michigan Multiple Sclerosis Center and Holtom-Garrett Program in Neuroimmunology, Department of Neurology, University of Michigan, Ann Arbor, MI
- 2007-06/2019 Holtom-Garrett Professor of Neurology, Department of Neurology, University of Michigan, Ann Arbor, MI
- 2007-06/2019 Staff Neurologist, Department of Neurology, VA Ann Arbor Healthcare System, Ann Arbor, MI 2006-present Henry Kunkel Society (Elected Member)
- 2004-2007 Associate Professor, Departments of Neurology, Microbiology and Immunology and the Cancer Center, University of Rochester Medical Center, Rochester, NY
- 2003-2007 Associate Chief, Multiple Sclerosis Unit, Department of Neurology, University of Rochester, Rochester, NY
- 2003-2007 Director, Neuroimmunology Research, University of Rochester Medical Center, Rochester, 2000-2007 Affiliate, Center for Vaccine Biology and Immunology, Aab Institute of Biomedical Sciences, University of Rochester Medical Center, Rochester, NY
- 1999-2004 Assistant Professor, Departments of Neurology, Microbiology and Immunology, and the Cancer Center, University of Rochester Medical Center, Rochester, NY

Courses Taught (selected)

- 1999-2007 Immunology (MBI-473), Graduate Program in Immunology, Microbiology and Vaccine Biology, University of Rochester, Rochester, NY
- 2000-2007 Cancer Biology (PTH-507), Graduate Program in Molecular Oncology and Cancer Biology, University of Rochester, Rochester, NY
- 2001-2007 Integrated Systems B Course, School of Medicine, University of Rochester
- 2003-2007 Pathways to Human Disease (PTH-493), Graduate Program in Pathology, University of Rochester, Rochester, NY
- 2004-2007 Neuroinflammation (ANA-513), University of Rochester, Immunology 851, Graduate Program in Immunology,
- 2009-2014 Neuropathology and Translational Neuroscience (NS602), Graduate Program in Neuroscience, University of Michigan, Ann Arbor, MI
- 2020-present Neurobiology of Disease, The Ohio State University, Columbus, Ohio

Trainees Advised (selected)

- PhD Students
    - 2002-2007 Pratima Deshpande, Microbiology and Immunology
    - 2002-2007 Thaddeus Carlson, Microbiology and Immunology (MSTP MD/PhD Program)
    - 2003-2008 Irah King, Neurosciences
    - 2004-2009 Mark Kroenke, Microbiology and Immunology 2009-2014 Heather Grifka-Walk,

Immunology
    - 2011-2016 Josh Stoolman, Immunology
    - 2012-2017 David Giles, Immunology (MSTP MD/PhD Program)
    - 2012-2019 Patrick Duncker, Immunology
    - 2017-present Ashley Munie, Immunology
- Postdoctoral Fellows
    - 2010-2013 Stephen Lalor, PhD
    - 2011-2014 Amanda Huber, PhD
    - 2014-2015 Sergei Chuikov, PhD
    - 2011-2015 Kevin Carbajal, PhD
    - 2017-present Andrew Sas, PhD, MD
    - 2017-2018 Alina Monteagudo-Caballero, PhD
    - 2018-present Jeffrey Atkinson, PhD
    - 2018-present Andrew Jerome, PhD
    - 2019-2020 Taryn Mockus, PhD
- Residents and Medical Students
    - 2000-2007 Attending Physician, Neurology Resident Firm, University of Rochester Medical Center, Rochester, NY
    - 2007-2015 Attending Physician and Chief, Resident Multiple Sclerosis Clinic, University of Michigan, Ann Arbor, MI, ½ day per week
    - 2007-2019 Attending Physician and Chief, Neuroimmunology Clinic, Ann Arbor VA Hospital, Ann Arbor, MI, ½ day per week
    - 2007-2019 Attending Physician, Neurology Ward, University of Michigan, Ann Arbor, MI, 4 weeks/ year
    - 2019- present Attending Physician, Department of Neurology, The Ohio State University

Publications (Selected)

- **Segal BM**, Dwyer B, Shevach EM. An IL-12/IL-10 immunoregulatory circuit controls susceptibility to autoimmune disease. J Exp Med 1998;187(4): 537-46. PMID: 9463404
- Baldwin KT, Carbajal KS, Giger RJ*, **Segal BM***. Neuroinflammation triggered by a □-glucan/dectin-1 signaling enables CNS regeneration. Proc Nat Acad Sci USA 2015;112(8): 2581-6. PMCID: PMC4345569 **Co-corresponding authors*
- Rumble JM, Huber AK, Krishnamoorthy G, Srinivasan A, Giles DA, Zhang X, Wang L, **Segal BM**. Neutrophil-related factors as biomarkers in EAE and MS. J Exp Med 2015; 212(1):23-35. PMCID: PMC4291533
- Sas AR, Carbajal KS, Jerome A, Menon R, Yoon C, Kalinski A, Giger RJ, **Segal BM**. A novel, alternatively activated neutrophil subset promotes CNS neuron survival and axon regeneration *in vivo*. Nature Immunol. 2020; 21(12):1496-1505. PMCID: PMC7677206

Awards/Honors (selected)

- R01 EY029159, Segal (PI) 04/01/18-03/31/23, A novel inflammatory cell with neuroprotective and neuroregenerative properties
- R01 EY028350, Segal (PI), 09/01/17 - 05/31/22, Immune mediated regeneration of retinal ganglion cell axons following optic nerve trauma
- R01 NS105385, Segal (PI) 09/25/17-7/31/22, Arginase-1 and iNOS expressing CNS myeloid cell subsets in EAE and MS
- K08 EY029362, Sas (PI), Role: Mentor 07/01/18 – 06/30/23, Neutrophil driven recovery from traumatic and ischemic optic neuropathy
- K12 NS098482, Magana (PI), Role: Mentor 7/1/2021-6/30/2024, Role of extracellular vesicles and small noncoding RNAs as epigenetic modifiers underlying MS pathogenesis

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Education

- M.S. Biochemistry/Immunology Université Pierre & Marie-Curie, Paris, France
- Ph.D. Cell Biology Université Pierre & Marie-Curie, Paris, France
- Postdoctoral Fellow Cell Biology Weill Medical College of Cornell University, New York, USA
- Postdoctoral Fellow Cellular Microbiology Pasteur Institute, Paris, France

Positions

- 2014-present Associate Professor with Tenure. Department of Microbial Infection and Immunity; Department of Microbiology, The Ohio State University Medical Center, OH.
- 2006-2013 Assistant Professor. Department of Microbiology; Department of Microbial Infection and Immunity, The Ohio State University, OH.
- 2005-2006 Research Investigator. Department of Microbiology and Immunology. University of Michigan Medical School, MI.

Courses Taught (selected)

- 2018-present Lecturer and Course Director MEDMCIM 8010 "Selected Topics in Advanced Immunology", OSU
- 2017-present Lecturer BSGP 7240 "Microbial Pathogenesis", OSU
- 2017-present Lecturer Micro 7010 "Immunology", OSU
- 2014-present Lecturer BSGP 7000 "Concepts in Biomedical Science", OSU
- 2014-2016 Course director Micro 7899 "Microbiology seminar series", OSU
- 2013-2016 Lecturer and Course Director Micro 4110 "Microbial Pathogenesis and Immunobiology" (43 lectures + 25 h office hours/year), OSU
- 2013-2016 Journal Club Micro 6010 "Principles of Microbiology", OSU
- 2008-2012 Lecturer and Course Director Micro 524 "Mechanisms of Microbial Diseases" (42 lectures + 11 h office hours/year), OSU
- 2007-present Lecturer BSGP/Micro 7240 "Molecular Biology of Bacterial Pathogens", OSU

Trainees Advised (selected)

- 2008-2013 Eusondia Arnett, Microbiology Graduate Program
  Recipient of the Ohio State University Presidential fellowship 2011-2012. Recipient of travel awards (Public Health Preparedness for Infectious Diseases Annual meeting, OSU, 2012; OSU Medical College Research Day, 2013). 5 publications (1 first author review; 2 first author research articles, 2 collaborative studies).
- 2008-2013 Stephen Vadia, Microbiology Graduate Program
  Recipient of the Ohio State University Presidential fellowship 2011-2012. Recipient of poster and travel awards (OSU Medical College Research Day, 2013; The OSU Food Innovation Center, 2013). Publication of 7 research articles (2 as first author, 3 as second author, and 2 collaborative studies).
- 2014-2018 Jonathan Lam, Microbiology Graduate Program
  Recipient of poster and travel awards (Microbial Infection and Immunity Travel Award for ASCB meeting Dec. 2017). Publication of one method article, one first author research article
- 2014-2019 Christopher Phelps, Microbiology Graduate Program

Recipient of poster and travel awards from OSU. Oral presentation 2017 Ohio Branch ASM. Selection for two oral presentations at the ASM annual meeting 2017. Publication of 2 research articles as first author.

- 2017-2021 Lauren Johnson, Microbiology Graduate Program
  Recipient of NIH Award (05/23/2018 $ 1,000.00) to present her research at the IFPA meeting in September 2018 (Tokyo). Oral presentation Ohio Branch ASM 2018. NIH travel Award for Midwest Microbial Pathogenesis Conference (MMPC) in September 20-22 in University of Toledo, Toledo, OH. Publication of 2 research articles (first author, second author).
- 2017-2021 Siavash Azari, Microbiology Graduate Program.
  Recipient of NIH-MMPC Outstanding Young Scientist Award oral presentation 2019 Midwest Microbial Pathogenesis Conference (MMPC), Toledo, OH. Publication of 2 research articles (first author, second author).

Publications (selected)

- Hofbauer cells spread *Listeria monocytogenes* among placental cells and undergo pro-inflammatory reprogramming while retaining production of tolerogenic factors. S. Azari, L. Johnson, A. Webb, S. M. Kozlowski, X. Zhang, K. Rood, A. Amer, **S. Seveau**.2021. mBio. Aug 31;12(4):e0184921. PMID: 34399615
- Human Placental Trophoblasts infected by *Listeria monocytogenes* Undergo a Pro-Inflammatory Switch Associated with Poor Pregnancy Outcomes. Johnson L. J., S. Azari, A. Webb, X. Zhang, M. A. Gavrilin, J. Marshall, K. Rood, **S. Seveau**. 2021. Frontiers in Immunology Jul 23;12:709466. PMID: 34367171
- A listeriolysin O subunit vaccine is protective against *Listeria monocytogenes*. C. C Phelps, S. Vadia, P. N Boyaka, S. Varikuti, Z. Attia, P. Dubey, A. R Satoskar, R. Tweten, **S. Seveau**. 2020. Vaccine. Aug 10;38(36):5803-5813.
- Relative Roles of Listeriolysin O, InlA, and InlB in Listeria monocytogenes Uptake by Host Cells. Phelps CC, Vadia S, Arnett E, Tan Y, Zhang X, Pathak-Sharma S, Gavrilin MA, **Seveau S**. 2018. Infect Immun. Sep 21;86(10).
- Host cell perforation by listeriolysin O (LLO) activates a Ca^{2+}-dependent cPKC/Rac1/Arp2/3 signaling pathway that promotes Listeria monocytogenes internalization independently of membrane resealing. Lam JGT, Vadia S, Pathak-Sharma S, McLaughlin E, Zhang X, Swanson J, **Seveau S**. 2018. Mol Biol Cell. Feb 1;29(3):270-284. PMID: 29187576
- Fluxes of Ca^{2+} and K^{+} are required for the LLO-dependent internalization pathway of *Listeria monocytogenes*. Vadia S and **S Seveau**. 2014. Infection and Immunity.82 (3): 1084-91
- Listeriolysin O is degraded by the neutrophil metalloprotease MMP-8 and fails to protect *Listeria monocytogenes* from intracellular killing in neutrophils. Arnett E, Vadia S, Nackerman CC, Oghumu S, Satoskar AR, McLeish KR, Silvia M. Uriarte ¶, and **S Seveau**. 2014. Journal of Immunology. 192 (1): 234-44
- The pore-forming toxin listeriolysin O mediates a novel entry pathway of *L. monocytogenes* into human hepatocytes. Vadia S, Arnett E, Haghighat AC, Wilson-Kubalek EM, Tweten RK, and **S Seveau**. 2011. Plos Pathog. 7(11):e1002356. cited in Faculty of 1,000 (3)
- Defensins enable macrophages to inhibit the intracellular proliferation of *Listeria monocytogenes*. Arnett E, Lehrer RI, Pratikhya P, Lu W, and **S Seveau**. 2011. Cell Microbiol. (4):635-51.

