The Hillock

where efforts summate to actions

Newsletter of the Department of Neurobiology and Anatomy
Drexel University College of Medicine

Volume 5 (December 2021)

The Hillock

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We extend special thanks to the Drexel University College of Medicine Marketing and Communications Department for their assistance with the preparation of this newsletter.

On the Cover:

Front — A very zoomed in look at a hippocampal neuron in a dense 21-day old culture. While the neuron is tagged with fluorescent PSD-95 and synaptophysin, the depth color coding really only makes it possible to differentiate the cell body (in green). *Imaged at the confocal at 63x by Shrobona Guha, Baas lab.*

Back — Human iPSC-derived dorsal forebrain cerebral organoid (one month old). Organoid has undergone cryosection and immunolabeled with progenitor cells marker SOX2 in green, neuronal nuclei marker NeuN in red, and astrocyte marker GFAP in magenta. *Submitted by Xiaohuan Beanie Sun, mentored by Dr. Liang Qiang and Dr. Peter W. Baas*

DREXEL UNIVERSITY
College of
Medicine
Department of Neurobiology and Anatomy

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Letter From The Editors

It is with great joy that we present to you the fifth edition of *The Hillock*. We are full of gratitude and excitement over the persistence of this wonderful tradition across the past five years. The success of our newsletter lies in the zeal of our department members to share their stories of success and triumph in the laboratory and beyond the bench. We'd like to thank all of our contributors for making this issue of *The Hillock* possible.

We continue to remember the history of our department, this time from the perspective of Dr. Dennis DePace. Descending from the Department of Anatomy at Hahnemann, Dr. DePace takes us on a journey through his career from Hahnemann Medical College to what we know now as the Department of Neurobiology and Anatomy at DUCOM. His narrative provides historical context for the growth of not only our department, but also medical education.

As usual, we cherish the culmination of our successes throughout this past year by highlighting featured research, faculty and student awards and alumni spotlights. The feature pieces on the expanding Computational Neuroscience Center and the recently awarded Spinal Cord Injury Graduate Training (T32) Program underscore how the achievements of our department are rooted in our collaborative efforts. We highlight impressive ways our graduate students have shown leadership throughout 2021, but we do not shy away from the struggles that exist as we continue to navigate working through a global pandemic. To this end, we share perspectives from both first and second-year students to highlight the similarities and differences they have experienced while adjusting to graduate school during these unprecedented times. Finally, the spirit of individuality and uniqueness that spans across our students, staff and faculty is evident through our creative submission and culture survey answers.

Our wish is for *The Hillock* to ignite a sense of unity by sharing the rich narratives that weave through the fabric of our department but may not appear on the surface. We hope that you enjoy these interviews and personal stories, along with pictures of furry friends and fun activities.

The Editorial Team

Pictured (from left to right): Jeremy Weinberger, Joya Maser, Nancy Mack, Shrobona Guha, Ashley Opalka, and Andrey Borisyuk

A View From the Chair

With the publication of Volume 5 of our newsletter, we must celebrate a milestone in documenting our history, our achievements and our scholarship, and congratulate our students for managing this endeavor and passing the baton along the different years. Looking back at 2020/21, I will repeat what I said last year about the continuing challenges, but with a more optimistic view about the future with effective COVID-19 vaccinations and growing in-person interactions. The scientific and educational activities are almost back to "normal," but Zoom is still around, and some restrictions are still in place.

Despite the COVID-19 challenges, it has been an outstanding year for the academic and scientific activities of our faculty and students underscored by the growth of funding and an impressive list of awards. I will highlight those achievements to emphasize the appreciation for individuals and the pride we have as an exceptional department inspired by the tradition of mentoring and collaboration. With respect to funding, I will first note the NIH R01 grants of Jessica Ausborn, Simon Danner and Liang Oscar Qiang, which opened the road for their promotion to become tenure track Assistant Professors, with all of them since receiving additional funding. Other additions to our portfolio include Peter Baas with a Multi-PI NIH R01 and two DoD grants; Tatiana Bezdudnaya with a Paralyzed Veterans of America grant; Kim Dougherty and Wen-Jun Gao with R21 grants; Shaoping Hou receiving a second NIH R01 grant; John Houle with an NIH subcontract with Jeff Twiss that will allow him to continue his research as Professor Emeritus; Michael Lane collaborating with the University of Florida in a joint Neilsen Foundation grant and receiving a second Moseley Foundation Award; Ramesh Raghupathi receiving a major NIH R01; Ilya Rybak a multi-PI R01; and Veronica Tom receiving a Nielsen Foundation award and setting a department record with the anticipation of her fourth NIH grant. Her exceptional scholarship has been followed by an invitation to participate in the Executive Leadership in Academic Medicine (ELAM) program designed to prepare future chairs, directors and deans. A most amazing achievement last year was evident after the announcement of the Department of Health of the Commonwealth of PA that it would allocate $1 million per year to fund research in spinal cord injury. The six proposals that were funded were all from our department totaling the full $1 million allocated last year. These grants were awarded to Drs. Lane, Jin, Giszter, Bezdudnaya, Hou and Qiang. Is there a better indication of the quality and strength of our research? Another parameter of excellence has come from the prestigious T32 training grant for the funding of our graduate students and program in spinal cord research with Peter Baas as PI and Michael Lane as co-PI. A somewhat unexpected milestone in an area we usually do not pay much attention to has been achieved by Simon Giszter and his former students (Taegyo and Arun) who invented a new way to produce braided electrodes in a patent that started to pay significant royalties of $1 million a year shared by the inventors, the University, the College of Medicine, the department and the lab. There is a lot more to our portfolio of funding, which altogether we expect to exceed $10 million for FY22 as you can find documented elsewhere in this newsletter.

The list of awards and honoraria is equally impressive even relative to the high standards established in previous years. Here the scholarship is driven to a large extent by our students. I will start with six first-place awards in Discovery Day. These included Sarah Bennison – Outstanding Platform Presentation; Andrew Lockhart – Outstanding Junior Graduate Student Poster; Silvia Fernandes – Outstanding Senior Graduate Student Poster; Emanuela Piermarini – Outstanding Postdoctoral Fellow Poster; Wenqiang Huang – Outstanding Technician Poster; Alexander Vasserman – Outstanding Undergraduate Poster. Other winners included second place for Leonardo Garcia-Ramirez – Outstanding Postdoctoral Fellow Poster and Yashvi Shah – Outstanding Undergraduate Poster; third place for Benjamin Sherman – Outstanding Medical Student Poster; and honorable mention to Nancy Mack – Outstanding Senior Graduate Student Poster. The highly prestigious Bondi Fellowship awarded to a graduating student for overall excellence went to Genevieve Curtis. Cameron Trueblood, Sarah Bennison, Sara Blazejewski and Micaela O'Reilly received F31 Fellowships from the NIH and based on a competitive score Trevor Smith is likely to get his fellowship as well. Other awards went to Nancy Mack and Genevieve Curtis - Dean fellowship and Dana Lengel – the Brain Injury Association. Two of our postdoctoral fellows received funding for their independent research projects with Leonardo Garcia-Ramirez receiving the Jekkal Fellowship of $53,000 and Emanuela Piermarini sharing the Christopher Reeve Fellowship of $20,000 with Tatiana Bezdudnaya.

Medical education has always been a challenge for the department because we are responsible for a significant portion of the first-year curriculum including Medical Neuroscience, Microanatomy, and in particular Gross Anatomy which requires preparation of the dissection lab and cadavers for 270 students. In the last several years, these challenges were amplified with a new curriculum of an inverted classroom, the adjustments we had to make for delivering these courses under COVID-19 restrictions, and with the opening of a new West Reading campus with an additional 40 students. Critical to the successful navigation of the education mission was the amazing leadership of Haviva Goldman. She has not only managed the departmental responsibilities in medical education, but became the de facto expert and leader of the Year 1 curriculum. Captain Goldman had an equally amazing team whose excellence has been acknowledged by the students and the College of Medicine with Golden Apple awards to Haviva Goldman, Francis Sessler and Janet Smith, the Outstanding Service to the Student Body award given to Dennis DePace, and the Mary DeWitt Pettit Fellowship to Caitlin Howe for her research project entitled "Accessing the Lab Remotely: Addition of Cadaveric 3D Models in Medical School Gross Anatomy Courses." And then we had to recruit and train faculty to teach and organize the educational processes at the West Reading campus. By now you know that the West Reading team is comprised of Dana Peterson leading Medical Neuroscience and serving as the director of our medical education, Kelly Brenan leading Microanatomy as well as Pathology and Jenna Hagerty leading Gross Anatomy. They have been working together as a team in all the disciplines facing a tremendous challenge because of the complex curriculum that was new to all three of them and because of the predictable difficulties in building up a new campus. Finally, I want to mention that one of Drexel's highest awards was given to John Houle for his lifetime contributions – the 2021 Daniel V. Schidlow, MD, Transformational Leadership Award.

I am writing this letter on Thanksgiving, which I feel is fitting, as I am grateful that despite the difficulties we encountered we continued to thrive and grow — reminding me that we are indeed fortunate to work with wonderful students who are engaged in scientific discoveries and enjoy the company of our colleagues every and each day.

Happy Holidays and Happy New Year.

Itzhak Fischer, PhD
Professor and Chair

The History of the Department of Neurobiology and Anatomy

CHAPTER 5:

A Personal History and Recollections of the Department of Anatomy at Hahnemann University

by Dennis DePace, PhD

Adjunct Associate Professor in the Department: Neurobiology & Anatomy

Most of the histories in previous editions of *The Hillock* focused on the MCP leg of our legacy. I was asked if I could fill in a few of the details from the Hahnemann side and some perspectives on my own career.

In the spring of 1974, when I was completing my PhD at the University of Buffalo, I was offered a faculty position in the Department of Anatomy at Hahnemann Medical College & Hospital in Philadelphia. Since I knew little about Hahnemann, I approached the chairman of my department at the University of Buffalo, Dr. Harold Brody, and asked him for his perspective. He described Hahnemann as a small, private medical college that, in his opinion, "was always striving for acceptability but never quite achieving it." I can still hear my brash and overconfident 27-year-old self saying, "Maybe they're waiting for me!" I had already defended!

Hahnemann was established in 1848 as a school to train physicians in homeopathic medicine. In simplest terms, homeopathy is a concept of medical practice based on a theory of treating patients with small doses of natural substances that in a normal person would produce symptoms of the disease. This in turn would stimulate the body's "natural resources" to cure itself. I've heard it said of homeopathy, "If it did no good, at least it did no harm." Homeopathy was conceived by an 18th century German physician, Samuel Hahnemann, and though widely accepted in the 19th century, in the 20th century it was rejected by practitioners of allopathic medicine because of its focus on the symptoms of disease rather than the underlying causes. It appeared to me that Dr. Brody's comments were likely rooted in the conflict between homeopathy and allopathy.

My account of the Department of Anatomy at Hahnemann begins in 1958 when Dr. Raymond Truex, who was chair of the department, recruited Dr. Peter Amenta to join the department. If the 1990s can be the 'decade of the brain' then the 1950s was surely the 'decade of the heart.' Funding for cardiac research in the 1950s was driven by the Framingham Heart Study that began in 1948 as the first serious undertaking to examine the root causes of hypertension and atherosclerotic heart disease and in the autumn of 1955 then-president Dwight Eisenhower suffered a major heart attack. Funding for heart disease increased and all things cardiac were hot topics. Many of the dietary proscriptions we follow today are a result of studies from that period, including peculiar dietary notions about salt, butter, cream and eggs that still persist.

Dr. Truex's research was largely focused on the cardiac conduction system. Dr. Amenta had been trained as a histologist in the laboratory of William Bloom (*Histology* by Bloom and Fawcett) at the University of Chicago. He had

expertise in tissue culture techniques and worked with cardiac muscle grown in tissue culture. His work and training made him a good fit for the department's research interests at the time. By Dr. Amenta's account, teaching and research progressed as expected for the first few years of his career. Courses were taught, funding was granted and the faculty did their committee assignments.

