



Center for Tropical & Emerging Global Diseases UNIVERSITY OF GEORGIA



Global Health Through Research

Director's Corner

As we approach the end of the year, it is clear that we in the Center for Tropical and Emerging Global Diseases have been extremely productive once again and that we have much to be excited about for 2020. We are fortunate to welcome several new important additions to our faculty and staff this year. Drs. Samarchith Kurup and Diego Huet both started their labs this fall. Sam brings a wealth of experience and insight into immunology of malaria and Diego is at the forefront of cell and molecular studies of Toxoplasma. Diego's addition also is exciting as he is the first CTEGD faculty member from the Department of Pharmaceutical and Biomedical Sciences in the College of Pharmacy.



We also completed a significant turnover in the CTEGD admin office and are excited to welcome Angela McLendon as the Business Manager and Susan Clayton as our Accountant. Both of them have previous experience at UGA and are helping us work through significant administrative issues congruent with an active, research enterprise faced with significant changes in the administrative structure at UGA in the past year.

Importantly, we completed the 5 year OVPR program review that allowed feedback from all members of the Center as well as independent review by senior scientists. The results of the review confirm the vibrant health of the Center as well as highlight some opportunities for growth in the near future. One of those is the newly established CTEGD Graduate Student Association; you will hear more about their activities over the coming months.

Finally, in 2019, we celebrated the 20th anniversary of the CTEGD. The growth of the center over the past 20 years is amazing, in breadth and scope. We've grown from a handful of faculty to one of the most impactful centers of excellence for the study of parasites in the world. We could not have achieved all of this without the efforts of all the faculty, staff, students, and the UGA leadership past and present. Our foundation is solid and we have an exciting future ahead of us.

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On the cover: The faculty of CTEGD are committed to training the next generation of scientists to tackle current and future diseases affecting our world.

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Our Mission: To pursue cutting edge research on tropical and emerging diseases, train students in this field and effectively tackle global diseases of poverty.



Daniel Colley: The Schisto Kid

by John H. Tibbetts

One day Daniel Colley raised his hand to volunteer, setting in motion five decades of scientific adventures. It was 1969, and Colley's postdoctoral adviser, Byron Waksman, a renowned immunologist at Yale University School of Medicine, had stepped into the laboratory and asked if anyone wanted to go to Brazil.

"I have no idea why my hand shot up," says Colley. "I didn't know anything about Brazil. My wife and I didn't even have passports. I asked Byron about the nature of the research, and he said, 'Schistosomiasis.' My response was, 'What's that?'"

Colley, today a UGA immunologist and Fellow of the American Association for the Advancement of Science, became fascinated by schistosomiasis, a parasitic worm infection plaguing poverty-stricken communities in sub-Saharan Africa and around the world. Globally more than 250 million people are infected via contact with water that carries the parasites.

The waterborne worms penetrate human skin and take up residence in blood vessels. About 5 to 10 percent of infections progress to life-threatening disease over decades. But most people experience more subtle symptoms such as fatigue, anemia, wasting, malnutrition and impaired cognitive development.



This irrigation channel in a village in Niger is a schistosomiasis transmission site. The children exposed there were tested and treated as part of the Schistosomiasis Consortium for Operational Research and Evaluation program, led by Colley. (Photo by Amadou Garba/SCORE)

"Children playing in the water are picking up these chronic parasitic infections," he says, "so they are sick and don't do as well in school. If kids don't receive what they need to develop early in life, it can become a lifelong disability."

After his Brazil sojourn, Colley arrived at Vanderbilt University in 1971, setting up a lab and beginning his career-long effort to understand the immunological paradox of schistosomiasis (or "schisto," in the vernacular).

