CORNELL INSTITUTE OF HOST-MICROBE INTERACTIONS AND DISEASE

Administrative Report

Spring 2021

The Cornell Institute of Host-Microbe Interactions and Disease (CIHMID) has a mission to unite researchers studying all elements of interaction between bacteria, fungi, viruses, and their plant and animal hosts. Research emphases include pursuit of fundamental biological understanding, applied veterinary science, applied agricultural science, and more. The research outputs are diverse but CIHMID is conceptually unified by the theme that host-microbe interactions are governed by common principles that span systems. CIHMID is devoted to building community, providing training at all levels, and supporting innovative research in host-microbe biology.

CIHMID was launched in January 2017 under funding from Cornell's Office of the Provost and College of Agriculture and Life Sciences. Since then, CIHMID has grown to include research programs of more than 55 faculty campus-wide, representing seven colleges and administrative units across the breadth of life sciences at Cornell.

The CIHMID administrative offices are in 304 Rice Hall on the Cornell University main campus. Information about CIHMID activities and events is described on our website (www.cihmid.cornell.edu) and distributed through an open-subscription email list (CIHMID-L@cornell.edu). CIHMID can be reached by email at CIHMID@cornell.edu.

Cornell University

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Organizational Structure

Director: Brian Lazzaro (*Liberty Hyde Bailey Professor of Entomology and Ecology & Evolutionary Biology, College of Agriculture and Life Sciences*)

Executive Committee:

Avery August (*Professor of Immunology, Vice Provost for Academic Affairs, College of Veterinary Medicine*)

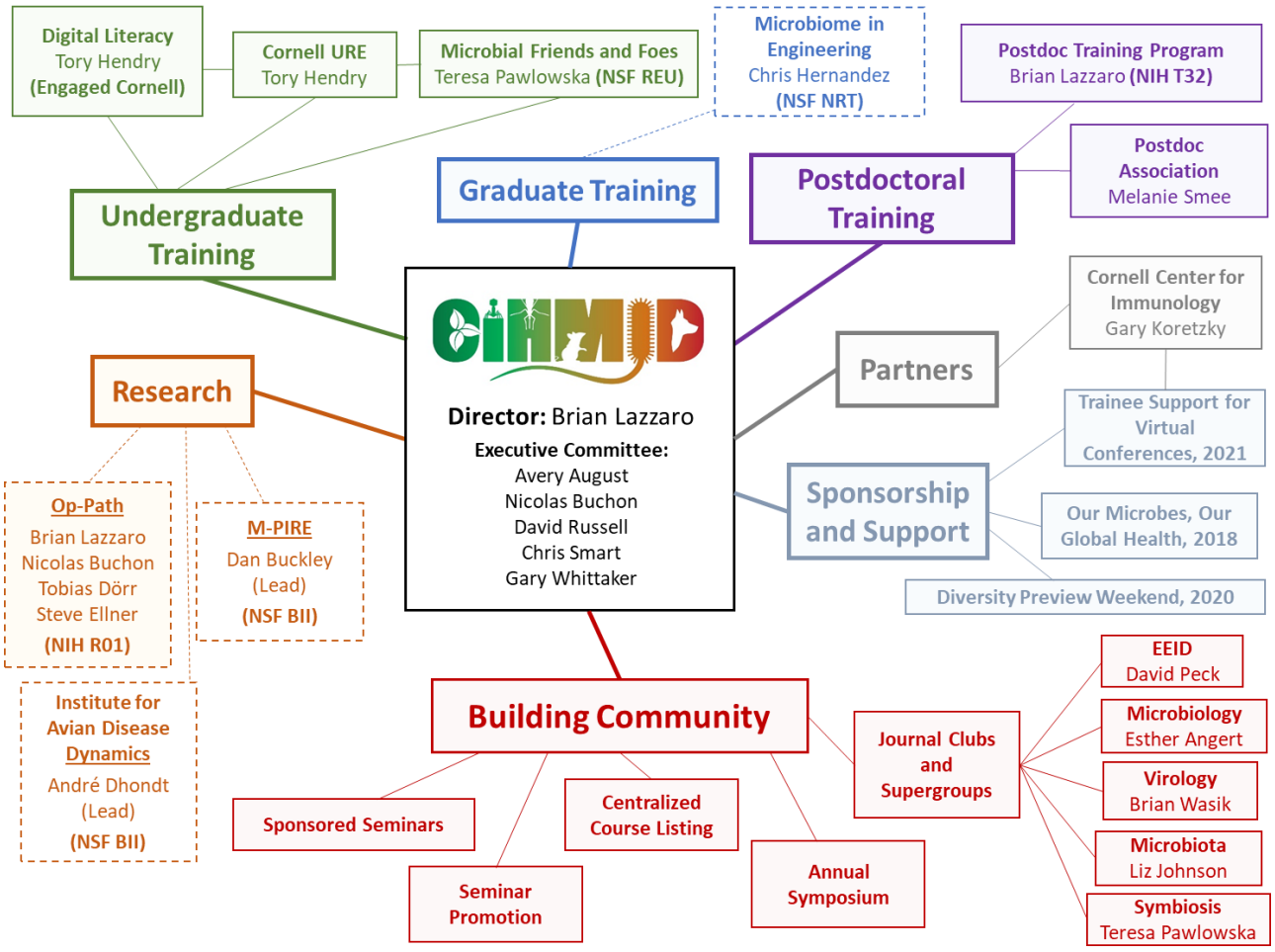
Nicolas Buchon (*Associate Professor of Entomology, College of Agriculture and Life Sciences*)