In 1961, Dr. Truex abruptly resigned his position, following a heated disagreement and an "or else" moment with Hahnemann's dean, Dr. Charles Cameron. Dr. Truex moved his research and some of his loyal faculty supporters up Broad Street to Temple University. While in the 1960s this situation would have been passed off as "academic differences," from having known both men I believe the disagreement was more deeply rooted in the political climate of the time. This was near the end of the era of Senator Joseph McCarthy (R-Wisconsin) and what became termed McCarthyism, which Wikipedia defines as, "demagogic, reckless, and unsubstantiated accusations, as well as public attacks on the character or patriotism of political opponents." Sound familiar? Senator McCarthy stoked Cold War era fears of communism and set about spinning conspiracy theories and innuendos to the purpose of expunging communists, homosexuals and other undesirables from Congress, government and the armed forces. It was a dark period in America in which neighbors spied on neighbors and people were black-listed for their political views. Two American citizens, Julius and Ethel Rosenburg were executed in the electric chair as Russian spies, offenses that pale in comparison to the events of last January 6.

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In any case, it is never a good idea to say 'or else I resign' to your boss, whatever your differences, unless you have another offer waiting on the sidelines, which Dr. Truex apparently did. Biases cause behaviors and behaviors result in consequences, and the consequence in this case set the stage for an opportunity for me many more years down the road.

The 1960s saw an increased interest in cell and molecular biology and genetics. Watson & Crick were awarded the Nobel Prize in 1962 for the discovery of the structure of DNA and genetics became the 'new kid on the block.' The departure of Dr. Truex afforded the opportunity for academic administration to move the Department of Anatomy in a different direction with the appointment of Dr. Berwind Kaufmann as department chairman. He was a geneticist and an MD and so was meant to be a bridge between clinical medicine and basic science. Over time, however, the de-emphasis on anatomy resulted in a decline in board scores and academic ranking to the point that alumni and trustees pressured once more for change. This time the faculty developed a novel curriculum that re-emphasized traditional anatomical dissection, embryology, microscopic anatomy, cell biology and neuroanatomy, but within a clinical context. Dr. Kaufmann was let go and Dr. Amenta was appointed acting chairman and charged with recruiting a new cadre of classically trained anatomists to teach the courses, I among them.

My personal history in the department began when I moved from Buffalo to Philadelphia in June of 1974. During that summer, while blissfully enjoying life in the City of Brotherly Love, I set up my lab, moved into my office and by August had met, unbeknownst to me at the time, my life partner, Donald Helms. I also learned that Hahnemann had a much better reputation in the medical community than I had been led to believe. Dr. Charles P. Bailey, a Hahnemann alumnus, had performed the first open-heart surgery in 1958. Dr. Truex had coauthored the neuroanatomy text we used in graduate school (*Neuroanatomy* by Truex and Carpenter) and had been a predecessor of Dr. Amenta as chairman of anatomy. Dr. Luther Brady, a pioneer of radiation oncology, chaired that department at Hahnemann Hospital, to name a few.

Two by two, like Noah populating the ark, we were hired to take up the yoke of teaching a ponderous number of courses. I think that each of us held the expectation that we would serve the traditional three-pronged approach to an academic career; teaching, research and service. Hahnemann was in evolution to university status to include not only the medical college but also a graduate school and college of allied health professions. The college of allied health professions included Hahnemann's original nursing program but also new programs in med tech, respiratory therapy, mental health technologies, creative arts therapies, physical therapy and radiologic technology. All of these programs needed support for anatomical science and so we all taught in both the medical school and undergraduate-level courses. In addition to being course director for Neuroanatomy in the medical school, I was also course director for the Anatomy and Physiology course in the School of Allied Health Professions and course director and sole faculty member for the Anatomy course for the Radiologic Technologists, who apparently needed to know anatomy, but not physiology. I

was also tasked to teach Medical Terminology, so was able to use my four years of Latin from high school; who'd have thought! Each of the programs had slightly different needs in terms of anatomy but this was helpful to me because I was challenged with a large variety of clinical situations that provided insight to significant clinically relevant concepts in which an understanding of anatomy was important. Also, interacting with students at different academic levels helped develop my teaching skills.

Needless to say, many of my colleagues, who were more interested in research careers, opted to move on. I was more interested in clinical anatomy and teaching, so along with a few others, like Dr. Suzanne Zarro, Dr. Judy Churchill, Dr. Peter Meyer, Dr. Alan Haroian and Dr. Michael Kennedy, I hung on, in what would become the 'educator track.' There is great satisfaction in the ability to distill a difficult concept to its essential elements and to then reassemble them in a way that facilitates another's understanding. This is how I view teaching. The distillation part is difficult because it sometimes requires learning the concept yourself, but this is also one of the rewards. The other is the look of joy on the face of a student when they recognize that they understand.

"There is great satisfaction in the ability to distill a difficult concept to its essential elements and to then reassemble them in a way that facilitates another's understanding. This is how I view teaching."

Taking on the Radiologic Technology Anatomy course turned out to be a strategically good move for me because it gave me access to an important clinical department that relied heavily on anatomy. I still remember Martha Thoroughgood, the director of the Radiologic Technology program telling me, "Dennis, my students only need to know two muscles, the diaphragm and the psoas major." Radiographically, these two muscles have distinctive profiles in plain film radiographs. Free air under the diaphragm is a sign of perforation of the bowel, and blurring of the edge of the psoas major may indicate a hemorrhagic tear in the kidney. However, in 1975, new technology was on the horizon that would revolutionize diagnostic imaging and present an entirely new way to view living anatomy outside the realm of surgery.

It was radiology that provided me with an interesting challenge and long-term career interest. In 1975, Dr. Marvin Haskin, chairman of the Department of Radiology, purchased the first-ever CT scanner in the Delaware Valley, another Hahnemann first. Dr. Anne Barnes, who many of us in this department fondly remember, always mentioned in her lectures how the technology that supported the development of CT by the medical branch of EMI was paid for by the Beatles, since EMI was their record label early on.

Dr. Haskin had a national reputation as the author of a book on radiologic medicine, which he had co-authored with another Hahnemannian, Dr. George Teplick. At the time, radiology was limited largely to plain film radiography, what we commonly call X-rays. Suddenly a new technology had come along permitting us to look within the body by producing cross-sectional images of a living person with a fair degree of detailed internal anatomy, which most radiologists hadn't considered since medical school. I remember sitting in Geary Auditorium, spellbound, by amazing images of the in situ brain as shapes in varying shades of grey, surrounded by a bright halo of the skull and the darkness of the ventricles within. When viewing plain film radiographs, one can make out vague shadows of internal organs all squashed together, but with CT, it suddenly became more important to know what was in front of the stomach or behind the liver and at what vertebral level you can get the best view of the left kidney or the exact dimensions of a brain tumor and how much brain tissue can be spared in its excision. Dr. Haskin asked me to develop a course in cross-sectional anatomy to help train his residents and technicians in what they would be seeing in these new images.

Cross-sectional anatomy had been studied in many medical schools over the years as a specialty for those who were interested in careers in surgery. At the University of Buffalo, where I trained, the Gross Anatomy lab had a large collection of what we and the faculty affectionately called "portholes": large metal dishes, containing formaldehyde and cross-sections of donor bodies. Each was sealed with a thick glass plate that was anchored in place by a metal ring bolted to the perimeter of the dish and resembling a ship's porthole. These were an integral part of the anatomy course so medical students and graduate students alike spent untold hours tapping the glass surfaces, scratched from years of assault by probes and forceps pointing to and trying to name a cross section of this duct or that vessel. Though I had learned a good deal of cross-sectional anatomy from the portholes and had a number of anatomical sources with drawings of cross-sections of the body, I had a technical issue to overcome.

Anatomists always viewed the body in cross-section from the perspective of standing at the head and looking down toward the feet. In radiographic imaging, CT scans are viewed from the perspective of standing at the patient's feet and looking up toward the head. This meant that any anatomical drawings I could use to devise such a course would have the organs on the opposite side of where they would appear in CT scans. There was no way to scan the image and flip horizontally on my laptop back in the '70s. Photograph, flip the negative, print, photocopy, repeat; this meant hours of setup and darkroom time, clipping strips of film and mounting slides. The course was created and I taught it in Hahnemann's evening division, mostly to working radiologic technologists, through the '80s and '90s. At one time, I could confidently go to any department of radiology within a 100-mile radius of Hahnemann and get a 'rock star' reception and CT scan for free. I presented the design of the course as a platform session at the annual meeting of the American Association of Anatomists in Louisville, 1976, where it was received with great acclaim and thunderous applause. Through cross-sectional anatomy, I developed an interest in diagnostic imaging and along with Dr. Goldman and our other anatomy faculty, have been working to include more CT, MRI and ultrasound imaging in our Anatomy courses, addressing one of the curricular goals of the medical school.

Over the years, Hahnemann faced the same market and financial pressures as many of the other medical schools in the city. It seemed like an annual ritual as budget time approached for rumors of closure or faculty and staff cuts to circulate and cast a pall over the entire institution. Despite constant changeover in top management, the stalwart faculty of the basic science and clinical departments pressed forward to deliver an excellent curriculum, outstanding research and exemplary clinical service.

The merger between Hahnemann and AHERF in the 1990s meant for certain that departments would be scaled down as Hahnemann and MCP were duplicates in terms of clinical and basic science entities. The merger between Hahnemann and MCP brought radical changes to my world as I was one of only a few Hahnemann Department of Anatomy faculty to be included in the new medical school. I remember Dr. Janet Smith and Dr. Anne Barnes coming down to Hahnemann to audition me for the role, sitting in the back row of the classroom, busily jotting down notes, while I conducted a small group case conference for Gross Anatomy. I must have wowed them though because a couple of days later, I got a call from Dr. Faber, the department chairman, telling me I made the cut. Although I had to leave old friends behind, I made many new friends who are now old friends. I also kept in touch with my original cohort of Hahnemann colleagues who continued in their teaching roles in the undergraduate and graduate school courses and in the new medical school.

The bankruptcy of AHERF and the aftermath once more called into question the survival of the medical school and once again we were a faculty, cast about looking for leadership and stability. Happily, that came when Drexel University agreed to a two-year trial run to manage the medical school, with an option to make it a permanent member of Drexel University.

For me personally, the merger between Hahnemann and MCP and later with Drexel was advantageous. I found the administrative styles of Dr. Faber and now Dr. Fischer democratic and collegial. Through the workshops offered by Drexel's IT department, I have developed an interest in novel approaches to delivering online anatomical content to our students and along with colleagues like Dr. Francis Sessler, Dr. Haviva Goldman and Dr. Jed Shumsky have developed online remediation courses utilized by other medical schools. In June 2020, I completed my fourth year of a three-year appointment to the Gross Anatomy and Embryology Test Development Committee for USMLE. I'm currently working on an Embryology website, utilizing images that I've recycled from the 1916 edition of Gray's Anatomy in the public domain and gif animations that I've created myself.

In my nearly 50 years, since coming to Philadelphia, I've seen several iterations of the medical school curriculum from the Hahnemann Core Curriculum of the 1970s back to a two-year basic science, two-year clinical science curriculum of the 1980s, IFM versus PIL in the 1990s and now Foundations and Frontiers. In all these formats, Anatomy continues to be a central focus and is likely to be so in the future. How can it not? I've also weathered all the name changes of the medical school itself, from Hahnemann to DUCOM and everything in between and delight in telling people that my CV looks like I can't hold a job; I've worked at so many places.

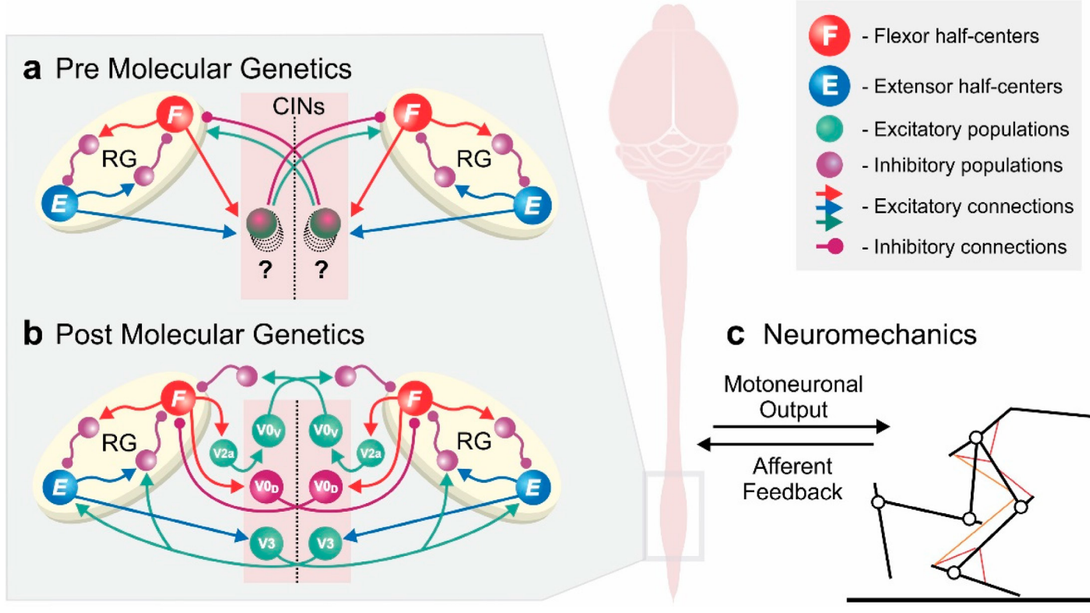
Though having surrendered my administrative role in the medical school anatomy course, I am still teaching in the courses part time and am working with new colleagues who share the same enthusiasm for anatomy as I do. While I look forward to the adventures the future holds, in particular, on this Thanksgiving Day, I am thankful for my family and friends and the challenges and opportunities I've had to change and grow and to still be enjoying life in the City of Brotherly Love!

