



**UNIVERSITY OF  
GEORGIA**  
Center for the Ecology  
of Infectious Diseases

# ANNUAL REPORT

FY 2025

**Seeking to  
understand the  
host-parasite  
relationship  
in nature**



# MESSAGE FROM THE DIRECTORS

As we reflect on the past year, we are deeply thankful for the remarkable community of researchers, students, staff, and collaborators who have helped shape the Center for the Ecology of Infectious Diseases (CEID) into a globally recognized hub for innovation in infectious disease research.

Since CEID was established in 2016, our mission has been to foster a collaborative and interdisciplinary environment that fuels scientific inquiry and addresses some of the most pressing questions in disease ecology. What began as a group of 36 dedicated individuals has grown into a vibrant network of more than 140 members.

In Fiscal Year 24, an independent advisory panel conducted an external review of our progress and impact. Their assessment affirmed that CEID has significantly elevated UGA's profile in the fields of infectious disease biology and ecology, noting our commitment to tackling broad and complex challenges that intersect with public health, veterinary medicine, and global biodiversity.



This past year, we continued to build on that momentum. We conducted multiple member meetings focused on center development and membership engagement while launching a new Strategic Planning Committee to assess the effectiveness of CEID's four core service areas: i) creating a culture of science, ii) facilitating research, iii) training a capable workforce, and iv) communications.

We believe these four service areas are critical to our mission of making the CEID a worldwide center of excellence in research and education in the ecology of infectious diseases. Over the course of the last year, we held four symposia, conducted four training workshops, hosted seminars with visiting scholars, and awarded two seed grants.

It is with sincere appreciation that we share this report highlighting CEID's achievements over the past year. We look forward to building on this success and exploring new opportunities for collaboration and discovery in the year ahead.

Cover photo:  
Japanese Greater Horseshoe Bat  
(*Rhinolophus nippon*),  
Kamayahagicho, Ena, Gifu, Japan  
(credit: Jan Ebr & Ivana Ebrov)

One of the host species in the study of helminths and bats  
across the Japanese Archipelago. See next page.

# FY 2025 by the numbers

	50	Faculty	Peer Reviewed Publications	155	
	140	Members	Seminars & Workshops	14	
	4	Working Groups	Symposia	4	

## Featured Working Group

The **Spatial Ecology Working Group** recently authored an article, accepted in *Integrative Zoology*, on the global distribution of avian malaria