David Russell (*William Kaplan Professor of Infection Biology, College of Veterinary Medicine*)

Christine Smart (*Professor and Director, School of Integrative Plant Science, College of Agriculture and Life Sciences*)

Gary Whittaker (*Professor of Virology, College of Veterinary Medicine*)

CIHMID activities include training programs, journal clubs, and research enterprises, all of which are led by members of our community. These enterprises are described in detail on the following pages and are summarized on the organizational chart below. Solid connector lines on the chart indicate active programs and dashed lines to unshaded boxes indicate planned programs for which extramural grant applications have been submitted. Funding agencies from which grants have been obtained or applied for are indicated in parentheses.



Memberships

CIHMID is presently composed of 56 research groups drawn from the College of Agriculture and Life Sciences (CALS; 29 faculty), College of Veterinary Medicine (CVM; 15 faculty), College of Arts and Sciences (CAS; 3 faculty), and College of Engineering (CoE; 2 faculty), as well as the Center for Advanced Computing (CAC; 1 faculty), Boyce Thompson Institute (BTI; 5 faculty), and US Department of Agriculture (USDA; 1 faculty).

Faculty Membership

Hector Aguilar-Carreno (CVM)
Esther Angert (CALS)
Avery August (CVM)
Gary Blissard (BTI)
Adam Bogdanove (CALS)
Ilana Brito (CoE)
Nicolas Buchon (CALS)
Daniel Buckley (CALS)
Clare Casteel (CALS)
Pamela Chang (CVM)
Yung-Fu Chang (CVM)
Andrew Clark (CAS)
André Dhondt (CALS)
Tobias Dörr (CALS)
Gerald Duhamel (CVM)
Stephen Ellner (CAS)
Heather Feaga (CALS)
Megan Greischar (CALS)
Ann Hajek (CALS)
Laura Harrington (CALS)
Maria Harrison (BTI)
Michelle Heck (USDA)
John Helmann (CALS)
Tory Hendry (CALS)
Christopher Hernandez (CoE)
Elizabeth Johnson (CALS)
Jenny Kao-Kniffin (CALS)
Daniel Klessig (BTI)
Brian Lazzaro (CALS)
Cynthia Leifer (CVM)
Gregory Martin (BTI)
Scott McArt (CALS)
Philipp Messer (CALS)
Andrew Moeller (CALS)
Corrie Moreau (CALS)
Courtney Murdock (CALS)
Chris Myers (CAC)
Rebecca Nelson (CALS)
John Parker (CVM)
Colin Parrish (CVM)
Teresa Pawlowska (CALS)
Joseph Peters (CALS)
Angela Poole (CALS)
Brian Rudd (CVM)
David Russell (CVM)
Luis Schang (CVM)
Frank Schroeder (BTI)
Krysten Schuler (CVM)
Christine Smart (CALS)
Jeongmin Song (CVM)
B. Gillian Turgeon (CALS)
Brian VanderVen (CVM)
Maren Vitousek (CALS)
Gary Whittaker (CVM)
Xiangtao XU (CALS)
Kelly Zamudio (CAS)