Feature Story: The Computational Neuroscience Center

In the not too distant past, computational neuroscience at Drexel was not just dominated by Dr. Rybak, it *was* Dr. Rybak.

Since joining the College of Medicine in 2006, Dr. Rybak has not only built up his lab, he has also built the Computational Neuroscience Center, Department of Neurobiology and Anatomy. The Computational Neuroscience Center has set out to accomplish something that not many other institutions offer — a seamless, collaborative group of computational and experimental researchers sharing a common goal of further understanding nervous system function. With a core faculty composed of Drs. Ausborn, Danner, Giszter, Markin and Shevstova, most have come from Dr. Rybak's Laboratory for Theoretical & Computational Neuroscience. It is because of this tree from Dr. Rybak's support that many of the ongoing projects in the Center are collaborative and overlapping with the core faculty and their experimental affiliates, including Drs. Bezdudnaya, Dougherty and Wang. Many of the current core faculty credit Dr. Rybak's guidance as the main reason for how and why the Center was able to formulate to what it is today, and it is a worthy reason for why Dr. Rybak is currently serving as the director of the Center.

A proper understanding of how the mechanisms of the nervous system process information and how various neural circuits control behavior is fundamental to neuroscience. The Center works to provide a computational complement to the experimental studies that occur in the Department of Neurobiology and Anatomy. With the implementation of single-neuron models, conductance-based models, and neural network models (just to name a few), the Center is providing innovative tools to derive new hypotheses and guide experiments to test them. The computational modeling done in the Center is a cutting-edge and essential tool to interpret underlying neuronal processes and functions of neural circuits, and ultimately behavior. Working in concert with the Marion Murray Spinal Cord Research Center, Drexel Neuroengineering, and experimentalists, engineers, and computational neuroscientists within Drexel and from across the world, the Center is using a collaborative, interdisciplinary computational and experimental approach to study mechanisms in the intact and injured nervous system as well as in neurological disorders.



Conceptual overview of computational models of spinal locomotor circuitry. (a,b) Model schematics of two rhythm generators coupled by commissural interneurons (CINs), controlling and coordinating left and right rhythmic activities—based on classical experimental studies. From Ausborn, J.; Shevtsova, N.A.; Danner, S.M. Computational Modeling of Spinal Locomotor Circuitry in the Age of Molecular Genetics. *Int. J. Mol. Sci. 2021, 22, 6835. https://doi.org/10.3390/ijms22136835*

Of the current core faculty in the Center, Dr. Danner is one of the youngest and newest. Originally joining Dr. Rybak's lab solely for a postdoc position, Dr. Danner has now moved on to being a principal investigator and assistant professor here at Drexel. After roughly three years of being here under Dr. Rybak, Dr. Danner got promoted to instructor, which opened the door for him to begin applying for more grants. The consistent guidance and support from Dr. Rybak allowed for Dr. Danner to eventually receive multiple grants and flourish as a researcher both in the department and with collaborators across the world. It was this smooth and collective transition from postdoc to faculty that allowed for Dr. Danner to stay working so closely with Dr. Rybak and other core faculty members of the Center. Dr. Danner's next goal is to guide new students in the same way that he was once guided. As Dr. Danner alluded to, "…it is important to create something tangible for prospective students to see within the Center, and as time goes on we must continue to attract more students because they are what will allow for the Center to grow." The creation of a journal club and the formal environment within the Center will allow for this continued prosperity, and ultimately allow for the Center to provide something to the Drexel community that not many institutions offer.

Developing an independent lab in parallel with Dr. Simon Danner is Dr. Jessica Ausborn. Dr. Ausborn joined Dr. Rybak's group as an instructor to return to computational neuroscience after spending much of her postdoc days as an experimentalist. The brand of computational neuroscience that Dr. Rybak's group did was exactly what Dr. Ausborn liked to work on, which is in close collaboration with experimentalists to develop models side-by-side. She branched off to have a collaboration with Dr. von Reyn in Bioengineering, looking at visual processing and sensorimotor integration in the fruit fly, as well as a collaboration with Dr. Rybak and a colleague in France looking at the descending control of turning movements in mice. Although Dr. Ausborn did not plan on staying here at Drexel for more than two to three years, the quality of the work with the collaborative and collegial group in the Center allowed her to prosper and become a principal investigator and assistant professor after five years. As the Center is growing, Dr. Ausborn reminds students that this is an exciting time to join since they have the benefit of working with young PIs embedded in a larger group with a lot of expertise.

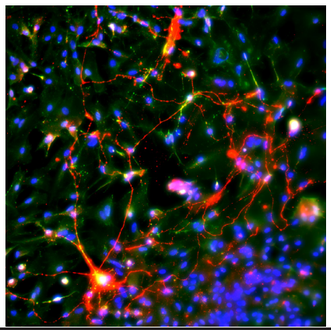
Spotlight: Spinal Cord Injury Graduate Training Program (T32)

The Marion Murray Spinal Cord Research Center (MMSCRC) has a long history of supporting a collaborative environment that brings together the multidisciplinary research that is being conducted here at Drexel.

Stemming back to Marion's dedication to spinal cord research when it was considered a dead-end without much promise, the MMSCRC is dedicated to pushing spinal cord research outside the box. The newly awarded Spinal Cord Injury Graduate Training Program (T32) led by director Dr. Peter Baas and co-director Dr. Michael Lane will build upon this successful history of spinal cord injury research with the goal of training a new generation of scientists to study spinal cord injury with the vigor that Marion did. The program is designed to prepare students for research with focuses on neural regeneration, neural engineering, rehabilitation, and more to continue to create leaps and bounds of research in the field of spinal cord injury. The trainees will include all graduate students pursuing spinal cord injury research within the Neuroscience program and the awardees for the T32 fellowship will include Shayna Singh, PhD student in Dr. Kim Dougherty's lab, and Jeremy Weinberger, PhD student in Dr. Marie-Pascale Côté's lab.

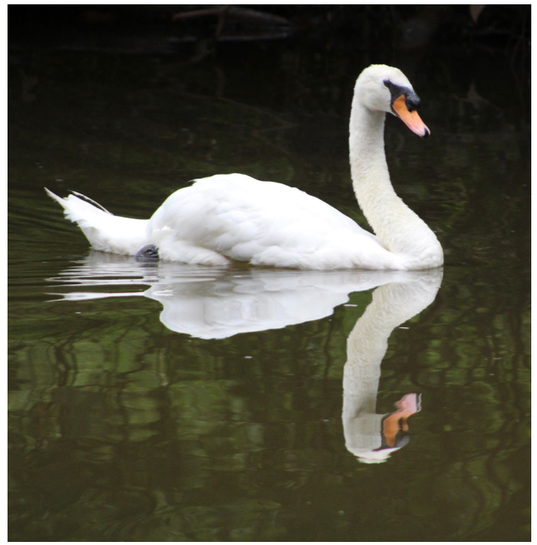
Creations

Let's Tessellate
Shrobona Guha

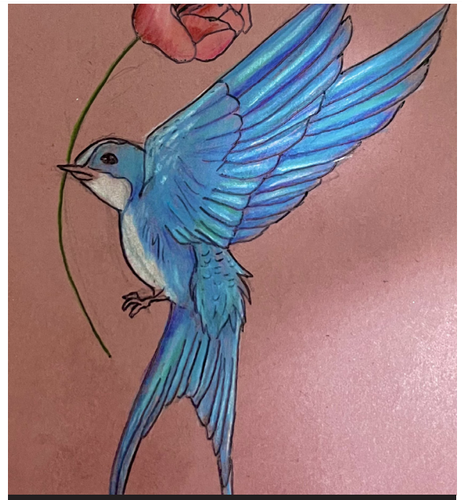


The mighty serotonergic neuron in vitro. Image description: Serotonergic neuron in culture. Green: NeuN, Red: 5-HT (serotonin), Blue: DAPI, magnification: 20X. *Silvia Fernandes*

Backside Crooked Grind on a Fall afternoon
Julien Bouyer

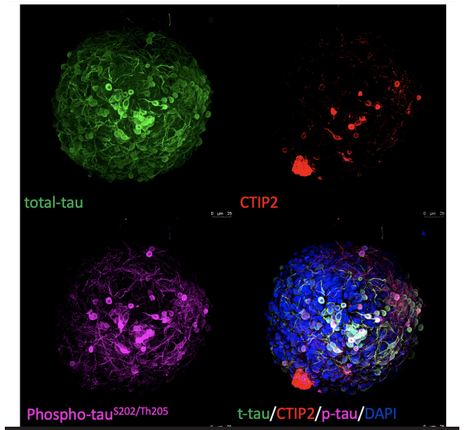


From top: Red-tailed Hawk | Reflected Swan | Song Swallow
Dr. Baird

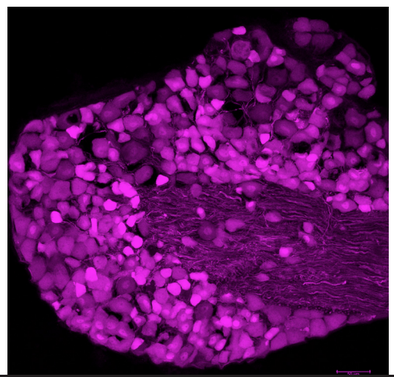


Jani Bilchak

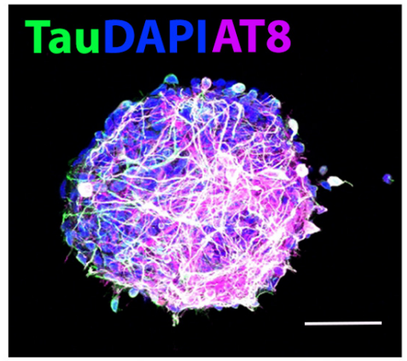
Jani Bilchak



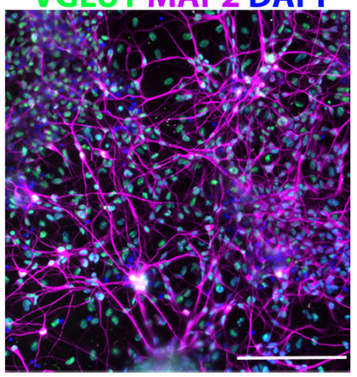
Representative whole-mount immunostaining images of assembloids with phenotypes and morphologies relevant to the study of Frontotemporal Dementia
Simeon Kofman



DRG from an adult (P61) mouse. It is lineage-labeled for Shox2 expression, which fills the nucleus, cell body, and many axons
Shayna Singh



Human iPSC-derived assembloid. The whole assembloid has been fixed and immunolabeled with total tau in green, phosphorated tau (AT8) in magenta and DAPI in blue. *Beanie Sun*



Human iPSC-derived forebrain glutamatergic neurons, which has been cultured 2 months and immunostained with glutamatergic neuron maker VGLUT in green, dendritic marker MAP2 in magenta and nucleus marker DAPI in blue. *Beanie Sun*

Alumni Spotlight

We asked recent graduates to share their current work, what their daily lives look like, and advice for current graduate students.

Sara Blazejewski, PhD

(2021 graduate)
Investigator in Industry

Sara Blazejewski is an Investigator in Reproductive Toxicology. Her role involves monitoring non-clinical safety studies that are conducted at contract research labs on behalf of GlaxoSmithKline. These non-clinical studies support the enrollment of women of childbearing potential on clinical trials. She is also involved with whole embryo culture, which is performed at earlier stages of drug development to predict whether a compound may impact embryo-fetal development. The goal of her work is to evaluate the safety of a compound at every developmental stage (fertility to embryo-fetal development to early post-natal, etc.) before it goes to market.

