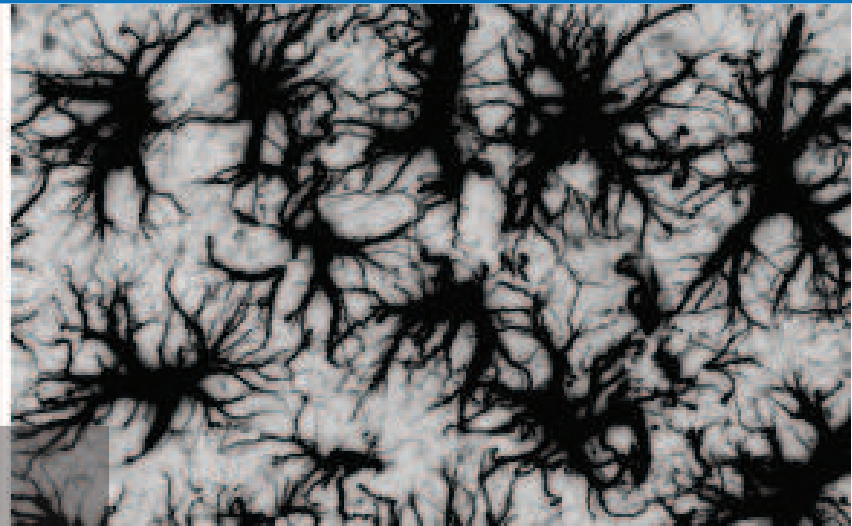
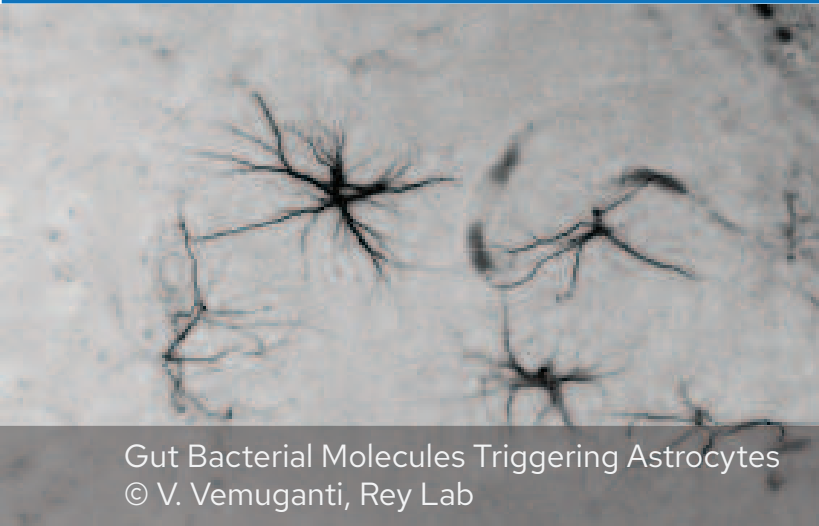


MMI NEWS



FALL 2025



Gut Bacterial Molecules Triggering Astrocytes
© V. Vemuganti, Rey Lab

As we begin this new school year, we're thrilled to share some fantastic highlights from our current faculty, researchers, and trainees.

The cover image of this newsletter is provided by graduate student, Vaibhav Vemuganti from the Federico Rey lab. These two images show a reaction from cells within our brains called Astrocytes. These cells normally have small, slender projections that contact neurons and blood vessels, tightly maintaining brain health. However, when they are exposed to a molecule produced by specific gut-bacteria, they enlarge and rapidly destroy neighboring regions within the brain. A response of this scale is usually only found in traumatic brain injuries and stroke. A gut bacterial compound triggering a response independent of injuries or stroke is unprecedented. Work in the Rey lab identifying this molecule as a potential early life risk factor of Alzheimer's disease and related dementias, provides a unique mechanistic outlook that positions gut bacteria as determinants of disease fate.

This is just one example of exceptional work being done in our department. Our achievements and ongoing contributions continue to inspire and shape our community, and we are proud to showcase the work of our researchers in this issue of our newsletter.