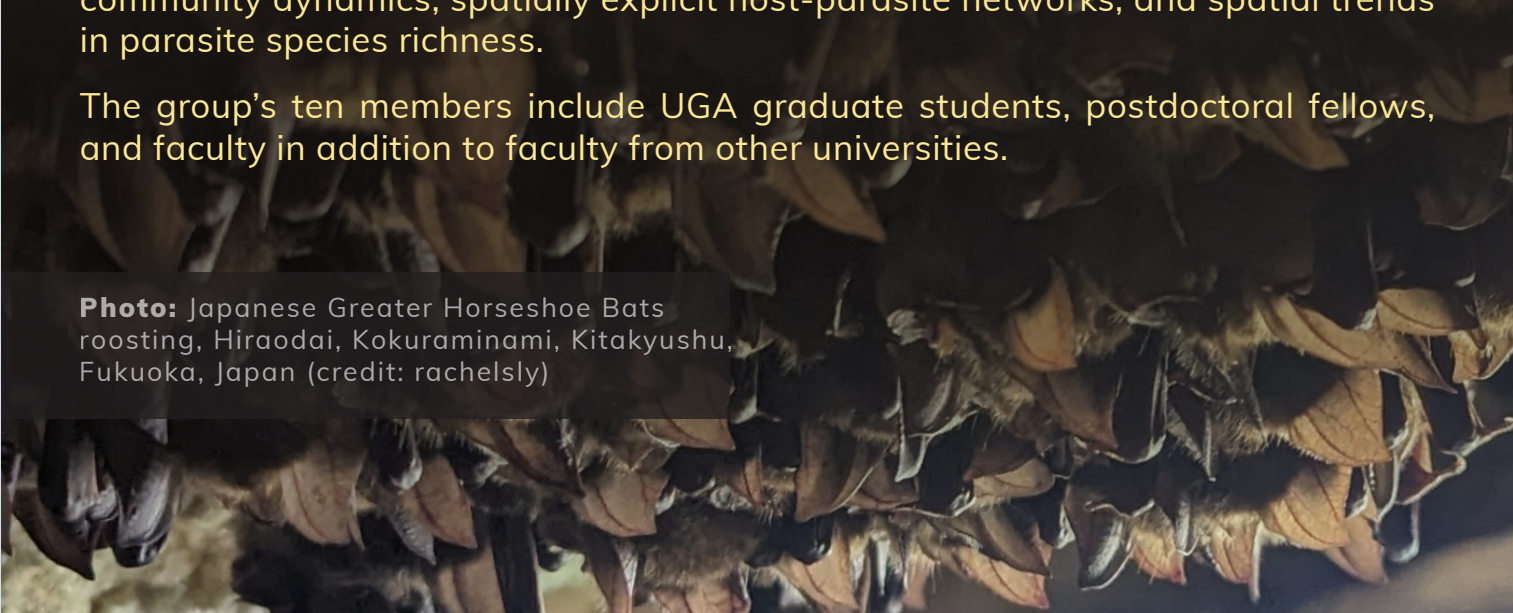
### Spatial Ecology

**New publication:**  
C. Molinero, C.H. Brown, T.L. Odom, D.C. Suh, A.W. Park. "Bird community composition, migration and environmental factors jointly influence the global distribution of avian haemosporidian lineages." *Integrative Zoology* (accepted).

The group has now begun working on spatial aspects of helminth-bat systems in across the Japanese Archipelago. Building on a dataset collected published by CEID member Elizabeth Warburton in 2018, this new effort examines helminths of insectivorous bats through the lenses of spatio-temporal changes in parasite community dynamics, spatially explicit host-parasite networks, and spatial trends in parasite species richness.

The group's ten members include UGA graduate students, postdoctoral fellows, and faculty in addition to faculty from other universities.

**Photo:** Japanese Greater Horseshoe Bats roosting, Hiraodai, Kokuraminami, Kitakyushu, Fukuoka, Japan (credit: rachelsly)





# Global Engagement

CEID Symposium:  
**Ecology and Evolution of  
Marine Parasites and Diseases**

Benthic Ecology Meeting Society (BEMS)  
April 3, 2025

**200 attendees**



CEID Symposium:  
**Viral Traits & Infectious Disease Emergence**

Odum School of Ecology  
Ginkgo Biosecurity  
CEPI  
September 9-10, 2024

**49 in-person attendees  
22 virtual attendees**

CEID Symposium:  
**Foot-and-Mouth Disease (FMD)**

USDA National Bio and Agro-Defense Facility (USDA NBAF)  
CDRF Global  
March 11-13, 2025



**93 in-person attendees  
119 virtual attendees**

**113 attendees**

CEID Symposium:  
**Ecology & Evolution of Influenza Viruses**

Center for Influenza Disease & Emergence Research  
Boehringer Ingelheim Animal Health  
Center for Applied Pathogen Epidemiology and Outbreak Control  
Odum School of Ecology  
November 18-19, 2024