Most often during her work, Sara works on many varying projects for compounds at different stages of drug development. Each day is different, depending on what stages each project is at. Some days she might get new data sets to interpret or she could be reviewing a protocol or report for one of the studies she monitors. She also consults on many projects where she is asked to evaluate the literature on a target.

Career skills that Sara often uses are data interpretation, problem solving, critical thinking of background knowledge on neurodevelopment, evaluation of scientific literature, writing and cell culture.

Some advice she would provide to current graduate students is to network as much as possible! Go out of your way to make connections with people working in the area you want to work in. It is hard to make connections in industry when your mentors are all academics, but they will be valuable contacts. Start networking well before you begin your job search.

Hemalatha Muralidharan, PhD

(2021 graduate)
Industry Postdoc

Hemalatha works as a postdoctoral fellow in the neuroscience group, where her current work focuses on the investigation of pre-clinical targets and mechanisms in the field of neuro-immunology with focus on tauopathies.

Most often during her work, Hemalatha works on a wide variety of activities, ranging from designing, conducting and evaluating experiments, to participation at meetings and presenting findings. In addition, she also participates in career development programs, including mentoring interns.

Career skills that Hemalatha often uses are analytical, problem solving and communication skills.

Some advice she would provide current graduate students is to identify strengths, what you enjoy the most, but also know your limitations. Understanding and being aware of yourself will help choose the right career path for you.

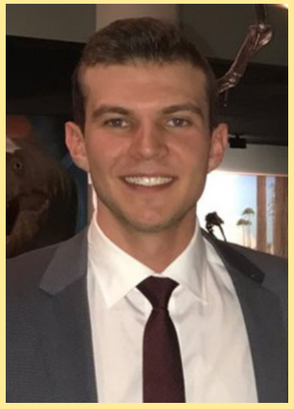
Dana Lengel, PhD

(2021 graduate)
Academic Postdoc

Dana works as an academic postdoc focused on understanding the mechanisms of nicotine addiction. She investigates the medial habenula, a small epithalamic structure and critical mediator of the behavioral effects of nicotine. The goal of her research is to elucidate the cellular and circuit-specific mechanisms of habenular regulation of nicotine behaviors. Having a better understanding of the mechanisms through which the addictive effects of nicotine are mediated will hopefully lead to novel strategies to facilitate smoking cessation.

Career skills that Dana finds most important are time management, communication and writing.

Some advice she would like to provide current graduate students is to start thinking about what you want to do after graduate school as early as possible. There are many career options and opportunities available, and she recommends learning about them early on by attending workshops, networking and/or talking to people working in the positions in which you are interested. Lastly, don't hesitate to consult older students and faculty for advice and guidance.



Eugene Mironets, PhD

(2019 graduate)
Consultant

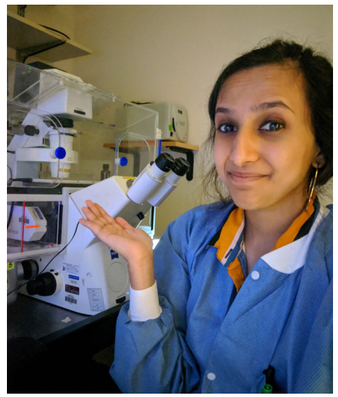
Eugene helps life science companies address any business needs ranging from pre-clinical study design all the way to marketing and commercialization.

Most often during his work, Eugene reads primary research articles and some secondary market research. He typically spends time incorporating data he researched into PowerPoint slides or Excel spreadsheets. Some days, he spends two to three hours in phone meetings with clients or with other co-workers.

Career skills that Eugene often uses are critical reading of primary and secondary research, lots of Microsoft suite apps and communicating with clients.

Some advice he would provide current graduate students is to not be afraid to break the mold. There is an ocean of opportunity outside of academia and you may not know the best path for you to take unless you try.

Research Highlights



A Few New Pieces for the Puzzle of MT Organization

by Ankita Patil

My dissertation research in Dr. Baas' lab explored a fundamental aspect of microtubule (MT) research — the mechanisms used by neurons to organize their MTs into distinct polarity patterns. An additional question we wanted to address was whether all neurons relied on a common set of mechanisms. MTs interact with many different kinds of proteins, and my project narrowed in on two possible mechanisms, the crosslinking of MTs and motor protein-mediated translocation of MTs.

We chose TRIM46 and PRC1 as our candidate MT crosslinkers based on the existing literature. An immediate hurdle was confirming that PRC1, a protein famously involved in mitosis, actually existed in neurons, cells that have famously forsaken mitosis. There are known examples of mitotic proteins that have been repurposed by neurons, and we were able to establish that PRC1 is yet another, being expressed in neurons and brain tissue at various ages and developmental timepoints. We next proceeded to study how these proteins contributed to MT organization by depleting either protein in both hippocampal and superior cervical ganglion neurons (SCGs) using siRNA. Depleting each protein alone disrupted MT polarity patterns only in hippocampal neurons. However, MT polarity patterns were disrupted in SCGs when both proteins were simultaneously depleted, suggesting that SCGs may rely less on MT crosslinking than their hippocampal counterparts, or that there may be some compensation between the two crosslinkers. We also found that depletion of TRIM46 increased the net sliding/translocation of MTs, while depletion of PRC1 had no effect. While we chose to study both proteins for their roles as MT crosslinkers, they are known to differ in their structures, regulation and possibly localization, all of which could underlie the phenotypic differences we observed.

The second aim of my project focused on MT sliding by kinesin-1. We used two approaches to study this sliding - depletion via siRNA and pharmacological overactivation. Depleting kinesin-1 did not disrupt MT polarity patterns in either type of neuron, but it did increase the number of MTs moving retrogradely. We also noted a delay in the development of kinesin-1-depleted neurons, and an impaired ability to regrow after axotomy, hinting at a role for kinesin-1 in key developmental events requiring extensive cytoskeletal mobilization. Overactivation of the protein drastically distorted the MT array in both neurons, with MTs forming curls and bends, and occasionally even being pushed out of the axon. Once again, we saw a disruption in MT polarity, but only in hippocampal neurons. SCGs must just be tough cookies…or to put it in more scientific terms, SCGs may have intrinsic characteristics that make them resistant to corruption of their MT polarity patterns.

The overarching goal of my project was to add to our growing understanding of neuronal MT organization. We wanted to assess the importance of MT crosslinking in neurons, and our current thinking is that these crosslinkers act in concert with the motor protein cytoplasmic dynein to maintain required MT polarity patterns. That being said, our experiments revealed interesting differences between the two crosslinkers, which merit further study. It is also unlikely that TRIM46 and PRC1 are the only proteins that act as crosslinkers; there are definitely other known proteins that can do this. Our kinesin-1 overactivation studies suggest that the motor has great potential to slide MTs, but that there are some regulatory checks that unleash this sliding only at certain key moments. Another takeaway from this project is that there is no one-size-fits-all answer for MT organization. Disruptions of MT-mediated processes are a hallmark of neurodegeneration, and one cause of these disruptions could be a breakdown of the intracellular machinery required to maintain appropriate MT organization. An improved understanding of what the target neuron uses to organize its MTs would help identify potential corrective or therapeutic strategies.

Impact of Sleep on Incubation of Cocaine Craving and Dopamine Terminal Adaptations Following Abstinence

by Pam Alonso

Finding effective and tolerable treatments for cocaine addiction has been extremely challenging due to the diversity of the neurobiological pathways involved as well as confounding socioeconomic factors, both of which contribute to high propensity to relapse. Relapse rates remain high even after prolonged periods of abstinence. Thus, there is a critical need to understand the mechanisms that contribute to drug relapse, to identify molecular targets that could predict the risk of relapse, and to develop therapies to decrease the probability of relapse and prolong abstinence.

Sleep disruptions are commonly observed during recovery from chronic cocaine use and manifest as abnormal sleep architecture which is posited to engender a progressive intensification or 'incubation' of cocaine craving that promotes relapse. While the neural mechanisms underlying the association between sleep disruption and incubation of cocaine craving are unclear, accumulating evidence suggests that alterations in mesolimbic dopamine (DA) neurotransmission may contribute to these processes. The mesolimbic DA system is a critical mediator of cocaine reinforcement due to cocaine's ability to inhibit the DA transporter—which, under normal conditions, is responsible for the swift removal of DA from the extracellular space.

In my thesis, I examined for the first time whether DA terminal neurotransmission in naïve rats fluctuates across sleep/wake activity. Results showed a robust association between sleep/wake state and DA terminal neurotransmission, with higher DA uptake rate, increased phosphorylated DA transporter at Thr53 site, and enhanced cocaine potency after periods of sleep. Then, I employed cocaine self-administration followed by a period of imposed abstinence to engender sleep disruptions that drive incubation of cocaine craving. Intermittent access to cocaine, a recently designed self-administration schedule that mimics binge-like patterns of consumption usually observed in humans, was used as schedule of reinforcement. I assessed how adaptations in DA neurotransmission influence incubation of cocaine craving after cocaine exposure and abstinence. Intermittent access to cocaine followed by abstinence engendered a significant intensification of cocaine seeking, decreases in REM sleep, and increases in DA release and uptake compared to cocaine naïve rats. Thus, I examined whether restoring sleep during abstinence from cocaine attenuates intensification of cocaine craving and whether these effects involve alterations in DA signaling in the nucleus accumbens core. Sleep restoration was achieved by limiting sleep during active/dark phase thereby consolidating sleep during the inactive/light phase. Restoring sleep attenuated incubation of cocaine craving and reversed DA terminal adaptations. These findings suggest that sleep disturbances might not only be a symptom of cocaine abstinence, but they could also be an important factor in promoting cocaine craving via dopamine terminal adaptations.

This work provides crucial insight into the value of a highly accessible and low-cost treatment option suggesting that interventions to improve sleep architecture in patients undergoing cocaine detoxification may prolong abstinence and decrease the probability of relapse. In addition, this novel approach represents a substantive departure from the few investigations associating sleep and motivation by proposing that DA neurotransmission in the nucleus accumbens may act as a crucial structure regulating motivational behaviors and sleep/wake processes. The results of this research will not only be important for generating new targets to attenuate cocaine-associated sleep disruptions but also to other sleep disorders commonly observed in DA-related diseases.

Student Leadership

Interview With Taylor McCorkle, MS

Interviewed by Joya Maser

Taylor McCorkle, MS, is a fourth-year PhD candidate in the Neuroscience program. She also serves as the vice president and co-founder of Neuroscience Graduate Students for Diversity.

Q: What are some of the leadership roles you've had this past year?
A: I am the Vice President of Neuroscience Graduate Students for Diversity (NGSD), treasurer of Drexel's Black Graduate Student Union, served as a student member of the admissions committee, and as a member of Drexel's Anti-Racism Task Force on the Graduate and Doctoral Student Life Committee.

Q: What was it at Drexel, or even outside of our community, that motivated you to take so many of these leadership roles on?
A: We founded NGSD because of the racial injustice that resulted in the uproar that was the summer of 2020. Basically, while a lot of institutions were finally making strides to do better, we created NGSD to form a safe space for students and faculty of diverse backgrounds, as a means to bring changes to our department and graduate school as a whole, and to hold leadership accountable for actually following through and implementing these changes. Before the summer of 2020, I didn't know about the Black Graduate Student Union, but through all of the Town Halls at Drexel last summer I met the president and got the opportunity to join their board this year. My roles on the admissions committee and the Anti-Racism Task Force also came out of the events that happened in 2020 and Drexel taking steps to combat systemic racism in academia.

Q: What was the most challenging part of trying to implement these changes?
A: I would say, getting people to acknowledge the fact that racism is embedded in so many of our everyday policies and language, that you can always do better, and the current systems in place are not perfect, by any means. Even if we, at Drexel, seem to be better than some other institution, we can always continue to improve. It seems, a lot of people don't realize how deep rooted some of the issues are. On the outside it may not seem necessary to change certain policies, but everything is intertwined and it's hard to get people to recognize that sometimes.

Q: On the other side, is there anything that has been rewarding? Is there anything that you've done that you can already see the benefit of?
A: The most rewarding thing for NGSD have been our outreach initiatives. We've met with people from local colleges and schools and have been able to be resources for the students. We've teamed up with teachers at certain middle schools and done various virtual STEM activities with the students there. We also hold virtual panels and Q&A sessions for undergraduates/people who want to apply to graduate school about graduate school programs, applications, and career opportunities post-grad. These areas are where we have been thriving the most. Which is great, we want to be able to provide people with information, opportunities, and resources that they might not have had otherwise.

