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We are delighted to bring you the fourth issue of The Hillock in the face of the unprecedented challenges that have accompanied the year 2020. The Hillock was created to document the history of our department, highlight accomplishments and successes, and, most importantly, celebrate our shared humanity. We believe that this mission was necessary this year more so than ever.

In this shortened issue, we continue to remember the history of our department, this time from Dr. John Houle. Dr. Houle had first set his eyes on our department while still a graduate student; however, a long journey stood ahead of him before he joined. At each step of his journey Dr. Houle not only reflects on advancements in the research field, but also on interpersonal relationships that we dearly cherish in our department. Dr. Houle reminds us that building friendly, supporting and positive relationships is one key to the success we enjoy in our department today. The contents of this edition, such as the feature story on the Neuroscience Graduate Students for Diversity (NGSD) Group, grants and awards, and the acknowledgement of a new incoming class of graduate students, highlight the astonishing ability of our departmental members to not only persist, but flourish despite the COVID-19 pandemic severely disrupting both our work and personal lives. The creativity of the department is highlighted in both the creative submission and the ways in which our department members have continued to participate in outreach in virtual formats. Back by popular demand, our scientist support animals are featured again in this edition, and we welcome all the new companions that have joined your lives since the start of the pandemic.

Finally, we wish to dedicate this issue to those who have lost their lives to the COVID-19 pandemic, to those who are missing their families, and those that we are missing from our department (Shasha Yang) due to travel restrictions.

The Editorial Team
Andrey Borisyuk, Ankita Patil, Ashley Opalka, Jani Bilchak, Jeremy Weinberger, Nancy Mack, Philip Yates, Sadie Bennison and Shrobona Guha
Neuroscience Graduate Student for Diversity (NGSD) and particularly an awareness of racial inequalities. They formed the crisis with a remarkable sense of community service and that such a review is essential. Our students responded to a review process despite tentative plans and the realization No other department at the University has established such including comments by the Faculty Development Committee.

We had to make adjustments with virtual rotations for first-year graduate students and remote classes using Zoom, but the momentum provided by the new funding and new faculty will help us catch up with experiments and effective expansion of our research enterprise. I am pleased that we were also able to continue our other academic activities. We continued for the second year a systematic postdoctoral review, also able to continue our other academic activities. We con

Amazingly, the pause in lab research resulted in a flood of productivity in publications and, most remarkably, in 36 new grants. As you will see in the award section of the Newsletter, in 2020 so far, we received 11 new R01s as well R21, F31, DoD and foundation grants adding up to $3-4M/year for a total of about $20M. Importantly, it allowed Jessica Ausborn and Simon Danner to move to tenure-track positions; Oscar Qiang will join their ranks once his award is finalized. Marie Pascale-Côté solidified her funding with several new grants, Ilya Rybak had a multi-PI R01 grant, Peter Baas received NIH and DoD funding to continue his record of excellence, Veronica Tom got her third R01, Ramesh Raghupathi had his R01 with an astounding score of 2nd percentile, and altogether the department is on the way for a grant portfolio of over $10M/year. Other outstanding accomplishments are reflected in the Goldberger/Murray awards for students, faculty and staff, also included in this newsletter.

As far as personnel changes, we have three of our faculty who moved or will be moving to tenure track (Jessica, Simon, Oscar), three new teaching faculty for the Reading campus (Jenna, Kelly, Dana), one who left (Manuel Castra) and one retired (Bruce Hirsch, whose legacy of artistic anatomy and bowties will always be remembered). As far as promotions, Michael Lane, Rodrigo España and Kim Dougherty were promoted to associate professor and Veronica Tom to full professor, with pending promotion for Marie. I started to worry that with this rate of promotions we will end up having only senior faculty, but with the transition of three of our faculty to tenure-track positions we are sure to have a continuous pool of young talent. In particular, I want to mention the Computational Neuroscience group that, under the leadership of Ilya Rybak, is now composed of five investigators with an international reputation of excellence and innovation. There was a change of guard in the spinal cord research center, with Simon Giszter and Veronica taking over as directors, and with the challenge of keeping the legacy and accomplishments of Marion Murray and John Houle.