Commitment to Diversity, Equity and Inclusion

CIHMID is committed to increasing diversity, equity and inclusion in the science of host-microbe biology. This includes diverse representation in events we organize, as well as in leadership and training roles within CIHMID. We strive for a welcoming community for all, regardless of race, color, culture, ethnicity, age, national origin, sex, sexual orientation, gender identity, difference in ability, or other status, and we actively create and promote accessible opportunities for individuals whose backgrounds are underrepresented in scientific research. This includes emphasis on diverse representation in our symposia and seminars and active recruitment of undergraduate students, graduate students, and postdoctoral researchers from underrepresented backgrounds into our training programs. These initiatives are described in more detail below. Academic institutions, scientific inquiry, and society as a whole all benefit from the integration of diverse experiences and perspectives. Our community of researchers should be as diverse and varied as the biological systems we study.

Undergraduate Research Opportunities

CIHMID enables research opportunities for both Cornell and non-Cornell undergraduate students through a pair of linked programs. The CIHMID Undergraduate Research Experience (URE) matches Cornell students with CIHMID research labs in an academic-year cohort. Approximately half of the URE students are supported to remain on campus over the following summer for full-time research. Microbial Friends and Foes (MFF) is an NSF-funded Research Experiences for Undergraduates (REU) program that brings non-Cornell students to campus for a summer research experience in a CIHMID host lab. The URE and MFF programs operate in concert during the summer, building a combined cohort that participates in joint professional and research development activities.

URE and MFF students presenting their research during the 2019 CIHMID Summer Symposium

CIHMID Undergraduate Research Experience (URE)

Dr. Tory Hendry

Directed by Assistant Professor Tory Hendry (CALS, Department of Microbiology), the CIHMID URE provides students with direct research experience in a CIHMID lab, as well as with guided training in professional development, research conduct, and preparation for a career in research. Cornell undergraduates apply to the program during spring semesters, with preferential admission given to sophomores and juniors. No prior research experience is required for admission into the program. Dr. Hendry identifies CIHMID laboratories that match the research interests of each accepted student and facilitates student placement. During the academic year, students perform independent research under the guidance of a CIHMID faculty member and graduate students or postdocs in that faculty member's research group. Students typically earn academic credit for research during the academic year although wage options are possible. Additionally, all participants in the URE program enroll in a one-credit course "Professional Skills for Host-Microbe Interactions Research" (BioMI 3990) instructed by Dr. Hendry. The academic year experience culminates with interested students writing a research proposal for full-time summer research. The students work with their mentors and Dr. Hendry to craft their proposals, and those who continue in the summer program receive wages for working full-time in their host labs to execute the project they proposed. CIHMID Summer URE students continue with professional development training jointly with students in the Microbial Friends and Foes program and present their research at the CIHMID Summer Symposium.

AY 2017-18

- 31 applications, 18 accepted for academic year research (6 men, 12 women)
- demographic information not collected
- 10 students continued for summer research (5 men, 5 women)
- Of the summer research students, all 10 continued in positions related to science or health after graduation; 5 are known to be currently enrolled in or been accepted to graduate or medical school

AY 2018-19

- 34 applications, 15 accepted for academic year research (5 men, 10 women)
- 7 participants were first-generation college or identify with an underrepresented background
- 9 students continued for summer research (3 men, 6 women)
- 7 students from this cohort have graduated: 2 are in graduate or medical school, 3 are in research-related positions, outcomes for 2 are unknown

AY 2019-20

- 35 applications, 15 accepted for academic year research (8 men, 7 women)
- college enrollments: 7 CAS, 5 CALS, 2 Human Ecology, 1 unknown
- 6 participants were first-generation college or identify with an underrepresented background
- 12 students (6 men, 6 women) were accepted to continue for summer research but the formal summer program was cancelled due to the COVID-19 pandemic; nevertheless 3 students were supported to remain on campus and participate in COVID-related research

AY 2020-21

- 41 applications, 20 accepted for academic year research (3 men, 17 women)
- college enrollments: 9 CAS, 10 CALS, 1 Human Ecology
- 10 participants were first-generation college or identify with an underrepresented background
- 12 students were accepted to continue for summer research (3 men, 9 women)

Microbial Friends and Foes, NSF-funded REU (MFF)