Vanessa Sperandio, Department Chair

IN THIS ISSUE:

Dr. Margaret Alexander Receives
Shaw Early Career Award

Dr. Nancy Keller Named 2024
Highly Ranked Scholar by
ScholarGPS

Dr. Mark Mandel Receives
Collaborative NSF Award

Highlights from the 2025
Perlman Symposium

Dr. Jenny Gumperz Lab
Awarded UWCCC Grant

Dr. Anna Huttenlocher Named
2026 SLB Keynote Award

Meet Our Researchers: Dr. Jing
Fan & Dr. Gustavo Caballero-
Flores



Department of Medical
Microbiology and Immunology
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

DR. MARGARET ALEXANDER RECEIVES SHAW EARLY CAREER AWARD

Written by Allison Bauer, Dept. of Medical Microbiology & Immunology

The Department of Medical Microbiology & Immunology and the University of Wisconsin-Madison is pleased to announce that Dr. Margaret Alexander has been selected as the recipient of the Shaw Early Career Research Award. Sponsored by the Greater Milwaukee Foundation (GMF), this prestigious award provides \$200,000 over two years to support early career researchers in the fields of Biochemistry, Biological Sciences, and Cancer research.



Dr. Margaret Alexander

The Shaw Early Career Research Award replaces the Shaw Scientist Program, which had been on hiatus for several years. Unlike its predecessor, the new award program is administered directly by UW-Madison, which has been delegated decision-making authority by GMF. The award is open to full-time, tenure-track assistant professors within three years of their appointment, with each department allowed to nominate one candidate annually. The funding aims to support innovative and high-impact research at a critical stage in a scientist's career.

Dr. Alexander's research focuses on answering a key question for patients suffering from autoimmune diseases: "Is there a diet that will improve my disease?" Due to the intricate relationships between diet, genetics, microbiota, and immune responses, there remains significant uncertainty as to why certain diets benefit some individuals but not others. The Shaw Early Career Research Award will allow Dr. Alexander and her lab to investigate these complex interactions in greater depth, with the ultimate goal of improving patient outcomes.

Her lab's research will utilize genetically diverse mice to explore how genetic variation influences dietary response, particularly in the context of the ketogenic diet. By studying the effects of diet on gut microbes and immune cells, the team hopes to uncover new insights into how diet influences autoimmune diseases such as multiple sclerosis. Additionally, her research will venture into an exciting new area by examining how

diet impacts interactions between three biological kingdoms—animalia, bacteria, and protozoa—particularly in relation to infection by the parasite *Cryptosporidium*.

Dr. Alexander emphasizes that the award provides invaluable support for pursuing high-risk, high-reward projects that may otherwise be difficult to fund through traditional sources. "This support comes at a critical time for us as a lab and for scientific research across the U.S., where traditional funding sources are in jeopardy," she explains. The award gives her team the freedom to explore novel research avenues that have the potential to reshape our understanding of diet, microbiota, and immune interactions.

Looking ahead, Dr. Alexander's long-term goal is to unravel the mechanisms by which diet shapes immune responses during autoimmunity and infection. Her research aims to identify host and microbial genes that mediate dietary effects on immunity, with the potential to improve therapies through bioactive dietary compounds, microbial-derived immunomodulatory factors, and targeted host pathways. She is also eager to expand her research to new areas, including the influence of diet-host-microbiota-immune interactions on the effectiveness of autoimmune therapeutics and infection responses.

The University of Wisconsin-Madison congratulates Dr. Margaret Alexander on this well-deserved recognition and looks forward to the groundbreaking discoveries that her research will bring.

DR. NANCY KELLER NAMED 2024 HIGHLY RANKED SCHOLAR BY SCHOLARGPS

Written by Allison Bauer, Dept. of Medical Microbiology & Immunology

The Department of Medical Microbiology & Immunology is proud to announce that Dr. Nancy Keller has been recognized as a 2024 Highly Ranked Scholar by ScholarGPS, a prestigious honor that celebrates outstanding academic contributions across the globe.

Dr. Keller was ranked in the top 0.05% of all scholars worldwide, a distinction that highlights her prolific publication record, the exceptional impact of her research, and her sustained excellence in the field of microbiology and related disciplines.

Among her notable rankings:

#2 in the world in both Gene Cluster and Fungus research

#7 in Secondary Metabolite

#11 in Fungus (lifetime)

#21 in Microbiology (last 5 years)

#42 in Metabolism (last 5 years)

#124 in Microbiology (lifetime)

#4,565 Overall (All Fields) over the past five years

These rankings reflect both her lifetime achievements and her continued influence over the past five years in the life sciences.

ScholarGPS rankings are based on objective metrics including publication volume, citation impact, and h-index, covering more than 30 million scholars globally. Dr. Keller's recognition stands as a testament to her leadership in microbiological research and her far-reaching contributions to the scientific community.

Congratulations to Dr. Keller on this well-deserved honor!



Dr. Nancy Keller

DR. MARK MANDEL RECEIVES COLLABORATIVE NSF AWARD

Dr. Mark Mandel received a collaborative National Science Foundation award with Jason Peters (UW-Madison, Pharmacy) and Julia van Kessel (Indiana University).