Awards/Honors (selected)

- Research Funding
  - R01 AI157205-01 (MPI, S. Seveau contact PI) 2021-2026
    Title: Host Responses to the Pore-Forming Toxin Listeriolysin O
  - R01 AI159452-01 (MPI, S. Seveau PI) 2021-2026
    Title: The role of the non-canonical inflammasome in innate imunity
  - R03 AI164337-01 (S. Seveau, PI) 2021-2023

Title: The macrophage repairome
- R21 AI156379-01 (S. Seveau, Co-I) 2021-2023
  Title: Susceptibility determinants to Legionella pneumophila infection in smokers
- R03AI149371 (S. Seveau, PI) 2019-2021
  Title: Establishing the roles of lncRNAs in placental infection by Listeria monocytogenes.

- Honors
  - 2020-present Editorial board, Pathogens
  - 2014-present Editorial board, Microbial Pathogenesis
  - 2014-2017 Associate Editor, Microbial Pathogenesis
  - 2016-present Associate Editor, Frontiers in Cellular and Infection Microbiology

2016-present Associate Editor, Critical Reviews in Microbiology

Ruoning Wang, PhD
Associate Professor, Department of Pediatrics, The Ohio State University School of Medicine
Principal Investigator, Center for Childhood Cancer and Blood Disease, Abigail Wexner Research Institute at Nationwide Children's Hospital
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Education
- China Pharmaceutical University, Nanjing, China BS Medicinal Chemistry
- Nanjing Medical University, Nanjing, China MS Biochemistry
- University of TX M.D. Anderson Cancer Center, Houston, TX Ph.D. Gene & Development
- St. Jude Children's Research Hospital, Memphis, TN Postdoc Immunology & Metabolism

Positions
- 2013 – Principal Investigator, Center for Childhood Cancer and Blood Disease, Abigail Wexner Research Institute at Nationwide Children's Hospital, Columbus, OH
- 2013 – Principal Investigator, Hematology/Oncology & Bone Marrow Transplantation (BMT), Abigail Wexner Research Institute at Nationwide Children's Hospital, Columbus, OH
- 2013 – 2019 Assistant Professor, Department of Pediatrics, The Ohio State University School of Medicine, Co-lumbus, OH
- 2019 – Associate Professor, Department of Pediatrics, The Ohio State University School of Medicine, Co-lumbus, OH
- 2019 – Associate Faculty, Department of Microbial Infection and Immunity, The Ohio State University School of Medicine, Columbus, OH

Courses Taught (selected)
- 2016, Mentor, Molecular, Cellular and Developmental Biology, 7890/97 Course mentor, The Ohio State University, Columbus, OH
- 2016, 7890/97 MCDB Graduate Student Seminar (Faculty Moderator, one of the three)
- 2020, 7600 IGO Graduate Student (break-out sessions on responsible conduct of, research and rigor and reproducibility)
- 2021, 7010/MEDMCIM BSPG Graduate lecture Cellular and Molecular Immunology

Trainees Advised (selected)
- Graduate Students

- 2016-2021, John Sherman, Molecular, Cellular and Developmental Biology, Ph.D. Candidate
- 2017-2020, Ruohan Wu, Molecular, Cellular and Developmental Biology, Graduate Student

- Rotation Students
  - 2015, John Sherman, Molecular, Cellular and Developmental Biology, Ph.D. Student
  - 2016, Maxine Ignacio, Molecular, Cellular and Developmental Biology, Graduate Student, The Ohio State University
  - 2016, Ruohan Wu, Molecular, Cellular and Developmental Biology Graduate Student, The Ohio State University
  - 2019, Zhenyu Wu, Molecular, Cellular and Developmental Biology Graduate Student, The Ohio State University

- Postdoctoral Research Fellows
  - 2014-present Tingting Wang
  - 2015-2017 Gaojian Lian
  - 2016-present Yuqing Shen
  - 2016-present Rashida Gnanaprakasam
  - 2017-present Xuyong Chen
- Graduate Student – Thesis Committee Member
  - 2017-present Sunayana Nayak, Molecular, Cellular and Developmental Biology Program, Ph.D. Candidate/ The Ohio State University
  - 2018-present, John Hinckley, Molecular, Cellular and Developmental Biology Program

Publications (selected)

- Welch, B.D., J. Redman, S. Paul, J.N. Francis, M.T. Weinstock, F.G. Whitby, P.M. Mesquita, J.D. Reeves, Y.S. Lie, B.C. Herold, D.M. Eckert, C.P. Hill, **M.J. Root**, and M.S. Kay. (2010) Design of a potent d-peptide HIV-1 entry inhibitor with a strong barrier to resistance. **J. Virol. 84**, 11235-11244. (PMCID: PMC2953169)
- Danial, M*, A Stauffer, FR Wurm, **MJ Root*** and HA Klok. (2016) Site-specific Polymer Attachment to HR2 Peptide Fusion Inhibitors against HIV-1 Decreases Binding Association Rates and Dissociation Rates rather than Binding Affinity. **Bioconj. Chem.** 28, 701-712. (PMCID: PMC5352488)
- Khasnis, MD, K Halkidis, A Bhardwaj, MJ Root. (2016) Receptor Activation of HIV-1 Env Leads to Asymmetric Exposure of the gp41 Trimer. **PLoS Pathogens 12**: e1006098. (PMCID: PMC5222517).
- Ahn, KW and MJ Root. (2017) Complex Interplay of Kinetic Factors Governs the Synergistic Properties of HIV-1 Entry Inhibitors. **J. Biol. Chem. 292**, 16498-16510. (PMCID: PMC5633110).
- Halkidis, K. and **M.J. Root**. Mathematical Framework for Analyzing Multisite Intermediate-State Inhibition of Viral Fusion Glycoproteins. (submitted to **PLoS Computational Biol.**, in revision)
- Halkidis, K., A.E. Siglin, K.M. Kahle, and **M.J.Root**. Coordinated Folding a Single Env Trimer-of-Hairpins Drives HIV-1 Entry. (submitted to **PLoS Pathogens**, in revision)

Awards/Honors (selected)

- Research Funding
  - R21CA227926-01A1, NIH, R. Wang, Chandler (mPIs), NCE (03/01/2021 – 02/28/2022), Oncogenic fusion gene FAX-FKHR in driving metabolic reprogramming in alveolar rhabdomyosarcoma.
  - U01CA232488-01, NIH/NCI, R. Wang (PI), 09/17/2018 – 06/30/2023, Metabolic reprogramming of tumor microenvironment to maximize immunotherapy for pediatric cancer.

- 1RO1CA247941-01A1, NIH/NCI, R. Wang (PI), 02/15/2021-02/14/2026, Modulation of asparagine bioavailability and stress response signaling to enhance T cell robustness and maximize immunotherapy.
- 2RO1Al114581-06, NIH/NIAID, R. Wang (PI), 04/01/2021-08331/2026, Dissect and target Arginine-polyamine metabolic axis in T cell mediated inflammation and autoimmunity.

- Honors
  - 2015-2017 V-Foundation Scholar
  - 2015-2020 American Cancer Society Scholar
  - 2021- Skestos Family Endowed Scholar in Center for Childhood Cancer and Blood Disease

Haitao Wen, MD, PhD
Associate Professor, Microbial Infection and Immunity
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Education

- Shan-Dong University School of Medicine, Jinan, P.R. China MD Medicine
- Shan-Dong University School of Medicine, Jinan, P.R. China MS Pathophysiology
- University of Michigan Medical School, Ann Arbor, MI PhD Molecular & Cellular Pathology
- University of North Carolina at Chapel Hill, Chapel Hill, NC Postdoc Immunology

Positions

- 06/2021-Present Associate Professor, Department of Microbial Infection and Immunity, The Ohio State University Comprehensive Cancer Center, The Ohio State University, Columbus, OH
- 03/2018-05/2021 Assistant Professor, Department of Microbial Infection and Immunity, The Ohio State University Comprehensive Cancer Center, The Ohio State University, Columbus, OH
- 09/2015-02/2018 Assistant Professor, Department of Pathology and Microbiology, Holland Regenerative Medicine Program, University of Nebraska Medical Center, Omaha, NE
- 10/2013-08/2015 Assistant Professor, Department of Surgery, Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, Chapel Hill, NC

Courses Taught (selected)

- Spring 2020 OSU BSGP7010 Cellular and Molecular Immunology
- Fall 2019 OSU BSGP7070 Fundamentals of Grant Writing
- Fall 2018 OSU BSGP8010 Selected Topics in Advanced Immunology
- Fall 2017 UNMC PAMM955 Advanced Immunology
- Spring 2017 UNMC PAMM992 Advanced Topics in Immunology, Pathology & Infectious Disease
- Fall 2016 UNMC PAMM992 Advanced Topics in Immunology, Pathology & Infectious Disease

Trainees Advised (selected)

- 2019 - Present Andrea Dunlap, The Ohio State University, MCDB, (Doctoral Students, Dissertation Committee Member)
- 2019 - Present Anjun Ma, The Ohio State University, BSGP, (Doctoral Students, Dissertation Committee Member)
- 2018 - Present Peter Brechting, The Ohio State University, Microbiology, (Doctoral Students, Dissertation Committee Member)
- 2018 - Present Tiffany Claeys, The Ohio State University, BSGP, (Doctoral Students, Dissertation Committee Member)
- 2016 - 2018 Kelsey Yamada, University of Nebraska Medical Center, IGPBS, (Doctoral Students, Dissertation Committee Member)

Publications (selected)

- Li T, Li X, Attri KS, Liu C, Li L, Herring LE, Asara JM, Lei YL, Singh PK, Gao C, **Wen H.** O-GlcNAc transferase links glucose metabolism to MAVS-mediated antiviral innate immunity. Cell Host Microbe.

2018 Dec 12;24(6):791-803. PMCID: PMC6296827. (Highlighted by Nat Immunol. 2019 Feb;20(2):111)

- Li X*, Gong W*, Wang H, Li T, Attri KS, Lewis RE, Kalil AC, Bhinderwala F, Powers R, Yin G, Herring LE, Asara JM, Lei Y, Yang X, Mocarski ES, Rodriguez DA, Yang M, Green DR, Singh PK, **Wen H**. O- GlcNAc transferase suppresses inflammation and necroptosis by targeting receptor-interacting serine/threonine-protein kinase 3. Immunity. 2019 Mar 19;50(3):576-590. PMCID: PMC6426684. (*Equal contribution).
- Lei Y*, **Wen H***, Yu Y, Taxman DJ, Zhang L, Widman DG, Swanson KV, Wen KW, Damania BA, Moore CB, Giguère PM, Siderovski DP, Hiscott J, Razani B, Semenkovich CF, Chen X, Ting JP. NLRX1 and TUFM form a mitochondrial complex that regulates type 1 interferon and autophagy. Immunity. 2012 Jun 29;36(6):933-46. (Equal contribution). PMCID: PMC3397828.
- **Wen H**, Miao EA, Ting JP. Mechanisms of NOD-like receptor-associated inflammasome activation. Immunity. 2013 Sep 19;39(3):432-41. PMCID: PMC3835203.
- Li T*, Kong L*, Li X, Wu S, Attri KS, Li Y, Gong W, Zhao B, Li L, Herring LE, Asara JM, Xu L, Luo X, Lei YL, Ma Q, Seveau S, Gunn JS, Cheng X, Singh PK, Green DR, Wang H, **Wen H**. Listeria monocytogenes upregulates mitochondrial calcium signaling to inhibit LC3-associated phagocytosis as a survival strategy. Nat Microbiol. 2021 Mar;6(3):366-379. (*Equal contribution).
- Zhang H, Ren J, Xia Y, Onuma A, He J, Chen T, Wu J, Hamad A, Shen C, Behbehani GK, **Wen H**, Deng M, Tsung A, Huang H. Pre-operative exercise therapy triggers anti-inflammatory trained immunity of Kupffer cells through metabolic reprogramming. Nat Metab. 2021 June;3(6):843-858.
- **Wen H**, Dou Y, Hogaboam CM, Kunkel SL. Epigenetic regulation of dendritic cell-derived interleukin-12 facilitates immunosuppression following a severe innate immune response. Blood. 2008 Feb;111(4):1797-804. PMCID: PMC2234040.
- **Wen H**, Hogaboam CM, Gauldie J, Kunkel SL. Severe sepsis exacerbates cell-mediated immunity in the lung due to an altered dendritic cell cytokine profile. Am J Pathol. 2006 (Jun;168)(6): 1940-50. PMCID: PMC1606615.
- Ishii M, **Wen H**, Corsa CA, Liu T, Coelho AL, Allen RM, Carson WF 4th, Cavassani KA, Li X, Lukacs NW, Hogaboam CM, Dou Y, Kunkel SL. Epigenetic regulation of the alternatively activated macrophage phenotype. Blood. 2009 Oct 8;114(15):3244-54. PMCID: PMC2759649.