Q: What is the biggest lesson you've learned about being a leader from these experiences that you and NGSD have gone through at Drexel?
A: One thing I knew, but not quite as much before, is how it truly does take a lot of patience and persistence to convey your point in the right way. A lot of what we've been trying to do is not to say, 'everything that's being done here is awful and we just need to restart,' it's more, 'can we work together to change and tweak things where we need to, to make them better.'
Also, realizing your own weaknesses. I grew up knowing about racism and feeling those explicit and subtle forms of it, but at the same time I learned so much more throughout last year. If I'm going to tell people that they need to educate themselves, then I need to do the same. Taking the time to educate myself actually opened my eyes to a lot of things. The other part of knowing your own strengths and weaknesses is that it really does take a village as they say. Without everyone else in NGSD, there is no way we would've been able to get this far.

Q: As a leader trying to move things in the right direction, how do you deal with meeting resistance?
A: I learned a lot, kind of recently, when some NGSD members met with Dr. Consuelo Wilkins, who came to receive the Marion Spencer Fay Award. She gave us so many tips on how to backpedal a little and convey our message in a way that makes it important to others, who may not directly experience racism, by tying it to something that they care about in terms of their experience. One thing we have done a little before, that she emphasized, was to bring hard data. We are scientists, so we need to have the facts about diverse students bringing supplemental funds to R01 grants, diverse teams being published in higher impact journals, and really show people how diversity benefits them. You definitely don't need to do this for everyone as so many people at Drexel are genuinely willing to make change and are really supportive of NGSD's mission. But in this way, making everything we do more intentional, is important for portraying a stronger message to people who are already with us and people who may need more convincing.

It does sound sad when you hear it, but [Dr. Wilkins] told us, not everyone is going to care that you are crying about the racism that you are experiencing. When NGSD did face resistance as a group, we felt like there was only so much we could do. We were sharing personal stories at Town Halls, in general meetings, and in the NGSD book club. And if you're waiting for someone to care that you're spilling your trauma, you could be waiting forever. When meeting this resistance or not feeling progress as quickly as we all want, it becomes important to protect your own mental health, your peace, and to remind yourself of all the good that you have done. In NGSD we ended up having a support group every Friday and sometimes we would cry, sometimes we would just vent, and sometimes we would get in a much needed laugh, because it was a lot to deal with, the trauma and resistance. We felt like we needed to have some type of group therapy and allow other students to come and share their feelings or simply be present in a safe space, and that was it for us.

Ultimately, I think people really do care and are trying to be helpful. But like I said, we can always do more. We want to keep having these difficult conversations and continue to grow.

Q: Do you feel like your experiences at Drexel will push you to remain a leader as you move forward?
A: Leadership, especially for racial justice, is something that I want to continue to be involved in. For me, taking on these leadership roles forced me to speak up. My first few years in the program, I was pretty quiet and kept to myself. With everything in the country that was going on at the time, someone needed to say something, and I thought, 'its looking like it's going to be me.' But it was a good thing, taking on these roles has made me so much more comfortable with my peers in the department.

I want to continue doing this work because even if our efforts change one person's life, by giving them the resources that they didn't have access to, then that is a win. I want to be able to mentor people and be a resource for anything from looking over an essay for a grad school application or whatever it could be, to help as many people as we can.

And I hope that the work that we've done so far will make other people feel comfortable and confident bringing up the issues that are affecting them. The goal is to make everyone feel safe and supported in our department!

More 2021 Student Leadership News:

BENNISON AND MACK WIN ASCB COMPASS GRANT FOR NGSD OUTREACH "STEM STARTERS"
The Neuroscience Graduate Students for Diversity (NGSD) group is passionate about increasing diversity in STEM through outreach. To this end, they created a "STEM STARTERS" series by pairing with local elementary and middle school classrooms to teach young students about neuroscience and careers in research. NGSD President and member of the American Society for Cell Biology (ASCB) Sadie Bennison, along with NGSD Treasurer Nancy Mack, won the 2021 Compass Outreach Grant from ASCB to help facilitate their work with STEM STARTERS. The $1,000 award will go to supplies for hands-on activities to help teach young children about the brain. Bennison and Mack, along with other NGSD volunteers, will facilitate these activities during winter 2021 and spring 2022.

NEUROSCIENCE STUDENTS SWEEP BSGSA LEADERSHIP BOARD
Over the past, neuroscience graduate students have always had a strong presence on the Biomedical Sciences Graduate Student Association (BSGSA) leadership board. Dr. Brielle Ferguson and Dr. Andrew Matamoros were both Presidents and Dillon Malloy has joined their ranks most recently. While the BSGSA board positions are up for re-election for the term of 2022-2023, we expect this board to retain some Neuroscience representatives: Andrey Borisyuk (VP of Professional Development), Candace Rizzi-Wise (VP of Event Management) and Shrobona Guha (VP of Inclusion and Diversity).

Graduates *of 2021*

Margo L. Randelman, PhD
Advisor: Michael Lane, PhD
Thesis Title: Hypercapnia respiratory training to enhance plasticity after cervical spinal cord injury
Defense Date: April 1, 2021
Current Position: Postdoctoral fellow in the laboratory of Dr. Lane by day; "professional Odin cuddler" by night

Ilse Pamela Alonso, PhD
Advisor: Rodrigo España, PhD
Thesis Title: Impact of sleep on incubation of cocaine craving and dopamine terminal adaptations following abstinence.
Defense Date: April 8, 2021
Current Position: Visiting Postdoctoral fellow in the Laboratory for Integrative Neuroscience at NIAA/NIH under Dr. Lovinger.

Sara M. Blazejewski, PhD
Advisor: Kazuhito Toyo-oka, PhD
Thesis Title: Dissecting cellular mechanisms of neurite formation in the developing cortex
Defense Date: April 9, 2021
Current Position: Investigator at GSK

Philip L. Yates, PhD
Advisor: Peter W. Baas, PhD
Thesis Title: A cellular approach to understanding and treating Gulf War Illness
Defense Date: April 16, 2021
Current Position: 3rd year medical student at Drexel University College of Medicine

Ankita Patil, PhD
Advisor: Peter W. Baas, PhD
Thesis Title: Static crosslinking and motor-driven sliding regulate the organization of axonal microtubules
Defense Date: July 16, 2021
Current Position: Scientist, Bioassay, Passage Bio

Emily M. Black, PhD
Advisor: Rodrigo España, PhD
Thesis Title: Hypocretin receptor 1 modulations on specific neuronal subtypes in the ventral tegmental area impact mesolimbic dopamine and cocaine-associated behavior
Defense Date: July 30, 2021
Current Position: Postdoctoral fellow at Temple University in the Briand lab. Adjunct professor at Haverford College for the spring semester.

Dana Lengel, PhD
Advisor: Ramesh Raghupathi, PhD
Thesis Title: Mechanisms of hippocampal dysfunction following pediatric brain trauma
Defense Date: July 26, 2021
Current Position: Postdoctoral fellow at Icahn School of Medicine at Mount Sinai in the lab of Paul J. Kenny.

Shasha Yang, PhD
Advisor: Wen-Jun Gao, MD, PhD
Thesis Title: Thalamocortical inputs regulate the development of inhibitory circuitry in the mPFC
Defense Date: August 4, 2021
Current Position: Postdoctoral fellow in Fudan University, Shanghai, China

Jadwiga N. Bilchak, PhD
Advisor: Marie-Pascale Côté, PhD
Thesis Title: Enhancing KCC2 expression restores reflex inhibition and improves locomotor function after spinal cord injury
Defense Date: July 28, 2021
Current Position: Postdoctoral fellow at University of Pennsylvania, Kayser lab

Emily Zihal, MS
Advisor: Rodrigo España, PhD
Graduation date: May 5th, 2021
Current Position: Regulatory, Quality, and Operations Rotational Associate, Integra Life Sciences

First Years *of 2021*

(Top, left-to-right)
Birdie Eckel
Julie Schaub
Nichole Yakas
Revathi Kaduru
Shanna Samels
Jana Smuts

(Middle, left-to-right)
Quinn Stewart
Jacob Clarin
Xinyi (Jenny) Chen
Christopher West
Cydney Martin
Sophie Cohen
Meghan Hemdal

(Bottom, left-to-right)
Moin Vahora
Anurag Singh
Anthony Moreno Sanchez
Nishell Savory
Jason Wheeler
Jazana Goolsby

First Years *of 2020*

(Top, left-to-right)
Jenna McGrath
Brody Carpenter
Christina Curran-Alfaro
Adam Hall
Kendra Case
Arron Hall
Andrew Lockhart

(Bottom, left-to-right)
Pryscilla Santos Acevedo
Abby Keith
Mariah Wulf
Joya Maser

First-Year vs. Second-Year Perspective

Over the past two years, our first- and second-year students have transitioned into the department during the unprecedented circumstances of the COVID-19 pandemic. Despite the similarities between these classes – masks, social distancing, general uncertainty — the experiences of the newest members of our department have been very different! Below we'll look at some of the first impressions of the two masked-cohorts, blazing their own trail — sanitizer in hand.

Lab Rotations

Of course, the most important impression of all is that of the mentors and P.I.s. As the newest scientists on the block, both first- and second-years felt welcomed and supported. Our students were impressed with your investment in their success and the eagerness to share knowledge and experiences with them.

Once settled in their new homes all our students enjoyed jumping into new projects and engaging with new techniques and skills. Of course, the change did not come without adjustments. Some of the most challenging aspects of rotations remain universal, coming in at 7 a.m., finding balance between new demands and outside life, and the fear of making mistakes.

Classes

Classes, like the COVID vaccine, might make you feel terrible but they're for your own good. The first-year students of 2020, attended their classes online, lived in separate corners of the country, and many did not meet in-person until this year! On the other hand, our current first-years of 2021 have already become a fixture at Queen Lane; tears and complaints of CORE flow down the halls once again.

So, how did the first-years' expectations of classes compare to reality? Regardless of the differences in lecture setting, there was consensus that classes proved to be challenging, time consuming, and stressful. However, the second-years' outlook is markedly more positive. Classes became more interesting, challenges were met, and the trauma of CORE has faded with time.

With their newfound wisdom and scholarly intellect our first- and second-years have left some sage advice for next year's cohort. Their biggest recommendation: don't procrastinate. And some additional advice that we could all use, prioritizing mental health, forging your own path, and reserving time for self-care!

Social Life

While our 2020 first-years were in their homes — memorizing metabolic pathways with parents, partners, and children — their one glimmer of hope was class discussions on zoom. On the other hand, our 2021 newbies enjoyed trivia nights, pumpkin carving, and spending time outside of the lab. Like many of us, both classes have found socializing in the pandemic-era stressful and challenging. Even with the difficulties, many of our students have found comfort in the friendships they have forged, new hobbies cultivated and opportunities for growth.

