



Animal Behavior Bulletin

2018

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Dear CISAB Community,

As I work with Office Assistant Charli Taylor and CISAB Administrative Assistant Linda Summers to put together this year's Bulletin, I'm once again struck by what a wonderfully diverse, accomplished, and engaged community CISAB is. It is full of examples of our engaged, energetic students, committed faculty and staff, and diverse and successful programs. I'm so glad to be part of this community, and honored that you've entrusted the directorship to me for the past few years.

Our graduate students are integral to CISAB's mission. In this issue, we congratulate the many CISAB students who **recently completed PhDs**, as well as our **CISAB fellowship recipients**. CISAB graduate students and postdocs organized a superb **2018 Animal Behavior Conference**, which provided a wonderful opportunity for undergraduates, graduate students, and postdocs to present their research. We were especially pleased to host plenary speaker and **2018 Exemplar Awardee Frans B.M. de Waal**. In addition, we thank our own **Kim Rosvall** for her Saturday keynote talk.

The undergraduate major continues to grow. Animal Behavior is currently the fifteenth largest major in the College, with 99 students! We are growing our curriculum accordingly with our latest **new course, Introduction to Animal Behavior**. Our undergraduates continue to seek out new learning experiences tailored to their interests through internships and summer research, **honors thesis research**, and more. We're so proud of our energetic, committed, and intellectually engaged students, and thrilled to be able to support some of their efforts through our Summer Scholarship Program.

In this newsletter, **CISAB Mechanisms of Behavior Lab** Director David Sinkiewicz reports on some exciting developments in the CISAB Lab, including the addition of a **pipetting robot**—hugely appreciated by those of us who have spent many hours pipetting for qPCR, ELISAs, and the like.

Directed by Laura Hurley and assisted by graduate student Colleen Friedly, fourteen undergraduates from across the U.S. participated in our NSF-funded **Research Experiences for Undergraduates**. The Summer 2018 program provided an intensive experience in mentored research in animal behavior, along with professional development workshops and fun outings. The NIH-funded training grant **Common Themes in Reproductive Diversity**, directed by Ellen Ketterson and Dale Sengelaub, appointed four predoctoral trainees and two postdoctoral fellows, and continued to provide a venue for fertile exchange of research ideas.

Thank you all for your participation in and support of CISAB! CISAB thrives because of the commitment of its faculty and student members, both past and present.

Cheers,



Congratulations CISAB Members



Linda Summers Marks 25th Year with CISAB

CISAB Administrative Assistant Linda Summers recently celebrated her 25th year at IU. Throughout the past 25 years, Linda has 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. Because of her professionalism, combined with her bright, cheerful, and gracious demeanor and her poise and thoughtfulness, Linda is beloved by faculty, students, and staff. She is the bright and cheerful heart of CISAB, and we are so happy she's stuck with us all this time!

PhDs Awarded to CISAB Graduate Students 2017-2018



Left to right:

Dr. Mikus Abolins Abols, Ketterson Lab: INTERACTION BETWEEN STRESS AND REPRODUCTION: A PHYSIOLOGICAL LIFE-HISTORY PERSPECTIVE

Dr. Justin Bollinger, Wellman Lab: EFFECTS OF STRESS ON MICROGLIA IN MEDIAL PREFRONTAL CORTEX: SEX SPECIFICITY AND HORMONAL DEPENDENCE

Dr. Rachel Hanauer, Ketterson Lab: STRESS PHYSIOLOGY AND DISEASE ECOLOGY IN RESPONSE TO URBAN ENVIRONMENT AND HUMAN DISTURBANCE: FIELD PATTERNS AND CAPTIVE MANIPULATIONS OF A COMMON SONGBIRD, THE DARK-EYED JUNCO (*JUNCO HYEMALIS*)

Dr. John J. Orczyk, Garraghty Lab: ION TRANSECTION-ASSOCIATED CHANGES IN GENE EXPRESSION ATTRIBUTED TO HOMEOSTATIC AND/OR USE DEPENDENT CHANGES IN THE RAT BARREL CORTEX, WITH SEX AND GONADAL HORMONE STATUS STUDIED AS FACTORS

Dr. Alicia Rich, Kaestle lab: POPULATION GENETICS OF EASTERN CHIMPANZEES (*PAN TROGLODYTES SCHWEIFURTHII*) LIVING IN TORO-SEMLIKI WILDLIF RESERVE, UGANDA

Dr. Sam Slowinski, Ketterson Lab; HOW PARASITES AFFECT, AND ARE AFFECTED BY, HOST PHYSIOLOGY, BEHAVIOR, AND BREEDING SYSTEM

Dr. Kristyn Sylvia, Demas Lab: MODULATION OF THE SYSTEM, GUT MICROBIOME, AND SOCIAL BEHAVIOR

Congratulations CISAB and CTRD Fellowship Recipients

CISAB Fellowship Recipients 2018-2019



Amrita Bhattacharya
Bashey-Visser Lab &
Lively Lab



Kara Million
Lively Lab



Chris Petersen
Hurley Lab

CTRD Predoctoral Fellows 2018-2019



Misty Proffitt
Smith Lab



Kat Munley
Demas Lab



Kelly Moench
Wellman Lab



Kayleigh Hood
Hurley Lab

CTRD Postdoctoral Fellows

Left: Courtney Fitzpatrick, Wade Lab

Right: Kelly Ronald, Hurley Lab



News from the Mechanisms of Behavior Lab

From Lab Director David Sinikiewicz

The CISAB Mechanisms of Behavior Lab continues to thrive as a space for performing molecular techniques. Operating as a recharge center has allowed the lab to provide services and techniques on a per-sample basis, keeping the cost to each lab manageable. We also continue to provide free access to shared equipment that may not be available in every lab. We also offer consultations on experimental design and technical troubleshooting.

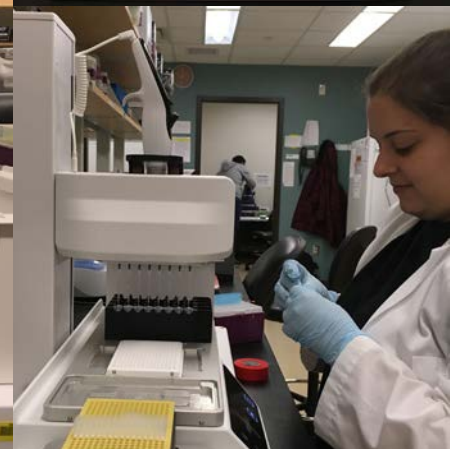
Thanks to Troy Smith, who has graciously shared his cryostat with the Mechanisms of Behavior Lab, this past year has seen a huge increase in cryosectioning in the CISAB lab. To cope with demand, we have a new policy limiting individual labs to 3 days of advanced reservations each week. This new policy has enabled users from multiple departments (including Engineering!) to use the cryostat.