The purpose of the award is to develop CRISPR technologies first in *Vibrio* bacteria and then adapt those broadly.

The U.S. National Science Foundation is an independent federal agency that supports science and engineering in all 50 states and U.S. territories.

CELEBRATING INNOVATION IN ANTIBIOTIC RESEARCH: HIGHLIGHTS FROM THE 2025 PERLMAN SYMPOSIUM

Written by Allison Bauer, Dept. of Medical Microbiology & Immunology

On April 25, 2025, the Department of Medical Microbiology and Immunology (MMI) at the University of Wisconsin–Madison welcomed students, trainees, and researchers from across the country to the 15th annual Perlman Symposium on Antibiotic Discovery and Development. Held in Ebling Auditorium at the Medical Sciences Building, this year's event brought together scientific minds from more than 20 institutions, continuing the tradition of excellence and collaboration in antibiotic research. We were thrilled to see a record number of attendees this year—marking a 10% increase from last year's record high.

The symposium honors the legacy of Dr. David Perlman, a pioneering microbial biochemist and UW–Madison alumnus, and is made possible by a generous gift from his wife, Kato Perlman. David earned his bachelor's, master's, and doctoral degrees from UW–Madison and made significant contributions to the fields of antibiotics and vitamin B-12 during his time at the Squibb Institute for Medical Research and later as dean of the UW–Madison School of Pharmacy.

Kato Perlman, originally from Budapest, Hungary, holds a PhD in organic chemistry and worked in both industry and academia, including a role at Princeton University. She met David Perlman shortly after arriving in the US, and the two moved to Madison together in 1968.

This year's symposium featured four outstanding keynote speakers, who shared cutting-edge insights into antibiotic discovery, microbial communities, and host-pathogen interactions:

Dr. Andrew Goodman, Yale University

Dr. Alexander Horswill, Univ. of Colorado



Due to a large number of submissions, our poster competition is divided into two sessions.



Speakers from 4 different universities were featured at this year's event.



Poster submissions are judged by an anonymous panel and the top 3 posters receive an award.

Continued on next page

Dr. Manuela Raffatellu, UC-San Diego

Dr. Andrew Mehle, UW-Madison

A highlight of the symposium is always the poster session, and 2025 was no exception. The event showcased an impressive array of scientific research from emerging scholars, culminating in awards for excellence in presentation. We're pleased to recognize this year's winners:

Best Lightning Talk: Kate Stack

First Place: Huiwen Wang

Second Place: Mira Syahfrien Amir Rawa

Third Place: Angel J. Hernandez Viera

The success of the Perlman Symposium would not be possible without the dedicated efforts of several key individuals. Special thanks go to Vanessa Sperandio, MMI Department Chair; Allison Bauer, MMI Communications Manager; and John Lawler, MMI Department Administrator, for their leadership and coordination.

As we celebrate 15 years of the Perlman Symposium, we continue to honor the spirit of discovery and collaboration that defines this event. In the face of growing antibiotic resistance, the symposium stands as a beacon for future breakthroughs and a testament to the enduring impact of scientific community.

DR. JENNY GUMPERZ LAB AWARDED UWCCC GRANT TO ADVANCE LEUKEMIA IMMUNOTHERAPY



Dr. Jenny Gumperz

The University of Wisconsin Carbone Cancer Center has awarded a "More for Stage IV Mary Gooze Clinical Trial and Translation Award" to the collaborative team of Dr. Jenny Gumperz from the Department of Medical Microbiology & Immunology and Dr. Hongtao Liu from the Division of Hematology. This prestigious grant will fund a pilot clinical trial testing an innovative iNKT cell-based cellular immunotherapy developed by MiNK Therapeutics. The trial will focus on patients who have undergone hematopoietic stem cell transplantation as treatment for leukemias and other blood cancers.

In addition to supporting the clinical trial, the award will advance fundamental research into the mechanisms by which invariant natural killer T (iNKT) cells combat leukemia, a core focus of the Gumperz Lab.

The UW Carbone Cancer Center's mission centers on accelerating cancer research and treatment across six integrated scientific programs, spanning basic science, clinical trials, population health, and advanced training. With strong partnerships throughout the state, the Center is committed to ensuring patients across the region benefit from the latest scientific advances.

ANNOUNCING THE 2026 SLB LEGACY KEYNOTE AWARD WINNER: DR. ANNA HUTTENLOCHER

The Society for Leukocyte Biology is proud to announce that Dr. Anna Huttenlocher has been named the recipient of the 2026 SLB Legacy Keynote Lecture Award—the society’s highest honor. Presented annually since 1980, this prestigious award recognizes excellence in leukocyte biology research and celebrates individuals whose work has made a lasting impact on the field.