Awards/Honors (selected)

- Research Funding
  - R01 AI162779, Wen (PI), 06/17/21 – 05/31/26, Targeting Immune Inhibitory Molecule SUSD2 to Reverse Immunosuppression
  - R01 GM135234, Wen (PI), 09/15/19 – 07/31/23, Mitochondrial Metabolism in Microbial Sepsis
  - R01 GM120496, Wen (PI), 08/15/17 – 06/30/22, Immunometabolism in Microbial Sepsis
- Honors
  - 2012 UNC Postdoctoral Award for Research Excellence (PARE)
  - 2012 Keystone Symposia (Innate Immunity: Sensing the Microbes and Damage Signals) Postdoctoral Scholarship
  - 2011 Lineberger Comprehensive Cancer Center Joseph S. Pagano Award

Andreas Wieland, PhD
Assistant Professor, Department of Otolaryngology
Division of Head and Neck Cancer
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Education

- Diploma in Biology (M.Sc.), University of Ulm, Ulm, Germany 2005
  Thesis Title: Development of surface plasmon resonance-based detection system to measure biologically active IL-6 using IL-6R
- Doctor of Human Biology, University of Ulm, Ulm, Germany 2009
- Thesis Title: Stress protein complexed multidomain vaccines identify subdominant CD8 T cells with enhanced anti-viral activity.
- Postdoctoral Researcher, Emory University, Atlanta, GA 2010-2019
  Department of Microbiology & Immunology Advisor: Rafi Ahmed

Positions

- Assistant Professor, Department of Otolaryngology, Division of Head and Neck Cancer 2021

Teaching Activities

- Christiane S. Eberhardt, postdoctoral fellow 2017-2019
- Julia L. Gensheimer, undergraduate student 2016-2019
- Giacomo C. Waller, M.Sc. student 2013

Publications (selected)

- **Wieland A.***, Patel MR., Cardenas MA., Eberhardt CS., Hudson WH., Obeng RC.,Griffith CC., Wang X., Chen ZG., Kissick HT., Saba NF., Ahmed R. (2020) Defining HPV-specific B cell responses in head and neck cancer patients. Nature *accepted* ***co- corresponding author**
- Buchwald ZS., Nasti TH., Lee J., Eberhardt CS., **Wieland A.**, Im SJ., Lawson D., Curran W., Ahmed R., Khan MK. (2020) The tumor-draining lymph node is important for a robust abscopal effect stimulated by radiotherapy. JITC *accepted*
- Chang YM., **Wieland A.**, Li Z-R., Im SJ., McGuire DJ., Kissick HT., Antia R., Ahmed R. (2020) T cell receptor diversity and lineage relationship between virus-specific CD8 T cell subsets during chronic lymphocytic choriomeningitis virus infection. JVI 94:e00935- 20
- Eberhardt CS., **Wieland A.**, Nasti TH., Grifoni A., Wilson E., Schmid DS., Pulendran B., Sette A., Waller EK., Rouphael N., Ahmed R. (2020) Persistence of varicella-zoster virus-specific plasma cells in adult human bone marrow following childhood vaccination. JVI. 94(13)
- Hudson WH., Gensheimer J., Hashimoto M., **Wieland A.**, Valanparambil RM., Li P., Lin JX., Konieczny BT., Im SJ., Freeman GJ., Leonard WJ., Kissick HT., Ahmed R. (2019) Proliferating transitory T cells with an effector-like transcriptional signature emerge from PD-1^{+} stem-like $CD8^{+}$ T cells during chronic infection. Immunity. 51(6):1043-1058
- Sullivan NL., Eberhardt CS., **Wieland A.,** Akondy R., Yi J., McElroy AK., Ahmed R. (2019) Characterization of virus-specific immune response during varicella zoster virus encephalitis in a young adult. Clin Infect Dis. 69(2):348-351
- Lesinski GB., Nannapaneni S., Griffith CC., Patel M. Chen W., Chen Z., Ahmed R., **Wieland A.**, Shin DM., Chen ZG., Saba NF. (2019) Interleukin-6/STAT3 signaling is prominent and associated with reduced overall survival in p16 negative oropharyngeal squamous cell carcinoma. Head Neck Pathol. 13(3):304-312
- Mener A., Patel SR., Arthur CM., Chonat S., **Wieland A**., Santhanakrishnan M., Liu J., Maier CL., Jajosky RP., Girard-Pierce K., Bennett A., Zerra PE., Smith NH., HendricksonJE., Stowell SR. (2018) Complement serves as a switch between CD4+ T cell- independent and –dependent RBC antibody

responses. JCI Insight. 3(22). pii: 121631

- **Wieland A.***, Kamphorst AO., Valanparambil RM., Han JH., Xu X., Choudhury BP., Ahmed R. (2018) Enhancing Fc□R-mediated antibody effector functions during persistent viral infection. Sci Immunol. 3(27). pii: eaao3125 ***co-corresponding author**
- **Wieland A.**, Kamphorst AO., Adsay NV., Masor JJ., Sarmiento J., Nasti TH., Darko S., Doueck DC., Xue Y., Curran WJ., Lawson DH., Ahmed R. (2018) T cell receptor sequencing of activated CD8 T cells in the blood identifies tumor-infiltrating clones that expand after PD-1 therapy and radiation in a melanoma patient. Cancer ImmunolImmunother. 67(11):1767-1776

Awards/Honors (Selected)

- Patents
    - Wieland A., Ahmed R. (2018). HPV E2 and Uses in Managing Abnormal Epithelial Cell Growth. U.S. Provisional Patent Application No. 62/632,777. application pending
- Grants
    - INV-004010, Gates Foundation (Co-PI)
    - The effect of therapeutic antibody administration on the CD8 T cell response during chronic viral infection

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Education

- Aquinas College 1978-1982 B.S. Biology, cum laude
- The Ohio State University 1984-1989 Ph.D. Microbiology
- University of Tennessee 1989-1992 Postdoctoral Fellow Microbiology

Positions

- May 2019 – Present Professor and Vice Chair Microbial Infection and Immunity and Microbiology Professor, Microbiology The Ohio State University
- November 2018 – Jan 2019 Professor and Interim Chair Microbial Infection and Immunity, Professor, Microbiology, The Ohio State University
- October 2008 – Present Professor, Microbial Infection and Immunity and Microbiology, Professor, Microbiology, The Ohio State University
- October 2008 – May, 2011 Adjunct Professor, Department of Microbiology and Immunology, Wake Forest University School of Medicine
- July 2008 to October 2008: Professor, Department of Microbiology and Immunology, Wake Forest University School of Medicine
- July 2002 to July 2008, Associate Professor with tenure, Department of Microbiology and Immunology, Wake Forest University School of Medicine
- July 1998 to July 2002: Associate Professor, Department of Microbiology and Immunology, Wake Forest University School of Medicine
- November 1992 to June 1998: Assistant Professor, Department of Microbiology and Immunology, Wake Forest University School of Medicine

Graduate Students/Residents/Fellows Advised (selected)

- **Current**
  - Landon Locke, Visiting Assistant Professor; Source of support ATS grant, Parker B. Fellow
  - Erin Gloag, Research Scientist; Source of support AHA Career Development Award
  - Katarzyna Danis-Wlodarczyk, Postdoctoral research fellow; Source of support OSU President's Postdoctoral Fellowship, CF C3 Fellowship
  - Yiwei Liu, Graduate student; Source of support; R01AI077628, CF C3 Fellowship
  - Danielle Ferguson, Graduate student; Source of support: R01AI34895
  - Pranav Rana, Graduate student; Source of support: R01AI143916
  - Sabrina Lamont, Graduate student, R01EB017755
  - Charlton Lam, Graduate Student, R01AI077628
  - Cortney Mitchum, Graduate Student, R01AI143916
- **Previous**
  - Matthew Pestrak, Graduate student; Source of stipend support R01AI097511-01, Current: Senior Research Scientist, Azitra Inc
  - Mohini Bhattacharya, Graduate student; Source of stipend support R01NR013898, Current: Postdoctoral fellow
  - Sankalp Malhorta, MSTP graduate student; Source of stipend support CCTS TL-1, Current: Residency Program, Internal Medicine, Ohio State University
  - Christopher Jones, Postdoctoral research fellow; Source of support CFF fellowship, Current: Director of Research, Sharklet, Inc.
  - Heather Eggleston, Graduate student; Source of stipend support SIBS training grant, Current: Research Associate, Henry Jackson Foundation

- Sarah Chaney, DVM, Graduate student; Source of stipend support T32 Veterinary Bioscience training grant, Current: Hugh Trumbull Adams Resident in Zoological Medicine and Surgery, Bronx Zoo
- Valerie Ray, Postdoctoral research fellow; Source of support CFF fellowship, Current: Baxter International
- Binjie Xu, Graduate student, Source of stipend support, R01HL58334, Current: Sharklet, Technologies, Denver CO.
- Meenu Mishra, Ph.D., Postdoctoral research fellow; Source of support CFF fellowship, Current: Defense Threat Reduction Agency.
- Dominique Limoli, Graduate student; Source of stipend support R01AI061396, Current: Assistant Professor, Iowa University.
- Christopher Jones, Source of stipend support, SIBS and AHA fellowships, Current: Sharklet, Technologies, Denver CO.
- Ethan Mann, Ph.D., Postdoctoral research fellow; Source of support T32 Pulmonary training grant.
    - Current: Chief Executive Officer, Validus Cellular Therapeutics
- Elizabeth Waligora, Ph.D. candidate; Source of stipend support: AHA predoctoral fellowship. Current: Program Manager, Syneos Health.

Publications (Selected)

- Gloag, E.S., **D.J. Wozniak**, P.S. Stoodley, and L. Hall-Stoodley. 2021. *Mycobacterium abscessus* biofilms have viscoelastic properties which may contribute to their recalcitrance in chronic pulmonary infections. Nat. Sci. Rep. doi:10.1038/s41598-021-84525-x
- Lafuse, W.P., **D.J. Wozniak**, and M.V.S. Rajaram. 2020 Role of cardiac macrophages on cardiac inflammation, fibrosis, and tissue repair. Cells. 10(1):51. doi: 10.3390/cells10010051.
- Wheeler, K.M., G. Carcamo-Oyarce, B.S. Turner, J.Y. Co, S. Lehoux, R.D. Cummings, **D.J. Wozniak**, and K. Ribbeck. 2019. Mucin glycans attenuate the virulence of *Pseudomonas aeruginosa* in infection. Nat. Microbiol. doi: 10.1038/s41564-019-0581-8. Epub 2019 Oct 14.
- Passos da Silva, D., M.L. Matwichuk, D.O. Townsend, C. Reichardt, D. Lamba, **D.J. Wozniak**, and M.R. Parsek. 2019. The *Pseudomonas aeruginosa* lectin LecB binds to Psl and stabilizes the biofilm matrix. Nat. Comm. 10.1038/s41467-019-10201-4.