Dr. Teresa Pawlowska

The Microbial Friends and Foes (MFF) program is an NSF-funded Research Experiences for Undergraduate program ($465,113; 2019-2022), directed by Associate Professor Teresa Pawlowska (CALS, School of Integrative Plant Science). The MFF program is aimed at increasing the participation of students from backgrounds that are underrepresented in science, with targeted recruitment of students who may not otherwise have access to robust research opportunities. MFF students are recruited nationally to come to Cornell for a 10-week immersive summer experience and conduct independent research in CIHMID labs under the guidance of CIHMID faculty, graduate students and postdocs. MFF projects span all aspects of host-microbe biology from cell biology and molecular genetic interactions to ecology, evolution and epidemiology. Through the MFF program, the students gain direct experience with research techniques, data analysis, interpretation of results, and research presentation. At the end of the program, the MFF students present their research at the CIHMID Summer Symposium. The MFF students reside together on campus and establish a strong cohort identity. The MFF program is integrated with the CIHMID URE summer program for a series of professional development activities that establish the foundation for careers in science, including training in the conduct of research, exposure to the range of possible careers in science, and preparation for application to graduate school and entry into the academic and biotechnology workforce. The current program is a

reincarnation of a previous program that had been funded by NSF from 2014 to 2016. Microbial Friends and Foes has become wildly popular and now attracts approximately 400 applications for 12 funded slots every year.

2019

- 113 applications, 12 students admitted (2 men, 9 women, 1 non-binary)
- 10 participants first-generation college or identify with an underrepresented background

2020

- 388 applications, 12 students admitted
- COVID-19 pandemic forced cancellation of the summer 2020 program

2021

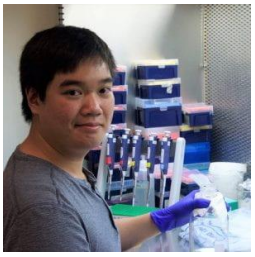
- 325 applications, 11 students accepted (3 men, 8 women)
- 11 participants first-generation college or identify with an underrepresented background
- program will be virtual in summer 2021

2019 Microbial Friends and Foes cohort

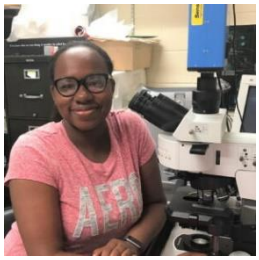
Culturing Digital Scientific Literacy Around Host-Microbe Interactions

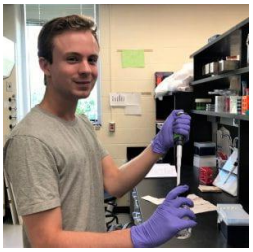
In 2019, the CIHMID URE program was awarded a $40,000 grant from Engaged Cornell to support public education in digital scientific literacy. Through a supplemental program called "Culturing Digital Scientific Literacy Around Host-Microbe Interactions" (PI: Hendry; 2019-2021, extended through 2022 due to the COVID-19 pandemic), a subset of the URE students receive training in the evaluation and curation of online scientific resources related to host-microbe interactions. Emphasis is placed on the Wikipedia platform, and on scientific content related to topics that have real-world resonance such as vaccination, use of probiotics, and emerging infectious diseases. In a layered mentoring strategy, the URE students impart their learned skills to regional high school students and their teachers, culminating in Wikipedia Edit-A-Thons wherein the high school students tackle curation of relevant Wikipedia entries that are inaccurate or deficient in content. This program has extended impact as the URE students and high school students retain the capacity to continue editing online resources well after the program ends, and the high school teachers gain the experience and proficiency to continue the exercise with subsequent classes even after Cornell students are no longer involved.

Testimonials



"The CIHMID program was great, especially in pushing me more towards an MD/PhD career…I don't think I had really seen the potential in looking at the interface of host and microbe until I saw examples from CIHMID. I think the strength of the program was exposing me to fields I would not have sought out on my own." – Srinand Paruthiyil, 2017, accepted into M.D./Ph.D. program at Washington University

