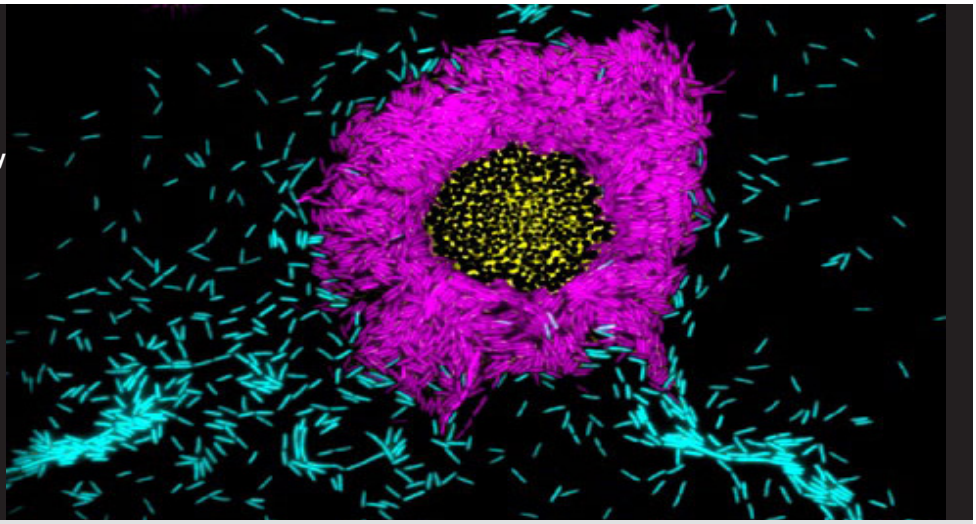
Pseudomonas cells labeled magenta are capable of sensing and attacking *Staphylococcus*, labeled yellow, while *Pseudomonas* cells in cyan have been genetically modified to be blind to interspecies signals.

Limoli Lab



MICROBIOLOGY AND IMMUNOLOGY NEWSLETTER

Spring 2022

PRIMARY FACULTY MEMBERS

Gail Bishop, PhD
Noah Butler, PhD
Craig Ellermeier, PhD
Hillel Haim, MD, PhD
Jon Houtman, PhD
Bradley Jones, PhD
Aloysius Klingelhutz, PhD
Dominique Limoli, PhD
Adam Mailloux, PhD
Balaji Manicassamy, PhD
Wendy Maury, PhD
Stanley Perlman, MD, PhD
Lilliana Radoshevich, PhD
Richard Roller, PhD
Patrick Schlievert, PhD
Jessica Tucker, PhD
Steven Varga, PhD
Mary Weber, PhD
David Weiss, PhD
Mary Wilson, MD
Li Wu, PhD
Timothy Yahr, PhD

ASSOCIATES AND INSTRUCTORS

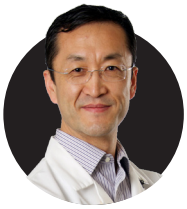
Marcia Cordts, PhD
Linda Knudtson, PhD
Theresa Ho, PhD
Robert Faris, PhD

SECONDARY FACULTY MEMBERS

Damian Krysan, MD, PhD
Kevin Legge, PhD
Paul McCray, MD
Patrick Sinn, PhD
Jack Stapleton, MD

UNIVERSITY OF IOWA CARVER COLLEGE OF MEDICINE
University of Iowa Health Care

medicine.uiowa.edu/microbiology/



Message from the Department

Li Wu, PhD, Professor, Chair and Department Executive Officer

The annual Department newsletter brings us the proud past and promising future, together with joyful stories and memories. In 2021 and 2022, we celebrated the 150th and 175th anniversary of the Carver College of Medicine and the University of Iowa, respectively. In this historical era, I am fully grateful to the faculty, staff, and trainees in the Department for everyone's dedication to teaching, research, service, and learning. We also appreciate the continuous support from the institution's leaders and our generous alumni and friends.

I learned what challenges and perseverance really mean since I started in the Department in November 2019, about 4 months before the COVID-19 pandemic that remains a threat to global health. Proudly, we have made remarkable accomplishments in the Department during the last three years through our team efforts. In FY2021, we achieved tremendous success despite continued challenges of the COVID-19 pandemic. Seven primary faculty and two staff members received nine awards in teaching, research, and service from the Carver College of Medicine, the University of Iowa, and the Board of Regents. We taught a total of 37 courses, 103 semester hours, and 2,574 contact hours for 1,748 students enrolled in undergraduate, graduate, medical, and health professional programs. Our faculty were highly successful in receiving research funding, with a total of $12.72M, including $9.98M from NIH grants and $2.74M from other funding sources. The primary faculty published 89 articles, including highly innovative and impactful research articles in top journals, such as *Cell*, *Cell Host Microbe*, *Nature*, *Nature Immunology*, and *PNAS*. Through tireless service and devotion to research, our faculty, staff, and trainees uniquely contribute to the research community at regional, national, and international levels.

Reflecting on the prosperous 84-year history of our department, we look forward to a brighter future. I appreciate what you do for our beloved department!