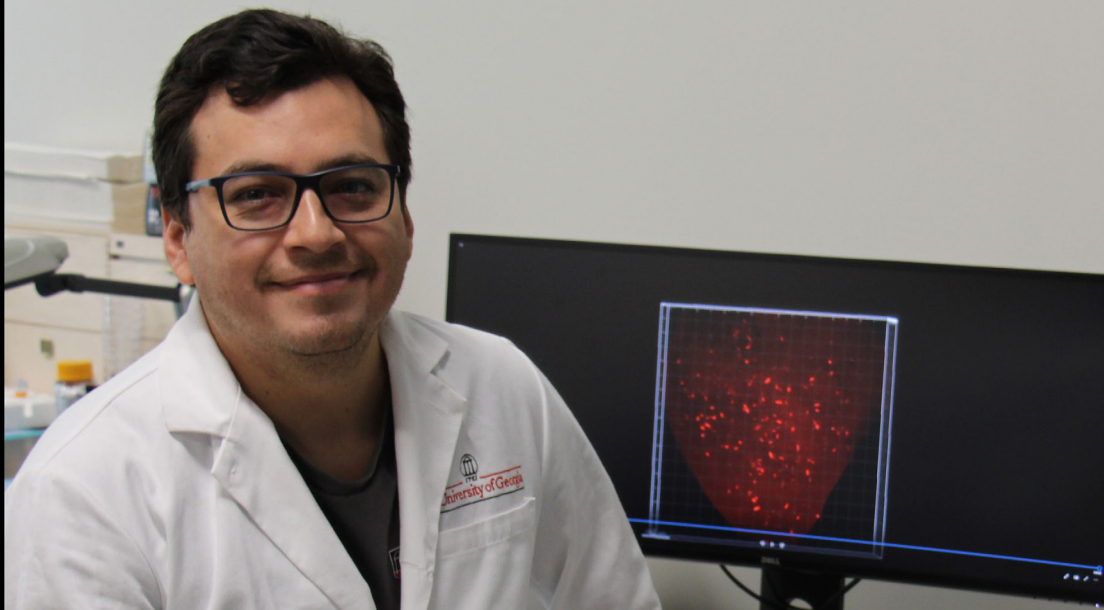
"The more I learned about schisto, the more interesting it became," says Colley, who tweets as @SchistoKid. "It has a bizarre life cycle. Here's a worm that can live inside your blood vessels for up to 40 years, though more typically it lasts for five to 10 years. Why doesn't your immune system get rid of this creature sooner? That was a very intriguing question."

In infected human blood vessels, the female worms produce eggs that the male fertilizes. Many of the eggs escape the human body in urine or feces. When people urinate or defecate in or near fresh water, the eggs can infect freshwater snails, where the parasite develops and rapidly multiplies. When worms re-enter fresh water, they can find human victims.

Meanwhile, the body's remaining worm eggs are swept by the bloodstream into the gut wall and the liver or bladder, where they become lodged. The immune system fights these egg intruders with a delicate, two-pronged effort: First, masses of cells called granulomas wall off the eggs, isolating them from surrounding tissue and reducing disease. But the immune system must also regulate granuloma growth. For most people, this regulatory response keeps granulomas relatively small, but some grow over decades, eventually causing fibrosis and blocking blood flow through the liver, causing internal bleeding.

"Schisto is a very complex puzzle for an immunologist," Colley says. "If you fail to have the initial immune response against the egg, you die. But if you fail to regulate this immune response against the egg over time, you die. How our immune system has co-evolved with schisto is fascinating to me, and I still haven't figured out how it's done."

In 1992, he joined the Centers for Disease Control and Prevention and a year later was promoted to director of its



CTEGD–Janssen Visiting Scholar: Fernando Sanchez–Valdéz

Dr. Fernando Sanchez-Valdéz, from Salta, Argentina, completed a Ph.D. in Molecular Biology at the Faculty of Pharmacy and Biochemistry at the University of Buenos Aires, Argentina in 2014. After his Ph.D., he completed a postdoctoral fellowship in Dr. Rick Tarleton's laboratory at University of Georgia. In 2018, he obtained a Research Scientist position in the career pathway of the National Research Council in Argentina (CONICET). Earlier this year, he was awarded a fellowship from the CTEGD-Janssen Visiting Scholars Program, which enabled him to return to the Tarleton Research Group.

What is your primary research focus? Why are you interested in this subject?

The main focus of my research has been to uncover the mechanism of drug resistance in the Chagas disease agent, *Trypanosoma cruzi*. The main question we are trying to answer is why the treatment with highly effective drugs like Benznidazole (the current available treatment for Chagas disease) often fails to cure Chagas disease. By combining *ex vivo* luminescence assays and tissue-clearing techniques we were able to report, for the first time, the presence of dormant non-replicating amastigotes forms in the chronic phase of the disease. Dormant amastigotes were uniquely resistant to extended drug treatment *in vivo* and *in vitro* and could re-establish a flourishing infection after treatment interruption. *T. cruzi*'s capacity to become dormant makes them transiently drug-resistant, suggesting that this phenomenon accounts for the failure of the otherwise highly active compounds such Benznidazole (Sanchez-Valdéz, et al eLife 2018).

Why did you choose UGA?

I returned to Athens in February 2019 to continue working on the findings we made during my postdoctoral training in the Tarleton Laboratory. I initially decided to come UGA based on a colleague's recommendations and the fact that Tarleton's lab is one of the reference centers for Chagas disease research. It's a really motivating environment to do science since the scientific and technical level here is really high as well as diverse including areas as immunology, drug discovery, genetic manipulation, genomics, diagnostics, etc. Also the amount of resources available is impressive not only from the lab but also from the Biomedical Microscopy Core, Cytometry Shared Resource Laboratory and the animal facility at UGA.

What has been your research project while at UGA?

Currently, we are expanding our knowledge about *T. cruzi* dormancy and trying to interfere *T. cruzi* dormancy using new compounds or the conventional drugs but in a different treatment schedule. One of the approaches we are testing now involves the evaluation of drug doses and treatment schemes able to kill dormant parasites. For this purpose, we are optimizing a robust platform to detect low levels of parasites in whole clarified mice organs using light-sheet fluorescent microscopy. This technique will allow us the specific detection of low levels of persistent dormant parasites.