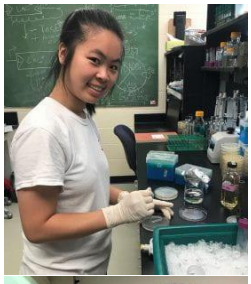


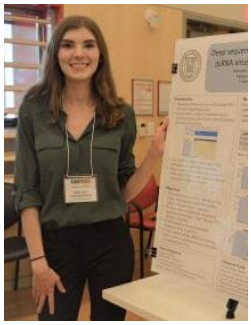
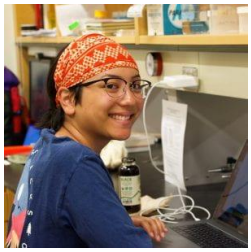


"The CIHMID URE program was absolutely helpful in pursuing my career goals! I think that most PIs and advisors know a lot about the grad school and funding app processes, but students who are new to the system don't always know the right questions to ask. A big strength of the CIHMID URE program is that it shares all of this information with us without waiting for students to ask the right questions." – Mercedes Lewandrowski, 2018, currently Ph.D. student in Virology at Harvard University

"CIHMID and Dr. Hendry gave me a community of likeminded peers to connect with and an opportunity, not only to work in a lab, but to learn how to be a researcher. How to write, how to present, how to take notes, and how to design and perform experiments. From writing my proposal, to designing and conducting experiments, to presenting my research at a poster presentation - all of those experiences were important for my growth and interest in grad school. I got a taste of how to be a successful scientist and I honestly enjoyed it." – John Tawil, 2017 cohort, accepted into Ph.D. program at Pennsylvania State University

"The CIHMID URE program was a vital point in my path that has led me to where I am today. Without this program, I wouldn't have had the chance to spend the summer diving deeper into the fascinating world of genetics while learning about the amazing research being done by my peers. I look back fondly at all of the activities I did during that summer through this program, and I wouldn't trade it for the world." – Miranda Martinez, 2017 cohort, currently a clinical research coordinator at Park South Medical in Brooklyn, NY



Graduate Training: Utilizing the Microbiome in Bioengineering

Dr. Chris Hernandez

A new training program proposed by Professor Christopher Hernandez (CoE, Department of Biomedical Engineering) would establish convergence research by graduate students in engineering and in microbiome science. Trainees in this program would develop skills to address major challenges in translating the composition and function of microbial communities into biomedical and agricultural application. This training program would provide integrative coursework and research experience for approximately 60 Masters and Ph.D. students in microbiological disciplines and engineering. These otherwise distinct student communities would each be introduced to the fundamental concepts and research approaches of the other, culminating in fundamental and applied collaborative projects. The proposed training program would emphasize participation by members of groups who are currently underrepresented in engineering and microbiome science, and would include targeted outreach activities in addition to the research training. An application to the National Science Foundation for support for this program is under review via the NSF Research Training mechanism ($3,000,000 requested for 2021-2026).

Postdoctoral Training (NIH funded)

The CIHMID postdoctoral training program offers fully-funded, 3-year fellowships for postdoctoral scholars to develop independent research programs in host-microbe biology at Cornell, under support from a National Institutes of Health T32 training grant (PI: Lazzaro; $1,822,691 for 2020-2025). CIHMID postdocs have intellectual ownership of their projects and work in collaboration with two or more research groups at Cornell. The postdoctoral fellows are encouraged use their support, which includes an annual discretionary spending allowance, to build bridges across different disciplines of study. An explicit goal of the program is to support a diverse portfolio of research projects in varied systems. Thus, postdoctoral trainees may study host-microbe interactions that are pathogenic or beneficial, between animal or plant hosts and microbial partners that may be bacterial, viral or fungal. A major objective of the training program is to help the trainees obtain career appointments in scientific research and to be successful in those appointments. To that end, the training program incorporates structured mentoring as well as a variety of workshops and professional development activities. Professional development topics include leadership and mentoring, the practical realities of running a lab, enhancing diversity, equity and inclusion in science, preparation of job application materials, and development of interview skills for positions in academia, government, and industry.

The CIHMID postdoctoral training program is directed by Professor Brian Lazzaro (CALS, Departments of Entomology and Ecology & Evolutionary Biology, Director of CIHMID) and is administered by an Executive Committee that consists of Professor Maria Harrison (Boyce Thompson Institute), Associate Professor John Parker (CVM, Baker Institute for Animal Health), and Professor Luis Schang (CVM, Baker Institute for Animal Health).