Awards/Honors (selected)

- Grants
    - CFF NIH Unfunded award. Novel bacterial topoisomerase inhibitors targeting Gram-negative bacteria. 07/01/2020-06/30/2022. (Mitton-Fry P.I, Wozniak: Co-Investigator).
    - R01AI077628-10, The pel exopolysaccharide gene cluster of Pseudomonas aeruginosa. 07/01/2009– 03/31/2025. (Parsek, Wozniak, MPI).
    - NIH, R01AI143916, The biofilm matrix of P. aeruginosa. 04/01/2019 - 03/31/2024. (Wozniak, Parsek, MPI)
    - Cystic Fibrosis Research Development Program. MCCOY19R0. 07/01/2019 - 06/31/2023 Impact of CF immune dysfunction on infection. (MPI: Wozniak, McCoy)
    - NIH, R01AI34895, Revisiting alginate paradigms. 09/01/2017 – 08/31/2022 (Wozniak, PI. Parsek, Co-I).
    - 1R33AI119116-01. Enzyme therapeutics for biofilm prevention and disruption. 07/01/2017 – 06/30/2022. (Howell P.I., Wozniak, co-investigator).
- Honors
    - 2020 Fellow, American Association for Advancement of Science
    - 2016-2018 ASM Distinguished Lecturer
    - 2015, ASM Jack Kenney Award for Outstanding Service on the Journal of Bacteriology Editorial Board
    - 2012, OSU Microbial Infection and Immunity Excellence in Teaching Award

Hsin-Jung "Joyce" Wu, PhD
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Davis Medical Research Center
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Education

- 2002-2011 Postdoctoral Fellow, Department of Pathology
  Harvard Medical School
- 1997-2002 PhD, Department of Microbiology, Immunology, and Molecular Genetics
  University of Kentucky
- 1991-1996 Bachelor of Veterinary Medicine, Department of Veterinary Medicine
  National Taiwan University (Taipei, Taiwan)

Positions

- 2018-present Associate Professor, Department of Immunobiology
  The University of Arizona Arthritis Center University of Arizona, College of Medicine
- 2011-2018 Assistant Professor Department of Immunobiology
  The University of Arizona Arthritis Center University of Arizona, College of Medicine

Teaching Activity (selected)

- Teaching
  - 2019-2021 696B –Student/Trainee Seminar Co-director (1 credit)
  - 2019-2021 IMB 695L Advanced Topics: Modulation of the Biology of Aging by Inflammation, Infection and Immunity (1 credit)
  - 2017-2021 IMB 401/501: Medical Microbiology and Immunology (4 credits)
  - 2014-2021 IMB 595A Immunology Journal Club, Co-director (1 credit)
  - 2011-2021 Rheumatology Grand Rounds
  - 2013-2016 IMB 548 Basic Immunological Concepts (3 credits)
  - 2014-2015 Med 822 Infection and Immunity Case Based Instruction (3 credits)
  - 2013-2014 IMB 564 Advance Topics: Function, Regulation and Dysregulation of the Immune System (3 credits)
- Research mentoring
  - 2016-2017 Walid Ashraf Raslan (now a medical school student at University of Arizona)
  - 2016-2018 Heqing Ma (now a masters student in Wu lab at University of Arizona)
  - 2014-2016 Nhan Tran (now a masters student at Midwestern University) Research
  - PhD Student
  - 2013-2018 Krysta Felix; Department of Immunobiology (now an instructor at Pima College)
- Postdoctoral Fellows
  - 2020-present Alejandra Sanchez (PhD from University of Edinburgh, UK) 2019-present Laurie Baert (PhD from Grenoble Alpes University, France)
  - 2018-present Tingting Fan (PhD from University of Chinese Academy of Sciences, China)
  - 2017-2018 Maran Sprouse, PhD (now a scientist at Watchmaker Genomics) 2015-2016 Debut Naskar, PhD (now a faculty in the Dept. of Biotechnology,
  - National Institute of Technology, India)
  - 2013-2016 Feng Teng, PhD (now a postdoctoral fellow at Weill Cornell University)

Publications (selected)

- Krysta M. Felix, Fei Teng, Nicholas A. Bates, Heqing Ma, Ivan A. Jaimez, Kiah C.Sleiman, Nhan L. Tran and **Hsin-Jung Joyce Wu***. P2RX7 Deletion in T Cells

- Maran L. Sprouse, Nicholas A. Bates, Krysta M. Felix, **Hsin-Jung Joyce W***. Impactof gut microbiota on gut-distal autoimmunity: a focus on T cells. Immunology 2019;156: 305-318. Review.
- Krysta M. Felix, Ivan A. Jaimez, Thuy-Vi V. Nguyen, Heqing Ma, Walid A. Raslan,Christina N. Klinger, Kristian P. Doyle, **Hsin-Jung Joyce Wu*.** Gut microbiota contributes to resistance against pneumococcal pneumonia in immunodeficient $rag^{-/-}$mice. Front Cell Infect Microbiol. 2018; 8: 118.
- C. Pierce Bradley, Fei Teng, Krysta M. Felix, Teruyuki Sano, Debdut Naskar, Katharine E. Block, Haochu Huang, Kenneth S. Knox, Dan Littman, **Hsin-Jung Joyce Wu***. Segmented filamentous bacteria provoke lung autoimmunity by inducing gut-lungaxis Th17 Cells expressing dual TCRs. Cell Host & Microbe 2017; 22: 697-704.
- Fei Teng, Krysta M. Felix, C. Pierce Bradley, Debdut Naskar, Heqing Ma, Walid A. Raslan, **Hsin-Jung Joyce Wu*.** The impact of age and gut microbiota on Th17 and Tfhcells in K/BxN autoimmune arthritis. Arthritis Research & Therapy 2017; 19: 188.

Awards/Honors (Selected)

- NIH/NIAID, 2R01AI107117 (Wu) 02/01/2019-01/31/2024
  Title: Tfh cells: linking the gut microbiota to a gut-distal autoimmune disease Role: PI
- NIH/NHLBI, 1R01HL148347 (Wu) 08/01/2020-07/31/2024
  Title: Microbiota control lung Th17 cell response and plasticity leading to autoimmune lung disease, Role: PI
- NIH/NIDDK, 1R01DK114252 (Longman) 02/01/2018- 01/31/2023
  Title: Host-Microbiota Interactions in Crohn's Disease-associated Spondyloarthritis Role: Collaborator, key personnel
- 2017 AAI Early Career Faculty travel grant, AAI Immunology 2017
- 2016 AAI Travel Award, 16th International Congress of Immunology
- 2010 Sontag Foundation Fellow of Arthritis National Research Foundation
- 2001 University of Kentucky, Commonwealth Research Award

Gang Xin, PhD
Assistant Professor, Microbial Infection and Immunity
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Education

- University of Sheffield, Sheffield, U.K. B.S. Genetic and Microbiology
- University of Bath, Bath, U.K. M.S. Regenerative Medicine
- Imperial College London, London, U.K. Ph.D. Immunology
- BloodCenter of Wisconsin, U.S. Postdoctoral Immunology

Positions

- 2020 - Present Assistant Professor, Department of Microbial Infection and Immunity, Pelotonia Institute for Immuno-Oncology, The Ohio State University
- 2015 - 2018 Chairmen, Postdoc association in BRI

Courses Taught (selected)

- 2020 BSGP7000 Concepts in Biomedical Science
- 2021 MEDMCIM7010 Cellular and Molecular Immunology
- 2021 Pathology6640 Fundamentals of Oncology

Trainees Advised (selected)

- David Schauder, MD, PhD (past graduate student mentored)
- Yao Chen, PhD (past graduate student mentored)
- Alex Ho, PhD (postdoc)

Publications (Selected)

- **Gang Xin***, Yao Chen, Paytsar Topchyan, Moujtaba Y. Kasmani, Robert Burns, Peter J Volberding, Chien-Wei Lin, Alexandra Cohn, Yiliang Chen, Ping-Chih Ho, Roy Silverstein, Weiguo Cui. "Targeting PIM1 Mediated Metabolism in Myeloid Suppressor Cells to Treat Cancer." *Cancer Immunology Research*: CIR-20-0433. PMCID: PMC33579728. **(*corresponding author)**
- **Gang Xin**, Achia Khatun, Paytsar Topchyan, Ryan Zander, Navjit Lehal, Yao Chen, Peter J Volberding, Chunmei Fu, Aimin Jiang, William A. See, Weiguo Cui. "Pathogen boosted adoptive cell transfer therapy induces endogenous antitumor immunity through antigen spreading." *Cancer Immunology Research*: CIR-19-0251. PMCID: PMC6946848
- **Gang Xin**, David M Schauder, Weiqing Jing, Aimin jiang, Nikhil S Joshi, Bryon Johnson, Weiguo Cui. A Pathogen Boosted Adoptive Cell Transfer Immunotherapy to Treat Solid Tumors. *Proceedings of the National Academy of Sciences*. 2017 Jan 9:201614315. PMCID: PMC5278465
- **Gang Xin**, Ryan Zander, David M. Schauder, Yao Chen, Jason S. Weinstein, William R. Drobyski, Vera Tarakanova, Joseph Craft, and Weiguo Cui. "Single-cell RNA sequencing unveils an IL-10-producing helper subset that sustains humoral immunity during persistent infection." *Nature Communications* 9, no. 1 (2018): 5037. PMCID: PMC6261948

Awards/Honors (selected)

- 2019 1st Runner Up Junior Faculty Research Scientist Award at the 5th Annual Immuno-Oncology Young Investigators' Forum

- 2016 Scholar-in-Training Award for the AACR Special Conference on Tumor Immunology and Immunotherapy
- 2015 The Elizabeth Elser Doolittle postdoc fellowship
- 2010 Recipient of travel fund for 5th Annual RIA Abstract Competition, Gaithersburg, USA
- 2009 Recipient of the Royal Society of Medicine President's Prize 2009 Final. London, U.K.