Thanks to a lot of hard work by Misty Proffitt and Dr. Sachi Koyama, we now have a reliable procedure for isolating high quality RNA from skin tissue of both fish and mice.

In partnership with the Environmental Resilience Institute (ERI), we have added new sets of single channel pipettes and electronic multi-channel pipettes. The multi-channel pipettes also work with our new Integra Assist Plus pipetting robot. This robot can reduce the time it takes to pipette a qPCR plate, EIA plate, or any other application that uses an 8-channel pipette. Through our partnership with ERI, we have also added an analytical balance, which enables users to measure samples weighing as little as 2 mg and with a precision of 0.01 mg.

The CISAB Lab is excited about our partnership with ERI. We look forward to how this will allow the lab to continue to grow and better serve the CISAB community and the ERI scientists!

Clockwise from top: David Sinkiewicz, Lab Director; Abby Kimmitt uses the cryostat; new analytical balance; Misty Proffitt uses the robot; new Integra Assist Plus pipetting robot



News from the Animal Behavior Major

By Animal Behavior Lecturer Dr. Adam Smith

As always, we here at CISAB are doing our best to provide new opportunities for our Animal Behavior undergraduate majors. We are excited to announce that in the spring of 2020 we will be rolling out a new course, Introduction to Animal Behavior (ABEH-A101), with the goal of giving our newest students an introduction to the science of animal behavior early in their academic careers. The behavior lab course (A350) will be offered in the fall of 2019 and every other year. Taken together, the ABEH program anticipates offering two more undergraduate-focused courses each year to accompany the existing workshop courses.

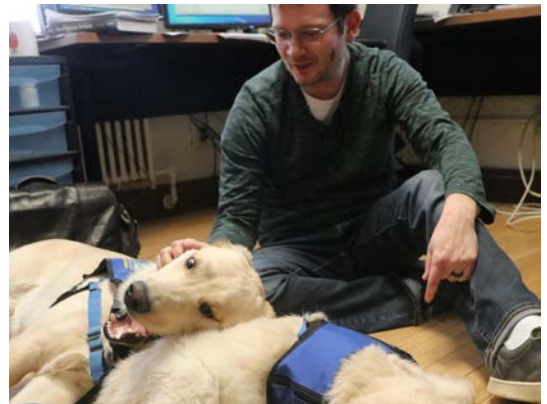
Internship News

ABEH students continue to make their mark in the local Bloomington community and beyond. As usual, many of our students worked in the Bloomington area for organizations such as Bloomington Animal Care and Control, WonderLab, and WildCare. In addition, our students worked at new internship sites around the country, including The Institute for Marine Mammal Studies in Gulfport, the Lincoln Park Zoo in Chicago, the Newport Aquarium in Cincinnati, and the Navy Marine Mammal Program in San Diego. Furthermore, we had yet another student perform an international internship at Marine Conservation Philippines. As the program's footprint grows, we hope our students will have even more opportunities to work both at home and abroad.

Featured Internship: Yasmin Lord at the Institute for Marine Mammal Studies

Over the summer I interned at The Institute for Marine Mammal studies in Gulfport, MS. While there, I learned how to train and take care of the animals. The facility had bottlenose dolphins, California sea lions, tropical parrots, reptiles, and many different crabs and sea fish. I worked with the trainers who cared for the bottlenose dolphins and sea lions. During my time there, I helped with fish prep in the mornings, prepped feeding buckets for training sessions, did daily cleaning activities, and cleaned the animals' enclosures. I was able to learn about husbandry behaviors and water quality management. I got the experience of looking after a new-born sea lion as well as observing the dolphins' behaviors after shows. The people there were very nice and made the transition easier for me. I enjoyed this internship and learned a lot about animal care and training.

Top to bottom: Dr. Adam Smith and ICAN trainees; Sienna Gonzalez interns at Lincoln Park Zoo; Yasmin Lord preps a dolphin for blood work; Yasmin Lord trains a dolphin



What Are Animal Behavior Majors Up To? Spotlight on Honors Thesis Research

Christina Sluka: Neophilic Behavior in Wild Raccoons (*Procyon lotor*) and Other Woodland Species

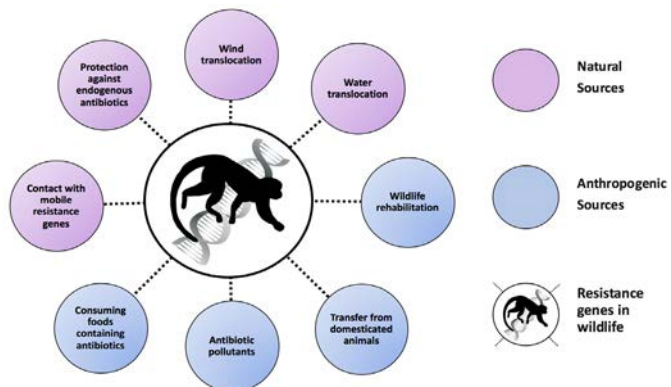


As our urban areas expand, other animals that call these areas home are increasingly interesting from an evolutionary and behavioral standpoint. Animals in urban areas must learn to cope with dangers not present in their natural habitat as well as take advantage of food sources unnatural to them. Raccoons are perhaps the best example of how a species can cohabitate in our space and become more successful than they are in their natural habitat. However, despite common ideas that raccoons are highly intelligent and adept at problem solving, there is little published research on this subject. I hope to shed light on what natural behavioral tendencies may contribute to raccoons' success in urban environments. Here I am focusing on neophilic behaviors in raccoons versus other species. This will help determine if wild raccoons have a pre-existing behavioral tendency to approach and interact with novel objects that is greater than other species, and whether a food reward influences their behavior with these objects. To study these animals, I am using a puzzle box that can be baited with a reward and motion sensor camera traps that take video of any animal that approaches the box. Video recordings have shown a total of 11 different mammal species across more than 1000 videos. All data collection took place in the IU Research and Teaching Preserve (IURTP) and my project was supported by a generous grant from the IURTP.

Top to bottom: Christina Sluka; trail cam catches raccoons with puzzle box.

Alec Iruri-Tucker: Can Human Interaction Affect the Presence of Antibiotic Resistance in the Wild Primate Microbiome?

Microbial resistance to modern antibiotics may originate from anthropogenic selective pressure as well as endogenous antimicrobial agents. In the modern world, it is important to investigate the presence and emergence of antibiotic resistance in the microbiomes of wildlife populations due to the implications to animal and public health. In this thesis project, fecal culture methods are used to determine the presence of resistant bacteria in wild populations of mantled howler monkeys (*Alouatta palliata*), white-faced capuchins (*Cebus capucinus*), and Geoffroy's spider monkeys (*Ateles geoffroyi*). Samples were collected across several field sites in Costa Rica with varying human-primate interactions. If antibiotic resistance toward clinically relevant antibiotics is found, it is possible that it originated from anthropogenic pressure. Furthermore, it may be possible to identify potential sources of resistance using geographic information system techniques.