CIHMID Postdoctoral Fellows

Dr. Jon Sanders (2018 – present)
Dr. Sanders tests hypotheses about adaptation and the evolution of host specificity in animal gut microbiomes. His research combines long-read metagenomics with high-throughput microbial cultivation, integrating information from thousands of bacteria mapped onto as host phylogeny. Dr. Sanders collaborates with Profs. Andrew Moeller (CALS, Ecology and Evolutionary Biology) and Ilana Brito (CoE, Biomedical Engineering).

Dr. Jingjing Fu (2019 – 2021)
Dr. Fu's CIHMID postdoctoral project was to determine how small-molecule metabolites produced by the microbes in the gut impact development of the host immune system, using approaches such as metabolomic profiling and genetic manipulation of host and microbiota. Dr. Fu is currently a research scientist at Q^2 Solutions in Ithaca, NY. In CIHMID, Dr. Fu collaborated with Prof. Pamela Chang (CVM, Microbiology and Immunology).

Dr. Gabrielle Lê-Bury (2019 – present)
Dr Lê-Bury is working to determine how HIV infection impairs human lung immunity. She uses single cell RNA-sequencing to analyze the transcriptomes of host macrophages from HIV-1 infected individuals undergoing antiretroviral therapy to understand the role of alveolar macrophages as a haven for persistent, treatment-refractory HIV infection. Dr. Lê-Bury collaborates with Prof. David Russell (CVM, Microbiology and Immunology).

Dr. Shaun Cross (2020 – present)
Dr. Cross uses spatial profiling of gene expression to understand how the host reacts to enteric viruses (rotaviruses and orthoreoviruses) and how these reactions allow or prevent infection. He is also is working to develop improved application of sequencing technologies for defining host-virus interactions. Dr. Cross collaborates with Profs. John Parker (CVM, Baker Institute) and Iwijn De Vlaminck (CoE, Biomedical Engineering).

Dr. Iris Holmes (2020 – present)
Dr. Holmes studies the evolution of vertebrate immune systems as a function of the diverse parasites. She uses molecular evolutionary approaches to look for signatures of adaptive evolution in immune-related genes of lizards, testing for correlation with the epidemiological structure of parasite communities. Dr. Holmes collaborates with Profs. Tory Hendry (CALS, Microbiology) and Chris Myers (Center for Advanced Computing).

Dr. Trevor Tivey (2021 – present)
Dr. Tivey studies the spatial landscape of symbioses between plant roots and arbuscular mycorrhizal fungi. His work combines gene expression profiling, genetic manipulation and microscopy to determine how fungal signaling influences plant cell growth. Dr. Tivey has been awarded an NSF Postdoctoral Research Fellowship in Biology that will fund the remainder of his CIHMID appointment. Dr. Tivey collaborates with Profs. Maria Harrison (Boyce Thompson Institute) and Iwijn De Vlaminck (CoE, Biomedical Engineering).

Dr. Janelle Veazey (2021 – present)
Dr. Veazey's research examines how alterations to diet and gut microbial communities during early development impact host immune cell maturation. She uses techniques such as flow cytometry and gene expression profiling to determine impacts on CD8+ T-cell development. Dr. Veazey collaborates with Profs. Brian Rudd (CVM, Microbiology and Immunology) and Ilana Brito (CoE, Biomedical Engineering).

CIHMID Postdoc Association

In Spring 2020, several postdoctoral researchers across CIHMID labs banded together to launch the CIHMID Postdoctoral Association, spearheaded by Dr. Melanie Smee (CALS, Microbiology). The objective of this group is to establish social and professional bonds within the postdoc community. Although some of the initially planned activities were derailed by the COVID-19 pandemic, the group has reassembled in a virtual forums to hold online social hours and develop an orientation handbook for new postdocs arriving at Cornell. Additional expanded activities are currently being planned for summer 2021 and beyond. Members of the CIHMID Postdoctoral Association participate in professional development activities offered through the CIHMID postdoctoral training program and host CIHMID-sponsored seminar speakers on their visits to campus. Participation in the CIHMID Postdoc Association is open to any postdoctoral research in a CIHMID lab. Interested researchers are encouraged to subscribe to the email list CIHMID-POSTDOCS-L@cornell.edu.

Dr. Melanie Smee

Building Community

CIHMID Summer Symposium

Annually since 2017, CIHMID's Summer Symposium is a one-day event that showcases the breadth of research across CIHMID laboratories. The Symposium is held on campus and is open to the entire campus community. Most years feature a set of oral presentations by graduate students, postdocs, faculty and staff, as well as a poster session that includes presentations by students in the Undergraduate Research Experience (URE) and Microbial Friends and Foes (MFF) undergraduate research programs.