We are also resurrecting the joint Neuroengineering program with Biomedical Engineering, where Katie von Reyn and Vikas Bhandawat serve as excellent partners. Finally, I want to thank our office staff: Lisa, who has been dealing with two crises a day relentlessly… Joy, who was present in the office throughout the pandemic… Anna, who watched our expenses to keep us in compliance… and Kathy, who keeps me going even after five Zoom meetings.

Itzhak Fischer, PhD
Professor and Chair
The History of the Department of Neurobiology and Anatomy

CHAPTER 4:
The Spinal Cord Research Center in the 21st Century

by John Houle, PhD
Professor in the Department of Neurobiology & Anatomy at Drexel University College of Medicine, and director of the Spinal Cord Research Center.

Working my way to Philadelphia

It was a long journey, but in 2005 I finally made it to the place I had been dreaming of being since my graduate student days in the late 1970s when I first started reading papers by Goldberger and Murray (or Murray and Goldberger) about plasticity in the injured spinal cord. For a short scientific perspective, at the time I was a PhD student in the lab of Dr. Gopal Das at Purdue University, who was the first to demonstrate that transplants of fetal neural tissue into the brains of adult rats would survive, differentiate into specific types of neurons and form synaptic contacts with host neurons. It also was a time when Sam David and Albert Aguayo in Montreal demonstrated for the first time that adult mammalian axons would regenerate if provided a supportive environment, such as a graft of peripheral nerve.

At my 1978 SfN poster presentation, I met Barbara Bregman, who was Michael Goldberger’s PhD student, and quickly we became close friends. Barbara introduced me to Michael and Marion and the Medical College of Pennsylvania (MCP) culture, and immediately I knew that it was a place I had to try to go to. I interviewed for a postdoctoral position with Michael and Marion in February 1981 and discussed the possibility of doing fetal transplants to promote recovery after spinal cord injury. At that time no one had managed to do this in an adult animal, and it was an exciting possibility to do this with the MCP group. On that visit I met Theresa Connors, Hazel Murphy, Tim Cunningham and Alan Tessler (who would later become a good friend and collaborator). The only hang-up was finding funding for my position, and unfortunately having two young children meant that I could not wait long before having to make the decision to accept
an offer elsewhere. The timing was just bad, but I felt certain that at some point there would be another opportunity to be part of the MCP experience.

After spending several years in Canada working on astrocyte lineages and the glial reaction to injury, Barbara informed me that her former postdoc advisor, Dr. Paul Reier, was establishing a spinal cord research group at the University of Florida and was looking for someone to run his new laboratory. Barbara and Paul had been transplanting fetal spinal cord tissue into neonatal spinal cord injured rats and Paul was now ready to move this into adults. I jumped at the chance to get back into the transplant field and went to join Paul in 1984. During my time there (1984-’87) I began my own studies on the potential for chronically injured neurons to regenerate and performed experiments with intraspinal peripheral nerve grafts. I also started collaborating with Alan Tessler, who had come to UF to learn the art of intraspinal transplantation to promote dorsal root regeneration. That was also when I first became acquainted with Dr. Tim Himes, then a graduate student with Alan. Together we did some groundbreaking work involving the demonstration of synaptic evoked potentials from regenerated dorsal root axons and their extension beyond the transplant back into the host spinal cord. Alan and I also published a top-five cited review (“Repair of Chronic Spinal Cord Injury”) in Experimental Neurology for five years in a row.

When it was time to start my own laboratory I found a department chair (Dr. Shirley Gilmore) at the University of Arkansas for Medical Sciences who reminded me very much of Marion Murray. Shirley was a leader in her field of spinal cord development, she was the first woman to serve as department chair at the medical school and was a no-nonsense leader who stood up for her faculty when appropriate and admonished us when necessary. Shirley was the mentor I needed as a new assistant professor, and she gave me the support and encouragement to withstand the disappointment of some less than favorable early reviews. I have tried to impart these features in my mentoring of students and faculty throughout my academic career. Interestingly, I find many of the qualities that I admired in Dr. Gilmore in Dr. Fischer, and they make him such a pleasure to work with both professionally and personally.