How has the CTEGD-Janssen Visiting Scholar Fellowship and your time at UGA impacted your research and professional goals?

I am so glad about the opportunity to continue working on *T. cruzi* dormancy with such experienced and renowned scientists and particularly using state-of-the-art microscopy techniques currently unavailable in South America. This experience will definitely have a positive impact on my career development and probably in the Chagas disease research field.

Dr. Blanka Tesla (Murdock Lab) completed her Ph.D. and is moving to Edinburgh.

Dr. Briam Mantilla (Docampo Lab) finished his post-doc training and is now an Assistant Professor at the University of Durham, UK

Dr. Nuria Negrão (Docampo Lab) completed her Ph.D. and has returned to Mozambique.

Pei-Tsz Shin (Wolstenholme Lab) earned his M.S. and is a rotating intern in the Dept. of Small Animal Clinical Sciences at Western College of Veterinary Medicine, Saskatoon, Canada.

Connor O'Neill (Wolstenholme) earned his M.S.

Omar Salas (Etheridge Lab) earned his M.S. in July and is now the lead assay developer at Precision Genetics.

Dr. A.J. Stasic (Moreno Lab) completed his Ph.D. in May is a staff scientist at the FDA.

Dr. Ana Lisa Valenciano (Cassera Lab) finished her postdoc training and is a scientist at GSK in Tres Canots, Spain.

Dr. Flavia Zimbres (Cassera Lab) finished her postdoc training and is currently living in Durham, UK.

Dr. Heather Kudyba (Muralidharan Lab) completed her Ph.D. and is now a post-doc at NIH.

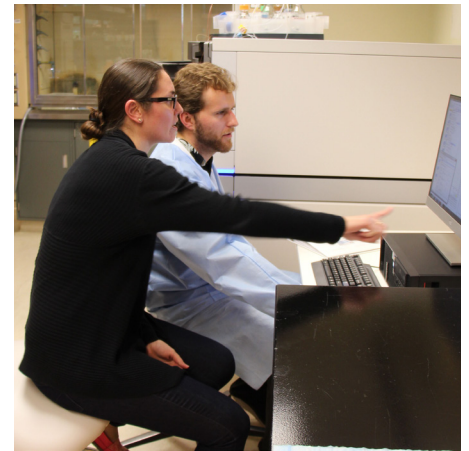
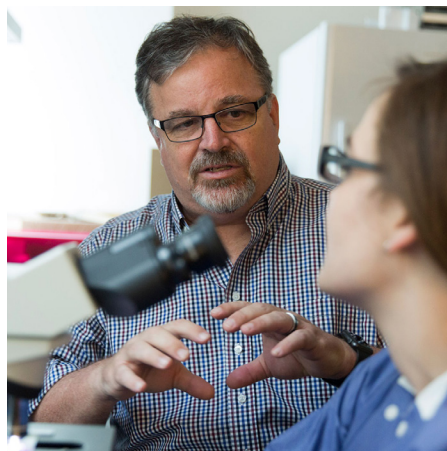


**Center for Tropical &
Emerging Global Diseases**
UNIVERSITY OF GEORGIA

Global Health Through Research

Faculty Search:

Assistant/Associate Professor



The Center for Tropical & Emerging Global Diseases at the University of Georgia invites applications for a full-time tenure track position at the level of Assistant or Associate Professor. We seek an individual who will build a research program centered on hypothesis-driven parasite biology or interactions with a host. The successful candidate will select one of the following departments as their academic home; Biochemistry and Molecular Biology, Cellular Biology, Genetics, or Microbiology. The successful candidate would build on the research strengths of the Center for Tropical and Emerging Global Diseases, one of the world's leading centers for parasite research. Teaching responsibilities will be in our undergraduate and graduate programs.

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The Schisto Kid (cont.)

Division of Parasitic Diseases. "I learned about a lot of other parasitic diseases. It was an incredibly broadening experience that became useful in my later work at UGA. From my colleagues, I gained knowledge in epidemiology—the incidence and prevalence of diseases and detecting the sources and causes of epidemics."

He arrived at UGA in 2001 as professor of microbiology and director of the Center for Tropical and Emerging Global Diseases, created only three years before. "UGA started the center and took risks by investing in it," he says. "Now it's globally famous for its work in parasitic diseases and has 23 principal investigators."

During the past decade, Colley has been director of UGA's Schistosomiasis Consortium for Operational Research and Evaluation (SCORE), a program supported by the Bill & Melinda Gates Foundation. SCORE scientists study strategies used in eight sub-Saharan African countries to control and eventually eliminate schistosomiasis. Today, most sub-Saharan African governments collaborate with the World Health Organization and a pharmaceutical company to provide a free drug, praziquantel, that treats existing infections and can significantly reduce new cases.

"SCORE has shown that mass interventions with praziquantel do work, and they are best done every year," he says. SCORE researchers also helped develop a more rapid and precise

diagnostic test for schistosomiasis, discovering many more cases in children than previously thought.

"The main message I've learned in my career is that diseases such as schisto are diseases of poverty," he says. "Poverty contributes to these diseases, and poverty is also the result of them. If you are a stunted kid, and you have anemia, and your cognitive development is not great because of a parasite, it's harder to succeed."

"People are the same everywhere—they all want a better life, and in some places, that's not happening. Fighting these infections is an important part of making lives better."

First published in UGA Research Magazine October 2018

**30th Annual Molecular
Parasitology & Vector Biology
Symposium**

Wednesday, April 29, 2020

**Georgia Center for Continuing
Education, Athens, GA**

CTEGD Welcomes Two New Faculty Members



Sam Kurup joined the department of cellular biology as an assistant professor with a joint appointment in the Center for Tropical and Emerging Global Diseases.

Kurup earned his doctorate in the department of cellular biology at the University of Georgia in 2013 and completed his post-doctoral training at

the University of Iowa in the laboratory of John Harty

Research in the Kurup lab is focused on understanding the mechanism of natural and acquired immunity to liver-stage malaria. They investigate the cellular and molecular pathways that help detect Plasmodium in the infected hepatocytes and help drive immunity to the parasite.

His laboratory is located in the Coverdell Center.



Diego Huet joined the pharmaceutical and biomedical sciences department as an assistant professor with a joint appointment in the Center for Tropical and Emerging Global Diseases.

Huet received his doctorate in molecular parasitology at the Pasteur Institute and Pierre et Marie Curie University in Paris, France, in 2013.

He served as postdoctoral fellow at the Whitehead Institute for Biomedical Research under the mentorship of Sebastian Lourido and was a teaching assistant in the biology department at the Massachusetts Institute of Technology.

Huet's research is focused on molecular parasitology with an emphasis on apicomplexan parasites. Members of the apicomplexans include the causative agents of malaria, cryptosporidiosis and toxoplasmosis.

Currently, he is combining genetic, biochemical and cellular approaches with metabolomics and proteomics to study the unique aspects of apicomplexan endosymbiotic organelles.

His office is located in the Coverdell Center.

CTEGD Welcomes New Administrative Team Members

Business Manager - Angela McLendon
Accountant - Susan Clayton

In the News

Dennis Kyle appeared on Classic City Science which airs on local NPR station WUGA. [Listen to the interview.](#)

Steven Hajduk is quoted in an article about extracellular vesicles in the [Conservative Daily News](#).

Adrian Wolstenholme was the featured scientist at [NemaMetric](#).

Dennis Kyle was interviewed during the 4th Annual Amoeba Summit about his work with *Naegleria fowleri* for [Outbreak News Today](#).

David Peterson spoke at Athens Science Cafe on Malaria: from miasma to elimination. Read about it in [Athens Science Observer](#).



Entomology professor named inaugural Pulliam Chair holder

by J. Merritt Melancon, Sharon Dowdy, Sam Fahmy

Professor Michael Strand has dedicated his career to unlocking the power of basic science to improve agriculture, and that dedication has earned him the recognition of the state's agricultural community.

This fall, Strand, a professor of entomology in the University of Georgia College of Agricultural and Environmental Sciences and a member of the National Academy of Sciences, has been selected as the inaugural H.M Pulliam Chair at CAES.

The chair was established in 2018 by the family of Henley Morris Pulliam, who served as an agriculture teacher in Georgia during the heart of the Great Depression and through his retirement in 1968.

"My father was a dedicated schoolteacher who gave everything he had to his family and to others," said Pulliam's son, Morris Michael Pulliam, an established ophthalmologist in Covington.

H.M. Pulliam's dedication to his family and love of UGA prompted the Pulliam family to establish the professorship in their patriarch's name. Strand was an excellent candidate for the role because of the impact his work has on UGA and agriculture.

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Sharing the Knowledge: NIH Award Supports Expanded Genomics Data Resource

by Alan Flurry

A team led by scientists at the University of Pennsylvania and University of Georgia provides thousands of researchers around the world with access to the Eukaryotic Pathogen Genomics Database (EuPathDB.org), a collection of resources for analyzing large-scale datasets associated with microbial pathogens. These include the parasites responsible for malaria, sleeping sickness, and toxoplasmosis; the fungi responsible for thrush, aspergillosis and Valley Fever; and many other important diseases. In parallel, a team led by investigators at the University of Notre Dame has been responsible for similar resources covering invertebrate vectors of disease (Vector-Base.org), including the mosquitoes transmitting malaria, Zika, and yellow fever, the ticks responsible for Lyme disease and Rocky Mountain Spotted Fever, and others.

To ensure that this important work continues, the National Institute of Allergy and Infectious Diseases, a part of the National Institutes of Health, has awarded a new contract to integrate these resources, worth up to \$7.2 million in 2019-2020. The five-year award for this project, rebranded as VEuPathDB.org (The Eukaryotic Pathogen, Host & Vector Genomics Resource) could total as much as \$38.4 million if all associated options are exercised.

The patterns revealed by such “Big Data” provide insight into important diseases, permit the development of diagnostic methods, and define drug and vaccine targets. But to be useful, these immense datasets must be sensibly organized and made conveniently accessible to the researchers worldwide. The integrated VEuPathDB database hosts data on thousands of genomes, representing hundreds of species, along with extensive information on isolate provenance, gene function and the like.

The award is based at Penn, and directed by David S Roos, E Otis Kendall Professor of Biology in the School of Arts & Sciences. Key subcontracts include the University of Georgia (Joint PI Jessica C. Kissinger, Distinguished Professor of Genetics and Bioinformatics in the Franklin College of Arts and Sciences and the Center for Tropical and Emerging Global Diseases), University of Notre Dame (Joint PI Mary Ann McDowell, Associate Professor of Biological Sciences at the Eck Institute for Global Health). Additional co-investigators include Professors Christian Stoeckert of Penn’s Perelman School of Medicine, Mark Caddick of the University of Liver-

pool, George K Christophides of Imperial College London, and Paul Flicek, Associate Director of the EMBL-EBI (European Bioinformatics Institute).

“It is wonderful to see the continued investment by NIH, the Wellcome Trust and others in resources that make performing much needed global research on infectious diseases both easier and better,” Kissinger said. “Datasets are larger and more complex than ever due to significant advances in technology. These breakthroughs create challenges for making the resulting data truly accessible and usable by the average researcher. We strive to remove barriers, integrate diverse



VEuPathDB
Eukaryotic Pathogen, Host & Vector
Informatics Resources

data and accelerate the speed with which new hypotheses can be generated and ideas tested both in silico and in the lab.”

“A critical aspect of this now joint program will be its accessibility throughout the world, empowering any infectious disease investigator to interrogate these highly complex databases in comprehensible and productive ways,” said Dan Colley, UGA professor of microbiology and member of the CTEGD who has conducted extensive research on schistosomiasis in western Kenya. “These databases have led, and the merged data base will lead, to the design of new drugs and studies on how to better control and eliminate these major public health challenges, such as malaria, toxoplasmosis, yellow fever, eastern equine encephalitis and Lyme disease.”

“Since its conception, corresponding with the release of the first parasite genomes, EuPathDB has been a transformative tool in our search for a better understanding of human disease and parasite biology,” said Stephen Hadjuk, Professor Emeritus of biochemistry & molecular biology at UGA whose lab investigates trypanosomes, the causative agent of an human African sleeping sickness. “Today, it’s difficult to

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Trainee Spotlight: Josh Butler

New T32 trainee Josh Butler is a third year Ph.D. student in Belen Cassera's laboratory. He is from Front Royal, Virginia and completed his B.S. in chemistry at James Madison University in Harrisonburg, Virginia.

Butler decided to pursue his graduate degree at the University of Georgia because of the Integrate Life Sciences program which offers the opportunity to explore a range of research topics. The same interdisciplinary aspect is what he found appealing about the Center for Tropical and Emerging Global Diseases and ultimately why he joined a lab within this department.

"There is no shortage of resources here, ranging from state of the art instrumentation and core facilities to people that are willing to mentor and train successful scientists," said Butler. "Coming from a smaller institution, I had never really seen anything to this scale and I knew it was something I wanted to experience and become a part of."

Research Focus

Broadly, Butler's research is focused on antimalarial drug discovery. More specifically, he is using antimalarial natural products as tools to discover novel drug targets in the malaria parasite *Plasmodium falciparum*.

Nearly 220 million people have malaria, and it kills nearly half a million people each year. *Plasmodium falciparum* causes the most severe forms of malaria, such as cerebral malaria, which can lead to brain damage, coma, and death, and placental malaria, which can be life-threatening to both mother and fetus.

"I chose this research because not only does it contribute positively to the global campaign of malaria eradication, but from a training standpoint it would also provide a solid foundation for a career further researching and developing antimicrobial therapies in general."

Capstone Experience

Each T32 trainee is provided with the opportunity to pursue a capstone experience. Butler hopes to do an internship with a pharmaceutical industry research group that is actively performing anti-parasitic research to experience how the type research he does as a graduate student can translate outside the realm of academia.

"Private-public collaboration in malaria research has really driven drug discovery research in a positive direction and I would like the opportunity to experience that first hand and develop acumen to engage in that type of research in the next stage of my career."

Future Career Goals

"I would like to continue working in a field of scientific research which can positively impact people's lives, whether it be through a biomedical or biotechnical avenue."