FACULTY NEWS

FACULTY SPOTLIGHT: Dr. Lilliana (Lilly) Radoshevich

by Patrick Schlievert, PhD

Dr. Lilly Radoshevich was hired as an Assistant Professor of Microbiology and Immunology in 2017; she has a secondary appointment in the Department of Molecular Physiology and Biophysics. She received her BA in Biology and French from Grinnell College in Grinnell, Iowa. She received her PhD in Biomedical Sciences from the University of California, San Francisco. Dr. Radoshevich then performed postdoctoral research at the Institut Pasteur in Paris, France, until she was hired at the University of Iowa.

Dr. Radoshevich has a broad background in host-pathogen interactions, with specific training and expertise in cell biology, microbiology, and proteomics. Her research addresses the important question of how cellular innate immune responses engage with and are hijacked by intracellular pathogens, primarily bacteria. She employs critical state-of-the-art mass spectrometry to study two intracellular pathogens: *Listeria monocytogenes*, which causes food poisoning, and *Francisella tularensis*, which causes tularemia and is a potential select agent of bioterrorism. The Radoshevich lab focuses on the tandem ubiquitin-like protein, Interferon Stimulated Gene 15 (ISG15), which is known to be an antiviral molecule, though its mechanism of action is enigmatic. Her lab has identified an anti-bacterial role of this protein in the context of *Listeria monocytogenes* and *Francisella tularensis* infection of cells. Furthermore, she has established expertise in identifying the substrates of ubiquitin-like proteins using quantitative proteomics. In 2020, Dr. Radoshevich received a prestigious five-year National Institutes of Health Maximizing Investigators' Research Award for early-stage investigators.

Thanks to Dr. Radoshevich's interdisciplinary interests in host-pathogen interactions and her expertise in leveraging modern mass spectrometry techniques, she collaborates with many faculty members in the Department of Microbiology and Immunology, as well as other departments, to perform proteomic studies on various pathogens of interest. Her expertise is applicable to any system where cell function becomes altered during infection by pathogens or other diseased states. Her laboratory has become a key proteomics resource for many studies performed here at Iowa. Dr. Radoshevich teaches Bacteria and Human Disease, a course taken by both undergraduate and graduate students from many departments. The course is highly-rated by students. She also serves as a member on many graduate student thesis committees. Additionally, she has been a member of the Microbiology Admissions Committee and the Department of Microbiology and Immunology Diversity, Equity, and Inclusion Committee.

Radoshevich Lab
Pictured (L-R) Lilly Radoshevich, Nathan Schwery, Yifeng Zhang, Ellen Upton, Brittany Ripley, Madeleine Vessely and Emma Luhmann.

The Radoshevich laboratory currently includes Yifeng Zhang, a graduate student in the Microbiology Graduate Program; Ellen Upton, a graduate student in the Immunology Program; Dr. Brittany Ripley, a postdoctoral fellow; Emma Luhmann, a lab manager/proteomics expert; Nathan Schwery, a pre-medical post-baccalaureate student; and Joey Kestleloot, an undergraduate researcher who is the 2022-2023 recipient of the Stinski Fellowship.

New Faculty

Jessica Tucker, PhD, recently started as an Assistant Professor of Microbiology and Immunology. Dr. Tucker completed her undergraduate studies in her hometown at the University of Alabama and her graduate work at the University of Georgia. She did her postdoctoral training at the University of California, Berkeley, with funding from the American Cancer Society. Dr. Tucker's research program is focused on the alteration of host transfer RNA expression by gammaherpesviruses, a group of viruses that cause a variety of human cancers, including Kaposi's Sarcoma. The Tucker lab will examine the functional impact of tRNA expression dysregulation during KSHV infection, with the goal of better understanding how KSHV replicates in the host and elucidating new angles for treatment and cancer prevention. Their immediate goals include: 1) applying innovative tRNA sequencing strategies to reveal new features of tRNA expression during gammaherpesvirus infection, 2) defining viral and host proteins that drive tRNA dysregulation in the infected cell, and 3) dissecting the functional relationship between tRNA expression changes and viral replication. Ultimately, they will apply their findings during oncogenic virus infection to studying tRNA dysregulation in other cancer or infection contexts. Dr. Tucker was recently awarded a Junior Faculty Seed Grant from the American Cancer Society and the Holden Comprehensive Cancer Center. Her new lab is in Bowen Science Building. Outside of the lab, Dr. Tucker loves to spend time with her family, including her husband, two young children, and her dog. She is excited to help establish new mentoring networks for female scientists at all training levels, starting with our newly established Women in Microbiology & Immunology Coffee Hour. The first Coffee Hour was held on March 21st with over 30 attendees! We welcome Dr. Tucker to the Department!