**Highlights of my time in Arkansas as they relate to Drexel**

I was fortunate to establish collaboration with two groups in Arkansas that helped my work move forward: locomotion physiologists and muscle biologists. Together we started to explore electrophysiological parameters of regenerated axons and their ability to promote some measure of functional recovery, and to develop rehabilitation approaches to train reestablished neuromuscular circuits after SCI. This included the building of motorized exercise bikes for spinalized rats that we later shared with colleagues at Drexel, University of Florida, University of Louisville and University of British Columbia.

As my research program on regeneration began to gain some notoriety I received an inquiry about postdoctoral research possibilities from a talented PhD candidate at the University of Hong Kong. In 1998 I welcomed Dr. Ying Jin to my lab to begin a productive two years of training. Ying worked tirelessly (as she still does) examining the neuronal response to injury and the beneficial effects of neurotrophic factors in reducing axonal dieback. Ying was instrumental in performing the experiments of a new collaboration with Dr. Itzhak Fischer, who had genetically modified fibroblasts to release the neurotrophic factor BDNF. Soon after completing this study, Ying left for a position at the University of Kentucky, but little did we know that we would be working together again in Philadelphia about eight years later. It is interesting to see how many of our paths cross at different times in different places.

A few years after Ying moved to Kentucky she was joined there by a bright young postdoctoral fellow from China, Dr. Shaoping Hou. Shaoping had contacted me in 2004 about a possible postdoctoral position in my lab, but I was being recruited for the position at Drexel at the time and was unsure of whether I could provide for additional personnel right away. I suggested that he contact a close friend and colleague, Dr. Sasha Rabchevsky, at the University of Kentucky about a position. I had great confidence in Sasha as a possible mentor for Shaoping because of my connection with Sasha during his graduate work with Paul Reier in Florida. I think what this starts to illustrate is how the influx of new investigators helps new spinal cord centers become established, allowing the field to expand in scope; yet we
remain strongly bonded and interconnected by a common goal of improving the quality of life of individuals with a spinal cord injury.

My pre-Drexel period ended in 2004 with two very happy events. Early in the year Dr. Veronica Tom joined the lab after finishing her PhD work with Dr. Jerry Silver at Case Western University. Her in vitro work with extracellular matrix molecules and chondroitinase to promote axonal growth had led the way for some in vivo experiments that I was working on with Jerry’s assistance. I was fortunate to entice Veronica to come to Arkansas for postdoctoral training, and together we finished a study demonstrating recovery of forelimb use due to regeneration of axons through an intraspinal peripheral nerve graft. Right away I felt comfortable with our scientific relationship and knew that she had great potential for stardom. I just needed to stay out of her way! Around this time Itzhak contacted me about coming to Drexel to give a seminar and to talk about the position of director of the Spinal Cord Research Center. Certainly I was interested, because it was the place I always wanted to be; the people at Drexel were some of my closest friends and colleagues, and professionally it was the right time to consider a move.

The major consideration not to move was that my wife Katherine had lived most of her life in Little Rock, and all of her family lived there, including our three grandchildren. Nevertheless, she agreed to visit Philadelphia for a long weekend with me. I believe destiny finally caught up with me because Katherine had a great time on the trip, meeting Itzhak and Gloria Fischer, Alan and Dee Tessier, Marion Murray and Justin Snow, and touring parts of Philadelphia. Katherine was so supportive of my making this move that we even found a house in Chestnut Hill that we wanted to buy before I had accepted an official offer. The last step was to convince Veronica to make a second major move within a year’s time, but I feel she was pretty easily swayed once she visited Drexel and appreciated the possibilities for scientific growth and collaboration at Queen Lane. I couldn’t have picked a better new boss than Itzhak. Everything we discussed about the position came to fruition, he was honest and up-front with his expectations and I believe we have shared an unrivaled 1.5-year period of productivity and growth because of our mutual interest in the development of young investigators.