Advice for Aspiring Scientists

"Don't be afraid to fail or be wrong. Learn from it and use it to keep pushing forward. Try to find positives in the negatives."

Sharing the Knowledge cont.

imagine any serious research on parasites and host pathology that doesn't rely, at least to some extent, on EuPathDB. The decision to incorporate the vectors database into the eukaryotic pathogens database was brilliant, and makes this an exciting new chapter in the EuPathDB story."

"Innumerable investigators, including my own laboratory, rely on daily access to the high quality genomic and functional datasets made available by the VEuPathDB Project," says Keith Gull, Professor of Molecular Microbiology at Oxford University. "Sustainable support for such resources is imperative if we are to capitalize on the promise of modern technologies for scientific discovery and translational application." Joe Heitman, James B Duke Professor / Chair of Molecular Genetics & Microbiology at Duke University agrees: "Inclusion of fungal pathogens under the BRC umbrella has greatly enhanced our ability to study important human mycoses. Cross-species comparisons provide insights into the biology and pathogenesis of these fascinating organisms, which can be deadly – but can also serve as workhorses for valuable biotechnology development."

Originally published at <https://www.franklin.uga.edu/news/stories/2019/sharing-knowledge-nih-award-supports-expanded-genomics-data-resource>



What's Bugging Michael Strand?

The unassuming mosquito may be smaller than a dime, but it packs a serious punch, killing more people each year than any other animal. And with average temperatures climbing around the globe, different mosquito species are making their way farther north than ever before and bringing their diseases—malaria, West Nile, dengue, and more—along for the ride.

But thanks to recent discoveries at the University of Georgia, it may soon become easier to fend off the swarm.

Regents Professor of Entomology Michael Strand's lab found that microorganisms, or microbes, in a mosquito's gut are

When warm weather approaches, so do pesky little bloodsucking pests.

essential for growth and development. Mosquito larvae spend anywhere from a few days to two weeks developing in pools of water that can be as small as an upside-down bottle cap. Microbes colonize the larvae's digestive tracts, forming a community of microorganisms that enables the larvae to mature into adult mosquitos.

The implications of the findings could lead to new approaches for mosquito control.

"If you can disrupt their growth cycle, you could control mosquito populations," Strand says. "Certain combinations of these organisms that exist in the digestive system of the mosquito also affect how well they are able to acquire and transmit disease-causing microorganisms to people.

Understanding how these organisms alter the mosquito's ability to transmit diseases offers the potential for increasing resistance to certain organisms they can pass on to people."

From a more basic science perspective, insects provide a more simplified version of a microbiome, the ecological community of microorganisms that call a space home. Researchers often discuss the roles microbiomes, such as that of the human gut, play in an individual's health, but it's

difficult to sort through the billions of different organisms that can be present. Mosquitoes, and other insects in general, are much less complex, sometimes hosting only several hundreds of microorganisms in their digestive tracts. The smaller number of microbes make it easier for researchers to study.

"In effect, this simplicity reduces the many variables involved," Strand says. "Some of the rules determining the importance of gut microbes in mosquito development may also have generalizable applications in how similar processes are regulated in larger animals."

Sting like a Bee



Mosquitoes aren't the only insects Strand studies.

His interests lie in parasitology, or how parasites interact with the animals they feed from. Parasitic wasps, comprising over a million different species, are the perfect medium to study parasite-host interactions.

Around 100 million years ago, some parasitic wasps were infected by a virus that became part of their genome. Wasps coopted that virus to deliver different types of genes into hosts.

One way wasps accomplish that is by injecting the coopted virus into other insects along with their eggs. The virus then



CTEGD opens lab doors to undergraduates at area schools

by Donna Huber

When UGA alumna Dr. Sharon Keller accepted the position of Assistant Professor at Georgia Gwinnett College (GGC) she wasn't ready to say goodbye to the research project she started in graduate school. Since GGC is not a research-intensive institution, Keller approached her Ph.D. mentor Dr. Silvia Moreno, distinguished research professor in the department of cellular biology and member of the Center for Tropical and Emerging Global Diseases (CTEGD) at the University of Georgia, about continuing the project in her free time. It was during this conversation, that they came up with a way of not only keeping Keller in the lab but helping to solve a problem that many undergraduates in the biological sciences face – gaining independent research experience in an NIH-funded laboratory.

“The opportunity to be involved in a collaborative research project was very exciting and an experience that I knew would be attractive to GGC students who might be interested in this type of research,” said Keller.

In 2014, with matching support from Franklin College's Office of the Dean, the Center for Tropical and Emerging Global Diseases sought to increase diversity in graduate education by offering independent research opportunities to faculty from local non-research intensive institutions. Originally, it was meant to be a 1-month summer sabbatical for these faculty. However, during her conversation with Keller, Moreno saw an opportunity to expand the program.

“Students get very excited when they experience independent research,” said Moreno. “But at some of the smaller schools in the area, they don't have the opportunity to experience this level of research.”