Dr. Huttenlocher is a pioneer in the study of cell migration, a critical process underlying inflammation, immune response, and cancer metastasis. Her lab’s work focuses on unraveling the molecular mechanisms that guide how leukocytes move toward sites of injury or infection—an essential component of immune function. These insights not only deepen our understanding of fundamental cellular behavior but also offer promising paths for developing new therapies for diseases like cancer, asthma, arthritis, and cardiovascular conditions.

As the 2026 Legacy Awardee, Dr. Huttenlocher will deliver the Legacy Keynote Lecture at the SLB Annual Meeting. She will also contribute a Legacy Award Review article to the Journal of Leukocyte Biology and share her perspectives in the SLB newsletter. In addition to complimentary registration, travel, and accommodation for the meeting, she will receive a \$1,000 stipend in recognition of her contributions.

Please join us in celebrating Dr. Huttenlocher’s remarkable achievements and her enduring legacy in leukocyte biology.



MEET OUR RESEARCHERS: DR. JING FAN

Hometown: Beijing, China

Zodiac Sign: Aquarius

Research Overview:

The overarching interest of Fan's research is to investigate how mammalian cellular metabolism is dynamically reprogrammed during physiological transitions and in pathological conditions, and how such reprogramming of metabolism in turn affects cell function and fate. To pursue this, they combine systematic approaches, especially metabolomics, lipidomics and fluxomics, with targeted biochemical and genetic techniques. Currently, Fan's lab focuses on two main areas: (1) understanding the dynamic metabolic reprogramming in immune cells, especially macrophages and neutrophils, during immune response; and (2) understanding how specific conditions in the tumor microenvironment impact the metabolism and behavior of immune cells and cancer cells.

What inspired you to select your field of study?

I got into metabolism in grad school, had a great time, and enjoyed staying in the field ever since. Metabolism is so dynamic, complex, and fundamental, lots of opportunities to make discoveries in different contexts.

What is one piece of advice you would give to students?

Be kind to yourself, be kind to others. Enjoy the experience of being a scientist and a student, the experience full of excitement, curiosity, stress, challenges, and fulfillment.

When you're not in the lab, how do you spend your time?

Gardening, cooking, spending time with the kids, and playing Civilization

If you didn't become a scientist, what career would you have pursued?

Perhaps historian



If you could have any superpower, what would it be?

Healing power.

If you had a time machine, would you go back in time or into the future?

Go back!

MEET OUR RESEARCHERS: DR. GUSTAVO CABALLERO-FLORES

Hometown: Uruapan, Michoacan, Mexico

Zodiac Sign: Sagittarius

Research Overview:

Using mouse models that mimic human intestinal infection, our research investigates the virulence factors and metabolic adaptations allowing bacterial pathogens to colonize and thrive in the gut during distinct infection stages. In parallel, we are also investigating how host-associated factors –such as gut microbiota composition, immune responses, age, and genetic background– influence pathogen colonization, persistence and/or clearance during infection. Our ultimate goal is to elucidate host-pathogen interactions contributing to differential disease severity and clinical outcome among individuals, toward a better understanding and treatment of infectious diarrhea.

What inspired you to select your field of study?

Since my very first biology classes until now, I have always been intrigued by the microscopic organisms present in our body, and all around us, and how we interact with them every day without even realizing it. This curiosity has greatly inspired and shaped my academic and research paths.

What is one piece of advice you would give to students?

To keep an open mind about their results, especially when they do not support the original hypothesis. Sometimes, unexpected outcomes lead to even more interesting research questions.

When you're not in the lab, how do you spend your time?

When I am not in the lab and you need to find me, just go to a popular kid's attraction in town like the children's museum, zoo, water park, movie theater, arcade etc. You'll find me there!



What is the best meal you've ever had?

Apart from Mexican food that is my favorite, seafood in Seville, Spain was just amazing!

You have to sing karaoke, what song do you pick?

In Spanish: 'Camino de Michoacán', a Mexican song dedicated to my home state.

In English: 'Just breath' by Pearl Jam; or 'Sleep on the floor' by the Lumineers.

Have you ever completed anything on your "bucket list"? If so, what was it?