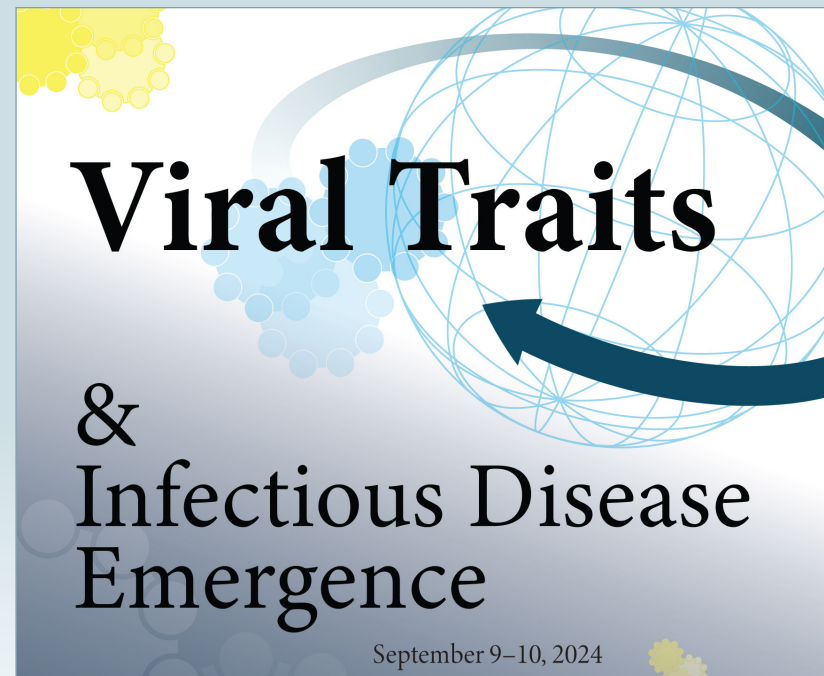


# Symposia

## Viral Traits & Infectious Disease Emergence

In September 2024, CEID convened a symposium to identify and underscore ecological and AI research frontiers in infectious disease emergence. With the field of ecology increasingly benefitting from the application of machine learning tools, recent work has integrated machine learning with ecological process and theory to further develop our understanding about ecological interactions and dynamics.

Over the course of two days, CEID hosted 15 talks and four panel sessions focused on infection, transmissibility, and disease severity to bring researchers together to review current knowledge on viral traits and disease emergence. The symposium concluded with a synthesis session focused on how we currently conceptualize viral traits and how this information can be incorporated into cutting-edge approaches for the modeling of disease emergence.



The symposium was supported by Ginkgo Biosecurity and CEPI (the Coalition for Epidemic Preparedness Innovations).

## Ecology & Evolution of Influenza

The CEID organized a symposium on the “Ecology and Evolution of Influenza Viruses” with sponsorship from Boehringer Ingelheim, the Odum School of Ecology, the Center for Influenza Disease and Emergence Research (CIDER), and the Center for Applied Pathogen Epidemiology and Outbreak Response (CAPE). The symposium took place in person at the University of Georgia in November, 2024.



The symposium brought together leading experts in influenza research presenting in five areas: Population Ecology & Evolution of Influenza A and B, Influenza in Animals, Management, Experimental Systems, and the Macroecology of Influenza.

Over two days, the symposium hosted 22 speakers and 20 poster presenters. A total of 113 people attended, representing 29 academic, medical, and public institutions.

## Foot and Mouth Disease

### Understanding FMD Epidemiology and Ecology to Identify Priorities for US. Risk Assessment and Research

In March 2025, the CEID and USDA National Bio and Agro-Defense co-hosted a hybrid symposium on foot-and-mouth disease virus (FMDV) in Manhattan, KS, with support from Boehringer Ingelheim, the Center for Outcomes Research & Epidemiology (CORE) at Kansas State University, and the Global Foot-and-Mouth-Disease Research Alliance (GFRA).

Designed around the highly contagious and economically important virus affecting millions

of domestic pigs, cows, goats, and sheep, the symposium brought together scientists from around the world to talk about FMDV incursion risks in the Americas. Attendees heard about livestock and wildlife surveillance and modeling, outbreak biocontainment strategies, and the development and commercialization of vaccines.

The symposium included presentations, breakout group discussions, a tour of the USDA's new biosafety level 4 research laboratory in Manhattan, KS, and networking events. Scott Carver, CEID Associate Director, is leading the development of a post-symposium white paper with several USDA National Bio and Agro-Defense researchers.