Jacob Yount, PhD
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Program Director, Viruses and Emerging Pathogens Program Area, Infectious Diseases Institute
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Education

- Grove City College, Grove City, PA, BS, Biochemistry
- Mount Sinai School of Medicine of New York University, New York, NY, PhD, Viral Immunology
- Rockefeller University, New York, NY, Postdoctoral, Chemical Biology & Innate Immunity

Positions

- 2012–2019 Assistant Professor, Department of Microbial Infection and Immunity, The Ohio State University College of Medicine
- 2019–Present Associate Professor (tenured), Department of Microbial Infection and Immunity, The Ohio State University College of Medicine
- 2019–Present Co-Director, Viruses and Emerging Pathogens Program, Infectious Diseases Institute, The Ohio State University
- 2013–present, Director, Microbial Pathogenesis Emphasis Area, OSU Biomed Sci PhD Program
- 2017–present, Faculty Advisor, Ohio Virology Association (OVA) graduate student group
- 2018–2023, American Society for Virology Student/Postdoctoral Award Selection Committee

Publications (selected)

- McMichael TM, Zhang Y, Kenney AD, Zhang L, Zani A, Lu M, Chemudupati M, Li J, and **Yount JS**. IFITM3 restricts human metapneumovirus infection. ***Journal of Infectious Diseases***. 2018. PMC6173576.
- Kenney AD, McMichael TM, Imas A, Chesarino NM, Zhang L, Dorn LE, Wu Q, Alfaour O, Amari F, Chen M, Zani A, Chemudupati M, Accornero F, Coppola V, Rajaram MVS*****, and **Yount JS***. IFITM3 protects the heart during influenza virus infection. ***Proceedings of the National Academy of Sciences***. 2019. PMC6744864. *****Corresponding authors
- Zani A, Zhang L, Kenney A, McMichael TM, Chemudupati M, Kwiek JJ, Liu SL, and **Yount JS**. Interferon-Induced Transmembrane Proteins Inhibit Cell Fusion Mediated by Trophoblast Syncytins. ***Journal of Biological Chemistry.*** 2019. PMC6937555.
- Shi G, Kenney AD, Kudryashova E, Zani A, Zhang L, Lai KK, Hall-Stoodley L, Robinson RT, Kudryashov D, Compton AA*****, and **Yount JS***. Opposing activities of IFITM proteins in SARS-CoV-2 infection. ***EMBO Journal***. 2021. PMC7744865. *****Corresponding authors
- Chesarino NC, McMichael TM, Hach JC, and **Yount JS**. Phosphorylation of the antiviral protein IFITM3 dually regulates its endocytosis and ubiquitination. ***Journal of Biological Chemistry***. 2014. PMC4002105.
- Chesarino NC, McMichael TM, and **Yount JS**. E3 ubiquitin ligase NEDD4 promotes influenza virus infection by decreasing levels of the antiviral protein IFITM3. ***PLOS Pathogens***. 2015. PMC4532365.
- Chesarino NM, Compton A, McMichael TM, Zhang L, Kenney AD, Soewarna V, Doering R, Davis M, Schwartz O, and **Yount JS**. IFITM3 requires an amphipathic helix for restriction of virus infections. ***EMBO Reports.*** 2017. PMC5623871.
- Chemudupati M, Kenney AD, Smith AC, Fillinger RJ, Zhang L, Zani A, Liu SL, Anderson MZ, Sharma A, and **Yount JS**. Butyrate reprograms expression of specific interferon stimulated genes. ***Journal of Virology***. 2020. PMC7394905.

- **Yount JS**, Moltedo B, Yang YY, Charron G, Moran TM, Lopez CB, and Hang HC. Palmitoylome profiling reveals S-palmitoylation-dependent antiviral activity of IFITM3. ***Nature Chemical Biology***. 2010. PMC2928251.
- Chesarino NM, Hach JC, Chen JL, Zaro BW, Rajaram M, Turner J, Schlesinger LS, Pratt M, Hang HC, and **Yount JS**. Chemoproteomics reveals Toll-like receptor fatty acylation. ***BMC Biology***. 2014. PMC4240870.
- Percher A, Ramakrishnan S, Yuan X, Thinon E, **Yount JS***, and Hang HC*. Acyl-PEG exchange reveals site-specific and quantitative levels of protein S-fatty acylation. ***Proceedings of the National Academy of Sciences***. 2016. PMC4843475. *Corresponding authors.
- McMichael TM, Zhang L, Chemudupati M, Hach JC, Kenney AD, Hang HC, and **Yount JS**. Palmitoyltransferase ZDHHC20 Enhances IFITM3 S-Palmitoylation and Antiviral Activity. ***Journal of Biological Chemistry.*** 2017. PMC5766958.
- Antonucci J, St. Gelais C, de Silva S, **Yount JS**, Tang C, Ji X, Xiong Y, Kim B, and Wu L. RNase activity of SAMHD1 is not essential for HIV-1 restriction in cells. ***Nature Medicine***. 2016. PMC5069697.
- Chen S, Bonifati S, Qin Z, St. Gelais C, Kodigepalli KM, Barrett BS, Kim SH, Antonucci JM, Ladner KJ, Vuzovetsky O, Knecht KM, Xiong Y, **Yount JS**, Guttridge DC, Santiago ML, and Wu L. SAMHD1 suppresses innate immune responses to viral infections and inflammatory stimuli by inhibiting the NF-kB and interferon pathways. ***Proceedings of the National Academy of Sciences***. 2018. PMC4843475.
- **Sermersheim M, Kenney AD, Lin PH, McMichael TM, Cai C, Gumpper K, Adesanya TA, Li H, Zhou X, Park KH, Yount JS*, and Jianjie Ma*. MG53 suppresses interferon-beta and inflammation via regulation of ryanodine receptor-mediated intracellular calcium signaling. *Nature Communications*. 2020. PMC7368064.** *Corresponding authors

Awards/Honors (selected)

- Research Funding
  - R01HL154001, Yount & Accornero (MPIs), 07/01/2020 - 06/30/2024, NIH/NHLBI, "Mechanistic characterization of a new master regulator of cardiac virus infections"
  - R21AI151230, Yount (PI), 07/01/2020 – 06/30/2022, NIH/NIAID, "Establishing a relevant mouse model with susceptibility to non-adapted influenza viruses for vaccine challenge studies"
  - R01AI130110, Yount (PI), 2/01/2017-1/31/2022, NIH/NIAID, 7th percentile renewal (2022-2027), "Mechanisms of innate resistance to virus infections"
  - COVID-19/Emerging Respiratory Virus Award, Yount (PI), 07/01/2021 – 06/30/2023, American Lung Association, "A host-directed strategy for combatting emergent respiratory viruses"

- Honors
  - 2017 OSU College of Medicine FAME Career Development Award for Researchers
  - 2011-15 K99/R00 Pathway to Independence Award, NIH/NIAID

Jian Zhu, PhD
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Education

- Peking University B.S. Pharmacology
- University of Nebraska Medical Center M.S. Pharmacology
- Johns Hopkins University, School of Medicine Ph.D. Host-oncovirus interactions (proteomics)
- Harvard Medical School, Brigham and Women's Hospital/HHMI Postdoc Host-virus interactions (genomics)

Positions

- 2018- Associate Professor (with tenure), Departments of Pathology (primary), Microbial Infection & Immunity (courtesy), Ohio State University College of Medicine, Columbus, OH
- 2013-2017 Assistant Professor (tenure track), Departments of Microbiology & Immunology (primary), Biochemistry & Biophysics (secondary), University of Rochester Medical Center, Rochester, NY

Publications (selected)

- **Zhu J**, Larman HB, Gao G, Somwar R, Zhang Z, Laserson U, Ciccia A, Pavlova N, Church G, Zhang W, Kesari S, Elledge SJ. *Protein interaction discovery using parallel analysis of translated ORFs (PLATO).* (2013) ***Nature Biotechnol***. 31(4):331-4.
- **Zhu J**, Davoli T, Perriera JM, Chin CR, Gaiha GD, John SP, Pertel T, Sims JS, Sigiollot F, Gao G, Xu Q, Qu H, Maranda L, Walker BD, Baker RE, Ng A, Elledge SJ, Brass AL. *Comprehensive Identification of Host Modulators of HIV-1 Replication using Multiple Orthologous RNAi Reagents* (2014) ***Cell Reports***. 9(2):752-66. PMCID: PMC4926641
- Huang H, Kong W, Jean M, Fiches G, Zhou D, Hayashi T, Que J, Santoso N, **Zhu J**. *A CRISPR/Cas9 screen identifies the histone demethylase MINA53 as a novel HIV-1 latency-promoting gene (LPG).* (2019) ***Nucleic Acids Res.*** 47(14): 7333-7347. PMCID: PMC6698651
- Kong W, Hayashi T, Fiches G, Xu Q, Li M, Que J, Liu S, Zhang W, Qi J, Santoso N, Elledge SJ, **Zhu J**. *Diversified Application of Barcoded PLATO (PLATO-BC) Platform for Identification of Protein Interactions.* (2019) ***Genomics, Proteomics & Bioinformatics***. 17(3):319-331. PMCID: PMC6818353
- Huang H, Santoso N, Power D, Simpson S, Dieringer M, Miao H, Gurova K, Giam CZ, Elledge S, **Zhu J**. *FACT Proteins, SUPT16H and SSRP1, are Transcriptional Suppressors of HIV-1 and HTLV-1 that Facilitate Viral Latency.* (2015) ***J Biol Chem.*** 290(45):27297-310. PMCID: PMC4646377
- Power D, Santoso N, Dieringer M, Yu J, Huang H, Simpson S, Seth I, Miao H, **Zhu J**. *IFI44 suppresses HIV-1 LTR promoter activity and facilitates its latency.* (2015) ***Virology.*** 481:142-50. PMCID: PMC4437885
- Kong W, Biswas A, Zhou D, Fiches G, Fujinaga K, Santoso N, **Zhu J**. *Nucleolar protein NOP2/NSUN1 suppresses HIV-1 transcription and promotes viral latency by competing with Tat for TAR binding and methylation.* (2020) ***PLoS Pathogens.*** 16(3):e1008430. PMCID: PMC7098636
- Zhou D, Hayashi T, Jean M, Kong W, Fiches G, Biswas A, Liu S, Yosief H, Zhang X, Bradner J, Qi J, Zhang W, Santoso N, **Zhu J**. *Inhibition of Polo-like kinase 1 (PLK1) facilitates the elimination of HIV-1 viral reservoirs in CD4+ T cells ex vivo.* (2020) ***Science Advances.*** 6(29): eaba1941. PMCID: PMC7439358
- **Zhu J**, Liao G, Shan L, Zhang J, Chen MR, Hayward GS, Hayward SD, Desai P, Zhu H. *Protein Array Identification of Substrates of the Epstein-Barr Virus Protein Kinase BGLF4.* (2009) ***J Virol***. 83(10):5219-31. PMCID: PMC2682057
- Li RF*****, **Zhu J***, Xie Z, Liao G, Liu J, Chen MR, Hu S, Woodard CL, Lin J, Taverna S, Desai P, Aminder R, Hayward GS, Qian J, Zhu H, Hayward SD. *Conserved Herpesvirus Kinases Target the DNA Damage*

Response Pathway and TIP60 Histone Acetyltransferase to Promote Virus Replication. (2011) ***Cell Host Microbe***. 10(4):390-400. * Equal contributions. PMCID: PMC3253558

- Fiches GN, Zhou D, Kong W, Biswas A, Ahmed EH, Baiocchi RA, **Zhu J***, Santoso NG*. *Profiling of immune related genes silenced in EBV-positive gastric carcinoma identified novel restriction factors of human gammaherpesviruses.* (2020) ***PLoS Pathogens.*** 16(8):e1008778. *Co-corresponding authors. PMCID: PMC7473590
- Biswas A, Zhou D, Fiches GN, Wu Z, Liu X, Ma Q, Zhao W, **Zhu J***, Santoso NG*. *Inhibition of polo-like kinase 1 (PLK1) facilitates 1 reactivation of gamma-herpesviruses and their elimination.* (2021) ***PLoS Pathogens.*** 17(7):e1009764. *Co-corresponding authors. PMCID: PMC8336821
- **Zhu J**, Gopinath K, Murali A, Yi G, Hayward SD, Zhu H, Kao C. *RNA-binding proteins that inhibit RNA virus infection.* (2007) ***Proc Natl Acad Sci U S A.***104(9):3129-34. PMCID: PMC1805585
- **Zhu J**, Gaiha GD, John SP, Pertel T, Chin CR, Gao G, Qu H, Walker BD, Elledge SJ, Brass AL. *Reactivation of latent HIV-1 by inhibition of BRD4.* (2012) ***Cell Reports.*** 2(4):807-16. PMCID: PMC3523124
- Hayashi T, Jean M, Huang H, Simpson S, Santoso NG, **Zhu J**. *Screening of an FDA-approved compound library identifies levosimendan as a novel anti-HIV-1 agent that inhibits viral transcription.* (2017) ***Antiviral Res.*** 146:76-85. PMCID: PMC5654649
- Jean MJ, Zhou D, Fiches G, Kong W, Huang H, Purmal A, Gurova K, Santoso NG, **Zhu J**. *Curaxin CBL0137 has the potential to reverse HIV-1 latency.* (2019) ***J Med Virol.*** 91(8):1571-1576. PMCID: PMC6599568
- Liu K, Xie F, Gao A, Zhang R, Zhang L, Xiao Z, Hu Q, Huang W, Huang Q, Lin B, **Zhu J**, Wang H, Que J, Lan X. *SOX2 regulates multiple malignant processes of breast cancer development through the SOX2/miR-181a-5p, miR-30e-5p/TUSC3 axis.* (2017) ***Molecular Cancer.*** 16(1):62. PMCID: PMC5348847
- Jiang M, Li H, Zhang Y, Yang Y, Lu R, Liu K, Lin S, Lan X, Wang H, Wu H, **Zhu J**, Zhou Z, Xu J, Lee DK, Zhang L, Lee YC, Yuan J, Abrams JA, Wang TC, Sepulveda AR, Wu Q, Chen H, Sun X, She J, Chen X, Que J. *Transitional basal cells at the squamous-columnar junction generate Barrett's oesophagus.* (2017) ***Nature.*** 550(7677):529-533. PMCID: PMC5831195