CIHMID's 2019 Summer Symposium kicks off!

Due to the COVID-19 pandemic, the 2020 Symposium was forced into a virtual format. Especially because COVID-related cancellation of most external research conferences in 2020 deprived trainees of the opportunity to present their work, the decision was made to emphasize trainee presentations in the 2020 CIHMID Symposium. All submitted abstracts from graduate students and postdocs were given speaking slots. The CIHMID undergraduate research programs had been cancelled for the summer so there were no undergraduate presentations.

Given the continued uncertainty regarding how and when the pandemic will resolve, the 2021 Symposium will also be a virtual event. However, thanks to improvements in the technological options, the 2021 Symposium is expected to more closely emulate an in-person conference, including with opportunities for poster presentations and casual conversation during breaks.

Summer 2017

- 74 registered participants (15 faculty, 23 postdocs, 21 graduate students, 4 undergraduate students, 11 staff and other)
- Program included 5 invited talks, 6 submitted talks, and 6 posters

Summer 2018

- 98 registered participants (16 faculty, 19 postdocs, 39 graduate students, 8 undergraduate students, 16 staff and other)
- Program included 7 invited talks, 9 submitted talks, and 17 posters

Summer 2019

- 112 registered participants (24 faculty, 16 postdocs, 18 graduate students, 24 undergraduate students, 14 staff and other, 16 walk-ins)
- Program included 6 invited talks, 8 submitted abstracts, and 18 posters

Summer 2020

- 54 registered participants (10 faculty, 16 postdocs, 15 graduate students, 2 undergraduate students, 11 staff and other)
- Program included 16 submitted talks, all by graduate students and postdocs

Research Seminars and Invited Speakers

In most years, CIHMID partners with departments and academic units across campus to co-host seminar speakers within existing seminar series. Anyone within the CIHMID community can nominate a potential speaker and identify an appropriate series. Often, the nominator will also serve as the host for the speaker. CIHMID can help bring in high-profile or international speakers who might otherwise be inaccessible for a standard department seminar. Promoting these seminars to the entire CIHMID community online and through email encourages cross-attendance of talks that are outside community members' home departments, while raising awareness of the various series that exist on campus.

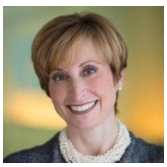
All seminars relevant to host-microbe biology are advertised on the CIHMID website and listed in a weekly digest sent to the CIHMID-L@cornell.edu email list each week, regardless of whether CIHMID is a sponsor.

The COVID-19 pandemic precluded invitation of outside researchers to visit campus during the 2020-21 academic year. Instead, CIHMID coordinated an independent virtual seminar series during the spring semester that emphasized international speakers.

Spring 2021 CIHMID Virtual Seminars

Dr. Kayla King, University of Oxford
"Microbe-mediated protection against infection: an evolutionary perspective"
Tuesday, January 20

Dr. Amy Pedersen, University of Edinburgh
"The ecology of infection, immunity and transmission in wild rodents"
Tuesday, February 23



Dr. Sabra Klein, Johns Hopkins School of Health
"SeXX affects immunity and outcomes of respiratory viral infections"
Wednesday, March 10

Dr. Abdelaziz Heddi, INSA Lyon
"Immune regulations involved in endosymbiont control and host homeostasis"
Wednesday, May 5

Dr. Ana Rivero, CNRS Montpellier
"Avian malaria and the evolutionary ecology of host-parasite interactions"
Friday, May 28

Journal Clubs and Research Supergroups

CIHMID supports and promotes several journal clubs and topical research supergroups at Cornell. All of these events are open to anyone in the campus community and participation in every meeting spans multiple departments and colleges. Presentation topics and papers to be discussed are posted on the CIHMID website and weekly announcements and reminders are sent to the CIHMID email list.

Ecology and Evolution of Infectious Disease (EEID) journal club: This weekly journal club discusses papers published in the primary literature with a focus on the evolution, ecology, and epidemiology of infectious diseases in animal and plant systems. Students may optionally enroll in Entom 6900 for credit.

Microbiology journal club: This weekly journal club discusses contemporary or seminal research papers in the field of microbiology. Students may optionally enroll in BioMI 7910 for credit.