## Ecology & Evolution of Marine Parasites & Diseases

In April, 2025, CEID members John Wares, Jeb Byers (UGA) and April Blakeslee (ECU) organized a special symposium on the Ecology & Evolution of Marine Parasites & Diseases at the annual Benthic Ecology Meetings in Mobile, Alabama.

The symposium featured presentations drawn from chapters of the CEID's forthcoming Oxford University Press book of the same title. Authors showcased work on coral diseases, helminth parasites of marine fish, scuticociliatosis in Mediterranean sea urchins, and black gill disease in shrimp, among many other topics.

The book is being published by Oxford University Press as part of the series Ecology and Evolution of Infectious Diseases.





# Undergraduate Engagement

# Graduate Student Profile

## Vertically Integrated Projects for Research: Perception & Preparedness: Healthcare Seeking Behaviors Before, During & After a Pandemic

The CEID's new Vertically Integrated Project for Research (VIPR) team provides undergraduate students an exceptional opportunity to engage in world-class collaborative research at the intersection of public perceptions with healthcare decision-making.

The project immerses students in in-depth analysis of healthcare decision-making behaviors captured through public opinion polls by the Center for Health Risk Communication and the CEID. Through empirical research, students unravel intricate patterns of healthcare-related attitudes and actions within diverse populations, tackling critical contemporary issues like vaccine acceptance and trust in medical advice.

Students gather, analyze, synthesize and interpret data, present results in writing, oral and conference poster communication formats, and practice professional skills that make substantial contributions to real-world problems.

Since UGA launched VIPR, CEID has had 23 undergraduate enrollments in the program, overseen by an interdisciplinary team of CEID scientists and graduate students from social, natural and engineering fields.



## First-Year Odyssey Seminar: Ecology of Infectious Diseases

The University of Georgia is a world leader in the ecology of infectious diseases. In the CEID's interdisciplinary First-Year Odyssey (FYO) Seminar, led by CEID Director John Drake, first-year undergraduate students at UGA learn from active CEID members about ongoing research projects from their personal laboratories through readings, discussion, and direct interaction with scientists.

Students get the opportunity to tour labs, discuss current research, and read papers from CEID faculty housed in schools and colleges across campus, including the College of Veterinary Medicine, School of Ecology, College of Public Health, College of Agricultural and Environmental Sciences, and College of Engineering. The goal is to show how different disciplinary perspectives address the ecology of infectious diseases.

Over the last six years, 90 undergraduate students have been engaged in our interdisciplinary FYO course resulting in several research opportunities.

## Juliana Hoyos

Juliana Hoyos is a PhD candidate at the Odum School of Ecology with extensive experience at the interface of population, community, and landscape ecology and molecular parasitology. Her research emphasizes the complex relationships among vectors, parasites, humans, and land-use change. With an international career spanning Colombia, Panama, and the United States, Hoyos has advanced understanding of ecological processes driving the transmission of Chagas disease and Leishmaniasis, while also contributing to broader work on vector-host interactions involving pathogens such as flaviviruses and Rickettsia.

She earned her bachelor's degree in Biology from Universidad del Valle and a master's degree in Ecology and Evolutionary Biology from Universidad de los Andes, both in Colombia. Her continuous dedication to producing impactful research on tropical diseases motivated her to pursue doctoral studies at the University of Georgia, where she has benefited from mentorship and collaboration with interdisciplinary faculty. These experiences have expanded both her technical expertise and her research perspective.



Hoyos joined UGA in 2021 for an interdisciplinary research project focused on investigating ecological, environmental, and social factors that control the dynamics of Chagas disease and American Cutaneous Leishmaniasis in Panama. Her work integrates diverse approaches—including vector field sampling, molecular biology, statistical modeling, bioinformatics, and GIS analysis—to identify key determinants of vector ecology and disease transmission. The insights generated from this project aim to inform public health policy, reduce disease risk in degraded landscapes, and provide frameworks applicable to other endemic regions.