Awards/Honors (selected)

- Research Funding
    - R01 DE025447 (NCE), Zhu (PI), 08/01/15-05/31/22, Investigation of Latency Promoting Genes (LPGs) in HIV Oral Reservoir Cells
    - R01 AI150448 (NCE), Zhu (PI), 09/15/15-08/31/22, Role of FACT Proteins in Regulating HIV Transcription and Latency
    - R56 AI157872, Zhu (PI), 06/30/21-06/29/22, Role of RNA Methylation in Regulating HIV Proviral Expression
- Honors
    - 2018 Discovery of "Levosimendan: A FDA-Approved Drug Treating Heart Failure Also Blocks HIV-1 Reactivation" highlighted at ScienceTrends.com and HIVPlusMag.com
    - 2014 The 18th Annual Centers for AIDS Research (CFAR) National Meeting Junior Faculty Award, Providence, RI

Appendix C: Program Curriculum and Course Descriptions

Autumn Y1 (total = 12 credits)

BSGP 7000 - Concepts in Biomedical Science (6 credits)
An exploration of selected topics in biomedical sciences, ranging from molecular and cellular to systems. An emphasis is placed on fundamental concepts and critical reading of the primary literature. The course combines traditional lectures within student presentations and weekly in-class discussions of published papers. Prereq: Enrollment in IBGP/Biomedical Sciences PhD program, or permission of instructor.

MEDMCIM 7998 – Laboratory Rotation, Graduate Research in Microbial Infection and Immunity (6 credits)
This course provides an opportunity for individualized study in the fields of microbial infection and immunity. This research-focused course will allow students the opportunity to participate in a research environment under the supervision of one of the department's faculty members. Prereq: Permission of instructor. Repeatable to a maximum of 20 credit hours.

MEDMCIM 7500 - Departmental Seminar and Journal Club - Recent Discoveries in Immunology and Microbial Pathogenesis (1 credit)

Students attend the Department of Microbial Infection and Immunity Seminar Series (MIISS) and Journal Club. The MIISS will host speakers on a biweekly basis throughout the semester. The course will educate students on searching and reading research articles and becoming familiar with the research of the MIISS seminar speaker. Students are expected to attend all seminars and journal club sessions. Repeatable to a maximum of 4 cr hrs. This course is graded S/U.

Spring Y1 (total = 12 credits)

MEDMCIM 7010 - Cellular and Molecular Immunology (3 credits)

Cellular and molecular mechanisms of immune response, cell recognition and communication, molecular biology of cell recognition structures, cytokines, and effector mechanisms. Prereq: Grad standing, or permission of instructor

MEDMCIM 7500 - Departmental Seminar and Journal Club - Recent Discoveries in Immunology and Microbial Pathogenesis (1 credit)

BIOPHRM 7510 - Professional and Ethical Issues in Biomedical Sciences (2 credits)

A discussion course based on case scenarios dealing with ethical issues facing biomedical researchers, such as publishing practices, confidentiality, mentoring.

Prereq: Grad standing, and enrollment in Biomedical Sciences program. This course is graded S/U. Cross-listed in VetBios 751.

MEDMCIM 7998 – Laboratory Rotation, Graduate Research in Microbial Infection and Immunity (6 credits)

Summer Y1 (total = 8 credits)

BMI 5750 - Methods in Biomedical Informatics (3 credits, online delivery)

An intensive, application-oriented survey of methods used during the course of the design, implementation and evaluation of BMI platforms, including clinical info systems, decision support systems, databases, elec, data capture instruments, data visualization tools and other analytical "pipelines". These methods span a broad spectrum from information needs assessments to systems evaluation.
Prereq: Basic knowledge of the following areas - basic computer science principles (logic, procedural and/or object oriented programming, data structures and algorithms), statistical methods, and medical terminology.

MEDMCIM 7998 – Graduate Research in Microbial Infection and Immunity (6 credits)

Autumn Y2 (total = 13 credits)

MEDMCIM 8010 - Selected Topics in Advanced Immunology (2 credits)

BSGP 7070 - Fundamentals of Grant Writing (4 credits)
Introduce students to the basics principles of grant writing. Student must have a dissertation project about which they can write a proposal in order to enroll.

MEDMCIM 7500 - Departmental Seminar and Journal Club - Recent Discoveries in Immunology and Microbial Pathogenesis (1 credit)

MEDMCIM 7998 –Graduate Research in Microbial Infection and Immunity (6 credits)

Spring Y2 (total = 11)

BSGP 7900 - Cancer Immunology: Critical Journal Readings (1 credit)

Faculty, students and postdoctoral fellows will give critical interpretations of research and journal readings on cancer immunology.

MEDMCIM (TBD) Immuno-oncology (3 credits)

This course will deliver key concepts surrounding the interplay between cancer pathogenesis (e.g. tumor microenvironment, metastasis) and the host anti-tumor immune response.

MEDMCIM 7500 - Departmental Seminar and Journal Club - Recent Discoveries in Immunology and Microbial Pathogenesis (1 credit)

MEDMCIM 7998 –Graduate Research in Microbial Infection and Immunity (6 credits)

Suggested Annual Curricula post Y1 and Y2

Su/Au/Sp - Dissertation research as required and electives in area of research focus. MEDMCIM 7500 strongly recommended each Au/Sp

Ph.D. Graduate Program in Immunology and Immunotherapeutics

From James Fant 1/3/2022, revisions in red by Anne Sandstrom 1/4/2022

	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028
REVENUE						
Tuition Revenue						
Number of Students	6	12	18	24	30	30
Average Annual Credit Hours per student	24.0	27.0	21.0	18.0	16.2	16.8
Total Annual Credit Hours	144	324	378	432	486	504
Tuition per FT student (estimate 3.5% annual increase)	26,909	31,332	25,222	22,376	20,843	22,372
Revenue from Tuition	**161,454**	**375,989**	**454,004**	**537,024**	**625,297**	**671,152**
Tax on Tuition Revenue (24%)	**(38,749)**	**(90,237)**	**(108,961)**	**(128,886)**	**(150,071)**	**(161,076)**
Total Net Tuition Revenue	**122,705**	**285,752**	**345,043**	**408,138**	**475,226**	**510,075**
Subsidy Revenue						
Effective Rate (estimate 0.5% annual increase)	677	681	684	688	691	694
Revenue from Subsidy	**0**	**48,765**	**159,280**	**240,114**	**278,440**	**317,143**
Tax on Subsidy (24%)	**-**	**(11,704)**	**(38,227)**	**(57,627)**	**(66,826)**	**(76,114)**
Total Net Subsidy Revenue	**-**	**37,062**	**121,053**	**182,487**	**211,615**	**241,029**
Student Services Assessments						
Grad Pool 2 (estimate 4% annual increase)	(77,177)	(180,594)	(219,123)	(260,384)	(304,717)	(328,643)
All Credit Hours Pool 3 (estimate 4% annual increase)	(317)	(742)	(900)	(1,067)	(1,249)	(1,351)
Total Assessments	**(77,494)**	**(181,336)**	**(220,022)**	**(261,451)**	**(305,966)**	**(329,994)**
Stipend Support (includes 11.5% fringe, assumes 2% annual increase)						
MI&I 2 Student Slots per FY	68,639	70,012	71,412	72,841	74,297	75,783
PIIO 2 Student Slots per FY	68,639	70,012	71,412	72,841	74,297	75,783
COM 2 Student Slots per FY	68,639	70,012	71,412	72,841	74,297	75,783
Total Stipend Support	**205,918**	**210,037**	**214,237**	**218,522**	**222,892**	**227,350**
EXPENSES						
Personnel						
Program Director (PhD Level) (effort a part of faculty service)		-	-	-	-	-
Administrative Assistant (assuming 50% FTE + 32.3% fringe, 2% annual increase)	(42,998)	(43,857)	(44,735)	(45,629)	(46,542)	(47,473)
Student Stipend (including 11.5% fringe, assumes 2% annual increase)	(205,918)	(210,037)	(214,237)	(218,522)	(222,892)	(227,350)
TOTAL EXPENSES	**(248,916)**	**(253,894)**	**(258,972)**	**(264,151)**	**(269,434)**	**(274,823)**

	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028
Total Net Revenue (tuition, subsidy, fees)	**45,212**	**141,477**	**246,074**	**329,174**	**380,874**	**421,110**
Total Transfers for Stipend Support	**205,918**	**210,037**	**214,237**	**218,522**	**222,892**	**227,350**
Total Expenses (personnel, misc.)	**(248,916)**	**(253,894)**	**(258,972)**	**(264,151)**	**(269,434)**	**(274,823)**
Total Income	**2,214**	**97,620**	**201,339**	**283,545**	**334,333**	**373,638**
Original (Nov. 2021) version	*46,069*	*70,742*	*74,274*	*80,519*	*87,176*	
Increase / (decrease)	*(43,855)*	*26,878*	*127,065*	*203,026*	*247,157*	

Budget estimate is based upon:

Completion of the required minimum of 80 credit hours for the PhD (with majority in years 1 & 2)

6 students per year 1. Year 2 students supported by mentor

Full time students complete in 15 -18 semesters

Estimated 3.5% annual increase for tuition revenue, based on Masters/PhD effective fee rate per credit hours, based on ~ 5 yrs' history

Subsidy revenue is based on Doc-1 average rate for past 5 years (0.5% annual increase), with subsidy realized based on rolling average of prior 2 years.

Tuition & Subsidy numbers represent estimates of revenue that will be realized by the University; numbers may not represent what will be allocated to the College of Medicine or Department(s).

Student services assessments based on average rates & increases for recent years

Estimated 2% annual increase for stipend support and expenses accounts for inflation

50% effort by Administrative Assistant

Stipend plus fringe for 6 students per year, with 2 supported by MI&I, 2 supported by the PIIO, and 2 supported by COM

Budget Narrative: Other (Student Services Assessments)

Ph.D. Graduate Program in Immunology and Immunotherapeutics					
	FY2023	FY2024	FY2025	FY2026	FY2027
REVENUE					
Tuition Revenue					
Number of Students	6	6	6	6	6
Average Annual Credit Hours per student	24	24	24	24	24
Total Annual Credit Hours	144	144	144	144	144
Tuition per FT student (estimate 6% annual increase starting FY26)	22,280	27,292	28,999	30,739	32,583
Revenue from Tuition	**133,680**	**163,753**	**173,993**	**184,433**	**195,499**
Tax on Tuition Revenue (24%)	**(32,083)**	**(39,301)**	**(41,758)**	**(44,264)**	**(46,920)**
Total Net Tuition Revenue	**101,597**	**124,453**	**132,235**	**140,169**	**148,579**
Subsidy Revenue					
Effective Rate (estimate 6% annual increase starting FY26)	507.351	531.562	531.706	564	597
Revenue from Subsidy	**73,059**	**76,545**	**76,566**	**81,160**	**86,029**
Tax on Subsidy (24%)	**(17,534)**	**(18,371)**	**(18,376)**	**(19,478)**	**(20,647)**
Total Net Subsidy Revenue	**55,524**	**58,174**	**58,190**	**61,681**	**65,382**
Student Services Assessments					
Grad (estimate 6% annual increase starting FY26)	(67,453)	(67,504)	(70,786)	(75,033)	(79,535)
All Credit Hours (estimate 6% annual increase starting FY26)	(601)	(523)	(631)	(669)	(709)
Total Assessments	**(68,054)**	**(68,027)**	**(71,417)**	**(75,702)**	**(80,244)**
Stipend Support (includes 11.5% fringe, assumes 2% annual increase)					
MI&I 2 Student Slots per FY	68,639	70,012	71,412	72,841	74,297
PIIO 2 Student Slots per FY	68,639	70,012	71,412	72,841	74,297
COM 2 Student Slots per FY	68,639	70,012	71,412	72,841	74,297
Total Stipend Support	**205,918**	**210,037**	**214,237**	**218,522**	**222,892**
EXPENSES					
Personnel					
Program Director (PhD Level) (effort a part of faculty service)		-	-	-	-
Administrative Assistant (assuming 50% FTE + 32.3% fringe, 2% annual ir	(42,998)	(43,857)	(44,735)	(45,629)	(46,542)
Student Stipend (including 11.5% fringe, assumes 2% annual increase)	(205,918)	(210,037)	(214,237)	(218,522)	(222,892)
TOTAL EXPENSES	**(248,916)**	**(253,894)**	**(258,972)**	**(264,151)**	**(269,434)**