2021 Awards & Grants

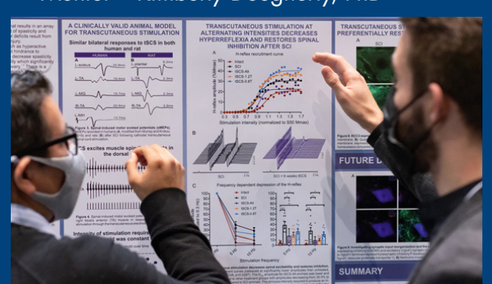
Outstanding Junior Graduate Student Poster
1st Place – Andrew Lockhart
Mentor – Simon Danner, PhD

Outstanding Senior Graduate Student Poster
1st Place - Silvia Fernandes
Mentor – Shaoping Hou, PhD

Honorable Mention – Nancy Mack
Mentor – Wen-Jun Gao, PhD

Outstanding Postdoctoral Fellow Poster
1st Place – Emanuela Piermarini, PhD
Mentor – Liang Qiang, PhD

2nd Place – Leonardo Garcia-Rameriz, PhD
Mentor – Kimberly Dougherty, PhD



Outstanding Medical Student Poster
3rd Place – Benjamin Sherman
Mentor – Michael Lane, PhD

Outstanding Technician Poster
1st Place – Wen-qiang Huang
Mentor – Dong Wang, PhD

Outstanding Undergraduate Poster
1st Place – Alexander Vasserman
Mentor – Jessica Ausburn, PhD

2nd Place – Yashvi Shah
Mentor – Michael Lane, PhD

Selected for Platform Talks
Kathleen Bryant
Mentor — Jacqueline Barker, PhD

Barry Waterhouse Outstanding Platform Presentation
1st Place – Sarah "Sadie" Bennison
Mentor – Kazuhito Toyo-oka, PhD

2021 Internal Student Awards:

Bondi Fellowship
Genevieve Curtis, mentored by Dr. Jessica Barson

Blue Graduate College Fellow
Nishell Savory, 1st-year PhD candidate

Dean's Fellowship for Excellence in Collaborative or Themed Research
Nancy Mack, mentored by Dr. Wen-Jun Gao
Genevieve Curtis, mentored by Dr. Jessica Barson

Drexel STAR Award Pitch Presentations: 2nd Place
Yashvi Shah, mentored by Dr. Michael Lane

2021 Faculty Awards:

Jessica Barson, PhD - 2021 New Investigator Award

John Houle, PhD - 2021 Daniel V. Schidlow MD Transformational Leadership Award

Simon Giszter, PhD, was nominated by College of Medicine and became a Provost Solutions Fellow, in the Drexel Solutions Institute, together with Dr. Sandhya Kortagere

Michael Lane, PhD, was invited to become a fellow of the Royal Society of Medicine (London)

2021 Golden Apple Awardees

Dennis DePace, PhD - Award for Outstanding Service to the Student Body

Haviva Goldman, PhD - Foundations of Basic Science – Year 1 Class of 2023

Francis Sessler, PhD - Foundations of Basic Science – Year 1 Class of 2024

Janet Smith, PhD - Foundations of Basic Science – Year 1 Class of 2024

2021 External Student Awards:

NIH F31 Fellowship
Kathleen Bryant, mentored by Dr. Jacqueline Barker
Sarah "Sadie" Bennison, mentored by Dr. Kazhutio Toyo-oka
Micaela O'Reilly, mentored by Dr. Veronica Tom
Cameron Trueblood, mentored by Dr. Shaoping Hou

Association for Women in Science (AWIS) Travel Award
Nancy Mack, mentored by Dr. Wen-Jun Gao
Shrobona Guha, MS, mentored by Dr. Peter Baas

The American Society for Neural Trauma and Repair (ASNTR) Travel Award
Tara Fortino, mentored by Dr. Michael Lane
Margo Randelman, PhD, mentored by Dr. Michael Lane. Margo also received a 1st place presentation award at this meeting.

Barry Goldwater National Scholarship Nominee
Nadia Bouras, mentored by Dr. Wen-Jun Gao

Carl Storm Fellowship
Jeremy Weinberger, MS, mentored by Dr. Marie Pascale-Côté

Diversifying the Community of Neuroscience Fellowship (University of Minnesota)
Taylor McCorkle, MS, mentored by Dr. Ramesh Raghupathi

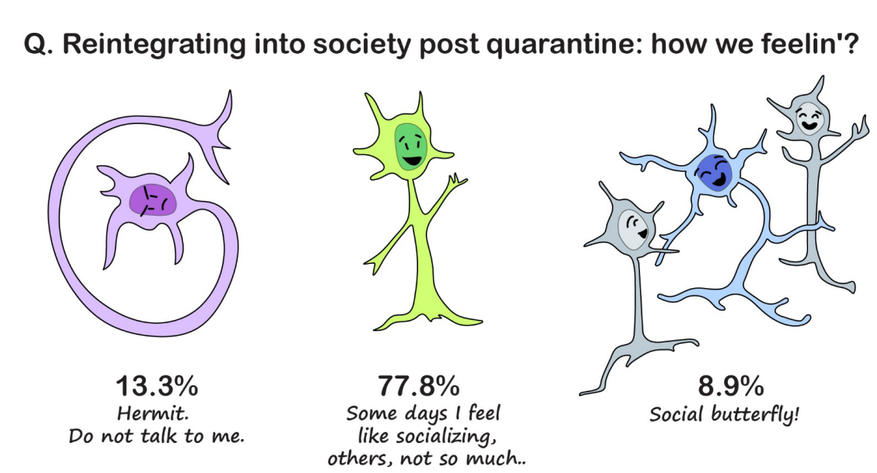
National Neurotrama Society Trainee and Diversity Award
Taylor McCorkle, mentored by Dr. Ramesh Raghupathi

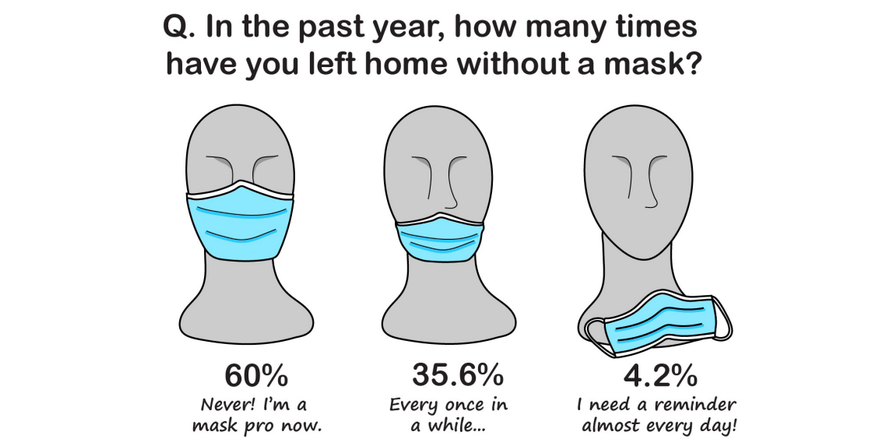
NIH Diversity Supplement Award
Taylor McCorke, mentored by Dr. Ramesh Raghupathi
Candace Rizzi-Wise, mentored by Dr. Dong Wang

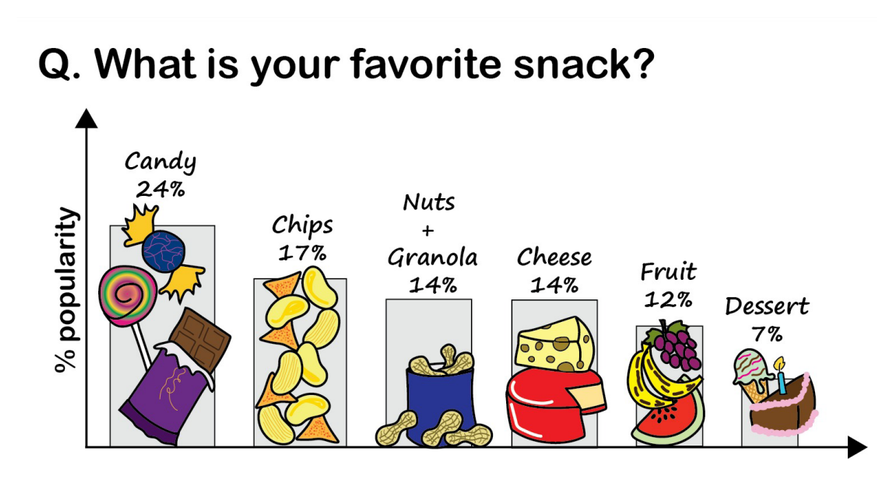
Society for Neuroscience Trainee Professional Development Award
Margo Randelman, PhD, mentored by Dr. Michael Lane
Alessia Niceforo, PhD, mentored by Dr. Michael Lane

Culture

Illustrations by Dr. Ankita Patil







Scientist Support Animals

Rooney James
Joya Maser

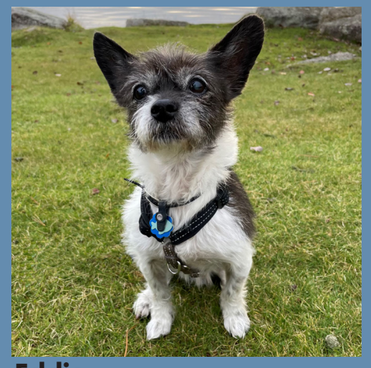
Sophie and Sylvie
Breanne Pirino

Fritz
Dr. Detloff

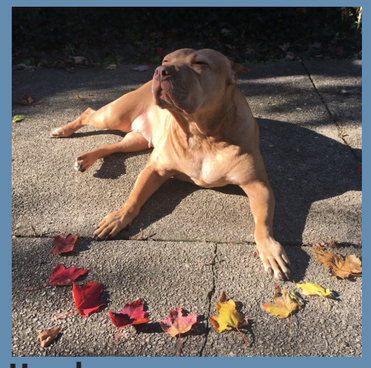
Sadie the Floof
Candace Rizzi-Wise

Paris
Shayna Singh

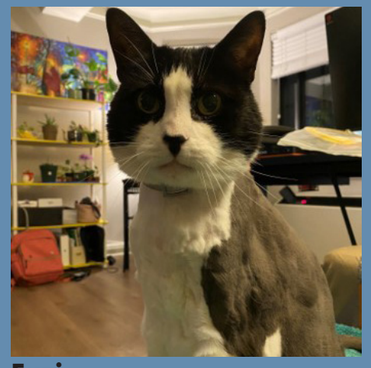
Chomchom
Shrobona Guha



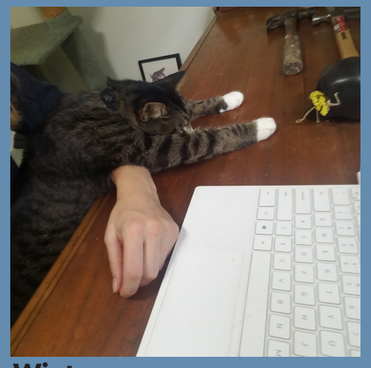
Eddie
Dr. Jessica Ausborn



Hazel
Ashley Opalka & Kyle Samson



Fuzi
Xiaohuan Beanie Sun

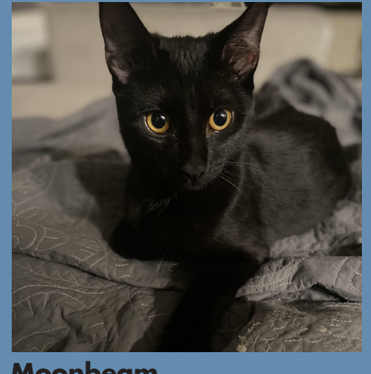


Winter
Jani Bilchak

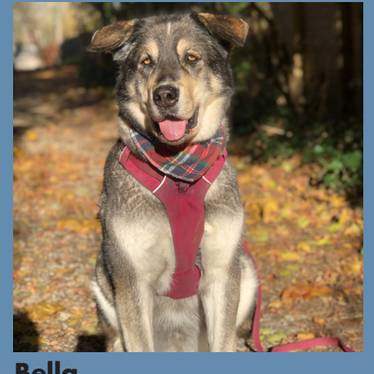
Mordi and Grey
Micaela O'Reilly

Rubble and Koen
Dr. Howe

Toby
Jana Smuts



Moonbeam
Jana Smuts



Bella
Nancy Mack

Josephine (Jo)
Jennifer Pastorino

Activities & Outreach

Ankita and Candace at the DIY candle making workshop by BSGSA

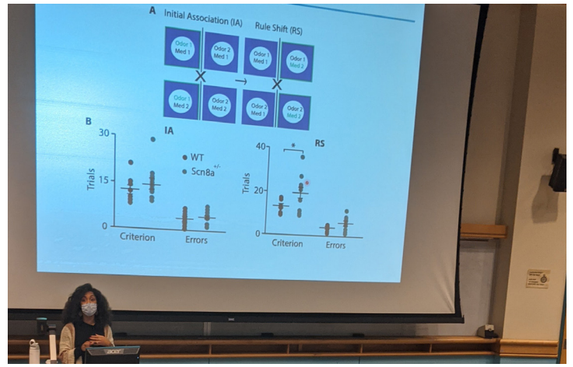
Philadelphia Flower Show

BSGSA Bouncy House Event

Côté lab dressing up the same!