FACULTY NEWS

Faculty and Staff Recognition

Wendy Maury, PhD
Mark Stinski Chair in Virology

Noah Butler, PhD
Mark Stinski Professorship in Immunology

Mary Weber, PhD
Early Career Scholar of the Year

Gail Bishop, PhD
Hubbard-Walder Award for Excellence in Teaching

David Weiss, PhD
Microbiology Endowed Professorship

Stanley Perlman, MD, PhD

- University of Iowa Leadership in Research Award
- Board of Regents Award for Faculty Excellence
- University of Iowa Distinguished Chair

Theresa Ho, PhD
University of Iowa Staff Award for Distinguished Leadership in Diversity, Equity, and Inclusion

Julie Nealson
University of Iowa Outstanding Staff Award

In his latest book, **Patrick Schlievert, PhD,** delves into his career on Toxic Shock Syndrome (TSS) research. Dr. Schlievert discovered TSS and showed that the principal cause was due to the production of toxins by vaginal *S. aureus* and that this was exacerbated by use of highly absorbent tampons. The book is entitled "What Was I Thinking? Toxic Shock Syndrome."

RETIRING FACULTY: Dr. Michael Feiss

By Patrick Schlievert, PhD

Mike Feiss received his BS (Chemistry) from the University of Utah, MS (Microbiology) from the University of Illinois, and PhD (Genetics) at the University of Washington, followed by postdoctoral research in bacteriophage genetics at Stanford with Allan Campbell. Mike came to Iowa as an assistant professor in 1972 and was promoted to professor in 1982. Mike retired in 2010 and is now professor emeritus.

Mike's lab worked on viral DNA packaging, using bacteriophage lambda as a model system. This was a time when lambda genetics was in its heyday, and Mike was at the forefront of these studies. His work defined cos, the site recognized by the viral DNA packaging terminase. Further studies explored how cos subsites cosQ, cosN, and cosB, orchestrate the actions of terminase in recognizing, processing, and packaging viral DNA into the preformed protein shell. Biochemical and genetic studies explored the working of terminase's ATP-powered DNA translocation motor. Motor mutants were used in collaborative single molecule studies investigating the relation between ATP hydrolysis and motor output.

Researchers Debbie Siegele, Jean Sippy, and Choon-Seok Oh contributed to research and operation of the lab. Notably, Jean Arens Sippy entered the lab in 1981 and continued until 2021. Postdocs were Kathryn Krizsanovith-Williams and Alok Dhar; doctoral students were Rich Fisher, Shuang Xu, Winnie Xin, Dave Cue, Greg Miller, Doug Wieczorek, Susan Frackman, Whi-Fin Wu, Ashly Yeo, Young Hwang, Gary Johnson, Julie Qi Hang, and Carol Duffy; MS students were Mike Smith, Zhi-Hao Chi, Jenny Wendt, Arsh Khare, and Cathy Rudolph; and there were over 100 remarkable undergraduates.

Mike is also well-known for his teaching activities, most notably microbial genetics. He has a quiet voice, a thoughtful demeanor, and, of course, superb microbiology knowledge. He was and continues to be a great asset to the Department of Microbiology and Immunology, the Carver College of Medicine, and the University of Iowa as a whole. In 1995, Mike received the University of Iowa M.L. Huit Faculty Award.

Mike's activities outside of the University include spending time with his children and grandchildren, even learning Danish to keep up with his grandchildren. Mike is interested in natural history and is an avid eco-tourist.

NEW RESEARCH FUNDING

Faculty Funding

Gail Bishop

NIH (R01)

Regulation of B cell signaling in autoimmunity by TRAF3

Noah Butler

NIH (R01)

Mechanisms and consequences of extrafollicular B cell activation during malaria

Craig Ellermeier & David Weiss

NIH (R01)

Cell Envelope Biogenesis in *Clostridioides difficile*

Craig Ellermeier

NIH (R21)

Regulation of the *C. difficile* cell envelope by two-component systems

Jon Houtman & Steve Varga

NIH (R21)

CD4 T cell intrinsic signaling defects during viral exhaustion

Jon Houtman

Holden Comprehensive Cancer Center-Mezhir Seed Grant

Connecting immunological changes to patient outcome in pharmacological ascorbate clinical trials

Dominique Limoli

NIH (R35)

Decoding interspecies signaling networks and the biogeography of polymicrobial infections

Adam Mailloux

Holden Comprehensive Cancer Center ACS-IRG Seed Grant

The Role of Hypoxia in the Immunopeptidomic Landscape of Cancer

Balaji Manicassamy

NIH/Chicago Biosolutions, Inc.

STTR Phase I: Development of 4-(aroylamino) piperidine-based entry inhibitors as anti-influenza therapeutics

Wendy Maury

BerGenBio ASA

Evaluation of the efficacy of AXL inhibition in enhancing type 1 IFN signaling in models of SARS-CoV-2 infection

Stanley Perlman

NIH/Kansas State University

Small Molecule Inhibitors Against 3C-like Protease of SARS-CoV-2

Stanley Perlman & Wendy Maury

NIH (T32 Competitive Renewal)

Training in Molecular Virology, Viral Pathogenesis and Viral Vectors

Richard Roller

NIH (R01)

HSV/VZV chimeric viruses for identifying critical herpesvirus assembly interactions