Spinal Cord Research Center, 2005-2020

The research strengths of the Spinal Cord Research Center in 2005 were transplantation to promote regeneration (Drs. Itzhak Fischer, Alan Tessier, Tim Himes, Marion Murray), robotic and treadmill training to promote functional recovery (Drs. Simon Giszter and Michel Lemay) and restoration of neuromuscular circuitry (Drs. Young Jin Son and Tony Burns). A core facility led by Dr. Jed Shumsky was developing behavioral assessments to detect sensory-motor recovery, and one of the important outcomes of this work was publication of a rat forelimb locomotor scale (FLS) to evaluate recovery of arm and forepaw use, which was analogous to the famous BBB scale used to evaluate hindlimb use after SCI. Assisting Jed on this project was Hanra Sandrow, who later became the first PhD graduate student to join my lab. Theresa Connors was (and remains) the mainstay of the day-to-day operation of the center. The MCP/Hahnemann/Allegheny/Drexel spinal cord research group had long been known for their collaborative work and NIH support in the form of a program project grant, and it was a major goal of mine to continue this tradition. With everyone’s input we designed a proposal around three PIs (Fischer, Houle, Lemay) and four core facilities (behavior, surgery, microscopy/histology and tissue culture) with directors from the group. Marion served as senior advisor for the project. Our first attempt received encouraging reviews but, not unexpectedly, it needed some revisions. With another great team effort, we were successful with the resubmission and funding of the P01 entitled “Spinal Cord Injury, Plasticity and Transplant Mediated Repair” beginning in April 2008. At that time, we were the only NIH funded program project for spinal cord injury research, and that remained the case for the full five years of the grant. There were larger and perhaps more prestigious institutions in the U.S. involved in SCI research, but to be the only P01 meant that we were held in high esteem by our peers. I felt our group worked hard every day to maintain their professional respect.

Starting a P01 with new colleagues was a really exciting time for me because it opened up many research possibilities and facilitated recruitment of high-quality graduate students and postdoctoral fellows, which had been difficult during my tenure at the University of Arkansas for Medical Sciences. Getting settled in the lab with Veronica, adding Harra to my group and working daily with Alan and Itzhak was like a dream come true. I learned so much from everyone over the first couple of years and had such great, stimulating conversations that it was like being at SfN every day. The center members always worked as a team. We expanded the range of techniques and training available within each of the core facilities, had some wonderful summer trainees and visiting PIs, and managed to have some fun along the way. There were many occasions for celebration: invited international talks, new grants, promotions, additions of new personnel. Here are a few highlights during the first five years of the P01: Ying Jin joined the Fischer lab, Veronica was promoted to assistant professor, Dr. Marie Côté joined my lab as a postdoctoral fellow (we got Julien as a bonus signee in that deal), Dr. Megan Detloff joined my lab as a postdoctoral fellow (interestingly her PhD advisor, Dr. Michelle Basso, was a postdoctoral fellow with Michael Goldberger at MCP), and Shaoping Hou joined Veronica’s lab as a research associate.

Another momentous occasion was the official retirement of Marion in 2013. Fortunately for us she continued reviewing our manuscripts and grant proposals, but her research career was complete with the thesis defense of Dr. Laura Krisa (now associate professor, Department of Physical Therapy, Thomas Jefferson University). Sadly, there were two valuable members of my lab who lost their battle with cancer within a few years of each other. Dr. Gang Liu was instrumental in moving my research into more molecular-based approaches, concentrating on changes in micro-RNAs associated with the PTEN-mTOR pathway after SCI. Dr. Vicki Zhukareva was an extraordinary protein biochemist whose protocols for tissue preparation and Western blot analysis are used routinely in many labs in the department. They were dedicated scientists and truly wonderful people and have been missed every day.

For the P01 competing renewal, one of the innovations we proposed was to embark on a five-year expansion program of the Spinal Cord Research Center whereby we would actively seek the best and brightest young SCI investigators to bolster our existing expertise and
expand into new research areas. Already we had kept one of the best and brightest in Dr. Tom and realized we should do that again with Dr. Côté based on her work on post-SCI spasticity and importance of potassium-chloride co-transporters. We then went outside the department and pursued two extremely talented individuals. We were fortunate to secure the services of Dr. Michael Lane, knowing that he would be an ideal candidate to lead studies of secondary complications after injury, concentrating on respiratory dysfunction. Michael’s connection with my former mentor, Paul Reier at UF, only positively influenced my judgement. When looking to expand our research portfolio in the area of interneurons and motor control, the input from Dr. Rybak was critical in leading us to the recruitment of Dr. Kim Dougherty from her postdoctoral position in Sweden. For the final two positions we chose two individuals who had demonstrated great success in securing research funding in areas that were highly significant for our center program and had strong potential to run an independent program: Dr. Shaoping Hou for his interest in autonomic control of bladder and cardiac function after SCI, and Dr. Megan Detloff for her work on neuropathic pain, inflammation and exercise. While this major expansion was supported in small part by the renewal of the program project, the success of this five-year growth plan was due primarily to Dr. Fischer’s negotiating skills with Dean Schidlow and his willingness to use departmental funds to back people who we had complete faith in as new investigators.