Virology journal club: This journal club meets weekly to recent publications in the primary research literature in virology.

Microbiome supergroup: This supergroup is a monthly meeting of researchers studying the microbiomes of plants and animals at Cornell. Each meeting consists of two 30-minute presentations describing work in progress by members of the campus community.

Symbiosis and Cooperation supergroup: This supergroup provides a monthly forum for students, postdocs and faculty who work on various symbiotic and cooperative systems to discuss their research. Meetings are centered on data presentations but the atmosphere is informal to encourage free exchange of feedback and ideas.

Partners and Sponsorships

CIHMID provides support to the campus community through partnerships and sponsorships of important enterprises that are aligned with the CIHMID mission.

- CIHMID has allied with the Cornell Center for Immunology to fund conference registration costs for postdocs and graduate students in our communities who wish to present research at virtual conferences in 2021.
- CIHMID has contributed financial support to Cornell's Diversity Preview Weekend since 2020. DPW is a graduate student-led initiative aimed at closing gaps in access to graduate programs for students coming from backgrounds that are underrepresented in the life sciences. The program provides peer coaching for undergraduate juniors from around the country in preparing graduate school applications, and includes a two-day preview event where the students visit Cornell to participate in professional development workshops and practice interviewing. Undergraduate students participating in the program have no obligation to attend, or even apply to, Cornell for their graduate study although some alumni from the program have subsequently chosen Ph.D. programs at Cornell.
- CIHMID provided financial support for the "Our Microbes, Our Global Health" workshop organized by Dr. Ilana Brito (CoE, Department of Biomedical Engineering) held on the Cornell campus in Ithaca in 2018.

Summary of CIHMID Grant Activity

CIHMID funding applications to date have emphasized training grants, infrastructure, and major collaborative research grants. The proposals listed below were either submitted by CIHMID or by programs for which CIHMID would play a major structural role. A future ambition is to expand activities that will enable new collaborative research ventures among CIHMID labs and support acquisition of extramural funding.

Awarded:

- "Host-Microbe Interactions that Determine Host Traits and Disease"
  National Institutes of Health T32 Training Grant 7/1/2020 – 6/30/2025
  $1,822,691 PI: B.P. Lazzaro
- "Microbial Friends and Foes"
  National Science Foundation, Research Experience for Undergraduates 2/1/2019 – 1/31/2022
  $465,113 PIs: T.E. Pawlowska (contact PI), T.A. Hendry, and E.R. Angert
- "Culturing Digital Scientific Literacy Around Host-Microbe Interactions"
  Engaged Cornell 4/1/2019 – 6/30/2022
  $40,000 PIs: T.A. Hendry (lead) and B.P. Lazzaro

Pending:

- "NRT-URoL: Utilizing the Microbiome in Bioengineering"
  National Science Foundation NRT Training Grant
  $3,000,000 PI: C.J. Hernandez (lead)
- "Institute for Host-Pathogen Systems in Wildlife"
  National Science Foundation, Biology Integration Institute
  $12,500,000 PI: A. Dhondt (lead)
- "How similar infections lead to widely divergent outcomes: feedbacks, environment, and chance"
  National Institutes of Health R01
  $3,988,931 PIs: B.P. Lazzaro (lead), N. Buchon, T. Dörr, S.P. Ellner

Declined:

- "M-PIRE: Microbe-Plant Integrative Research in Ecology" (2020)
  National Science Foundation, Biology Integration Institute
  $12,500,000 PI: D.H. Buckley (lead)
- "Institute for Host-Pathogen Systems in Wildlife" (2020)
  National Science Foundation, Biology Integration Institute
  $12,500,000 PI: A. Dhondt (lead)
- "Managing Opportunistic Infection by Manipulating Host-Pathogen Interplay" (2020)
  Keck Foundation
  $1,000,000 PIs: B.P. Lazzaro (lead), N. Buchon, T. Dörr, S.P. Ellner
- "Host-Microbe Interactions that Determine Host Traits and Disease" (2020)
  National Institutes of Health T32 Training Grant
  $1, 563,348 PI: B.P. Lazzaro
- "Cornell Institute of Host-Microbe Interactions and Disease" (2019)
  SUNY Center-Scale Proposal Planning and Development Program
  $50,000 PI: B.P. Lazzaro