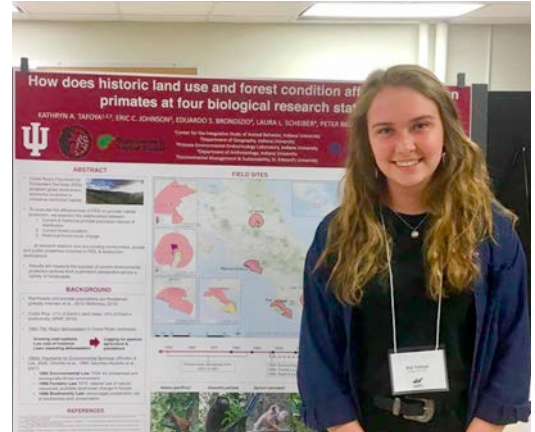


Left to right: Alec Iruri-Tucker; diagram of potential influences on microbiomes of Costa Rican monkeys.

Honors Research in Animal Behavior (Continued)

Kat Tofoya: The Effects of Historical and Present Forest Condition on Costa Rican Primates

Costa Rica is home to the capuchin (*Cebus capucinus*), squirrel monkey (*Saimiri oerstedii*), howler monkey (*Alouatta palliata*), and the endangered spider monkey (*Ateles geoffroyi*). My honors thesis examines the historical relationship between these Costa Rican primate species and their forest habitat at four research sites through a time series analysis. This time series utilizes current forest condition data and primate population data, as well as historical primate population and remote sensing data from two decades before and after environmental protection laws were instituted in the late 1990s. By studying the dynamic between these species and their habitat in the context of the changing political landscape, we may better understand the effects of past and present conservation policies.



Kat Tofoya at the 15th annual Midwest Primate Interest Group Conference in October 2018.

John Reinhart: The Ontogeny of Consolation Behavior in the Prairie Vole

I investigated consolation-like behavior among adolescent prairie vole siblings in response to restraint stress. Two phases were used in the study. Phase one investigated if consolation-like behavior was directed toward a stressed individual by an unstressed individual in two age groups (PND30 and PND45). Phase two repeated the study with the single age group at PND45 and included an i.p. injection of an oxytocin antagonist, L-368,899, to the unstressed individual to study the role of oxytocin in displays of consolation-like behavior.

2018 Animal Behavior Graduates



In May, CISAB hosted a reception for our 2018 Animal Behavior graduates.

Graduates attending, top to bottom:

Row 1- Steven Wade, Kayla Kirby

Row 2- Abigail Canright, Ashton Asbury, Bethanie Gore

Row 3- Juliette Horn, Lindsay Curran, Claire Romine, Sierra Donaldson

Row 4- Julie Mathias, Madison Swinney

Row 5- Xandri Clifton, Makenzie Todd, Kennedy Reynolds

Row 6- Alex Black, Genesis Martinez, Emily Dunham

CISAB Summer Scholarship Experiences

Ashton Asbury spent 10 weeks at the Toro-Semliki Wildlife Reserve in Uganda, working on the Semliki Chimpanzee Project, founded and directed by IU CISAB faculty member, Dr. Kevin Hunt.

Upon arriving at the field site as a volunteer research assistant, my project became aiding in the habituation of the community of chimpanzees in addition to overseeing camp activities and visitors. Some days we were lucky enough to find the chimps early and follow them for numerous hours while other days we were unable to find any signs of them. The most interesting part of my experience was the day we followed the chimp calls and discovered an orphaned infant chimpanzee near the body of her dead mother. We observed behaviors that indicated mourning and realization the mother was dead such as poking the mother with a stick, unsuccessful attempts to nurse, grooming, rocking and distress calls after the burial. I was given the unique opportunity to assist the veterinarian in a physical exam of the mother in the hopes of determining the cause of death. Unfortunately, we found no cause as she had no broken bones, scratches or bruises. Since the infant appeared to still be nursing and was in close proximity with the mother we believe that she too would have been very ill by that point if the disease had been infectious. Overall, my experience at Semliki was a good one considering the events. I feel I have been properly exposed to the realities of field work and the necessity for adaptability in circumstances like the ones I faced.

Below: chimpanzees in trees and Ashton with field crew



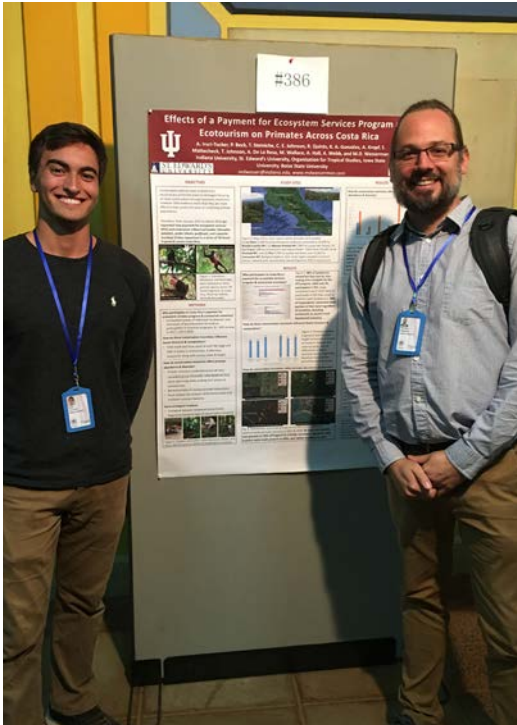
Erin Willkie spent her summer at the Mote Marine Laboratory and Aquarium in Sarasota, Florida.

Mote is a top conservation, rehabilitation, and research facility located in Sarasota, Florida. This internship provided me with a great experience at a top-quality AZA facility. I was primarily caring for and assisting in the training of three North American River Otters (NARO): Jane, Pippi, and Huck. Not only was I given hands-on experience with operant conditioning and positive reinforcement of the NAROs, I was cross-trained to care for and assist in training their resident sea turtles, manatees, and crocodilians. Over the course of the internship, I assisted in several sea turtle hatchlings' releases, as well as dolphin research and surveys of wild dolphin populations. This internship was an amazing, hands-on experience, and I would highly recommend it for anyone who has interest in gaining experience in animal care, research, and public education! This summer would not have been possible without the generous funding through CISAB Undergraduate Summer Scholarships, as the cost of living is extremely high in this area.

Right: Erin and two otters; below: Erin with Jane, Pippi & Huck.



CISAB Summer Scholarship Experiences (continued)



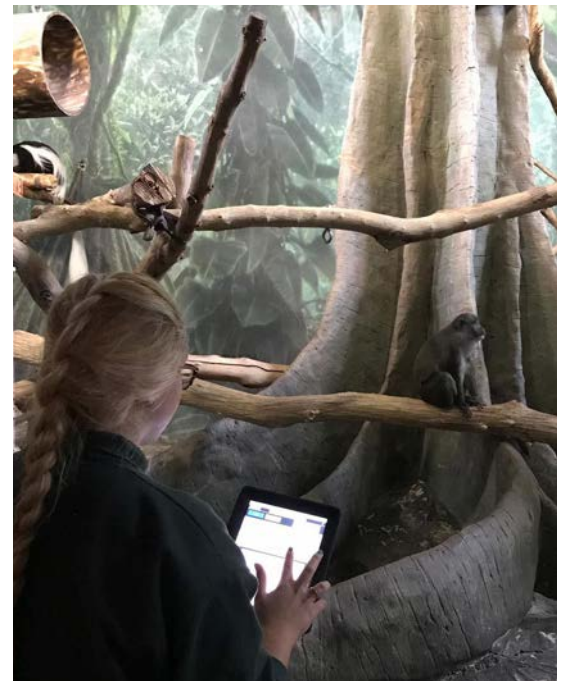
Alec (left) & Dr. Michael Wasserman (right)

Alec Iruri-Tucker observed primates in Kibale National Park, Uganda, and attended the Congress of the International Primatological Society in Nairobi, Kenya.

During the summer of 2018, CISAB supported my travels to Uganda and Kenya for a period of three weeks. In Kibale National Park, Uganda, I observed and followed arboreal primate groups, including red-tailed monkey, grey-cheeked mangabey, Ugandan red colobus, and black-and-white colobus. Each day I spent 7-9 hours with a group, or groups, of wild primates in order to collect behavioral data and fecal samples for my antibiotic resistance tests. From Uganda, I went to Nairobi, Kenya to attend my first international research conference, the Congress of the International Primatological Society. I presented a poster, and benefitted from the opportunity to attend scientific talks by leading and upcoming primatologists around the world. This was a tremendous networking and investigative activity that allowed me to identify future pathways for graduate school. I am very grateful for the support that CISAB provided, as well as the guidance from my principal investigator, Dr. Michael Wasserman. This experience proved to be a major step in my professional development as an animal behaviorist.

Sienna Gonzalez interned at the Lincoln Park Zoo in Chicago, IL, observing three primate species.

I interned with the behavioral enrichment department and focused on monitoring the behavior of three primate species. My behavioral observations primarily were conducted prior to the building opening to the public. Researching the natural history of these species was important when studying their behavior and evaluating their activity budget. To benefit the animals' welfare, another aspect of my internship was to maintain current enrichment items and create new items to promote natural behaviors. The enrichment items would be evaluated and reevaluated throughout the day to determine if these items promoted their natural behaviors. My supervisor was the manager of enrichment and husbandry at the zoo and is often on call to train new behaviors for medical procedures and evaluations. I was fortunate to see many training sessions of different animals on a regular basis throughout the zoo. At the end of my internship, I collaborated with the other two interns on a zoo-wide project to establish more time feeders throughout the zoo to promote natural feedings and more foraging opportunities for foraging animals. The proposal was researched, written, and presented to the entire zoo. Many of our proposals are being discussed and may be added in the upcoming year. I am currently working on a poster based on the data I collected this summer with one of the Zoo's animal welfare scientist, which I will present at the 2019 Animal Behavior Conference. My courses from the Animal Behavior program prepared me for my internship and taught me how to analyze, define, and evaluate behavior in a professional setting with a variety of species.



Sienna observes primates at Lincoln Park Zoo.

What Are Animal Behavior Alumni Doing Now?

Meet Julie Mathias, currently Volunteer and Canine Coordinator for the Indiana Canine Assistant Network (ICAN).

During one of my favorite animal behavior courses at IU, Workshop in Animal Behavior (ABEH-A 200), I heard a presentation from Dr. Sally Irvin, the founder of the Indiana Canine Assistant Network (ICAN), a non-profit organization that trains & places service dogs. Her presentation opened up a whole new career trajectory for me.

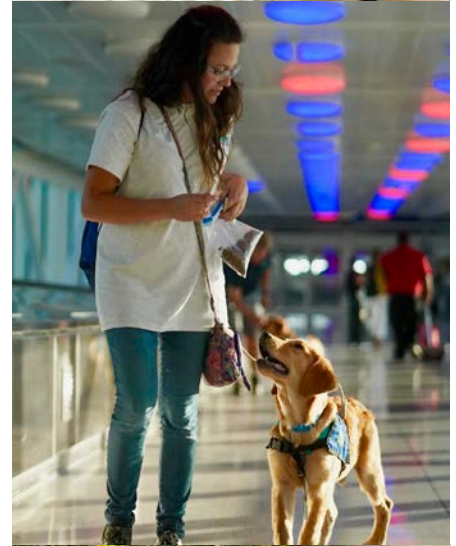
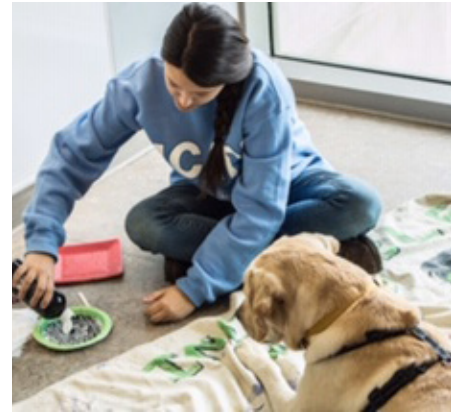
A fellow classmate and I were so impressed that we co-founded a student organization called ICAN at IU, focused on assistance dog education, fundraising, and volunteer efforts in support of ICAN. Through my involvement with ICAN at IU, I was trained as a furlough volunteer and hosted several service dogs in training.

Shortly after graduating from IU, I was hired as Volunteer and Canine Coordinator for ICAN, based in Indianapolis. As part of the ICAN program, our service dogs advance through various levels of training inside several Indianapolis area correctional facilities. Approximately every 6 weeks, the dogs are brought outside the prison environment for 3 weeks at a time to live with a furlough volunteer. Part of my job is to place the dogs with volunteers to provide real-world experiences and reinforce the behaviors and cues they already know in new situations during those three weeks.

I work closely with the Director of Training to work with our program staff to continue education at volunteer events; onboard new volunteers through our 8-week “foundation” course; handle release dogs & place them with families that best fit the temperament of the individual dogs; & work with our veterinarian to schedule routine medical procedures & vaccinations. I also shadow the Director of Training during his visits to the prisons to further educate the trainer inmates. I continue to serve as a furlough volunteer. As you can see from the adjacent photos, I even had the chance to serve as a “Puppy Starter,” where I helped one pup during his early stages of socialization by teaching him appropriate behaviors.

Much of the knowledge I needed to succeed in my work with service dogs came from the internships I held through CISAB during my time at IU - including an internship at a BloomingPaws doggie day care and training facility (where I learned body language during group play and shadowed the head trainer during obedience classes). In addition, my time as co-founder of ICAN at IU was in itself an intensive internship - especially the matching of volunteers for different campus events with the available dogs received from ICAN. Not only does the IU Animal Behavior program expose students to experimental methods and design, potential research opportunities, and various career paths in animal behavior, but it also provided me with the chance to network with professionals who helped guide my career trajectory.

Top to bottom: Julie & Thunder “paw signing” calendars as fundraiser; Julie working on loose leash walking & Jack staying focused on handler at Indy airport; Julie’s Puppy Starter: 10 week old Jack; Golden retriever group participating in weekly puppy class, building confidence in public places such as the Indy Airport.



2018 Research Experiences for Undergraduates (REU) Program

By Colleen Friedly



This summer's NSF-funded REU program hosted 13 undergraduate students in a 10-week program on animal behavior research, ethics, and professionalism. Our students' future plans ranged from attending veterinary school, graduate school, or medical school to working in non-profit wildlife management or with zoo animals. To encompass these varying interests we planned a number of guest speakers and field trips to give the students insights into these varying professions and supplement the research that they took part in during their time at IU.



The Exotic Feline Rescue Center (EFRC) has been a regular CISAB REU trip for many years because it gives the students we bring in from all over the country the opportunity to see an exotic species rescue in a completely unexpected place, central Indiana. We received an in-depth tour of the facility in mid-June and learned about the exotic pet trade and just how many people in the states still own exotic felines.



Following the EFRC visit, a group of the REUs went to IU's own Kent Farm for the opportunity to see researchers at work banding and tracking several different bird species. Because the students work with such different animal models in labs across IU's campus, this trip provided the opportunity for everyone to see yet another, perhaps unfamiliar, aspect of animal behavior research at IU. We learned about the use of banding, mist netting, radio telemetry, and outdoor free-flight aviaries at this site within the IU Research and Teaching preserve. This experience, along with the trip to the EFRC and the several talks with animal rehabilitators, campus veterinarians, and professors, allowed for the 2018 REU students to receive a relatively holistic view of animal behavior research and its applications.



The 2018 REU cohort was yet another excellent example of the future of animal behavior research. We look forward to seeing several of these students return to IU for our annual Animal Behavior Conference in Spring 2019, or in future years as IU graduate students. We wish them all the best of luck!

Top to Bottom: Group photo at the Exotic Feline Rescue Center; bird banding at Kent Farm; walking mist nets; Representative of the Indiana Raptor Center gives a talk at CISAB

REU Program (continued)



Front Row, left to right : Dr. Laura Hurley (REU Director), Jennifer Gonzalez, Yvette Rodriguez, Valeria Toro, Sol Beltran, Braiam Rosado, Ayley Shorrtridge

Back Row: Colleen Friendly (REU Facilitator) Brandi Pessman, Desiree Nieves, Michaela Breach, Molishka Flores, Allison Bishop, Eric Navarro

SOL BELTRAN, Dominican University, River Forest, IL

“Does early postnatal stress exposure lead to sex-specific telomere dynamics in wild tree swallows (*Tachycineta bicolor*)?” Mentors: Dr. Kimberly Rosvall and Sarah Wolf

MICHAELA BREACH, Indiana University, Bloomington, IN

“Sex-specific dendritic reorganization after chronic stress in adult rats that experienced social instability as adolescents” Mentors: Dr. Cara Wellman and Kelly Moench

VALERIA C. TORO DÍAZ, University of Puerto Rico at Mayagüez, Mayagüez, PR

“Investigating the relationship between a social trait, bacteriocin production, and virulence in pathogenic bacteria” Mentors: Dr. Farrah Bashey-Visser and Amrita Bhattacharya

MOLISHKA A. FLORES, Pontifical Catholic University of Puerto Rico, Ponce, PR

“Gene expression of hormone-related genes influence signal perception” Mentors: Dr. Troy Smith and Melissa R. Proffitt

JENNIFER GONZALEZ, Messiah College, Mechanicsburg, PA

“Oxytocin receptor densities in the nucleus accumbens and medial preoptic area and PPD-associated behavior in *Microtus ochrogaster*” Mentors: Dr. C. Sue Carter and Dr. Allison M. Perkeybile

OLUWAGBEMISOLA IBIKUNLE, Indiana University, Bloomington, IN

“Replay of items in context using episodic memory in rats” Mentors: Dr. Jonathon Crystal and Danielle Panoz-Brown

YVETTE D. RODRÍGUEZ JIMÉNEZ, University of Puerto Rico at Mayagüez, Mayagüez, PR

“Sensitivity to testosterone in the avian eye and its relationship with sex, species, and trait differences” Mentors: Dr. Kimberly Rosvall and Dr. Alexandra Bentz

ERIC NAVARRO, Washington State University, Pullman, WA

“The effects of prior experience and the role of serotonin in male response to female rejection in mice” Mentors: Dr. Laura M. Hurley and Kayleigh Hood

DESIRÉE NIEVES, University of Puerto Rico at Ponce, Ponce, PR

“The effects of gut dysbiosis on reproductive physiology and aggression in Siberian hamsters following fecal transplantation” Mentors: Dr. Gregory Demas, Kathleen Munley and Elizabeth Morrison

BRANDI PESSMAN, North Central College, Naperville, IL

“The role of arginine vasotocin on aggression and electrocommunication signals in black ghost knifefish (*Apteronotus albifrons*)” Mentors: Dr. Troy Smith and Megan Freiler

BRAIAM ROSADO, Universidad del Turabo, Gurabo, PR

“Medial prefrontal cortex activation in response to acute stress in male and female rats” Mentor: Dr. Cara Wellman

AYLEY SHORTRIDGE, Michigan State University, East Lansing, MI

“Modulation of the HPA axis and anxiety-like behavior following fecal transplantation in Siberian hamsters” Mentors: Dr. Gregory Demas, Kathleen Munley and Elizabeth Morrison

2018 Animal Behavior Conference



This year marked our 25th annual Animal Behavior Conference, which brought together animal behaviorists from across the country to present and discuss research. The students and trainees comprising the Organizing Committee, along with our expert staff, as always did a wonderful job of fitting together all of the components of this complex event.

The conference was attended by 222 participants, from 32 institutions across 10 states. Twenty-one talks were given by students and postdocs Friday and Saturday, while 46 posters were presented at the Friday night session. Exemplar awardee Dr. Frans de Waal of Emory University gave the Friday plenary address on the evolution of emotion and empathy in primates. On Saturday, CISAB faculty Dr. Kimberly Rosvall gave a keynote address on social competition in female birds.

Thanks to generous support from the departments of Biology and Psychological & Brain Sciences, we were especially pleased this year to welcome back three of our 2017 REU students, who each gave poster presentations on their summer research. We hope to make this a yearly tradition!

Counter-clockwise from top left: 25th ABC program cover; ABC organizing committee; Dr. Frans de Waal enjoys the presentations; Saturday keynote speaker Dr. Kimberly Rosvall; REU student presenters- Isabella Salinas, Krysten Garcia, Teresa Jones



2018 Animal Behavior Conference: Awards

Exemplar Award 2018: Dr. Frans de Waal



Dr. Frans de Waal earned his PhD in Biology at Utrecht University. After taking a position at the University of Wisconsin, he transitioned to Emory University, where he is now C.H. Candler professor in the Psychology Department and director of the Living Links Center at the Yerkes National Primate Research Center. He is also a Distinguished Professor at his alma mater, Utrecht University. Dr. de Waal is a Fellow of the American Academy of Arts & Sciences as well as a member of the National Academy of Sciences, the Royal Holland Society of Sciences and Humanities, and the Royal Netherlands Academy of Arts and Sciences. His numerous other honors include the Galileo Prize and the Edward O. Wilson Biodiversity Technology Pioneer Award.

Dr. de Waal's work focuses mainly on primates. He is credited with inspiring if not founding the field of primate cognition, and has pioneered work on primate social structure and the evolutionary underpinnings of cooperation, empathy, and emotion. He is adept at marrying rigorous science with an ability to communicate it in a compelling way to a lay audience: in addition to publishing hundreds of scientific articles in scholarly journals such as *Animal Cognition*, *Science*, and *Nature*, he has also published many books, with a substantial portion of those aimed at and very popular with the lay audience. Such sharing of science in the public interest is critically important—perhaps especially now—and comprises a lasting and profound contribution to science and society.

Rowland Award 2018: Abby Kimmitt

A graduate student in Biology, Abby is described by her thesis advisor Ellen Ketterson as a “talented and committed graduate student who is currently conducting creative independent research that stands out for its blend of behavior and evolution.” The NSF has recognized the excellence of Abby's research with a highly competitive pre-doctoral fellowship.

In addition to being an excellent scientist, Abby is a wonderful mentor, described by Ellen as a strong and considerate leader who has mentored REU students and many field assistants. She has helped undergraduates to develop and present posters at meetings, write papers, and plan their graduate careers. She is even working with one undergraduate on a project comparing PCB levels in urban and rural cardinals in Monroe County, despite the projects' tangential relation to her own research goals.

Abby also excels in classroom teaching. For instance, as associate instructor in the Biology of Birds lab course, Abby re-designed exercises and developed new ones. She is actively involved in IU's Center for Innovative Teaching and Learning, and incorporates innovative teaching into her classes. For instance, last fall, she taught the core course for the Animal Behavior major, incorporating active learning techniques to engage the students as scientists rather than passive learners. She has also co-lead workshops on effective lesson design and making lab and discussion sections more effective. Thus, not only is Abby mentoring undergraduates in the lab and classroom, she is also mentoring her fellow graduate students in effective teaching.



2018 Animal Behavior Conference: Awards

Hanna Kolodziejski Award 2018: Kristyn Sylvia

Kristyn was a graduate student in Biology, studying the influence of early life stress on reproductive development, immune function, microbiome, and social behaviors in Siberian hamsters under the mentorship of Greg Demas. Kristyn was productive in this integrative work, with many presentations at international meetings, several primary research papers, plus two first-authored review articles. Kristyn aspires to be a professor at a small liberal arts college, and she tailored her graduate experience accordingly, serving as an assistant instructor for a wide range of courses. As part of her work as an assistant educational coordinator for the Peer Assisted Study Sessions program, she served as a pedagogical mentor for other graduate students. She engaged in pedagogical research, working with instructors of the Animal Behavior core course to develop tools to assess student learning outcomes and to investigate how student's characteristics are related to their performance in the course. These data can be used to inform course and curricular innovations that support student learning across the STEM disciplines.



Kristyn also excelled at one-on-one teaching and mentoring of many high schoolers, undergraduates, and REU students—many from groups underrepresented in STEM. Many of these students have not just presented their research at international meetings, but have also co-authored papers and gone on to graduate school. Kristyn even organized her own weekly lab meetings with the undergrads she worked with, to discuss ongoing projects and career plans.

Kristyn also considers service and outreach to be an important contribution to the larger world in which she lives, whether it be within her department, the university or the greater Bloomington community. She was the graduate student representative on CISAB's Steering Committee and our Undergraduate Curriculum Committee, and was heavily involved in organizing the Animal Behavior Conference. Her many other service and outreach projects during grad school include mentoring youths at Girls Inc./WonderLab Life Sciences Camp on the Farm, Marble Hill Farm, volunteering as an organ system specialist for Cook Medical Interns, volunteering to collect data on several Scholarship of Teaching and Learning research projects, facilitating the Teaching Orientation for new Associate Instructors at IU's Center for Innovative Teaching and Learning, volunteer teaching at Childs Elementary School, and serving as a judge at local and regional science fairs. Thus, Kristyn demonstrated excellence in research and a commitment to mentoring and service.

ABC Undergraduate Poster Award Winners



Left to right

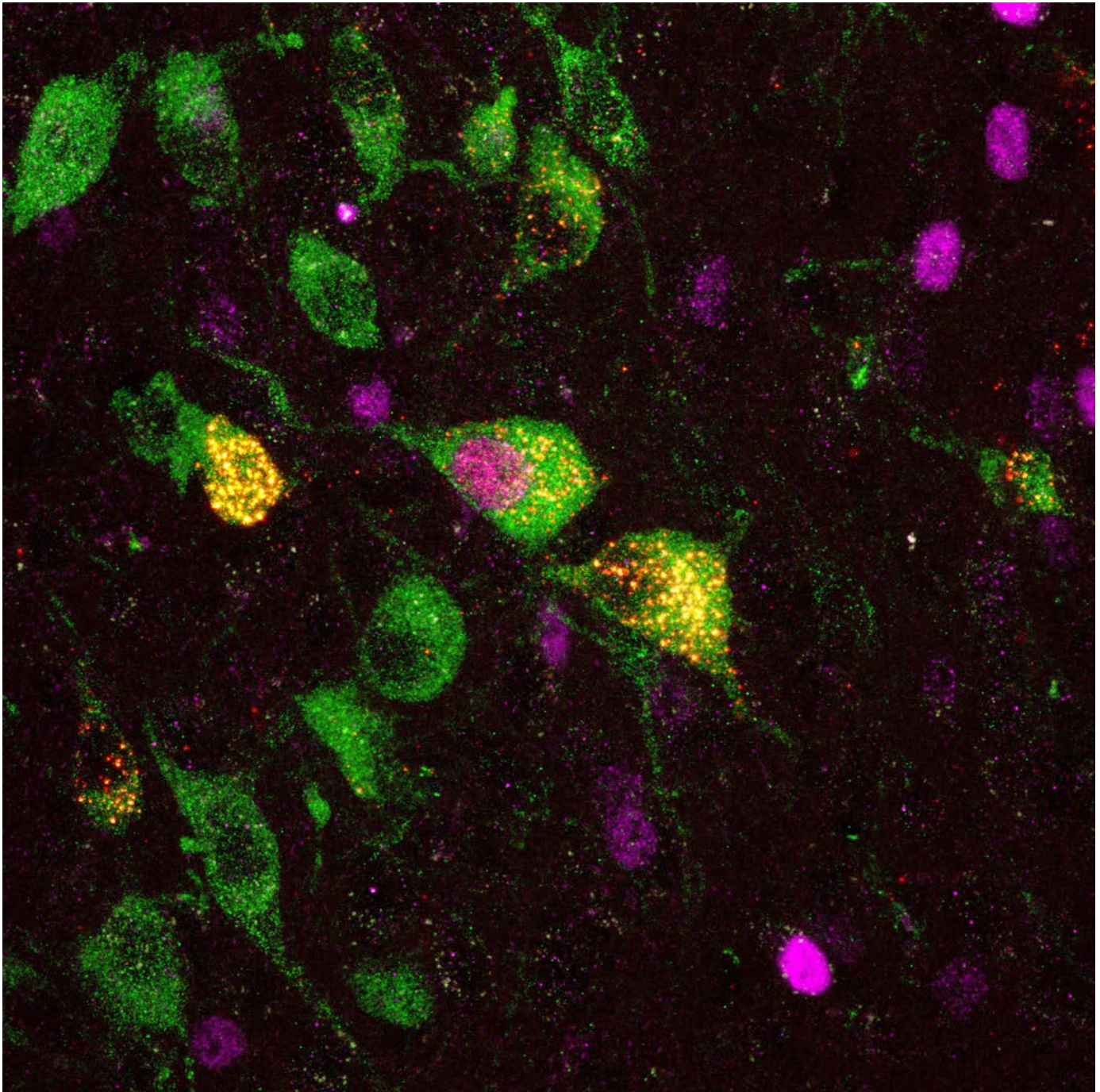
MITCHELL SINGSTOCK *Miami University*
"Oxytocin Decreases Impulsive Choice in Rats"

ISSAC SOMEKH *Indiana University*
"The Effects of Chemotherapy on Reversal Learning and Savings in the Rat"

MICHAELA BREACH *Indiana University*
"Sex-Specific Dendritic Reorganization after Chronic Stress in Adults Rats that Experienced Social Instability as Adolescents"

2018 Animal Behavior Conference: Awards

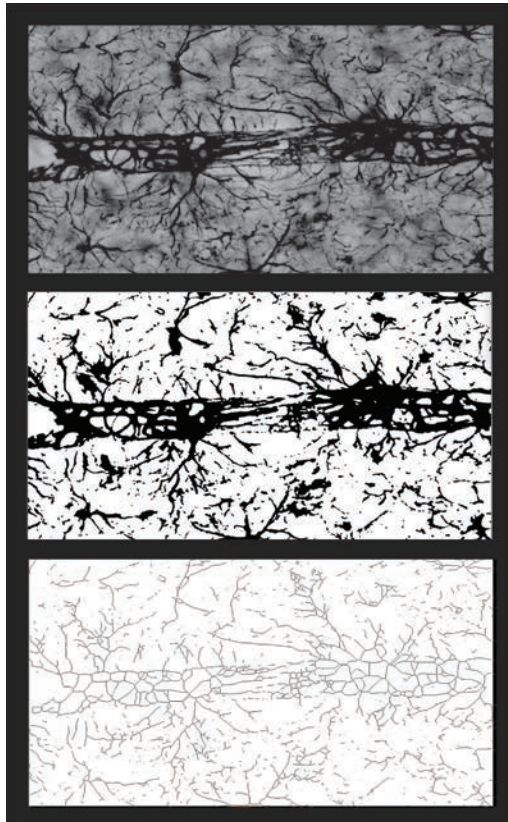
Jim Goodson Art in Science Award Winner: Chris Petersen



This year's Goodson Prize for Art in Science goes to Chris Petersen, for his lovely image showing context-dependent activation (magenta) of serotonin neurons (green) that project to the inferior colliculus (red). This image was generated in the context of a study examining the anatomical substrate of serotonin release into the auditory midbrain. Chris is a graduate student working with Dr. Laura Hurley. It seems especially fitting to award him the Goodson Prize, as in his first year year, Chris was Jim's grad student.

2018 Animal Behavior Conference: Awards

Jim Goodson Art in Science Award Runners-up: Justin Bollinger and Stephanie Campos



Justin's image depicts a blood vessel ensheathed by astrocytes in medial prefrontal cortex. Astrocytes play a critical role in maintaining blood-brain barrier integrity, regulate neuronal transmission, and have been implicated in numerous behavioral processes. To characterize stress-induced changes in astrocyte morphology, Justin used image processing and image analysis to measure the amount of astroglial material (middle), astroglial branching, and the length of astroglial processes (bottom) present in images captured from medial prefrontal cortex.



Stephanie's image shows an exemplar of her study species, a *Sceloporus* lizard. Stephanie says, "It took me 6 years and nearly a PhD to capture this photo, a rare sight to behold. This photo shows secretions being exuded from three pores on a lizard's thigh, but secretions are usually rubbed off as lizards move around their territories. While *Sceloporus* lizards are perhaps best known for the vibrant technicolor belly patches, the genus is actually named for these scent-emitting pores (from the Greek 'skelos' and 'poros' translating to 'leg pore')." Her doctoral thesis investigated the evolution of chemical signal design and content in *Sceloporus* femoral pore secretions, demonstrated their impact on lizard space use and chemosensory behavior, and linked composition to phenotypic traits of individuals.

2018 Conference Student Exchange Program

Will Kinkel Attended 19th annual Student and Postdoc Symposium at North Carolina State's W.M. Keck Center for Behavioral Biology

Thanks to the support of the CISAB program, I was recently able to travel to North Carolina State University to attend the annual conference of the W. M. Keck Center for Behavioral Biology. I was fortunate to be able to give a talk on my recent findings on the developmental consequences of common birth interventions, specifically how the hormones of birth are affected by contemporary obstetric practices in ways that shape the development of the brain and behavior in offspring. When I arrived, I was taken out for a lovely dinner by two graduate students who served as my guides while I was in Raleigh. The day of the conference was filled with talks from the Keck Center's grad students and a few postdocs like myself. The Keck Center group is quite strong around topics such as fruit fly genetics as it relates to longevity, and the relationship between genotype and phenotype among cichlid fish. There was also some very interesting work on a gene drive project to eradicate invasive mice populations on an island off California. I had recently applied for a position at NCSU, so the entire visit was a very helpful window into the city, university and program. At the conclusion of the conference, a few grad students took me out for a night on the town at a fantastic beer garden with a rooftop patio that overlooked the downtown.



The 26th annual Animal Behavior Conference will be held March 29-30, 2019 at the Monroe Convention Center, Bloomington, IN

Chris Petersen Attended the 2018 annual Brains and Behavior Retreat at Georgia State University

I was grateful for the opportunity to participate in this year's student exchange program between the Center for the Integrative Study of Animal Behavior (CISAB) at Indiana University, and the Center for Behavioral Neuroscience at Georgia State University (GSU). Some of the highlights of past CISAB Animal Behavior Conferences have been meeting, hosting, and talking shop with Georgia State exchange students; as such, I was quite unsurprised by the wonderful hospitality I received and more importantly the quality of the science being done at Georgia State.

After an evening where I was left to my own devices in vibrant downtown Atlanta, I was picked up in the morning and escorted to the Center for Behavioral Neuroscience located in the heart of GSU's urban campus. The day kicked off with an introductory symposium celebrating the center's anniversary, which was followed by a buffet lunch of southern fare. The symposium comprised of graduate students talks ranging from social behavior in gerbils to imaging studies in humans. The breadth of talks highlighted the integrative and interdisciplinary nature of modern neuroscience and the diversity of research interests at GSU. The keynote speaker Matia Solomon from the University of Cincinnati got her PhD at GSU, and couched her data discussion in light of how her thinking had changed as a result of her time as a graduate student in the neuroscience and behavior program. The symposium ended with a poster session over wine and cheese where I was able to network, talk science, and socialize with students and faculty alike. In the evening, I participated in a study of graduate student social behavior over food, drink, and Mario Kart at a local bar.



2018 Conference Student Exchange Program

Keck Center and CBN Student Ambassadors to the 2018 Animal Behavior Conference



Left to right:

BYRON A. GARDNER, Graduate Student, Department of Behavioral Neuroscience, Yerkes National Primate Research Center

“Molecular Mechanisms Underlying Striatal Oxytocin Receptor Expression in the Prairie Vole”

ERIN PETERSON, Postdoctoral Fellow, Department of Biological Sciences, Program in Genetics, and W.M. Keck Center for Behavioral Biology, North Carolina State University

“Developmental Impacts of Polygenic Sex Determination in a Cichlid Fish”

JOHNATHAN M. BORLAND, Graduate Student, Neuroscience Institute, Georgia State University

“Sex differences in Oxytocin Modulation of the Rewarding Properties of Social Interactions”

BRANDON BAKER, Graduate Student, Department of Biological Sciences, North Carolina State University

“Dissecting the Genetic Underpinnings of Cocaine and Methamphetamine Consumption in *Drosophila Melanogaster*”

REU Presenters at the 2018 Animal Behavior Conference



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.

Left to right:

ISABELLA SALINAS, St. Mary's University, San Antonio, TX
“Sex Differences in- and Chronic Stress Effects On-Microglial Morphology and Δ FOS B Induction in Medial Prefrontal Cortex”

KRYSTEN GARCIA, John Hopkins University, Baltimore, MD
“Replay of Episodic Memories in the Rat”

TERESA JONES, Mary Baldwin University, Newport, RI
“How Infective Behavior of Parasites Change in Different Environments”

2018 IU Science Fest

CISAB participated in Science Fest for the first time this year, thanks to the hard work of many CISAB volunteers, including staff and students. Charli Taylor and Rachel Skipper put together a terrific set of demonstrations and activities that showcased different levels of analysis in the study of animal behavior. They were a huge success, with kids, parents, and caregivers stacked up, eager to learn what you can tell about animal behavior from a skull, race a chimpanzee in our demonstration of how we can use computers to study animal behavior, and build a neuron while learning how these cells communicate with each other and muscles to produce behavior.

Many thanks to our volunteers: Michelle Benavidez, Clara Hall, Jay Goldberg, Christina Sluka, Molly Fagan, Kelly Moench, Harumi Shimano, Kat Munley, Jesse Montoure, Beth Morrison, Diego Guerrero, and Cassandra Sarria.

Top to bottom: Science Fest kids examine skulls; visitors learn what skulls can tell us about an animal's eating habits; participants and volunteers build neurons; participants learn how computers can be used to study animal cognition



In Remembrance

Dr. Brenda Brinton 1961-2018

Brenda was a former collegiate volleyball player, artist, and graphic design artist. In 1980 she graduated from University of Nebraska – Lincoln with a Bachelor’s degree in Women’s Studies and pursued graduate work in feminist philosophy at the University of Cincinnati. In 1987 she moved to Chicago where she began her career as a painter. Brenda and her husband, CISAB member Jeff Schank, lived in Bloomington from 1995-1998, while Jeff was a postdoctoral fellow in the Alberts lab. During her time here, Brenda continued to develop her skills as an oil painter, becoming involved with the art community at Indiana University. As a graphic design artist, one of her specialties was designing logos and t-shirts for scientific meetings. Brenda’s talent and creativity is evident in her design of CISAB’s iconic logo, which continues to represent CISAB almost unchanged since the early 90s, as well as her illustration for the 1996 Animal Behavior Conference, shown here. The CISAB community extends deep sympathy to Brenda’s family.



Alexandra Black 1996-2018

Alex graduated with a B.S. degree in in Animal Behavior last May. Alex is remembered by CISAB faculty as a creative, engaged, and inspiring student, and her loss is deeply felt by the CISAB community. During her time at IU, Alex interned in wildlife rehabilitation centers—she in fact was responsible for the addition of the Wildcat Creek Wildlife Rehabilitation Center to our list of approved internship sites. She had hoped to use her hands-on experience as well as her training in the science of animal behavior to work in rehabilitation and zookeeping. In working towards that goal, Alex continued to seek out internship opportunities after graduation, and completed an internship at Wolf Park here in Indiana. She had just begun working at a conservation center in North Carolina when an accident in the course of her work took her life. We are deeply saddened by her loss, and our hearts go out to Alex’s family and friends.



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

Please consider donating to CISAB at myiu.org/one-time-gift. Type 'ANIMAL' in the Search Box to find "Center for Animal Behavior."



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