Growth within the center was not yet finished, though. Over the last few years Dr. Rybak has attracted some outstanding postdoctoral fellows to his computational neuroscience research program. First with the addition of Dr. Simon Danner and then Dr. Jessica Ausborn, there now was a critical mass of young investigators in Ilya’s group. These talented individuals followed a familiar formula of publishing outstanding papers, submitting grant proposals and securing NIH funding for their independent research. Given our proven success with ‘in-house’ promotions, Dr. Fischer worked his charm again with the new dean and secured tenure-track positions for both Simon and Jessica to begin in 2020. Not everything about this year of the pandemic has been awful!

While quite accomplished in their own areas of SCI research, each of these seven new faculty appointees had to have one thing in common – the understanding and desire to be part of a special culture where research ideas are shared freely in a collegial atmosphere. This has been part of the core principle of the SCI group since it was established by Michael and Marion at MCP over 40 years ago, and it is an important part of our identity. It has been so rewarding to see how each of them has matured professionally and grown their individual research programs while developing collaborations within the center that could lead to future programmatic funding.

In September 2018, Marion Murray, one of the founders of the spinal cord research group at MCP, died. This was a deeply felt loss of a friend and colleague for everyone in the department, if you had been here for 40 years or for 40 days. In a memorial ceremony at Queen Lane held a few months later, there was an outpouring of appreciation for what Marion had contributed to each individual in the room. During the opening remarks I was grateful to be able to announce Drexel’s official naming of the Marion Murray Spinal Cord Research Center. Every day that I pass the lettering at the end of the corridor proclaiming it her center I think back on what it was like at the beginning when few people believed in the plasticity and regeneration work that she started, and how I so much wanted to be part of it. I then realize how lucky I am to have been a part of the group for the last 15 years.

As I was finishing this perspective there was an announcement of the 2020 Daniel V. Schidlow, MD, Transformational Leadership Award, and I wanted to recognize Dr. Fischer as the first recipient of this award, because it reflects what his contribution has been to the Marion Murray Spinal Cord Research Center for over 25 years. “This award is presented to a faculty member who exhibits substantial leadership to transform and make change through example and articulates an energizing vision. This faculty member encourages, inspires, mentors and sponsors a diverse, inclusive and equitable next generation of clinicians, scientists, educators and staff. This transformational faculty leader motivates members of the institution to innovate and create change that will help grow and shape the future success of the institution.”
The Neuroscience Graduate Students for Diversity: Moving Science and Academia Forward

Founding Story

The Neuroscience Graduate Students for Diversity (NGSD) group was founded by a small group of students wishing to make a long-lasting change following the murders of George Floyd and Breonna Taylor. The Department of Neurobiology & Anatomy at DUCOM prides itself on its inclusive, welcoming and collaborative environment. Building on this, the primary goal of NGSD is to ensure that this environment is inclusive and mindful of trainees and staff of diverse backgrounds. Moreover, NGSD seeks to provide a safe and inclusive environment for supporting diverse staff and trainees. The purpose of this group is to increase the sense of community, belonging and support that encompasses the intersectional experiences of diverse staff, trainees and their peers through open and honest conversation and to discuss and promote diversity in all aspects of their experience. When we say “diversity”, we mean people of all genders, race, ethnicities, sexual orientations, backgrounds and neurodiversity; however, our immediate goal is to foster Black representation in neuroscience. NGSD works closely with department faculty to ensure that concrete steps are taken to: 1) increase diversity within the department and the Neuroscience graduate program; and 2) foster a safe and welcoming environment for members of the department, as well as provide appropriate resources for education, research and outreach for diverse students and staff.