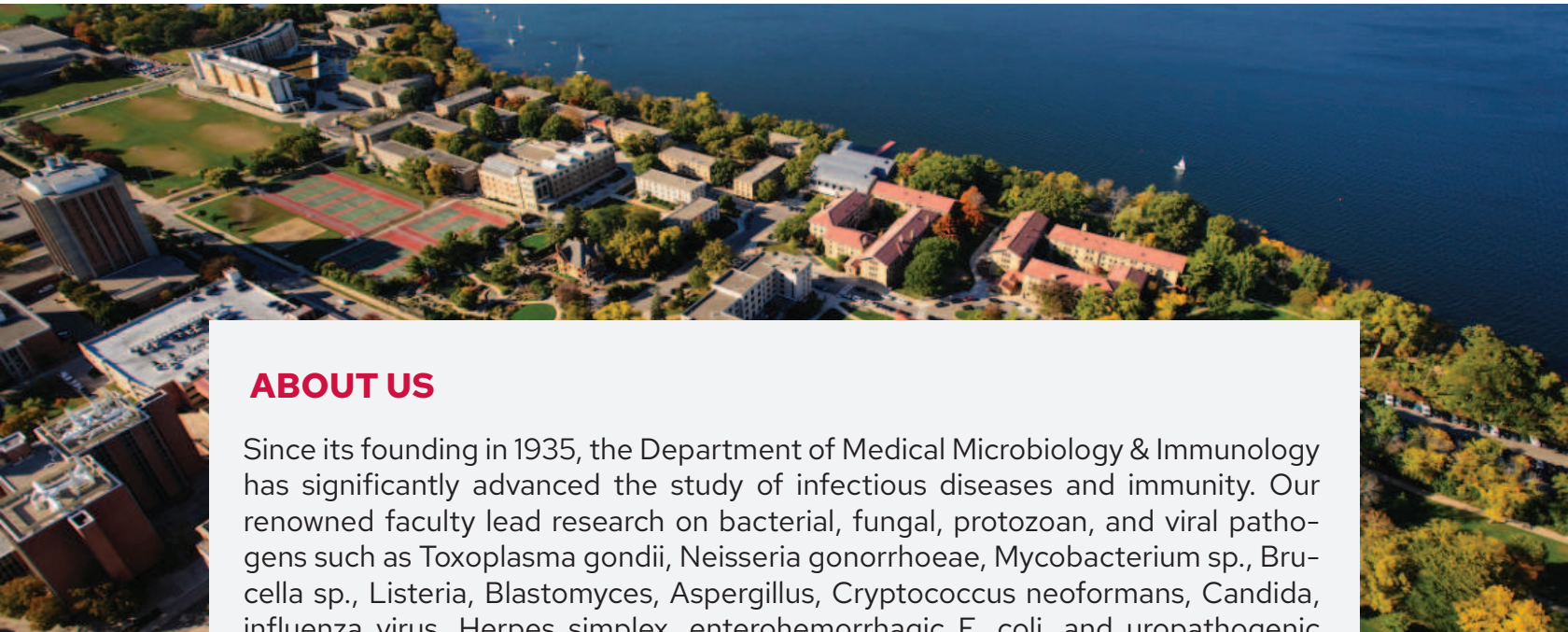
Living in a different country, learning a new language, visiting Europe and Japan. Some pending ones: visiting the Patagonia, Iceland and New Zealand, trying scuba diving and skydiving for the first time, and the list continues...

What is the last TV show that you binge-watched?

'Division Palermo' an Argentinian dark comedy about inclusion. It is an entertaining show that also encourages critical thought and meaningful discussions about this complex and highly important topic.

If you could have any superpower, what would it be?

Teleportation, for sure! I can imagine having breakfast in Mexico, dinner in Paris, watching the sunrise on a mountain, and catching the sunset at the beach –all in one weekend!



ABOUT US

Since its founding in 1935, the Department of Medical Microbiology & Immunology has significantly advanced the study of infectious diseases and immunity. Our renowned faculty lead research on bacterial, fungal, protozoan, and viral pathogens such as *Toxoplasma gondii*, *Neisseria gonorrhoeae*, *Mycobacterium* sp., *Brucella* sp., *Listeria*, *Blastomyces*, *Aspergillus*, *Cryptococcus neoformans*, *Candida*, influenza virus, Herpes simplex, enterohemorrhagic *E. coli*, and uropathogenic *Escherichia coli*. They also explore immunological topics including regulatory T cell biology, leukocyte migration and vaccine development. Additionally, the department study the roles of diet, the immune system and the gut-brain-axis in the intestinal microbiome.

We offer undergraduates rigorous coursework and research opportunities, and our nationally acclaimed Microbiology Doctoral Training Program allows graduate students to earn a Ph.D.

Microbial Sciences Building
1550 Linden Drive
Madison, WI 53706

www.mmi.wisc.edu

FOLLOW US ON SOCIALS

@UWMADISON_MMI



UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH