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Animal Behavior Bulletin

2022

Dear Animal Behavior Community,

In 2022 we were thrilled to return to in-person classes, in-person graduation celebrations, and an in-person Animal Behavior Conference.

In this year's bulletin, we highlight a few examples of the many accomplishments of our students, both graduate and undergraduate, and update you about developments in our undergraduate and graduate programs. We also bid a warm farewell to Linda Summers, CISAB's beloved administrative assistant of many years, and say hello to our new Program Management Assistant, Jessica Smith.

In addition, be sure to check out the "What Are They Up to Now?" section, which features updates on some of our recent undergraduate, predoctoral and postdoctoral trainees.

Along with many outstanding contributed talks and posters by students and postdocs, highlights of the 2022 Animal Behavior Conference included a fascinating plenary talk by this year's Exemplar Awardee Susan Alberts, along with a keynote presentation by Troy Smith.

As always, many thanks for all of your contributions to the Animal Behavior community. CISAB thrives on the strength of its engaged faculty and student members, both past and present.

We can't do it without you!

Cheers,



Congratulations CISAB and CTRD Fellowship Recipients

CISAB Fellowship Recipients 2022-2023



Katie Talbott
Ketterson Lab



Mary Woodruff
Rosvall Lab



Sarah Wolf
Rosvall Lab



Ashwini Ramesh
Bashey-Visser Lab



Liz Aguilar
Rosvall Lab

CTRD Predoctoral Fellows 2022-2023



Liz Aguilar
Rosvall Lab



Sierra McAlister
Hurley Lab



Malia Piazza
Garcia -Gesselman Lab

Congratulations ABEH Graduates

May Reception for Animal Behavior Majors Graduating in 2022



2022 Graduates

Liz Abbott
Caroline Abrams
Makayla Adams
Riley Beam
Emma Clookey
Jasmine Collins
Allison Devries
McKenna Downey
Austin Ehrie
Courtney Eshelman
Case Fleck
Toudora Galuska
Marissa Gore

Sheldon Gottschalk
August Greene
Diego Guerrero
Alyssa Harkness
Gray Hite
Joshua Horan
Aron Janko
Brynn Kellermeyer
Madeline Larrison
Anissa Liphford
Junlin Lu
Abby McDowell
Chloe Miller
Morgan Miller

Kaitlyn Mills
Jae-Lynn Owsley
Cade Parker
Sara Pfister
Cassie Roberts
Jess Rosebrough
Madison Rust
Sarah Smith
Shannon Smoot
Makayla Swinford
Haley Walls
Annie Wilhelmus
Lauren Wilkins

Congratulations CISAB Members

PhDs Awarded to CISAB Graduate Students 2022



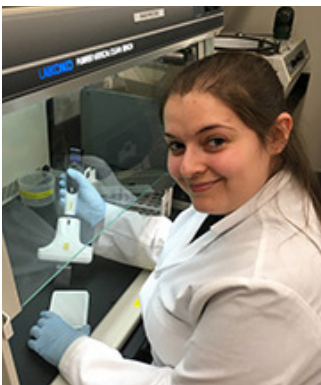
Dr. Ashwini Ramesh, *Bashey -Visser Lab and Hall Lab*:
THE PARADOX OF THE PARASITE: ECOLOGICAL MECHANISMS OF
PARASITE SPECIES COEXISTENCE



Dr. Sarah Wolf, *Rosvall Lab*:
LINKING TELOMERE REGULATION AND LIF HISTORY VARIATION
ACROSS LEVELS OF BIOLOGICAL COMPLEXITY



Dr. Kat Munley, *Demas Lab*:
MELATONIN AS A NEUROENDOCRINE REGULATOR OF SEASONAL
AGGRESSION IN SIBERIAN HAMSTERS (*PHODOPUS SUNGORUS*)



Dr. Misty Proffitt, *Smith Lab*:
GENOMIC MECHANISMS UNDERLYING SPECIES VARIATION IN
SEXUALLY DIMORPHIC COMMUNICATION SIGNALS IN SOUTH
AMERICAN WEAKLY ELECTRIC FISH (*FAMILY APTERONOTIDAE*)

Congratulations Animal Behavior Majors

Phi Beta Kappa Awardees

Cami Elizabeth Albers

Austen J. Ehrie

Case Fleck

Annie Wilhelmus

Toudora Galuska

Austen Ehrie Completed a Honors Thesis in Animal Behavior

Strategic Reproduction: Evaluating the Relationship between Testes Size and Howling Bouts across *Alouatta palliata* Groups



As a result of energetic constraints, sexually reproducing organisms often only invest in a few reproductive traits and strategies; with a trade-off commonly occurring between pre-copulatory and post-copulatory strategies. Across howler monkey species there is a trade-off between the pre-copulatory strategy of hyoid size and subsequent howling dynamics and the post-copulatory strategy of testes size and subsequent sperm production. This relationship is mediated by the number of males typically occupying groups in those species. Our study aimed to evaluate whether this same trade-off persists and creates variation at the inter-group level within a single species. Testes size measurements derived from parallel laser photogrammetry, howling bout duration, and number of howls for given howling bout were recorded across fourteen groups of mantled howler monkeys (*Alouatta palliata*). Our results indicated that this trade-off does persist at the group level; however, it is not mediated by the number of males within a group. This suggests that mantled howler monkeys may not be able to modify reproductive strategies based on group

dynamics, although a larger sample size is required to more definitively support these claims. A key objective from this study was to provide support for the validity of using parallel laser photogrammetry to make measurements of relatively small anatomy; this will be important for future studies as it will minimize the negative impacts that manual and invasive methodology can have on study subjects.

Congratulations Animal Behavior Majors

ABEH Summer Internship Awardees

Sabrina Simms

Austen J.Ehrie

Animal Behavior Says Goodbye and Hello

Linda Summers leaves Animal Behavior + CISAB to enjoy retirement



Linda Summers, our Administrative Assistant, retired in July 2022 after many years of outstanding service to CISAB. During her time with us, she demonstrated over and over again her commitment to CISAB, her support for CISAB faculty and students, her extreme competence, and her willingness to go the extra mile to help CISAB grow and thrive. While Linda was instrumental in helping every aspect of running CISAB and the Program, she was especially committed to, and integral to, the success of our NSF-funded summer Research Experience for

Undergraduates (REU) program. Indeed, REU director Laura Hurley regarded Linda as a co-Director. She was critical to nearly every phase of the REU, including serving as a ‘mom away from home’ to the REU interns. Five years ago, we began a tradition of inviting alumni of the REU program to present their research at the Conference. This year, in recognition of her service to CISAB and to the REU Program, we have established this tradition as the Linda Summers Conference Fellows.

We extend our heartfelt gratitude for everything Linda has done for CISAB and the Program, and wish her bon voyage as she sets out on the next stage of her journey!

Animal Behavior + CISAB welcomes Jessica Smith



Animal Behavior’s new Program Management Assistant, Jessica Smith, took on the role recently vacated by Linda Summers’ retirement.

Jessica comes to us from the *American Historical Review* in the History department, where she was the production assistant, coordinating the Review’s book review process. She brings an assortment of organizational, administrative, and people skills to the job.

News from the Mechanisms of Behavior Lab

From Lab Director David Sinkiewicz



The CISAB Mechanisms of Behavior Lab continues to offer access to a variety of equipment and reagents to support research efforts primarily in the life sciences. Our services that include reagents are available on a per-sample basis, and, as always, our equipment is available to use free of charge. Our Lab Director is also available for training and experimental consultation.

The CISAB Lab is a designated Indiana Clinical and Translational Sciences Institute (CTSI) service core facility.

This affiliation offers unique funding opportunities through the CTSI itself. We have had multiple scientists win CTSI awards for use in the CISAB Lab and we look forward to supporting even more researchers in their efforts to secure the needed funding to ensure their projects are successful.

This year we have seen renewed interest in hormone extractions and assays, while continuing to see consistent qPCR work. These projects have been primarily done by IU scientists, including graduate students, postdocs, and faculty. We have also worked collaboratively with several external groups who have utilized the services available through the CISAB Lab.

Our pipetting robot has also begun to see some expanded use. While initially envisioned as a way to increase precision and decrease time and physical strain when pipetting 384-well plates, it has now found use as a facilitator of high throughput cell culture investigations. This has proven to be a useful and versatile tool for life scientists at IU!

The CISAB Lab also continues to collaborate with the A501 Techniques in Reproductive Diversity course by providing space and equipment enabling junior graduate students a hands-on opportunity to be introduced to techniques that can be valuable in their graduate research projects.



Pictures right to left: Graduate students at Kent Farm learning about mist netting for bird catching, nematodes under a microscope (photo provided by Nicholas Levis), Nicholas working with graduate students in the Lab for A501

Program In Animal Behavior Courses

From Dr. Adam Fudickar



It's turning out to be another great year in the Animal Behavior Program. The enthusiasm that the undergraduate students have in the classroom makes it a pleasure to work with them. Our students have a range of opportunities to explore their interests with internships, lab experiments, and interactions with accomplished guest speakers. This year, students in Animal Behavior Workshop and Animal Conservation have been visited by experts from the Indiana Department of Natural Resources, Sycamore Land Trust, Indianapolis Zoo,

Discovery Cove Orlando, IU Department of Anthropology, and the Indiana Canine Assistance Network. Animal Behavior interns have been exploring diverse career paths with external conservation organizations, veterinarians, and zoos across the country. These students share their internship experiences with other majors in the Animal Behavior Workshop.

Students in the Animal Behavior Laboratory course (ABEH-A350) are busy running experiments exploring topics such as optimal foraging theory, resource competition, and chronobiology. Due to high demand, next year, we will offer the Animal Behavior Laboratory course in both Spring and Fall semesters. We hope that offering Animal Behavior Lab in the spring will allow more Animal Behavior and Biology majors to take the course.



Pictures right to left: Students in the Animal Behavior A350 lab observing reverse turning in millipedes, ABEH alumni Cheyenne Zammit and August Greene volunteering with Wildcare, Inc. to give a presentation on their center, Students in A350 observing crayfish aggression following introduction of an intruder crayfish to their home aquariums

Photo Essay: ABEH + Science Fest



2022 Alex Black Memorial Scholarship

Caroline Abrams interned at the Mote Marine Laboratory and Aquarium in Sarasota, FL

In the summer of 2022, with the generous support of the Alex Black Memorial Scholarship, Caroline interned at Mote Marine Laboratory and Aquarium in Sarasota, Florida with the nighttime sea turtle tagging team. She worked on-site at Casey Key Beach in Nokomis. Casey Key Beach is a nesting habitat for both loggerhead (*Caretta Caretta*) and green (*Chelonia Mydas*) sea turtles, and has the highest sea turtle nesting density on the west coast of Florida.

Each night they surveyed the beach for nesting adults. Each turtle was labeled with a Passive Integrated Transponders (PIT) tag, a small microchip inserted into the rear flippers and flipper tags on the front two flippers. Caroline took measurements of their carapaces, checked for injuries, and participated in hatchling research and releases.

Over the course of her internship, Caroline also assisted in the satellite tagging of multiple loggerhead and green sea turtles. This tagging technique, which uses tags that geolocate above water, works well because sea turtles must surface every two hours at minimum for another breath of air. All of the turtles whose satellite taggings Caroline assisted with can be tracked online at mote.org/sea-turtle-tracking.

All marine turtle images taken in Florida were obtained with the approval of the U.S. Fish & Wildlife Service (USFWS) and the Florida Fish & Wildlife Conservation Commission (FWC) under conditions not harmful to these or other turtles. Images were acquired while conducting authorized research activities pursuant to FWC MTP-22-155A.



2022 Alex Black Memorial Scholarship

Brock Bucker interned with the Indiana Raptor Center in Nashville, IN



Brock interned at the Indiana Raptor Center, which rehabilitates birds of prey. As an intern, he held birds during examinations, helped move them from the ER to outdoor enclosures, and helped with flight testing birds within a flight cage. Brock also accompanied executive director Patti Reynolds on visits to the veterinary clinic to observe the assessment process, and learn what an x-ray looks like for a bird of prey. He also learned how to properly hold birds of prey, maintain enclosures, cut up mice and rats for the smaller and younger birds, and so many other interesting details about the birds themselves. The most common injury in birds of prey, he learned, is a wing break in the left wing due to birds commonly being hit by oncoming traffic. He learned a lot about the vast array of injuries that are commonly seen in birds of prey, and that the severity of an injury has a lot to do with the location of said injury.

“One key thing I learned throughout my stay is how many birds end up being non-releasable,” Brock said. “Although one might expect mortality rates to be a little high for rehab centers, due to many injuries being life-threatening, many of the ones that do survive end up with life-altering injuries. Most may end up being releasable (>1/2 throughout my stay), but there are more life-long patients then one might expect. I had the pleasure of meeting a handful of the permanent residents located within the Indiana Raptor Center.”

Brock exclaimed that this journey, although short thus far, has been one heck of an experience. “I’ve already learned so many interesting things throughout this summer and cannot wait to see what all is left for me to do and see. The people here are all quite outstanding and are all very fun to be around. This experience has definitely made quite an impression on me and my life.”



Top to bottom: Brock Bucker holding a juvenile Red-tailed hawk after receiving treatment, an Educational Ambassador Golden Eagle in an outdoor flight cage

2022 Animal Behavior Conference

Our first in-person conference post-COVID brought together animal behaviorists from across the country. About 190 people from more than 25 institutions from many states, including Indiana, Ohio, Illinois, Michigan, North Carolina, California, and Georgia attended. We were thrilled to welcome back alumni of both our undergraduate and our graduate programs, as well as previous interns in our summer REU program. In addition to the many contributed talks and posters by students and postdocs, we enjoyed a fascinating plenary talk on early adverse experiences and mortality in baboons by this year's Exemplar Award winner Dr. Susan Alberts. Dr. Troy Smith treated us to an interesting keynote on communication in electric knifefish.



Cover designed by Michelle Benavidez

CISAB Exemplar Award 2022: Susan Alberts

Dr. Alberts earned her bachelor's degree at Reed College before obtaining her PhD from the University of Chicago. She completed her postdoctoral research at the University of Chicago and at Harvard, and has had a faculty position at Duke since 1998, where she is now the Robert F. Durden Distinguished Professor of Biology. Dr. Alberts co-directs the Amboseli Baboon Research Project—a project that began in 1971 with Jeanne Altmann and has continued since then with continuous longitudinal, daily study of baboons in the wild. Susan's work explores fundamental questions of the fitness consequences of social behavior, using approaches that integrate behavior, life history, demography, and genetics. The results of her work have implications not just for basic science but also for human health and disease. Susan is a National Academy member, a fellow of the American Association for the Advancement of Science, the American Academy of Arts & Sciences, and the Animal Behavior Society. She has won countless awards for her work, including the Sewall Wright Award from the American Society of Naturalists and the Distinguished Primatologists Award from the American Society of Primatologists. She is also an excellent mentor and teacher.



2022 Animal Behavior Awards

Rowland Award 2022: Kayleigh Hood

Kayleigh pursued a PhD in Biology in Laura Hurley's lab, investigating the role of serotonin in how environmental context modulates a mouse's perception of communication calls. Kayleigh has a strong interest in pedagogy, mentorship, and outreach. While at IU, her many contributions to mentorship and teaching included co-organizing and developing demonstrations for a STEM activities day at a local elementary school; mentoring students in the lab through CISAB's REU summer research program, the Louis Stokes Alliance for Minority Participation program, and IU's Center of Excellence for Women & Technology; and teaching a course on her own in Spring 2021 while co-instructing a readings course. Kayleigh's mentees have described her as "patient, kind, and insightful" and say they "couldn't have asked for a better introduction to lab work."



Rowland Award 2022: Ashwini Ramesh

A graduate student in Biology, Ashwini worked with Farrah Bashey-Visser to examine the eco-evolutionary processes that govern host-parasite interactions and their consequences for disease spread. A skilled and caring mentor, Ashwini worked one-on-one with nine undergraduates over her six years at IU, while also giving advice and guidance to other undergraduates in the lab. Much of Ashwini's mentorship focused on students who are part of groups that are underrepresented in the sciences, through CISAB's REU program and the Center for Excellence of Women in Science & Technology. Dr. Bashey-Visser noted Ashwini's selfless dedication to serving as a guide and role model for undergraduates, with her mentoring going beyond supervising research to include organizing a series of lab meetings focused on professional development for the undergrads in the lab.



Ashwini has also devoted much effort to service, including organizing the EcoLunch for graduate students, helping to organize the Animal Behavior Conference, leading a workshop on coding in R for the REU students, and working on efforts aimed at increasing diversity and inclusion in STEM fields.

2022 Animal Behavior Awards

Hanna Kolodziejski Award 2022: Kat Munley

As a PhD student working in Greg Demas's lab, Kat examined the role of melatonin, DHEA, and neurosteroids in regulating seasonal aggression in hamsters. She was quite productive in this work, publishing multiple empirical papers in top-ranked journals, as well as two review articles and a methods paper.

Kat made student mentoring a priority, working with many undergraduates during her time at IU. This included mentoring a student through the design and implementation of an undergraduate honors thesis, several students in our REU program in animal behavior, and a high school student via the Jim Holland Summer Science Research Program. Seven of her mentees are co-authors on published papers in peer-reviewed journals.

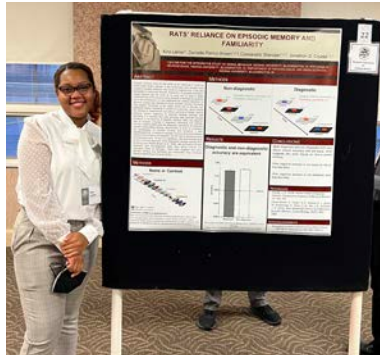


Kat served on organizing committees, moderated sessions, and was a judge for the undergraduate poster competition for our annual Animal Behavior Conference. She also was co-founder and co-chair of EEBorg, which represents graduate student interests in Biology's Ecology, Evolution, and Behavior program, and was active in IU's Graduate and Professional Student Organization. Kat's outreach to the broader community included contributions to IU's science blog, serving as an instructor for the College's Foundations in Science and Mathematics Program, designing and teaching an Animal Diversity course for local middle and high school students, participating in IU's STEM Research Bootcamp, leading an undergraduate workshop on writing abstracts and giving poster presentations, volunteering for IU Science Fest and "Skype a Scientist", and judging in the Indiana Junior Academy of Science Outstanding Junior Scientist Competition.

In all, Kat combined her talents and efforts in research and mentoring with her civic obligations to give back to her community in the form of science communication and outreach. As her mentor Greg Demas put it, "In this age of science misinformation and distrust, this is a critical task and it's important to have ambassadors like Kat to help lead the way."

2022 Animal Behavior Conference

2022 Linda Summers Conference Fellows



With support from the departments of Biology and Psychological & Brain Sciences, as well as generous donations in memory of late CISAB alumnus Dr. Ronald Villareal, we initiated a tradition of sponsoring outstanding REU students to return to campus to present at the Animal Behavior Conference.

Vivian Huynh

FUNCTION OF CHIRPING DURING SOCIAL INTERACTIONS IN STERNARCHORHYNCHUS SPP.
California State Polytechnic University Pomona

Kira Lainer

RATS' RELIANCE ON EPISODIC MEMORY AND FAMILIARITY
Winston-Salem State University, Crystal Lab

Gabriel Jimenez

THE EFFECTS OF UNFAMILIAR MAKE ODOR DURING SQUEAK PLAYBACK ON MALE MOUSE VOCALIZATIONS BASED ON DOMINANT AND SUBORDINATE STATUS
Ursinus College

2022 Trainee Exchange



Jad Nasrini

ADULT RHESUS MONKEYS DO NOT COPY THE CHOICES OF A CONSPECIFIC SHOWN IN VIDEOS
Department of Psychology and Yerkes National Primate Research Center, Emory University

Nicole Rigney

BEHAVIORAL SEX DIFFERENCES CAUSED BY DISTINCT VASOPRESSIN SOURCES
Graduate Student, Neuroscience Institute, Georgia State University

2022 Trainee Exchange: Brains & Behavior Annual Retreat



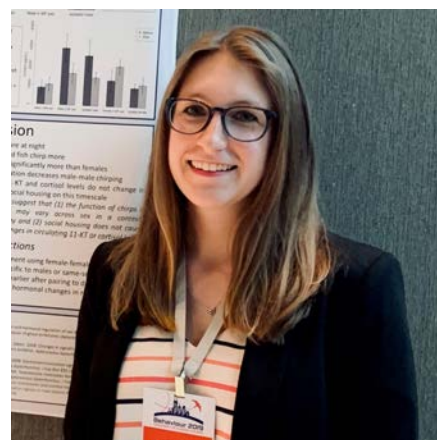
Devraj Singh

It was a pleasure attending in person after 2 years of post-pandemic. I was grateful to have been given the opportunity to attend the 2022 Brain & Behavior Annual Retreat organized by Georgia State University. Megan Freiler and I both felt privileged to get this opportunity to represent IU and continue the long-running exchange program between the two centers. We were warmly welcomed by our hosts, Georgia State University neuroscience graduate students and postdocs. The

symposium started with introductory remarks by Professor Dan Cox, followed by five talks given by postdocs and graduate students from Georgia State University. We had an opportunity to meet the keynote speaker, Professor Ketema Paul, and learn about his exciting research on how Brain and Muscle ARNT-Like Protein 1 (Bmal1) in skeletal muscle provides protection from sleep loss. I enjoyed his talk very much, which led to several interesting questions and discussions. I had a chance to discuss my research on seasonal timing of reproduction in dark-eyed junco populations. Later, I enjoyed visiting different posters presented by Georgia State University graduate students and discussed my research on daily and annual timing mechanisms using birds as a model system.

Megan Freiler

I was grateful to have the opportunity to travel to Atlanta to attend and present at Georgia State's annual Brains and Behavior retreat. I enjoyed listening to talks that spanned a wide range of disciplines, but all still intersected with neuroscience. The keynote speaker, Dr. Ketema Paul, was especially engaging. He discussed his ongoing research on the genetic underpinnings regulating sleep and recovery from sleep loss. I was amazed to learn that genes expressed in muscle play an equally important role as the brain in regulating sleep. At the evening poster session, I presented my findings on how social context modulates communication and steroid production in a species of electric fish. I appreciated interacting with the faculty and students at Georgia State throughout the conference. It was helpful to discuss my research with people who were more clinically focused. It is also always fun to introduce people to the unique model system I work with, weakly electric fish. After the poster session, a few of the graduate students took me to dinner at a local restaurant where we discussed our ongoing research. Overall, I greatly benefited from learning about the integrative behavioral neuroscience work being conducted at Georgia State and from networking with colleagues outside of my own institution.



What are they up to now?