Patrick Schlievert

NIH/Boston Children's Hospital

Genetic and microbial modifiers of Atopic Dermatitis (AD): Mechanisms of increased AD severity in patients with the R576 polymorphism in IL-4Ra and impact of *S. aureus* skin decolonization on AD

Jessica Tucker

Holden Comprehensive Cancer Center ACS-IRG Seed Grant

Alteration of transfer RNA expression by oncogenic gammaherpes viruses

Steve Varga & Jon Houtman

Holden Comprehensive Cancer Center Oberley Seed Grant

Underlying immune mechanism modulating T cell responses induced by pharmacological ascorbate administration in a murine model of Lewis Lung carcinoma

Mary Weber

NIH

R01 Diversity Supplement

David Weiss

NIH (R21)

CRISPR interference-enabled phenotyping of essential genes in *C. difficile* to aid in discovery of antibiotic targets

David Weiss

National Science Foundation

REU Site in Microbiology at the University of Iowa - Supplement

Mary Wilson, Patrick Schlievert, & Noah Butler

NIH (T32 Competitive Renewal)

Training in Mechanisms of Parasitism

Li Wu

NIH (R21)

Epitranscriptomic m6A profile of SARS-CoV-2-infected human lung epithelial cells

Li Wu
Co-Investigators: Wendy Maury, Patrick Sinn, & Lilliana Radoshevich

Carver College of Medicine COVID-19 Pilot Grant

The role of SAMHD1 in regulating SARS-CoV-2-induced inflammation

Li Wu

NIH (R61)

Targeting HIV-1 RNA modifications in latently infected CD4+ T cells for therapeutic development

Staff Funding

Bruce Hostager (Bishop Lab)

UI/Mayo Lymphoma SPORE Developmental Research Grant

How the B cell tumor suppressor TRAF3 regulates B cell receptor signaling in normal and malignant B cells

SELECT PUBLICATIONS

GAIL BISHOP

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HILLEL HAIM

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PATRICK SCHLIEVERT

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MARY WEBER

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LI WU

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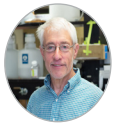
Drs. Paul McCray and Stanley Perlman with U.S. Secretary of Labor Martin Walsh (left) discussing COVID research during the Secretary's campus visit thanking the University for its research efforts to address the COVID-19 pandemic

High Impact Publication

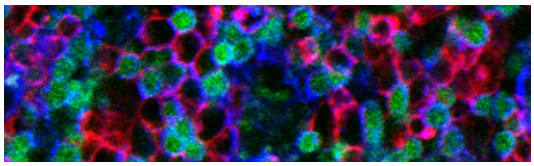
Dr. McCray



Dr. Perlman

The laboratories of Drs. Paul McCray and Stanley Perlman recently published an influential Nature article describing how an experimental prostaglanding D2 blocking drug prevents severe disease in a mouse model of COVID-19. Read the CCOM article about their research, Drug protects older mice from worst effects of COVID-19.

Wong LR, Zheng J, Wilhelmsen K, Li K, Ortiz ME, Schnicker NJ, Thurman A, Pezzulo AA, Szachowicz PJ, Li P, Pan R, Klumpp K, Aswad F, Rebo J, Narumiya S, Murakami M, Zuniga S, Sola I, Enjuanes L, Meyerholz DK, Fortney K, McCray PB Jr, Perlman S. Eicosanoid signaling blockade protects middle-aged mice from severe COVID-19. Nature. 2022 Mar 21. PMID: 35314834.



Interactions among germinal center B cells (red) and IL-21 (green) expressing CD4 helper T cells (blue) during malaria parasite infection.

Butler Lab

GRADUATE STUDENT NEWS

Students who graduated with a PhD in 2021-2022

Ellen Kiser, PhD - "A "Meta" analysis: The proper usage of computational biology and bioinformatics in infectious disease research" Mentor: Mary Wilson, MD

Bridget Moricz, PhD - "Adhesins of *Streptococcus sanguinis* that promote infective endocarditis through interactions with platelets" Mentor: Bradley Jones, PhD

Kelsie Nauta, PhD - "Dissection of β-lactam resistance in *Bacillus anthracis, cereus*, and *thuringiensis*" Mentor: Craig Ellermeier, PhD

Phuong Tran, PhD - "Investigations into *Staphylococcus aureus* β-toxin pathogenesis" Mentor: Wilmara Salgado-Pabón, PhD

Jodi Corley, PhD - "Post-transcriptional control of *Pseudomonas aeruginosa* virulence genes by global regulatory networks" Mentor: Tim Yahr, PhD

Shiloh Lueschow, PhD - "Prevention and treatment of necrotizing enterocolitis and sepsis using antimicrobial peptides and probiotics" Mentor: Steven McElroy, MD

Graduate Student Fellowships and Awards

Tina Arkee, Immunology Program
Ballard-Seashore Dissertation Fellowship

Dana Bohan, Immunlogy Program
American Association of Immunlogists Late Breaking Poster Award

Lorellin Durnell, Microbiology Program
Graduate College Post-Comprehensive Research Fellowship

Jordan Johnson, Immunology Program
National Institutes of Health (NIH) F31 Fellowship

Kody Waldstein, Immunology Program
NASA Space Grant Consortium Fellowship

Kaitlin Yarrington, Microbiology Program
Cystic Fibrous Foundation Student Traineeship

New Graduate Students 2021/2022

Picture (L-R)

Xavier Tijerina
Medical Science Training Program (MSTP)
BS - Saint Mary's University of San Antonio

Noah Schuster
BS - DePauw University

Natalie Jarvis
BS - Saint Louis University
MS - University of Texas Health Science Center

Jonathon Bernardi
BS - University of Michigan

TRAINING PROGRAMS

Training in Molecular Virology, Viral Pathogenesis and Viral Vectors

Program Directors: Stanley Perlman, MD, PhD, and Wendy Maury, PhD

The research focus of this program is understanding fundamental aspects of human virology with an emphasis on emerging virus infections and viral pathogenesis with the use of viral vectors for gene delivery.

Key facts:

- Funded since 1998 by NIAID; 26 predoctoral trainees supported
- Participating trainees were 50% female
- 36% of all trainees came from socio-economically disadvantaged backgrounds
- 100% of trainees have continued in scientific careers

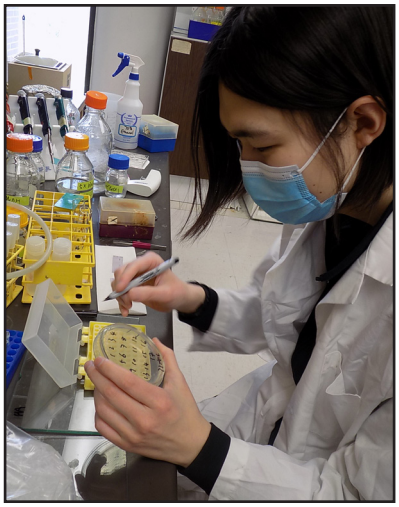
2021-2022 Trainees


Camilla Hippee (Sinn Lab)


Christopher Lopez (Legge Lab)


Shea Lowery (Perlman Lab)


Shaowen White (Roller Lab)


Shaowen White, Graduate Student

Training in Mechanisms of Parasitism

Program Directors: Noah Butler, PhD, Patrick Schlievert, PhD, and Mary Wilson, MD

This research program focuses on supporting students working on research projects related to how microbial pathogens interact with mammalian hosts via common mechanisms and themes. Participants include pre- and post-doctoral trainees working under the direction of experienced faculty.

Key facts:

- Funded since 1996 by NIAID; 102 trainees supported
- 54% of participating trainees hold tenure track university positions
- 39% of participating trainees are performing research in industry

2021-2022 Trainees

Predocs


Dana Bohan (Maury Lab)


Anthony Pannullo (Ellermeier Lab)


Elvia Silva (Badovinac Lab)


Brianna Steiert (Weber Lab)


Yifeng Zhang (Radoshevich Lab)

Postdocs


Andrew Jezewski, PhD (Krysan Lab)


Gabriela Kaus, PhD (Weiss Lab)


Roy Lok-Yin Wong, PhD (Perlman Lab)

Interdisciplinary Immunology Postdoctoral Training Program

Program Directors: Noah Butler, PhD, and Li Wu, PhD

The core of this research program is a commitment by postdoctoral trainees to an immunology research experience under the direction of outstanding faculty mentors.

Key facts:

- Funded since 1984 by NIAID; 165 postdoctoral trainees supported
- Since 2010, 18% of trainees were under-represented minorities
- Nearly equal numbers male and female trainees have participated
- 100% of trainees have continued in academia, industry, clinical, or clinical research careers

2021-2022 Trainees

Postdocs

Mariah Hassert, PhD (Harty Lab)

Patrick Nuro-Gyina, PhD, (Wilson Lab)

Alan Sariol, PhD (Perlman Lab)

Fellow Physicians

Marika Raff, MD (Santillan Lab)

Madeleine Stump, MD, PhD (Rahmouni Lab)

Scientific Careers Retreat

The Scientific Careers Retreat occurred on October 29, 2021, and provided basic career advice by speakers from government, private industry, and the academic field for graduate students and postdoctoral students. The retreat was sponsored by NIH-funded T32 training programs, the Carver College of Medicine, and the Department of Microbiology and Immunology.

Research Experience for Undergraduates (REU)

Principal Investigators: David Weiss, PhD, and Aloysius Klingelhutz, PhD

The REU program is comprised of a group of 8-10 undergraduate students who spend 10 weeks during the summer working closely with participating faculty on a specific research project.

Key facts:

- Funded by National Science Foundation since 1994
- 150+ undergraduate students supported
- Emphasis on selecting students who are under-represented minorities, first-generation college students, or from small colleges where research opportunities are limited

The Department was excited to host the REU in-person in 2021 after cancelling the REU in 2020 due to the pandemic.

Summer 2021 REU Participants

Back row: (L-R) Brittney Dinkel, Emma Thames, Zulymar Ramos, My Tran, Jade Hays, and Francois LeSage

Front row: (L-R) David Weiss, Facundo Torres, Julian Bonilla, Andres Orea, Julie Nealson, Wesley Hanson, and Al Klingelhutz

UNDERGRADUATE STUDENT NEWS

Microbiology Undergraduate Student Association (MUSA) Program Update

Elise Femino, MUSA president

The Microbiology Undergraduate Student Association (MUSA) has been busy this year with its return to in-person meetings after two years of a virtual-only format. Along with being in-person, MUSA is proud to have an all-female executive board this year that has worked hard to offer exciting programming for microbiology undergraduate students. MUSA started the year off with several great meetings, including a guest lecture from the Department of Microbiology and Immunology Chair, Dr. Wu, a social trip to Wilson's Orchard & Farm, and even an agar art contest!

MUSA Executive Officiers
(L-R) Caro Icardi, Eileen Murray, Elise Femino, Riya Parekh and Lillian Thurber

MUSA has also continued its strong tradition of microbiology outreach with thanks to faculty advisor Dr. Theresa Ho. Students have participated in Kids Go STEM, as well as outreach to Southeast Junior High school, introducing kids to microbiology-related concepts through virus building activities and yeast fermentation experiments. MUSA members have also worked diligently to raise funds to send a group of students to the ASM conference this year in Washington, DC. For those who are staying home but are interested in the conference, keep an eye out for the virtual ASM watch party that MUSA will be hosting in June!

As we move into spring, MUSA is very excited to introduce several new events for students to explore clinical and laboratory applications of microbiology. MUSA will be hosting a clinical microbiology tour of Dr. Ford's laboratory and co-hosting an event with the Biochemistry and Molecular Biology Club to give students the opportunity to explore how microbiology and biochemistry are connected to one another. While the executive board has been busy planning events for students, it is very thankful for the support of the faculty and graduate students who have taken the time out of their schedules to attend, lecture, and create opportunities for students at MUSA events. The departmental interest in undergraduate students has created an incredibly special environment for students to develop as future leaders in science and healthcare, while in turn seeking to develop the next generation of microbiologists.

Microbiology Undergraduates Announcements

2021 Honors in Microbiology

Shelby Anderson
Mentor: Mary Weber, PhD

Luci Bullman
Mentor: Mary Weber, PhD

Alex Dobrila
Mentor: Craig Ellermeier, PhD

Lindsey Grady
Mentor: Wendy Maury, PhD

Jonathan Mattingly
Mentor: Kevin Legge, PhD

Nathan Schwery
Mentor: Hillel Haim, MD, PhD

Abigail Wischmann
Mentor: Bradley Jones, PhD

Microbiology Undergraduate Awards

Caro Icardi (Weber Lab)
Selected as an IBA Scholar

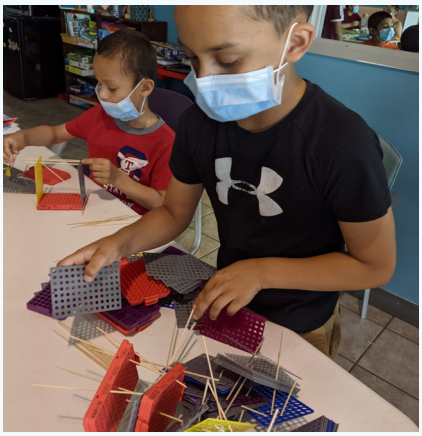
Shalini Birari (Wilson Lab)
ICRU Summer Research Fellowship

2021–2022 Stinski Undergraduate Research Fellowship

Recipients pictured (L-R) Micaila Kurtz (Maury Lab) and Miranda Sturtz (Manicassamy Lab)

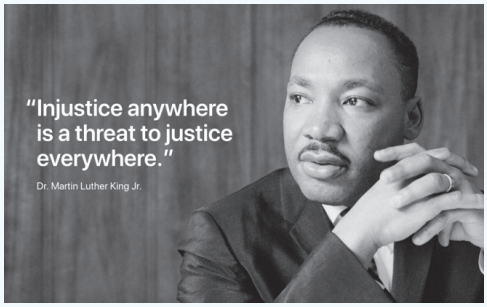
OUTREACH AND DEI ACTIVITIES

The Department of Microbiology and Immunology strongly supports STEM (Science, Technology, Engineering, and Math) outreach and DEI (Diversity, Equity, and Inclusion) issues. Dr. Theresa Ho, Director of Diversity, Equity, and Inclusion in the Department, spearheads outreach with elementary, junior-high, and high school students from the area. Dr. Ho also serves as Chair of the Department DEI Committee, which helps encourage science in underserved populations and advance DEI-related goals. In late Spring 2021, Dr. Ho led a group of undergraduate microbiology majors working with 3rd and 5th graders to teach them some virology. A build-your-own virus activity was used to teach the kids about viruses and to stimulate discussion on how viruses cause disease and how vaccines work. Summer brought a week-long STEM summer camp at Open Heartland, a non-profit community group that serves predominantly Spanish-speaking immigrants. A virtual Kids Go STEM event with microbiology-related activities was offered in January of this year. In February and March, volunteers from the DEI Committee and undergraduate, graduate, and medical students went to junior and senior high schools to educate over one-hundred 8th-12th graders on the variety, ubiquity, applicability, and pathogenesis of the microbes on and around us. Connecting with our local schools enhances excitement for microbiology, forges stronger bonds with committed educators, and helps to provides safety nets and opportunities for students who lack scientific education and mentors. Plus, it allows our microbiology undergraduate and graduate students to gain teaching experience.



In-person kid STEM education

Zoom hands-on science activities during the pandemic



To celebrate Dr. Martin Luther King Jr's legacy of human rights, the Department of Microbiology and Immunology organized daily Department- and Carver College of Medicine-wide discussions of DEI. On Tuesday and Wednesday of Human Rights Week, the Department's invited speaker, Dr. Matt Anderson, from The Ohio State University, not only presented his fascinating research on genetic systems of the human fungal pathogen *Candida albicans*, but talked about his journey as a Native American scientist and his work with indigenous-led science and empowerment programs. Students from the Meskwaki Settlement High School as well as undergraduates, graduate students, staff, and faculty from across the University of Iowa campus participated in an enlightening conversation on Native American contributions to science. On Thursday, Dr. Jason Barker from Internal Medicine led a deliberation of race versus ancestry in science, medicine, and medical education via zoom. Later that evening, members of the Department, Carver College of Medicine, and teachers from the Iowa City Community School District discussed the film The Immortal Life of Henrietta Lacks and the role of race in medicine and medical ethics. On Friday of Human Rights week, over 40 people from the Carver College of Medicine and local non-profit organizations considered ways that scientific and medical professionals might help their local community through STEM education, mentorship, and other outreach activities. On Saturday, members of the Carver College of Medicine had opportunities to volunteer at Houses into Homes, a local organization which provides beds and household items for people exiting domestic violence, homelessness, or other crisis situations.

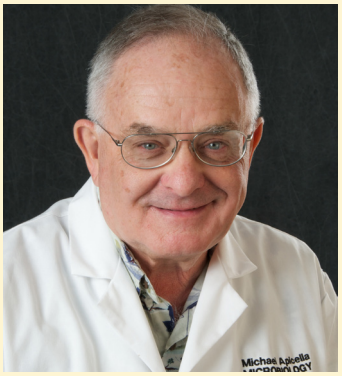
Theresa Ho, PhD, DEI Director, teaching in the lab

Dr. Ho continues to plan for the upcoming summer and will run a microbiology workshop for the Iowa First Nations summer program which serves Native American high school students from various indigenous populations in Iowa and surrounding states. Dr. Ho's efforts and hard work on outreach and DEI activities were recently recognized through a UI Staff Award for Distinguished Leadership in Diversity, Equity, and Inclusion. This spring, she was honored to give the keynote address for the UI Staff Council DEI Celebration.

If you would like to be notified of future outreach, mentoring, or DEI opportunities, please contact Dr. Theresa Ho.

EMERITUS FOCUS

Dr. Michael Apicella

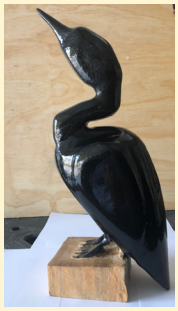


Professor Emeritus Michael Apicella, MD, led the Department of Microbiology as Chair for 18 years, coming to Iowa in 1993. While serving as Chair, he also took on the role of Associate Dean for Research in the Carver College of Medicine. During his entire time at Iowa, Dr. Apicella maintained a vigorous and highly successful research program.

Michael Apicella grew up in a large Italian family in a neighborhood in Brooklyn, NY, where Sunday dinners usually had 15-20 people at several tables. In high school, he lettered in track and found a passion for chemistry, biology, and physics classes that continued into his college years. He graduated *cum laude* from the Jesuit College of Holy Cross, and he credits strong lab-based courses and great teachers in college for turning his interest to medicine and science. After college, he went to medical school at the State University of New York. During an internship at Ohio State, Dr. Apicella became keenly interested in infectious disease. He decided to take a residency in infectious disease at Johns Hopkins, where he studied the T-cell responses in guinea pigs and human IgA immunoglobulin variation. After his fellowship, he was drafted into the US Air Force, during which time he was assigned to work on vaccines at a lab in San Antonio, TX. For his studies, he received a Pentagon award for his research on meningococcal disease. He then became a faculty member at SUNY, Buffalo, where he expanded his studies to include *Neisseria gonorrhoeae* and became interested in the role of LPS in pathogenicity of meningococcus and gonococcus. He was recruited to the University of Nevada, then back to Buffalo as Head of Infectious Diseases. Having great success in a leadership role and in his research, he was recruited to the University of Iowa to serve as Chair of the Department of Microbiology.

During his tenure at Iowa, Dr. Apicella recruited a large number of outstanding faculty, promoting all the subdisciplines of microbiology including bacteriology, parasitology, virology, and immunology. Under his leadership, the faculty achieved the highest funding level in the history of the Department. His seminal studies on *Neisseria meningitidis*, *Neisseria gonorrhea*, and *Haemophilus influenza* were critical for understanding how these microbes evade immunity and cause pathogenesis and for the development of bacterial vaccines. For his outstanding accomplishments, he was awarded the Research Career Development Award and the prestigious Merit Award from the NIH. He has 16 patents and over 250 publications in his career with an H-index of 85 and over 19,000 citations. While he retired in 2012, Dr. Apicella continues to keep his finger on the pulse of *Neisseria gonorrhea* research and has many recent publications through collaborations with others.

Dr. Apicella valued teaching at all levels and was particularly emphatic about maintaining strong lab classes to train students. He mentored numerous undergraduates, graduate students, and postdoctoral fellows, many of whom went on to successful scientific careers. He received the Graduate College Outstanding Mentor Award and the Carver College of Medicine Distinguished Mentor Award. Dr. Apicella continues to donate personal funds for graduate education at Iowa.



Dr. Apicella now lives with his wife, Agnes, in the wine country of Santa Rosa, CA, where their house was narrowly spared in the recent forest fires there. He enjoys time with his children and grandchildren. Being unable to sit still, Dr. Apicella has a variety of hobbies. Fitting with his desire to understand the intricacies of small things and his attention to detail, he repairs old pocket watches and has a collection of over 50. He also carves wood and has built, in exquisite detail, several miniature doll houses. (See accompanying photographs.)

Dr. Apicella frequently said that one of the smartest things he ever did was come to Iowa. Considering his productivity and success in research and his broad and positive impact on the Department, he clearly made the right choice.

ALUMNI FOCUS

Distinguished Alumnus John Cambier received his PhD from the University of Iowa Department of Microbiology in 1975, working in the lab of Dr. John Butler. He went on to have a distinguished career in research, service, teaching, and leadership. Dr. Cambier credits Dr. Butler for the critical role that he played in his scientific development and success.

John Cambier grew up in the neighboring state of Illinois, where he enjoyed hunting, fishing, and playing sports, particularly football. Indeed, his early years in college at Missouri State University were mainly spent playing sports on a scholarship, and he acknowledges very strong mentorship from Dr. Roar Irgens, at MSU, who nurtured his interest in microbiology. Dr. Irgens convinced him to go to graduate school at the University of Iowa in 1970. At Iowa, John first earned a Master's degree in virology working in Dr. Edward Meek's laboratory. During his first year he became fascinated by immunology, and, as a consequence, moved to Dr. Butler's lab to work towards a PhD on a project which involved defining the mucosal immune system of rodents. Dr. Butler's enthusiasm for immunology was inspirational, and for Dr. Cambier, there was no turning back. He was going to devote his life to immunology. Motivated by an interest in how immune system cells were instructed by their environment, e.g., antigen and cytokines, he sought a postdoc in the then-new field of transmembrane signal transduction. This took him to the laboratories of Drs. Jon Uhr and Ellen Vitetta at the University of Texas Southwestern Medical School, who were experts in studying lymphocyte receptors. Dr. Cambier's first faculty position was at Duke, where he started his independent research program continuing productive studies of B cell receptor structure and signaling in response to antigen.

After much success at Duke, Dr. Cambier was recruited to the University of Colorado School of Medicine and National Jewish in 1983, where, in 1987, he became the founding Chief of the Division of Basic Sciences in the National Jewish Department of Pediatrics. Later, in 1999, he became the founding Chair of the Integrated Department of Immunology, a joint effort of National Jewish and the University of Colorado. In 2014, this department moved physically to a new medical school campus and merged with the Microbiology Department, becoming the Department of Immunology and Microbiology, with John remaining its Chair. In 2016, Dr. Cambier was instrumental in starting and directing the University of Colorado Human Immunology and Immunotherapy Initiative. Throughout his leadership, Dr. Cambier recruited 39 new faculty, propelling immunology at the University of Colorado to national prominence.

Dr. Cambier's career-long research focus has been on understanding the structure and transmembrane signal transduction by the B lymphocyte antigen receptor and checkpoint receptors. His studies have contributed significantly to understanding receptor signaling and autoimmunity, and several of his research findings are being utilized in the development of therapies for autoimmunity. Dr. Cambier has authored over 230 peer-reviewed publications and over 100 reviews. He has served on NIH study sections and editorial boards continuously through his long career and has received numerous honors and awards, including the University of Iowa Distinguished Alumni Award and Distinguished Fellow of the American Association of Immunologists. He has cofounded three companies and is Editor-in -Chief of Immunological Reviews. Dr. Cambier, now Distinguished Professor Emeritus, lives with his wife, Sara, in Denver.

Department of Microbiology and Immunology Emeritus Faculty

Lee-Ann Allen, PhD	Michael Feiss, PhD	George Stauffer, PhD
Michael Apicella, MD	Louis Hoffman, ScD	Mark Stinski, PhD
John Butler, PhD	William Johnson, PhD	Marty Stoltzfus, PhD
Steven Clegg, PhD	Linda McCarter, PhD	
Charles Cox, PhD	Donald Stahly, PhD	

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Please let us know any status updates, career achievements, or other news!

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