Many undergraduate teaching labs consist of well-prepared protocols and information on the expected result. The experiments they conduct are supposed to work. That's not how it happens in real life. In a research lab, a student develops a different skill set from those they learn in a teaching lab. They use critical thinking, problem-solving, and result analysis skills to tackle real-world problems.

“As an instructor, I see the disconnect students can have between a learned concept and the application of that concept,” said Keller.

Keller agreed it was a great idea to include her undergraduates and began the process of selecting students shortly after their initial conversation. Makayla Yang, a student lab assistant in the biology department at GGC, was one of two students selected to accompany Keller 2 – 4 times a week to the laboratory of Dr. Roberto Docampo, the Barbara and Sanford Orkin –GRA Eminent Scholar in Tropical and Emerging Global Diseases.

“Working with trypanosomes at UGA was one of the greatest learning opportunities I have experienced,” said Yang. “It made me see the bigger picture of my work that it was not just an undergraduate research opportunity, but it was a contribution to science and what could be a future health solution.”

It is the hope of the program that by giving faculty and undergraduates from area schools real-life research experience more students will apply to graduate school and have the same competitive edge as students from research-intensive institutions.

For Yang, the experience has her thinking more about pursuing research and a Ph.D. “I was able to discover my true passion for lab bench work,” concluded Yang.

If you are interested in participating in this program, please contact Dr. Silvia Moreno.

Bugging cont.

infects the insects' cells in much the same way as modern medicine's gene therapies that use viruses to introduce genes into human patients for disease prevention or treatment.

The virus' genes suppress the host insect's immune defenses, which would otherwise destroy the foreign eggs. The wasps can then hatch and develop into adults while slowly consuming the host from the inside out.

The article first appeared on UGA's Great Commitments.



Database offers tool for global health collaboration

As the big data revolution continues to evolve, access to data that cut across many disciplines becomes increasingly valuable. In the field of public health, one barrier to sharing data is the need for users to fully comprehend complex methodological details and data variables in order to properly conduct analyses.

The Clinical Epidemiology Database, ClinEpiDB.org, aims to address these barriers by not only providing access to huge volumes of data, but also providing tools to help interpret complex global epidemiologic research studies. The development of ClinEpiDB has been led by the University of Georgia's Institute of Bioinformatics, University of Pennsylvania's School of Arts and Sciences and its Perelman School of Medicine, and the University of Liverpool's Institute of Integrative Biology.

On March 7, ClinEpiDB released data, methodology and documentation from “The Etiology, Risk Factors, and Interactions of Enteric Infections and Malnutrition and the Consequences for Child Health and Development” (MAL-ED) study. The MAL-ED study represents a nearly decade-long research collaboration between the Foundation for the National Institutes of Health (FNIH), Fogarty International Center, and an international network of investigators.

The MAL-ED study was designed to help identify environmental exposures early in a child's life that are associated with shortfalls in physical growth, cognitive development, and immunity. The study characterizes gut function biomarkers on the causal pathway from environmental exposure to growth and development deficits and assesses diversity across geographic locations with respect to exposures and child health and development. The MAL-ED consortium has published a significant library of peer-reviewed publications and ClinEpiDB now makes the MAL-ED data highly visible and accessible in new and exciting ways.

“It is great to see how investments and effort directed at data being Findable, Accessible, Interoperable and Reusable—i.e., F.A.I.R—are beginning to bear fruit,” said Jessica Kissinger, UGA Distinguished Research Professor of Genetics and co-principal investigator on the Bill & Melinda Gates Foun-

dation award that funded the ClinEpi Development. “Too many important studies are buried in the scientific or medical literature and not easily accessible or reusable in moving the frontier in the important battles related to infectious disease and human health. This multi-institutional, multiple-funder, interdisciplinary approach is working.”

ClinEpiDB is also home to the Global Enteric Multicenter Study (GEMS) which contains data from more than 22,000 children from seven sites in South Asia and Africa and was the largest-ever study to investigate the causes to moderate-to-severe diarrheal illness in children in lower- to middle-income countries. The most recent ClinEpiDB release also contains data from GEMS1A, a continuation of the GEMS study that broadened its scope to include less-severe diarrheal episodes. The addition of MAL-ED adds to the growing resource of high-quality maternal and child global health data.

“Over 10 years, our international network of investigators collaborated through MAL-ED to better understand the complicated relationships among intestinal infections, nutrition and other environmental exposures on child development,” said Michael Gottlieb, FNIH deputy director of science (retired) and lead PI for the MAL-ED study. “The MAL-ED Network generated a high-quality data set, possibly the largest of its kind, on various research areas from cognitive abilities to gut function to immunological response. We are pleased to make this dataset available through ClinEpiDB so it can be used by researchers far into the future to increase scientific understanding, test new research hypotheses and design and implement better intervention strategies to reduce childhood morbidity and mortality.”