With a broad skill set of research techniques, publication in high-impact journals and extensive scientific literacy, Hoyos plans to continue her international career after her PhD, contributing to meaningful scientific endeavors in the Ecology of Infectious Diseases.





# Postdoctoral Scholar Profile

## Christina Næsborg-Nielsen

Dr. Christina Næsborg-Nielsen examines disease severity across species and within populations through the lens of genomics.

A biomathematician with a career centered in population genomics, Næsborg-Nielsen researches spatial ecology within and across diverse wildlife populations while using genomics to inform wildlife disease management practices. She hopes to find answers as to why some species are better at coping with disease and why some outbreaks are more significant than others by linking host immune response to ecological and genetic factors to understand these differences.

A lifelong dream of working with animals led Næsborg-Nielsen to pursue a career in genetics and its application to wildlife management. She completed a PhD with Dr. Scott Carver, incorporating genetics into disease management practices, exploring how to understand genomic host responses to sarcoptic mange using genetic tools.

Næsborg-Nielsen examined how wombats react to mange both systemically and on the level of the skin microbiome. Her PhD research focused on applying these findings to other species, examining immune response changes within species and linking host immune responses to ecological and genetic factors that can be applied across species and within ecosystems.

Before taking up her postdoc fellowship at UGA, Næsborg-Nielsen held a postdoctoral position with the US Forest Services as an ORISE Fellow, examining inbreeding and its impact on population

health and genomics and effect on migration patterns within wolf and muskox communities. During this time she met CEID member Justin Bahl, who was working on avian influenza, and accepted her current position within the Bahl Lab.

Næsborg-Nielsen currently works with the Bahl Lab on highly pathogenic avian influenza (HPAI) with

an emphasis on wildlife disease management. She examines host-response interactions and the severity of the disease across species and within populations. Her research focuses on a variety of host species including mice, mallards, chickens, and turkeys and on why different host species respond differently to HPAI. Her current projects include a meta-analysis of prevalence and seroprevalence within host species, a study examining host gene expression within seven different host species at different stages of infection, and a microbiome study examining shifts in

the gut microbiome of eight species infected with avian influenza.

Næsborg-Nielsen appreciates the interdisciplinary nature of the CEID. CEID's seminars and symposia afford her the opportunity to learn how researchers across disciplines approach and view their research.

Næsborg-Nielsen hopes to continue working within academia on highly infectious diseases in order to deepen our understanding of their impact on non-human animal species. By applying genomic and molecular ecology to the study of ecological host-pathogen interactions, Næsborg-Nielsen hopes to contribute to more direct and actionable management practices within wildlife disease ecology.



# Faculty Profile

## Justin Bahl

Dr. Justin Bahl holds joint appointments in the College of Veterinary Medicine (Center for Vaccines and Immunology, Department of Infectious Diseases), the College of Public Health (Epidemiology & Biostatistics), and the Institute of Bioinformatics. Over two decades of research in the ecology, evolution, population dynamics, and molecular epidemiology of emerging infectious diseases, Bahl has championed both advances in fundamental science, and translational research aimed at improving public health.

Bahl joined the University of Georgia and the CEID in 2018, and was promoted to Professor in 2023. He now directs the Center for Applied Pathogen Genomic Epidemiology and Outbreak Response (CAPE), a CDC-funded Pathogen Genomics Center of Excellence focused on advancing pathogen genomics for operational public health response. Bahl's research path began with a PhD in Molecular Systematics and Evolution in 2006 from the University of Hong Kong. He then joined the State Key Laboratory for Emerging Infectious Diseases at the University of Hong Kong, a WHO reference laboratory for diagnosing A/H5 influenza, to work on influenza systematics as a postdoctoral fellow. In 2010 he moved to the Duke-NUS Graduate Medical School in Singapore to continue postdoctoral training as a Research Fellow in Molecular Epidemiology, focusing on the Evolution and Epidemiology of RNA viruses. He became Research Assistant Professor in Emerging Infectious Disease at the school in 2011. He then served as Associate Professor in the Center for Infectious Diseases, University of Texas School of Public Health, in Houston from 2013-2018 before moving to UGA.