BSGSA Board at the Pumpkin Carving & Painting Event

Diwali "Festival of Lights" event by BSGSA



Dr. Brielle Ferguson presenting her work from Stanford University at the departmental seminar

Candace delivering Fall goodie bags from the BSGSA

Students meet Dr. Consuelo Wilkins, recipient of the Marion Spencer Fay Award

NeuroCamp 2021 at the Franklin Institute

Faculty Grants 2021

Jessica Ausborn, PhD
NIH RO1 NS118562 - (Ausborn and VonReyn – PI's)
9/15/20 - 6/30/25
Title: Neural algorithms underlying diversity in visual feature integration
Total Direct Costs - $700,305 (Ausborn)

NIH RO1 NS118562 - (Ausborn and VonReyn – PI's)
9/1/21 - 6/30/22
Title: Research Supplement to Promote Diversity in Health - Related Research Program for Alisha Augustin
Total Direct Costs - $10,200

Steinbright Career Development Center Research Co-op (Ausborn PI)
3/29/21 - 9/28/21
Title: Persistent activity underlying sustained behaviors in Drosophila melanogaster. Co-op: Alexander Vasserman
TDC - $7,250

NSF 2113069 (Ausborn PI; Ilya Rybak Co-Investigator)
10/1/21 - 9/30/25
CRCNS US - French Research: Brainstem - spinal circuits for control of locomotor steering.
Total Direct Costs $441,412

Peter Baas, PhD
Multi - PI RO1 NIH NS118177R01 (Baas and Morfini - PI's)
9/30/20 - 6/30/25
Title: Mechanisms of SPG4 hereditary spastic paraplegia
Level of funding: $1,029,185 total direct costs to Dr. Baas; $1,028,547 total direct costs to Dr. Morfini

DOD W81XWH 2110189 (Baas PI)
3/15/21 - 3/14/23
Title: Novel microtubule - based hypothesis for Frontotemporal Dementia leading to therapy for military personnel and veteran
Total Direct Costs - $200,000

NIH R21AG068597 (Baas PI)
4/15/21 - 3/31/23
Role of Tau in Microtubule Stability in Adult Neurons
Total Direct Costs $275,000

Subcontract from Texas A&M University (Baas PI, Oscar Qiang Co-I)
5/15/21 - 5/14/24
DOD W81XWH 2110171 (James Cai PI)
Inferring Single - Cell Regulatory Networks in Neurons Derived from Veterans Afflicted with GWI
Total Direct Costs $42,474

NIH T32NS121768 (Baas PI)
7/1/21 - 6/30/26
Training Program on Innovative Approaches to Spinal Cord Injury
Fellows: Shayna Singh (Kimberly Dougherty, Mentor) and Jeremy Weinberger (Marie - Pascale Cote, Mentor)
Total Direct Costs $973,863

DOD W81XWH 2110537 (Baas PI) 9/30/21 - 9/29/24
Microtubule - Based Therapies for Memory Loss in Gulf War Illness: Studies Using Human Minibrain Organoids from Veteran - Derived Human Pluripotent
Total Direct Costs $624,993

Jessica Barson, PhD
NIH 1R01AA028218 - 01 – (Barson - PI) 4/10/20 - 3/31/24
Pituitary adenylate cyclase - activating polypeptide 27 in the paraventricular thalamus and its projections: Role in ethanol drinking
Total Direct Costs: $ 900,000

NIH R01AA028228 (MPI Karkhanis and Barson)
6/1/21 - 5/31/26
Mechanisms of rostrocaudal differences in accumbal kappa opioid receptor effects on ethanol drinking
Total Direct Costs $733,645

CURE 2019 (Jacqueline Barker, PI; Jessica Barson, Co-I)
6/1/21 - 5/31/22
Title Targeting the Glutamate System to Reduce Binge Eating Following Alcohol
Dependence
Total Direct Costs $26,936

Sarah Bennison
NIH F31HD103405 (Bennison PI; Kazuhito Toyooka, Mentor)
4/1/21 - 3/31/23
Adnp regulates axogenesis and dendritogenesis in the developing cortex
Total Direct Costs $92,072

Tatiana Bezdudnaya, PhD
Paralyzed Veterans of America Grant # ¬¬3178 (Bezdudnaya PI)
1/1/21 - 12/31/22
Promoting Colonic Peristalsis after Chronic Spinal Cord Injury with Closed - Loop Electrical Stimulation"
Total Direct Costs $138,889

PA Spinal Cord (Bezdudnaya PI) 6/1/21 - 5/31/23
Improving breathing with limb muscle stimulation after cervical SCI
Total Direct Costs $190,476

Christopher Reeve Fellowship (Bezdudnaya PI)
7/1/21 - 6/30/22
Role of Central Chemoreception
Total Direct Costs $20,000

Sara Blazejewski (Dr. Kazu Toyo - oka)
NIH F31 NS113404 9/1/20 - 4/30/21
Title: Novel functions of Plxdc1 in neurite formation
Total Direct Costs - $27,690

Marie Pascale - Côté, PhD
DOD (SC190008) (Côté – PI; S Harkema and Y Gerasimenko – CoI) 7/1/20 - 6/30/23
Acute and Chronic Spinal Plasticity Triggered by a Tailored Epidural Stimulation Program After Chronic SCI
Total Direct Costs - $500,000

Scholarly Materials and Equipment Award (Côté – PI)
7/1/20 - 6/30/21
Drexel Office of Research & Innovation
Motion capture system to assess functional recovery after spinal cord injury
Total Direct Costs - $19,000

Craig H Neilsen Foundation (647897) (Côté – PI)
7/31/20 - 7/30/22
Repeated Transspinal Stimulation Decreases Spasticity after SCI
Total Direct Costs - $270,000

NIH/NINDS (1RO1 NS119475 - 01 (Côté – PI)
12/15/20 - 11/30/25
Mechanisms of action contributing to decrease spasticity and improve motor recovery with repeated transcutaneous stimulation after spinal cord injury
Total Direct Costs - $1,250,000

Genevieve Curtis
1/1/21 - 6/30/21
COM Dean's Fellowship (Curtis PI, Jessica Barson, Mentor)
Total Direct Costs $20,274

Simon Danner, PhD
NIH NINDS: R01 NS115900 (Danner – PI) 9/21/20 - 6/30/25
Spinal circuits for sensorimotor integration and interlimb coordination during locomotion.
Total Direct - $1,303,388

NIH R01NS112304. (Multi PI Magnuson/Danner/Whittemore)
3/15/21 - 1/31/26
Propriospinal neuron function in normal and post - SCI locomotion.
Total Direct Costs $596,751

Megan Detloff, PhD
Subcontract from Vulintus, Inc. (Detloff PI) 6/24/20 - 5/31/22
NIH - R44 MH119734 (PI Sloan)
HabiTrak: low - cost, wireless home cage health and activity monitoring.
Total Direct Costs $93,987

Kimberly Dougherty, PhD
NIH R21NS118226 (Dougherty - PI) 7/1/20 - 6/30/22
Specific spinal locomotor circuit alterations induced by epidural stimulation.
Total Direct Costs - $275,000

Rodrigo Espana, PhD
Pending CURE 2020 (PI Mortensen, Espana Co-I)
Real - time Ex Vivo Modulation of ERK1/2 Signaling in Dopamine Neurotransmission

Wen - Jun Gao, PhD
R21MH121836 (Gao, PI; Yan - Chun Li, Co-I)
7/1/20 - 6/30/22
Behavioral Effect of IgSF9b in Prefrontal Cortex
Total Direct Costs - $275,000

CURE 2019 (Gao, PI and Dong Wang, Co-I) 6/1/21 - 5/31/23
"Novel tools for study the behavior and neural circuitry of anxiety"
Total Direct Costs $75,000

Pending NIH R21 (Gao PI and Dong Wang Co-I)
4/1/22 - 3/31/24
Norepinephrine tunes prefrontal - thalamic circuitry to modulate avoidance behavior
Scored 6th Percentile; Impact 22.

David Leonardo Garcia Ramirez, PhD
Jekkal Fellowship (Ramirez PI, Dougherty Mentor)
7/1/21 - 6/30/22
Total Direct Costs $53,000

Simon Giszter, PhD
PA Spinal Cord (Giszter PI) 6/1/21 - 5/31/23
Enhancing Regeneration Efficacy after SCI with Robot - Rehab Coupled Optogenetics
Total Direct Costs $190,476

Coulter Foundation (Giszter PI, Williams, Binder-Markey, Ramakrishan Co-I's) 7/1/21 - 6/30/23
Braided electrodiagnostic probes
Total Direct Costs $125,667

Shaoping Hou, PhD
NIH R01NS099076 (PI Hou) 7/1/19 - 5/31/21
Spinal dopaminergic mechanisms regulating the micturition reflex after spinal cord injury
Research Supplement to Promote Diversity in Health - Related Research Program for Cameron Trueblood
Total Direct Costs - $82,088

Subcontract from Dignity Therapeutics, LLC (Hou – PI)
9/1/20 - 08/31/21
NIH R41NS117205 (PI Rupniak)
Examination of a novel potential therapy for autonomic dysreflexia
Total Direct Costs: $130,032

NIH R21 NS120161 (Yinghui Zhong – PI; Hou – Co-I)
9/30/20 - 8/31/22
A novel biomaterial approach for local delivery of hepatocyte growth factor to promote stem cell graft - host integration and spinal cord repair.
Total Direct Costs - $275,000

PA Spinal Cord (Hou PI) 6/1/21 - 5/31/23
Rebuilding Supraspinal Regulation to Restore Voluntary Micturition Reflex
Total Direct Costs $95,238

Pending NIH R01NS121336 (Hou PI; John Houle Co-I)
12/1/21 - 11/30/26
Combining serotonergic neural progenitor transplantation and exercise to improve cardiac disorders and autonomic dysreflexia after spinal cord injury
Total Direct Costs $1,250,000

John Houle, PhD

NIH RO1 NS117821 – (University of SC Subaward J Houle, (PI)
7/1/20 - 6/30/25
Title: Role of Stress Granule Protein Aggregation in Axon Regeneration
Total Direct Costs $349,059

Caitlin Howe, PhD

Mary De Witt Pettit, MD Fellowship (Howe PI)
7/1/21 - 6/30/23
Accessing the Lab Remotely: addition of cadaveric 3D models in medical school gross anatomy courses
Total Direct Costs $10,000

Ying Jin, PhD

PA Spinal Cord (Jin PI) 6/1/21 - 5/31/23
Glial Progenitor Grafts to Promote Regeneration and Functional Recovery after SCI
Total Direct Costs $95,238

Michael Lane, PhD

Neilsen Foundation University of Florida Subcontract (PI Lane)
2/1/20 - 7/30/22
Electrical Stimulation and Intraspinal Transplantation
Total Direct Costs $369,368

Subcontract from Texas A&M University (Lane PI)
1/1/21 - 11/30/21
NIH R01NS116404 (Dulin, PI)
Dissecting Connectivity and Functions of Transplanted Interneurons in the Injured Spinal Cord
Total Direct Costs $9,335

PA Spinal Cord (Lane PI) 6/1/21 - 0/31/23
A Novel Training Strategy to Enhance Respiratory Recovery after SCI
Total Direct Costs $190,476

Subcontract from Thomas Jefferson University (Lane PI)
7/31/21 - 7/30/23
Neilsen Foundation (Lepore PI)
Respiratory interneuron plasticity following cervical SCI: therapeutic promotion of relay circuits
Total Direct Costs $11,000

Moseley Foundation (Lane PI, Zholudeva, Co-I)
10/1/21 - 9/30/23
Broad Scale Genetic Screening of Human and Non - Human Neural Precursor Cells (NPCs)
Total Direct Costs $249,236

Dana Lengel, PhD

Brain Injury Association of America (Lengel, PI; Raghupathi, Mentor) 2/1/21 – 1/31/22
The Role of FK506 - binding Protein 51 (FKBP5) in Long - term Psychosocial Outcomes of Pediatric TBI.
Total Direct Costs $5,00

Nancy Mack 1/01/21 - 6/30/21

COM Dean's Fellowship (Mack PI, Wenjun Gao, Mentor)
Total Direct Costs $20,274

Micaela O'Reilly

NIH F31NS118841 (O'Reilly PI, Tom Mentor) 4/1/21 - 9/30/23
Role of NF - kB in sympathetic hyperreflexia after spinal cord injury
Total Direct Costs $110,503

Emanuela Piermarini, PhD

Christopher Reeve Fellowship 7/1/21 - 6/30/22
"Mechanisms of neurodegeneration in SPAST-based Hereditary Spastic Paraplegia"
Total Direct Costs $20,000

Liang Oscar Qiang, MD/PhD

Mosely Foundation (Qiang PI) 11/1/20 – 10/31/22
Title: Using "Mini - Brains" from Patient Derived Pluripotent Stem Cells as the Models to Investigate Novel Microtubule Based Mechanisms and Therapies for Tauopathies.
Total Direct Cost - $250,000

NIH R01 NS115977 (Qiang PI; Baas Co-I) 12/15/20 - 11/30/25
Title: Elucidating the Etiology of SPAST - based Hereditary Spastic Paraplegia
Total Direct Cost - $1,250,000

PA Spinal Cord (Qiang PI) 6/1/21 - 5/31/23
Gene Therapy via Spastin Overexpression to Promote Axon Regrowth for SCI Repair
Total Direct Costs $190,476