MAL-ED sites (located in Iquitos, Peru; Fortaleza, Brazil; Haydom, Tanzania; Limpopo, South Africa; Bhaktapur, Nepal; Naushero Feroze, Pakistan; Vellore, India; Dhaka, Bangladesh) allowed for comparisons to be made among and between children living in geographically and culturally diverse urban and rural environments and in countries at different levels of economic development.

MAL-ED data in ClinEpiDB account for over 1.3 million observations covering anthropometrics, nutrition, vaccination sta-

tus, diarrheal and respiratory disease episodes and countless other details collected by community field workers in 2009-2014. The current release includes longitudinal data from children followed two times a week for the first 24 months of life.

Future data releases will contain data for some children up to 5 years of age. ClinEpiDB allows users to walk through these data easily via an intuitive interface, enabling point-and-click filtering, simple queries and more complex “search strategies.”

See <https://youtu.be/535PcFrBH8M> for a video introduction to this resource. ClinEpiDB will continue to grow and provide increased access to malaria and maternal and child health global datasets thus facilitating epidemiologic research in an open data environment while protecting patient identity.

Watch a video about **Silvia Moreno's** research
<https://youtu.be/SQj7rxdVSwQ>

Pulliam Chair cont.

“I am so pleased that Dr. Mike Strand will hold the H.M. Pulliam Endowed Chair. His career has garnered many accolades including a NATO Fellowship in Science, D.W. Brooks Award for Research, Regents Professor and member of the National Academy of Sciences,” said CAES Dean and Director Sam Pardue. “His honor is emblematic of the research excellence he has maintained for decades. Ranked eighth in the world by Times of London’s Higher Education Center for World University Rankings, UGA’s department of entomology achieved this distinction because of the efforts of Mike Strand and his colleagues.”

Strand came to the university in 2001. He holds an appointment in the entomology department in CAES and is a member of the Center for Tropical and Emerging Global Diseases and the Center for the Ecology of Infectious Diseases. His work as principal or co-principal investigator has generated more than \$31 million in competitive extramural funding and has been published in the world’s most selective research journals, including Nature and Proceedings of the National Academy of Sciences. Strand’s research has been cited at a level that places him in the top 1% of cited biologists. He has delivered invited seminars and symposia in nearly every department of entomology in the United States, numerous universities in Europe, Asia and Australia and many international meetings.

Strand is an elected member of the National Academy of Sciences, Fellow of the American Association for the Advancement of Science and Fellow of the Entomological Society of America. He is the recipient of the Entomological Society of America’s highest award in physiology, biochemistry and molecular biology and has also received the Brooks Award, the College of Agricultural and Environmental Sciences’ highest recognition for research.

The article first appeared in Columns on November 14, 2019

Newly funded projects

Jessica Kissinger is part of a \$21.9 million gene modulation research effort that targets influenza pandemics. [Read the press release.](#)

Dennis Kyle is part of an NIH grant studying orally bioavailable 4(1H)-Quinolones with multi-stage antimalarial activity.

Drew Etheridge had his project entitle Characterizing the unique endocytic organelle of Trypanosoma cruzi funded by the NIH.

Michael Strand and **Mark Brown** received NIH grants to study the endocrinology of mosquito reproduction and the role of the gut microbiome in mosquito development.

Noelia Lander was awarded a K99 Pathway to Independence award for NIH.

Check our website for recently published papers.

Recently the CTEGD calendar on the website migrated to the UGA Master Calendar. If you would like to have our calendar automatically added to your personal calendar, please follow these directions.

Visit our group page at https://calendar.uga.edu/group/center_for_tropical_and_emerging_global_diseases

Scroll down and between the upcoming events and recent events sections, click “view full calendar” link.

Scroll down to the bottom of the page. Look for the blue icons in the lower right corner above the footer.

G icon is for Google calendar
Calendar icon is for iCal
Clock icon is for Outlook
RSS icon is for RSS feed.

Upcoming Seminar:

Dawn Wetzel , M.D., Ph.D.
UT - Southwestern

January 13 @ 8:30 am
175 Coverdell Center

Support CTEGD with a year-end financial gift

Financial contributions from alumni and friends are vital to accomplishing CTEGD's mission to pursue cutting edge research in emerging global diseases and to train students in this field.

To truly impact global health through research, support from a variety of sources is required and donations from individuals, foundation, and corporations play a significant role.

Regardless of size, your gift can have an impact.

The CTEGD Fund is an unrestricted fund that allows us to support various initiatives of the students and faculty, such as those featured in this issue. A portion of this fund goes to the annual Molecular Parasitology & Vector Biology Symposium, an annual regional scientific meeting that has free registration.

Also, your tax-deductible gift provides travel opportunities to trainees. Such opportunities include attending national and international conferences to present their research as well as travel to international research sites. These international research opportunities are life-changing experiences for our graduate students and postdoctoral trainees.

Learn more about how you can support our research and training efforts: <https://ctegd.uga.edu/give/>