	FY2022	FY2023	FY2024	FY2025	FY2026
Total Net Revenue (tuition, subsidy, fees)	**89,067**	**114,600**	**119,008**	**126,149**	**133,718**
Total Transfers for Stipend Support	**205,918**	**210,037**	**214,237**	**218,522**	**222,892**
Total Expenses (personnel, misc.)	**(248,916)**	**(253,894)**	**(258,972)**	**(264,151)**	**(269,434)**
Total Income	**46,069**	**70,742**	**74,274**	**80,519**	**87,176**

Budget estimate is based upon:

Completion of the required minimum of 80 credit hours for the PhD

6 students per year 1. Year 2 students supported by mentor

Full time students complete in 15 -18 semesters (minimum 12 credits/semester)

Estimated 6% annual increase for tuition revenue, subsidy revenue, and student services assessments is based on average increase for past 9 years

Estimated 2% annual increase for stipend support and expenses accounts for inflation

50% effort by Administrative Assistant

Stipend plus fringe for 6 students per year, with 2 supported by MI&I, 2 supported by the PIIO, and 2 supported by COM

Appendix E: Letters of Concurrence and Support

THE OHIO STATE UNIVERSITY

Department of Veterinary Biosciences
Office of the Chair
207 Goss Lab
1925 Coffey Road
Columbus, OH 43210-1093
614-247.4671 Phone
614-292.6473 FAX
vet.osu.edu/biosciences

October 29, 2021

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
College of Medicine
The Ohio State University

Re: Doctorate in Immunology and Immunotherapeutics

Dear Gene,

This letter is to provide my support to the proposal for the PhD degree program in Immunology and Immunotherapeutics.

Immunology has been traditionally viewed as a discipline primarily related to microbiology and focused on mechanisms of protection against pathogenic microbes. This view has changed with the increasing body of evidence that immune cells and molecules are involved in a variety of biological processes and infectious as well as non-infectious diseases. In addition to the breadth of diseases and conditions regulated by immune cells, more complex approaches are constantly being developed for in-depth analysis of immune cells, pathways used to mediate their functions, and molecules they produce. Therefore, it is essential to develop a doctorate program dedicated to the development of next generations of immunologists.

As a longtime member of the immunology community and co-director of the Host Defense and Microbial Biology Program of the Infectious Diseases Institute (IDI), I am pleased by the recent growth of the immunology community at The Ohio State University (OSU). The fact that this growth was in large part driven by the recruitment of new faculty in the area of immuno-oncology further demonstrates that the proposed PhD degree in Immunology and Immunotherapeutics will be a great addition to the portfolio of training opportunities at OSU. Therefore, I offer my full support to this proposal.

Sincerely,

Prosper Boyaka, PhD
Stanton Youngberg Professor
Chair, Department of Veterinary Biosciences
Program co-director, Host Defense and Microbial Biology, OSU IDI

THE OHIO STATE UNIVERSITY
COLLEGE OF MEDICINE

Ginny L. Bumgardner, MD, PhD, FACS
Associate Dean for Physician Scientist Education and Training
395 W. 12th Ave
1st Floor, #132
Columbus, OH 43210
Phone: (614) 293-6177
Ginny.bumgardner@osumc.edu

October 28, 2021

Eugene Oltz, PhD
Chair, Microbial Infection and Immunity
Samuel Saslaw Professor of Infectious Diseases
776A Biomedical Research Tower
460 W. 12th Avenue

Dear Dr. Oltz,

I enthusiastically support your application to the OSU Graduate School to establish a Doctor of Philosophy degree program entitled "Doctorate in Immunology and Immunotherapeutics." This program has great value for students interested in basic and translational immunology research careers. The didactics in this program will align nicely with the goals of the NIH T32AI106704 training program I direct entitled "Advanced Research Training in Immunology for Surgical Trainees (ARTIST)."

Sincerely,

Ginny L. Bumgardner MD PhD FACS
Associate Dean for Physician Scientist Education and Training
Professor of Surgery
Comprehensive Transplant Center
Director, OSU Medical Scientist Training Program
Director, Department of Surgery Research Training Program
Director, Medical Student Research Program
The Ohio State University Wexner Medical Center

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Wendy L. Frankel, MD
Kurtz Chair and Distinguished Professor
Chair, Department of Pathology
Director of GI/Liver Pathology Fellowship

Department of Pathology
1664 Neil Avenue, Suite 6100
Columbus, OH 43210
Phone: 614-688-8660
Fax: 614-292-7072

October 27, 2021

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University College of Medicine
776A BRT
460 W 12th Ave
Columbus OH 43210

RE: Support for PhD Program in Immunology

Dear Gene:

As Chair of the Department of Pathology in the College of Medicine, I am writing in support of your proposed graduate program to establish a Doctor of Philosophy degree titled "Doctorate in Immunology and Immunotherapeutics"

After reviewing your proposal, I agree that this will be a conventional, research-focused degree for students seeking careers in academic, pharmaceutic, biotech, clinical, and public health fields. I am excited by the prospect of this program, which promises to advance not only its graduates but also our rapidly growing community of basic and translational immunologists, as well as infectious disease researchers here at OSU.

OSU's ongoing investment in immunology-based research has been vital over the past few years. If the COVID-19 pandemic has taught us anything, it is that we need more people in this specialty to keep up with the ever- changing world and need for vaccines, diagnostics and treatments for emerging and existing pathogens in addition to the needs for innovative immunotherapeutic strategies to combat cancer and inflammatory diseases.

I whole-heartedly support this program.

Sincerely,

DocuSigned by:
Wendy L. Frankel
C62C0C3E9DC14C2...

Wendy L. Frankel, MD
Chair and Distinguished Professor
Kurtz Chair in Pathology
Director of GI/Liver Pathology Fellowship

Department of Microbiology

484 West 12th Avenue
Columbus, OH 43210-1292
Phone (614) 292-6679
Fax (614) 292-8120
E-mail fredrick.5@osu.edu

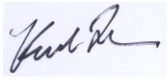
Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University
Wexner School of Medicine

October 27, 2021

Dear Gene,

I support your proposal to establish the *Immunology and Immunotherapeutics Graduate Program* (I2GP) at OSU. Your Department of Microbial Infection and Immunity, which has recruited several talented immunologists in recent years, is well poised to lead this effort. The focus of the I2GP is distinct and complementary to that of our Microbiology graduate program, hence I provide concurrence.

Best regards,



Kurt Fredrick
Professor and Chair

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Pulmonary, Critical Care and Sleep Medicine
Department of Internal Medicine

241 West 11th Street
Columbus, OH 43210

614-247-7707 Phone
614-293-4799 Fax

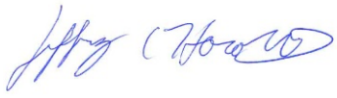
October 25, 2021

Re: Doctorate in Immunology and Immunotherapeutics

Dear Dr. Oltz (Gene)

It is my pleasure to write this letter to support your proposal to establish a Doctor of Philosophy degree program entitled "Doctorate in Immunology and Immunotherapeutics" within the College of Medicine at The Ohio State University. I think this is an important and timely addition to the portfolio of the University, and I agree that there is an existing need and growing opportunity for graduates with the skills and expertise that will be developed within this doctoral program. Within the field of pulmonary and critical care medicine, immunology has taken center-stage among leading research programs. Indeed, we currently have 3 faculty who completed their PhDs in immunology-related research, and we have several additional faculty members with courtesy appointments in the Department of Microbial Infection and Immunity because of the substantial collaborative opportunities that exist. Finally, as you know we are preparing to submit a post-doctoral T32 program, and I can readily envision that the graduates from a doctorate program in Immunology would have abundant opportunities for training with the PCCSM Division. I am excited about the opportunity that this represents, and I enthusiastically support the development of this program.

Sincerely,



Jeffrey C. Horowitz, M.D. ATSF, FCCP
Professor of Medicine
Division Director
Pulmonary, Critical Care and Sleep Medicine

THE OHIO STATE UNIVERSITY

Division of Rheumatology and Immunology
Department of Internal Medicine
Davis Medical Research Center
480 Medical Center Drive
Columbus OH 43210

614-366-7016 Phone

November 1, 2021

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases

Dear Gene:

I am writing this letter to provide my very enthusiastic support to establish a Doctor of Philosophy degree program entitled "Doctorate in Immunology and Immunotherapeutics."

The growth in immunology in the last few decades has been paradigm-changing in many fields of medicine including autoimmunity, cancer and infectious diseases. It is critical to enhance our ability to train students in immunology and Immunotherapeutics through the development of this program. The graduates will gain the knowledge base and skill set to contribute to rapidly growing fields, including molecular and cellular immunology as well as applied diagnostics and therapeutics. Learners in the program will thrive because of Ohio State University's environment and will develop into the next generation of leaders in academic and pharmaceutical medicine.

I enthusiastically support this application and firmly believe that such a program would promote the mission of the College of Medicine and the Ohio State University.

Sincerely,

Wael Jarjour, MD, FACP, FACR
Professor of Medicine
Director, Division of Immunology/Rheumatology
Martha Morehouse Chair in Arthritis and Immunology Research

The James

THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER CENTER

Zihai Li, MD, PhD
Professor & Founding Director
Pelotonia Institute for Immuno-Oncology
460 W. 12 Avenue, 580 BRT
Columbus, OH 43210
614-366-0172
zihai.li@osumc.edu

October 21, 2021

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
College of Medicine
The Ohio State University

Re: PhD Graduate Program in Immunology and Immunotherapeutics

Dear Gene,

It is with great enthusiasm that I provide this letter of support for the PhD Graduate Program in Immunology and Immunotherapeutics (I2GP). The demand for exceptional immunologists is increasing, fueled by the threat of infectious disease, the need to broaden the application of cancer immunotherapy, and increased pathology in allergy and autoimmunity. You and I have worked together to advance cancer research within the Ohio State University Comprehensive Cancer Center (OSUCCC) Pelotonia Institute for Immuno-Oncology (PIIO), and I have collaborated with several faculty within the Department of Microbial Infection and Immunity, where I hold a secondary faculty appointment. Given the faculty, resources and environment at OSU, the I2GP will have access to the critical mass of expertise necessary to drive education in the realm of immunology.

I serve as The Klotz Memorial Chair in Cancer Research, Professor of Internal Medicine, and Founding Director of the PIIO. My primary research interests are in the fields of chaperone biology, immune tolerance, and cancer immunology, particularly related to the roles of a key immune chaperone gp96 (known also as grp94) in the endoplasmic reticulum. Our team is the leader in the field with respect to elucidating GRP94 biology via genetic approaches. In fact, we discovered that grp94 controls multiple key pathways in cell growth, migration, immune tolerance, and oncogenesis, including integrins, TLRs, IGF-II, LRP6, and GARP. One of my laboratory's emphases has been on understanding the roles of the grp94-GARP-TGFβ axis in cancer biology and immune tolerance. We found that GARP promotes cancer immune evasion via regulating multiple cell types (e.g., cancer cells, platelets, regulatory T cells, and B cells); discovered a novel mechanism of TGFβ activation via thrombin-mediated GARP cleavage; found that GARP is aberrantly expressed in human cancers to promote oncogenesis via both cancer cell intrinsic and extrinsic mechanisms; and, established GARP as a novel anti-cancer target. My research has been supported continuously for nearly two decades by the National Institutes of Health, and includes a program project grant from the National Cancer Institute and six active R01 grants for which I am principal investigator. In addition, I am an elected member of the American Society for Clinical Investigation (ASCI) and the Association of American Physicians (AAP).