Erin Habig, Aquarium Biologist at Mote Marine Laboratory and Aquarium, Sarasota, FL

I knew from a young age that I wanted to care for animals. IU, and specifically the Animal Behavior Program, helped these dreams become a reality. During my time at IU, I met many amazing people and professors that shaped my career in animal husbandry. I also owe a huge thanks to the Center for Underwater Science—their immersive program and dedicated professors gave me the opportunity to work on artificial reefs in the Dominican Republic and obtain certification as a PADI Rescue diver. This experience and certification made me a standout candidate for the position I fill currently at Mote Marine Laboratory. Through different connections and courses at IU, I was encouraged to take part in several internships, including at Mad4MyDog in Bloomington, where I taught owners about positive reinforcement and aided in training domestic animals. Later, I interned at Mote Marine Laboratory and Aquarium in the Mammals and Reptiles department where I work currently. After completing my summer at Mote in 2018, I came back to IU, and in my ABEH-A200 course, I met the supervisor of the Aquatics department at The Fort Wayne Children's Zoo (FWCZ). The summer after I graduated IU, I moved to Fort Wayne, IN and completed an internship with otters, crocodilians, sea lions, and African Penguins. Then, I completed a seasonal position at the FWCZ where I worked as a zookeeper, caring for small felids, primates, rodents, and several species of birds.

After the seasonal zookeeper position, I moved to Sarasota, Florida and started in the position I currently work in at Mote Marine Laboratory and Aquarium. I am an Aquarium Biologist II, caring for North American river otters, an American alligator, manatees, an alligator snapping turtle, cane toads, an Eastern indigo snake, roseate spoonbills, domestic rats, a gopher tortoise, sea turtles, and a variety of fish. We have both aquatic, semi aquatic, and terrestrial animals to train, enrich, and care for. Each day is a different adventure. Some days are more training-focused, working on training husbandry behaviors to aid in us taking the best care possible of our animals that we can. Other days, we are educators, talking with small- and large-scale tour groups. We even work with scientists to train behaviors for research projects. One of my newest responsibilities is being a mentor for our internship program. I have really enjoyed being able to make connections with prospective animal care professionals, help them learn about the field, and help them on their path in animal husbandry.



What are they up to now?

Dr. Alexandra Bentz, Assistant Professor of Biology, University of Oklahoma



Dr. Alexandra Bentz, a postdoctoral alumnus of the CTRD and the Rosvall lab, is in her second year as an Assistant Professor of Biology at the University of Oklahoma. Her lab focuses on how social experiences are encoded into organismal function and, in some cases, communicated across generations. She combines behavioral endocrinology and genomics to explore how variation in a female's hormonal response to her social environment causes lasting changes in herself and transgenerational effects, generating long-lasting (potentially adaptive) changes in the behavior and physiology of her offspring. In particular, the maternal sex steroid testosterone is transferred to offspring during development and can cause lasting behavioral changes. Three graduate students have joined the lab to explore questions about this maternal effect using wild songbirds and wild-caught songbirds housed in the newly constructed outdoor aviary. Jasmeen Kaur, a PhD student and alumnus of Indiana University, is planning to keep wild-caught house sparrows in captivity to study the molecular mechanism underlying maternal effects. She will perform pharmacological manipulations of testosterone in eggs and determine how neurogenomic and cellular processes change across development, from embryo to adult, connecting early-life modifications to later brain and behavior. Leigh Bailey, a master's degree student, is working to understand how embryonic metabolism of testosterone affects its ability to influence development. Finally, PhD student Anna James is working on a project that will shed light on why this maternal effect is not present across all species or even all females. While hormone-mediated maternal effects are common and numerous studies have manipulated a female's environment and measured the degree to which she alters testosterone allocation to eggs, almost half of these studies obtained non-significant results. Anna will use machine learning to identify whether there are particular environmental contexts that are better at eliciting ovarian flexibility or if there are life-history traits that may have shaped a female's ability to respond hormonally. In addition to this current research, Bentz is also teaching Endocrinology and Physiology courses, and is working with graduate students to create an annual graduate student symposium to help showcase their research to the community at-large.

What are they up to now?

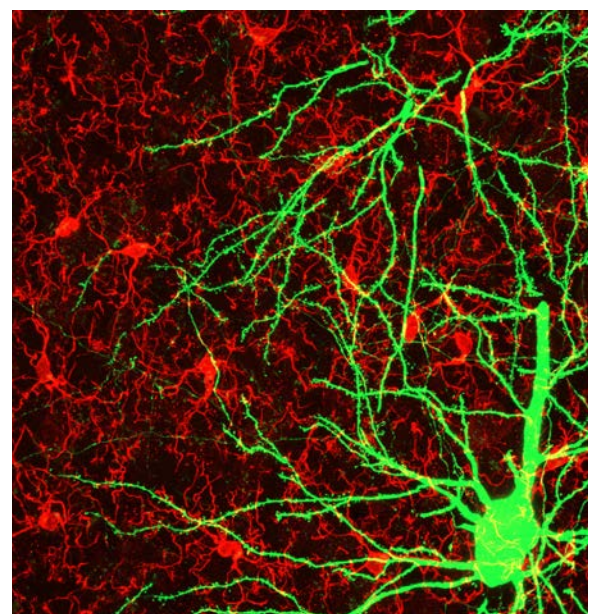
Dr. Justin Bollinger: Expanding our Understanding of Glia in Stress, Neuroplasticity, and Behavior



Glia were once thought of as the 'glue' of the central nervous system. We now know that these cells are critical in maintaining brain homeostasis, regulating neurotransmission, and modulating behavior. I first gained an interest in glia as a graduate student in Dr. Cara Wellman's lab at Indiana University. Despite the lab's neuronal focus, Cara encouraged me to branch out to examine sex-dependent stress effects on microglia, the resident immune cells of the brain. We found that psychological stress shifts microglia in the prefrontal cortex, a brain region implicated in depression, to an activated profile in male rats – yet a deactivated profile in females.

After graduating from IU, I joined the University of Cincinnati as a postdoctoral fellow in Dr. Eric Wohleb's lab. Here, I have extended my graduate research. Our recent findings indicate that microglia 'eat' bits of neurons in the PFC in male – but not female – mice exposed to chronic stress. This leads to a loss of synapses in males and subsequent deficits in behavior. A similar pattern is seen in people, with reports noting heightened microglial gene expression and reduced synapse-associated transcript in the frontal cortex of men – but not women – with depression. I have also characterized several pathways driving microglia-neuron interactions in stress. I have found that stress-induced neuronal activation leads to microglia-mediated remodeling of synapses in the prefrontal cortex and subsequent deficits in cognition and behavior. This occurs through the synaptic release of purines (e.g., ATP/ADP) acting on P2Y12, a receptor exclusive to microglia in the brain. These findings may be clinically relevant, as recent studies report heightened microglial expression of P2Y12 in the frontal cortex in depression.

Reflecting on my time with CISAB, a classic aphorism comes to mind: you never know what you've got until it's gone. I now see more than ever how unique the CISAB community is. This collective bridges various disciplines exploring behavior and encourages collaboration across these divides. Likewise, CISAB imparts a diverse perspective to its trainees through stellar courses, fellowships, a regional conference, and an amazing REU Program in Animal Behavior. I benefited greatly from these efforts and am constantly framing my work in translational neuroscience through a lens informed by my training at CISAB. I hope to carry this interdisciplinary spirit forward as I continue exploring links between stress, glia, and behavior.



Contributions to the Program in Animal Behavior help support our scholarship and fellowship programs, travel awards for graduate and undergraduate students, the Animal Behavior Conference, and more.

Please consider donating at myiu.org/one-time-gift. Type 'ANIMAL' in the search box to find "Program in Animal Behavior Fund"



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