Spastic Paraplegia Foundation (Qiang PI) 7/1/21 - 6/30/23
Elucidate impaired autophagy as one of the major contributors to SPG4 - based Hereditary Spastic Paraplegia
Total Direct Costs $150,000

Ramesh Raghupathi, PhD

NIH/NINDS R01NS110898 (Raghupathi – PI)
4/1/20 – 2/28/25
Dopaminergic mechanisms underlying behavioral deficits following mild TBI
Total Direct Cost $ 1,215,460

NIH R01 NS110898 (Raghupathi PI) 2/1/21 - 2/28/24

Dopaminergic mechanisms underlying behavioral deficits following mild TBI
Research Supplement to Promote Diversity in Health - Related Research Program for Taylor McCorkle
Total Direct Costs - $170,043

Subcontract from Rowan University (Raghupathi PI)
4/1/20 – 3/31/22
New Jersey Brain Injury Research (Waterhouse PI)
Effects of Repetitive Mild TBI on Flexible Attention and the Norepinephrine Transmitter System
Total Direct Costs $11,260

Drexel Office of Research & Innovation
2020 Racial Equity Rapid Response Research Awards (PI Raghupathi) 9/1/20 - 8/31/21
Does racial disparity contribute to delayed diagnosis of Autism Spectrum Disorders in children with early childhood brain injury?
Total Direct Costs $5,200

Steinbright Career Development Center Research Co-Op (Raghupathi PI) 3/29/21 - 9/28/21
Title: A prototype device to induce brain injury using high frequency ultrasound. Co-Op: Daniel Hendricks.
TDC - $1,500

Ilya Rybak, PhD

NIH RO1 NS110550 (Rybak–Multi PI with Frigon and Prilutsky)
2/15/20 - 1/21/25
Limb Coordination during locomotion before and after spinal cord injury
Total Direct Cost $1,997,403 Rybak $680,630, Frigon $680,625 and Prilutsky $645,017.

Trevor Smith

NIH F31 NS124347 - scored 14th percentile (PI Smith, Giszter Mentor) 4/1/22 - 6/30/24
Independence of Spinal Motor Modules and Motoneuron Recruitment from Motor Modules: New Experimental Tests
Total Direct Costs $120,055

Veronica Tom, PhD

NIH/NINDS R01 NS085426 (PI, competitive renewal)
1/1/20 - 12/30/24
Title: Multipronged approach to promote functional axonal regeneration in the spinal cord after injury
Total Direct Cost $1,093,750

Craig H. Neilsen Foundation (Tom – PI) 7/31/20 - 7/30/22
Title: Elucidation of Mechanisms Behind Renal Dysfunction After Spinal Cord Injury
Total Direct Cost $240,000

Office of the Provost's 2020 Award for Outstanding Mid - Career Scholarly Achievement
Total Direct Costs $15,000

Pending NIH R01 NS122371 Score 13th percentile (Tom PI,Bethea Co-I) 12/1/21 - 11/30/26

Multipronged approach to diminish sympathetic hyperreflexia and ensuing cardiovascular and immune dysfunction after spinal cord injury
Total Direct Costs $1,833,550

Kazuhito Toyooka, PhD

CURE 2019 Competition (Toyooka PI, Gao Co-I)
6/1/21 - 5/31/23
Targeting AMPK in Autism Spectrum Disorder
Total Direct Costs $75,000

CURE 2019 Competition (Spiliotis PI, Elias, Toyooka and Han Co-I's) 6/1/21 - 5/31/23
Roles of the autism and schizophrenia risk kinase TAOK2 and its phospho - target SEPT7 in neuritogenesis
Total Direct Costs ($75,000)

Cameron Trueblood

NIH F31 NS 122245 (Trueblood PI, Hou, Mentor)
7/1/21 - 11/30/22
Elucidating Serotonergic Mechanisms Regulating Cardiovascular Recovery After Grafting Embryonic Raphe Neurons into the Injured Rat Spinal Cord
Total Direct Costs $74,551

Dong Wang, PhD

NIH R01 NS R01MH119102 (Wang PI) 6/1/21 - 11/30/23
A raphe - hippocampus pathway for regulation of memory specificity during consolidation
Research Supplements to Promote Diversity in Health - Related Research Program for Candace Rizzi - Wise
Total Direct Costs $72,088

Publications

Jessica Ausborn, PhD

Ausborn, J., Shevtsova, N. A., & Danner, S. M. (2021). Computational Modeling of Spinal Locomotor Circuitry in the Age of Molecular Genetics. International Journal of Molecular Sciences, 22(13), 6835.

Peter Baas, PhD

Yates PL, Patil A, Sun X, Niceforo A, Gill R, Callahan P, Beck W, Piermarini E, Terry AV, Sullivan KA, Baas PW, Qiang L. A cellular approach to understanding and treating Gulf War Illness. Cell Mol Life Sci. 2021 Nov;78(21-22):6941-6961.

Mohan N, Qiang L, Morfini G, Baas PW. Therapeutic Strategies for Mutant SPAST-Based Hereditary Spastic Paraplegia. Brain Sci. 2021 Aug 18;11(8):1081.

Guha S, Patil A, Muralidharan H, Baas PW. Mini-review: Microtubule sliding in neurons. Neurosci Lett. 2021 May 14;753:135867.
Fischer I, Baas PW. Resurrecting the Mysteries of Big Tau. Trends Neurosci. 2020 Jul;43(7):493-504.

Jessica Barson, PhD

Runyan A, Lengel D, Huh JW, Barson JR, Raghupathi R. Intranasal Administration of Oxytocin Attenuates Social Recognition Deficits and Increases Prefrontal Cortex Inhibitory Postsynaptic Currents following Traumatic Brain Injury. eNeuro. 2021 Jun 11;8(3):ENEURO.0061-21.2021.

McCorkle TA, Barson, JR, Raghupathi, R. A Role for the Amygdala in Impairments of Affective Behaviors Following Mild Traumatic Brain Injury. Front Behav Neurosci. 2021 Mar 4;15:601275.
Curtis GR, Oakes K, Barson JR. Expression and Distribution of Neuropeptide-Expressing Cells Throughout the Rodent Paraventricular Nucleus of the Thalamus. Front Behav Neurosci. 2021 Jan 14;14:634163.

Pirino BE, Barson JR. A little night(PA)CAP: pituitary adenylate cyclase-activating polypeptide mediates behavioral effects of alcohol withdrawal. Neuropsychopharmacology. 2021 Feb;46(3):489-490.

Barson JR, Mack NR, Gao WJ. The Paraventricular Nucleus of the Thalamus Is an Important Node in the Emotional Processing Network. Front Behav Neurosci. 2020 Oct 29;14:598469.
Gargiulo AT, Pirino BE, Curtis GR, Barson JR. Effects of pituitary adenylate cyclase-activating polypeptide isoforms in nucleus accumbens subregions on ethanol drinking. Addict Biol. 2021 May;26(3):e12972.

Pirino BE, Spodnick MB, Gargiulo AT, Curtis GR, Barson JR, Karkhanis AN. Kappa-opioid receptor-dependent changes in dopamine and anxiety-like or approach-avoidance behavior occur differentially across the nucleus accumbens shell rostro-caudal axis. Neuropharmacology. 2020 Dec 15;181:108341.
Pandey S, Barson JR. Heightened Exploratory Behavior Following Chronic Excessive Ethanol Drinking: Mediation by Neurotensin Receptor Type 2 in the Anterior Paraventricular Thalamus. Alcohol Clin Exp Res. 2020 Sep;44(9):1747-1759.

Barson JR. The role of neuropeptides in drug and ethanol abuse: Medication targets for drug and alcohol use disorders. Brain Res. 2020 Aug 1;1740:146876

Lengel D, Huh JW, Barson JR, Raghupathi R. Progesterone treatment following traumatic brain injury in the 11-day-old rat attenuates cognitive deficits and neuronal hyperexcitability in adolescence. Exp Neurol. 2020 Aug;330:113329.

Marie-Pascale Cote, PhD

Caron, G., Bilchak, J. N., & Côté, M. P. (2020). Direct evidence for decreased presynaptic inhibition evoked by PBSt group I muscle afferents after chronic SCI and recovery with step□training in rats. The Journal of Physiology, 598(20), 4621-4642.

Bilchak JN, Yeakle K, Caron G, Malloy D, Côté M-P (2021) Enhancing KCC2 activity decreases hyperreflexia and spasticity after chronic spinal cord injury. Exp Neurol 338:113605.

Bilchak JN, Caron G, Côté M-P (2021) Exercise-Induced Plasticity in Signaling Pathways Involved in Motor Recovery after Spinal Cord Injury. Int J Mol Sci. 22:4858.

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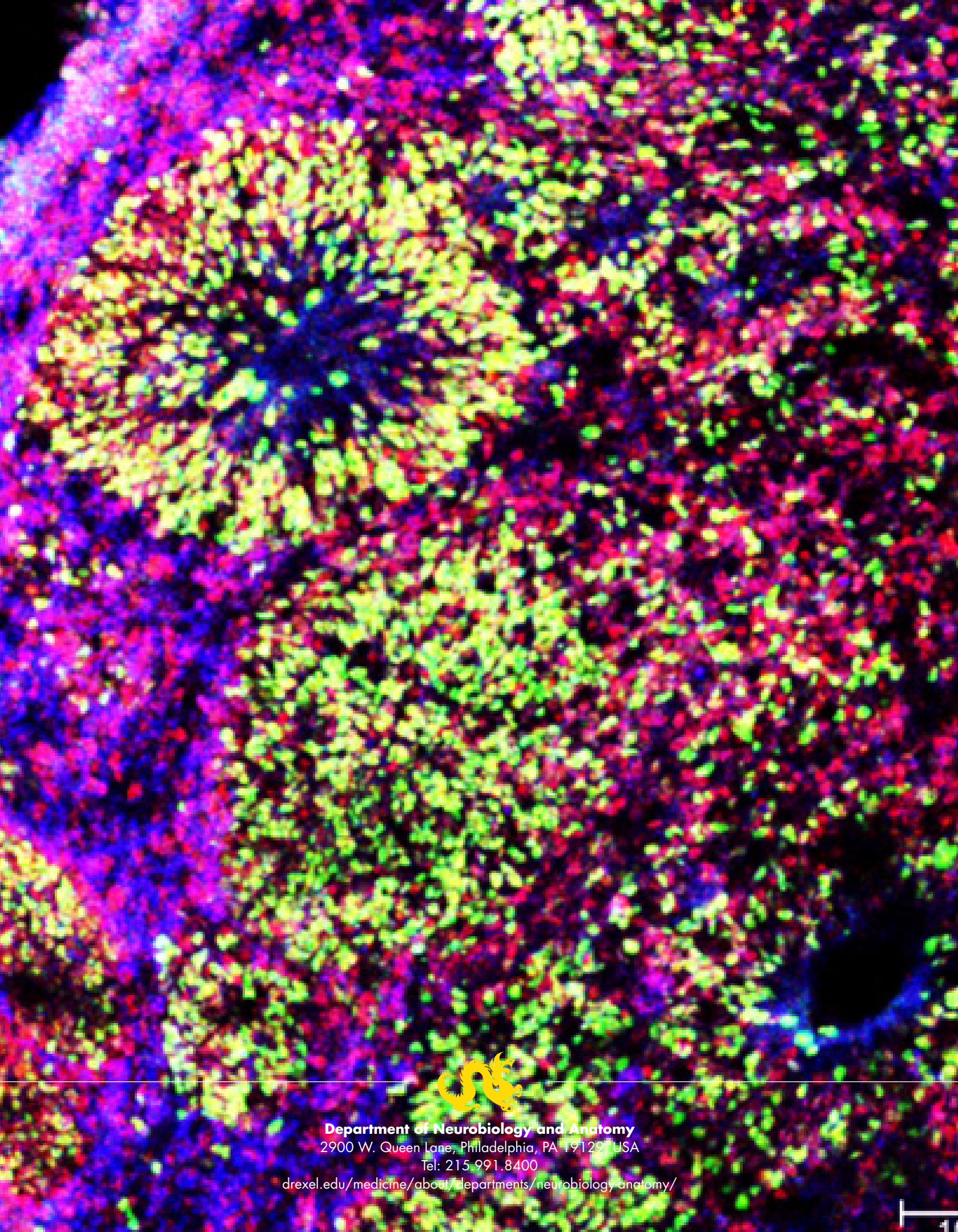

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