I have extensive experience as a scientific mentor for trainees at all levels. Currently, I serve as the direct advisor to three Postdoctoral Scholars (including one T32 Fellow), and five PhD graduate students (including one Pelotonia Fellow). I mentor multiple Ohio State faculty junior investigators as well (Ephraim Ansa-Addo, PhD, Margaret E. Gatti-Mays, MD, MPH, FACP, Feng Hong MD, PhD, Brian Searle, PhD, Andreas Wieland, PhD, Dwight Owen, MD, Debasish Sundi, MD, Gang Xin, PhD, Jacob Kaufman, MD, PhD, Hazem E. Ghoneim, PhD and Xingjun Wu, PhD). Over the past 25 years, I have directly supervised 44 graduate students, post-doctoral and clinical fellows and many of these have had significant success in their own research careers. Among them, 14 have gone on to independent academic positions, including multiple who have reached the rank of Professor and Department/Division Chair. Among my former mentees, nine currently serve as director or senior consultant roles at biotechnology companies.

In my role as director of the PIIO, I oversee a comprehensive bench-to-bedside research initiative focused on harnessing the body's immune system to fight cancer at all levels – from prevention to treatment to survivorship (cancer.osu.edu/PIIO). The PIIO builds upon a rich portfolio of active investigator-initiated immuno-oncology (IO) clinical trials being conducted at the OSUCCC – James. Its external advisory board comprises multiple world leaders in the field of IO, including Drs. Lisa Butterfield, Lieping Chen, Carl June, Susan Kaech, Miriam Merad, and Robert Schreiber. Spanning multiple colleges, departments, and disciplines, the PIIO focuses on two research areas:

1. Systems Immuno-Oncology
    a. Fundamental Cancer Immunology: designed to bolster our knowledge of cellular systems to create more efficient and effective cancer immunotherapeutic tools,
    b. Cancer Immunogenomics: focus areas including epigenetics, neo-antigen vaccine, epitope prediction, TCR repertoire analysis, HLA typing, and CRISPR screening
2. Translational Immuno-Oncology
    a. Cell Therapy: focus area including CAR-T, TCR, TILS, DC vaccines, NK cells, and protein-based as well as gene-based immunotherapy
    b. Clinical Immuno-Oncology: focusing on next-generation cancer immunotherapy, biomarker and human immuno-oncology, early phase IO trials (first in class, first in man), liquid tumor, lung cancer, pediatric tumor, and building industry alliances toward a pipeline of novel therapeutics.

Our Immune Monitoring and Discovery Platform (IMDP) provides comprehensive cell-based and molecule-based immunoassay services to support basic, translational, and clinical IO studies. It operates as a technological hub for innovative IO research, paving the way for advanced immune phenotyping and functional analyses as well as multiplexed biomarker detection discovery methods. The PIIO's Immuno-Informatics Group is comprised of leading faculty from the Department of Biomedical Informatics (BMI). The Group provides data analytics for flow cytometry and mass cytometry data analysis, cytokine and chemokine, ELISA, and viral neutralization assay, bulk RNA-Seq data analysis, bulk ChIP-Seq and ATAC-Seq data analysis, T Cell receptor repertoire sequencing data analysis, single-cell RNA-Seq data analysis, single-cell ATAC-Seq data analysis, spatial transcriptomics data analysis, and mining public data. Other data analytics tools being developed include single cell proteomics data analytic pipeline, spatial imaging data analysis, neoantigen discovery, HLA repertoire analysis, and artificial intelligence.

The PIIO cultivates an environment for education. An extensive selection of lectures, programs, and workshops are available and widely advertised within the university. During our weekly Research in Progress meetings, investigators and their trainees have the opportunity to present their data and discuss ways to improve the overall excellence of publications and/or grant applications. Our Distinguished Immuno-Oncology Professor Seminar Series features guest lectures from nationally and internationally recognized researchers in the fields of cancer immunogenomics, cell therapy, fundamental cancer immunology, and translational immuno-oncology. The PIIO Annual Immuno-Oncology Symposium provides exciting research updates in cancer research from some of the world's leading experts in the field. The symposium also features poster presentations, which are excellent means of development with respect to presentation of data.

In summary, I believe the I2GP is comprised of a worthy group of faculty who are well suited to train the next generation of immunologists. I fully support this proposal and confirm that the PIIO will fund up to two first year graduates through support of stipend, tuition, and applicable fees. I look forward to hearing about the success of this proposal and to serving as participating faculty.

Sincerely,

Zihai Li, MD, PhD
Klotz Memorial Chair in Cancer Research
Professor and Founding Director

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Office of the Chairman
Department of Internal Medicine

395 W. 12th Ave
Third Floor, Room 314
Columbus OH 43210

614-293-8724 Phone
614-293-6656 Fax

October 27, 2021

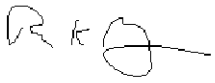
Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University College of Medicine
776A BRT
460 W 12th Ave
Columbus OH 43210

Dear Gene:

I am delighted to support your initiative in the OSU Graduate School to establish a Doctor of Philosophy degree program entitled "Doctorate in Immunology and Immunotherapeutics." I think this is a well-constructed program with superb leaders here at OSU who will train the next generation of successful PhD trainees that will have an impact in a wide spectrum of immune-mediated disorders. Given the Covid-19 pandemic and our immuno-oncology programs, this is especially timely. I concur that this program will meet an unmet need here for students seeking careers in academic, pharmaceutic, biotech, clinical, and public health fields with formalized training in immunobiology.

I am happy to support this program any way I can and hope that the OSU Graduate School will look at this proposal favorably.

Regards,



Rama K. Mallampalli, MD
S. Robert Davis Chair of Medicine
Professor and Chair, Department of Internal Medicine
Director, Medical Scientist Training Program
The Ohio State University
Wexner Medical Center

THE OHIO STATE UNIVERSITY

College of Medicine
Office of Research

260 Meiling Hall
370 W. 9th Avenue
Columbus, OH 43210

614-247-8610 Phone
614-292-4499 Fax

medicine.osu.edu/research

October 26, 2021

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University College of Medicine

RE: Ph.D. Graduate Program in Immunology and Immunotherapeutics

Dear Dr. Oltz,

As Vice Dean for Research of The Ohio State University College of Medicine, I am writing to convey my strongest level of support for the establishment of a Doctor of Philosophy (Ph.D.) degree program entitled "Doctorate in Immunology and Immunotherapeutics." Our goal at the Wexner Medical Center is to pioneer life-altering biomedical discoveries and their translation into breakthrough healthcare solutions. Programs, exactly like the one you have proposed, are needed in order to take our discoveries to the patient bedside.

The past two years have revealed the importance of catalyzing this area of research. As you noted in the program's application, Ohio State has recruited over 30 faculty members in immunology and is very much in alignment with the program's goals to contribute to the rapidly growing field. Ohio State has the expertise, experience, and growing infrastructure to support such a program and the incredible learners it is sure to attract.

In summary, I am pleased to commit support to this application. I strongly endorse this effort and thank you for leading this important initiative. I wish you success and look forward to the program's continued development and progress.

Sincerely,

Peter J. Mohler, Ph.D.
Interim Senior Vice President for Research, Office of Research
Chief Scientific Officer, Wexner Medical Center
Vice Dean for Research, College of Medicine
Professor, Departments of Physiology & Cell Biology and Internal Medicine

THE OHIO STATE UNIVERSITY
COLLEGE OF MEDICINE

Jeffrey D. Parvin, MD, PhD
Louis Levy Professor for Cancer
Associate Dean for Graduate Studies
Director, Biomedical Sciences Graduate Program
Dept. of Biomedical Informatics
The Ohio State University
Jeffrey.Parvin@osumc.edu
https://u.osu.edu/parvinlab/

October 25, 2021

Eugene Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University
Wexner School of Medicine

RE: Letter of support for the I2GP

Dr. Oltz,

I have read with interest your information on the planned PhD Graduate Program in Immunology and Immunotherapeutics (I2GP). There is some overlap with the Biomedical Sciences Graduate Program (BSGP), but I believe that the two programs will attract different populations of students. The two programs will share courses, which will be a plus for the BSGP. There is no problem with concurrence in your planned graduate program.

Best of luck for your proposal for a new PhD program, and I look forward to working with you in the future.

Sincerely,

Jeffrey Parvin
Associate Dean for Graduate Studies
Director, Biomedical Sciences Graduate Program

THE OHIO STATE UNIVERSITY

Benjamin M. Segal, M.D.
Chair, Department of Neurology
Director, Neurological Research Institute

Co-Director, Neurological Institute
Stanley and Joan Ross Endowed Professor of Neuromodulation

Faculty Office Tower: 395 W. 12th Ave., 7th Floor
Columbus, OH 43210

Benjamin.Segal@osumc.edu

October 25, 2021

Dear Gene,

I am writing to express my support and enthusiasm for the establishment of a Doctor of Philosophy degree program entitled "Doctorate in Immunology and Immunotherapeutics." As a neuroimmunologist myself, I am particularly excited about this initiative. The corps of faculty members in my Department who are focused on neuroimmunology has grown rapidly over the past 2 years. There are now 4 physician-scientists in the Multiple Sclerosis division engaged in investigator-initiated biomarker and clinical intervention studies, and 4 research faculty who study animal models of immune–nervous system interactions in the context of trauma, stroke and brain tumors. There is a great deal of enthusiasm among them to mentor and teach future trainees in your new program. The focus of the program on clinical translation and immunotherapy adds novelty, and will likely attract both basic and translational immunologists. Please let me know how I and my faculty can help with curriculum development, mentorship and teaching.

Sincerely,

Benjamin M. Segal, M.D.
Chair, Department of Neurology
Director, Neuroscience Research Institute
Stanley and Joan Ross Professor of Neuromodulation

The James

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Division of Hematology
College of Medicine | Comprehensive Cancer Center
Biomedical Research Tower
460 West Twelfth Avenue
Columbus, OH 43210

October 27, 2021

Eugen Oltz, PhD
Chair, Dept. of Microbial Infection & Immunity
Samuel Saslaw Professor of Infectious Diseases
The Ohio State University
Wexner School of Medicine

SUBJECT: PhD Graduate Program in Immunology and Immunotherapeutics

Dear Gene,

I am writing this letter to express my full support for your application to establish a PhD degree program in Immunology and Immunotherapeutics. This is exciting and timely! The research training provided by this program is vitally important in fostering our next generation of academic immunological researchers. Furthermore, the launch of such a program will accelerate the scientific output as well as impact of this critical and rapidly growing, basic and translational immunology research community at the Ohio State University including many faculty in the Division of Hematology.

As a physician scientist, I have long-standing research interests in cancer immunology and immunotherapy, with an ultimate goal of developing effective immunotherapy approaches for treating cancer. My research is currently supported by three R01s: 1) Regulation of tumor-infiltrating T cells by macrophages; 2) T Memory Stem Cells in Cancer; 3) The role of macrophage polarization in chronic GVHD in hematological malignancies, all of which are relevant to the mission of the proposed application. Over the years, I have mentored over 70 trainees at various levels and many of them are currently holding academic positions.

I enthusiastically look forward to participating as a mentor and providing any guidance the program might need.

Sincerely,

Yiping Yang, MD, PhD
Director, Division of Hematology
Professor of Medicine
Jeg Coughlin Chair in Cancer Research
The Ohio State University Wexner Medical Center