Bahl's research at UGA centers around viral disease systems that pose a risk to animal and human health like influenza A, where transmission at individual, population, and global scales and between host species is difficult to observe or quantify. He seeks to understand how factors like population structure, host immune pressure, geographic spread, and transmission dynamics influence viral genetic diversity. He is focused on developing a molecular epidemiology program with applications in public health, advancing and promoting the use of pathogen sequence analysis to inform public health response to infectious disease.

Through CAPE, the CDC-funded center he leads, as well as through the CEID-led, NSF-funded initiative "Heterogeneous Model Integration for Infectious Disease Intelligence," and through contracts and working agreements, Bahl maintains partnerships with the Georgia Department of Public Health, Houston Health Department, Department of Health US Virgin Islands, and state public health agencies across the US southeast. In addition to his role as PI or Co-PI on over \$5 million in research awards, he has contributed as an investigator for the Center for Influenza Vaccine Research for High-Risk Populations (CIVR-HRP)

and the UGA-led Center for Influenza Disease and Emergence Research (CIDER).

Bahl's multidisciplinary research team, which draws from the Department of Infectious Diseases, Institute for Bioinformatics, and Department of Epidemiology and Biostatistics, has been in high demand to respond to pandemic, seasonal, and emerging public health threats. His lab has worked on rapid identification of transmission clusters using genomic data, assisted multiple institutions with processing sequenced COVID-19 samples, and investigated interspecies transmission of emergence of beta-coronaviruses with recently collected samples from bats, snakes and camels. Bahl exemplifies CEID's commitment to multidisciplinary inquiry and translational science with impacts on human and animal health.



# MEMBER ACCOMPLISHMENTS



## Sonia Altizer

Martha Odum Distinguished Professor of Ecology, was recognized as a **UGA Distinguished Research Professor** for being a preeminent leader in her field.



## Christian Brown

Ph.D. student, was awarded a scholarship from **ARCS (Achievement Rewards for College Scientists)** for his research investigating causes of range limits of eastern temperate tree species.



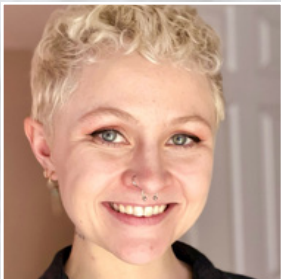
## Christopher Cleveland

Assistant Professor, received the **Fred C. Davison Early Career Scholars Award** for a trajectory toward an exceptional, sustained research career with an imminent rise to international stature in his field of study.



## Sonia Hernandez

Josiah Meigs Distinguished Professor, received the **Richard Reiff Award for Campus Internationalization**, recognizing full-time faculty who have made exceptional contributions to global education at UGA.



## Kane Moser

Ph.D. student, was awarded an **NSF Graduate Research Fellowship** to pursue research in the disease ecology of fungal pathogens.



## Pejman Rohani

Regents' Professor & UGA Athletic Association Professor, received a **Lamar Dodd Creative Research Award** for his research impact and international reputation, and was named a **2024-25 SEC Academic Leadership Development Program Fellow** for his contributions to Odum and the field of disease ecology.



## Alex Strauss

Assistant Professor Alex Strauss received a **Russell Award for Excellence in Undergraduate Teaching** from UGA.



## Megan Tomamichel

Ph.D. graduate, was awarded **Best Student Presentation** at the Annual Meeting of the American Society of Parasitologists in Denver for her talk "Changes in transmission rates drive seasonal patterns of shrimp black gill disease caused by the parasitic apistome ciliate *Hyalophysa lynni*."



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JOHN M. DRAKE, DIRECTOR  
SCOTT CARVER, ASSOCIATE DIRECTOR  
203 D.W. BROOKS DRIVE | ATHENS, GA 30602  
CEID@UGA.EDU