Leadership

President: Sadie Bennison

Following the murders of Breonna Taylor and George Floyd, the students realized that there is no better time than now to make a positive change. A group of students led by the women who later founded NGSD, came up with a list of actionable items to move science and academia forward. However, we felt it unfair to ask for change from the administration without working for it ourselves. We first needed to re-educate ourselves on the intersection between science, racism and society. Next, we needed to come up with creative solutions for recruiting and retaining historically excluded minorities to our program. Most importantly, we also needed to assess the supportiveness of our environment for diverse populations. NGSD was created to hold our department accountable for actionable items, and to provide educational content for ourselves, our peers and faculty members. As a white senior graduate student with a good relationship with many faculty members, I realized that I had the privilege necessary to get a group like this off the ground. Through NGSD we have already made concrete changes, had difficult but necessary discussions, and performed successful community outreach. I am consistently blown away by the amazing work of fellow NGSD leaders! Scientists cannot shed their identities when they enter academic spaces, and we hope that with NGSD’s work, scientists will be comfortable and celebrated for being their most authentic selves.

Vice President: Taylor McCorkle

This group is extremely special to me as the senseless murders of countless Black individuals in this country hits too close to home. I want to do my part in demanding justice and uplifting the Black community. Through this group, we are able to provide accessibility to resources that are otherwise not provided in marginalized communities. We will bring awareness and create opportunity in STEM fields and hopefully inspire the future of BIPOC youth. For me, this group is the definition of “be the change you want to see in the world.”
I am a passionate advocate for antiracism in STEM and society as a whole. As countless Black lives have been lost and communities continue to be terrorized and marginalized, now is the time to stand up and actively work to enact meaningful change in society—in whichever way we can. My fellow founders and I sought to form a group that would bring awareness, education and career opportunities in STEM to underrepresented and marginalized communities in the local Philadelphia area. However, it is my hope that NGSD will remain a permanent fixture at Drexel and in the community, inspiring others to explore careers in STEM and creating an accepting and socially conscious environment for students to flourish. Hopefully, after reading this, you too will find a way that you can “pay it forward” and continue this mission.

I am passionate about mental health research, science communication, community engagement, and most importantly, the intersection of these avenues with anti-racism work. I believe that our ability to answer the tough questions with innovative approaches requires participation from a diverse pool of researchers who hold unique experiences and perspectives. Higher education, like many other institutions in our country, has historically been exclusive to white males. I am grateful that barriers for women have started to be addressed, and I am passionate about using my privilege as a scientist and participant in academia to lift additional barriers for others. This led me to be a co-founder of NGSD, and I feel very fortunate to work with an awesome group of women to provide educational opportunities to instill long-lasting changes within our department. As the current treasurer, I am dedicated to ensuring our group has appropriate funds to make the greatest impact in our local community and beyond.

I came to the United States to do my master’s in neuroscience at Drexel in 2017. After I finished my master’s, I worked as a research assistant in a neuro-engineering lab. Currently, I have transitioned from a career in academia to a new position in industry in the Infectious Diseases Department of Regeneron Pharmaceuticals. I am very excited that prior to leaving Drexel University, and I am honored to have been a part of that while at Drexel. I am excited to continue being involved in NGSD, even in a limited capacity, when I transition to my new position.

I helped found NGSD because, as I am one of the few minorities currently in the program, it is important to me to increase representation of Black students in neuroscience. I hope that the efforts of our group raise awareness and provide an outlet for Black and other underrepresented students to find passion and seek higher education opportunities in all areas of science.

When our NGSD team started to develop the group, I thought that one way to increase BIPOC representation in neuroscience/STEM was to show local young students that anyone can identify as and become a scientist, regardless of race, gender, sexual orientation, neurodiversity, or whether you personally know a scientist. By having graduate students from various backgrounds provide information sessions, educational outreach and resources, we hope that young students can relate to our volunteers, while gaining an understanding of what research is and how to become a research scientist. We also hope to create an open environment for mentorship, as navigating higher education can be intimidating, so everyone feels welcome [and excited!] in this collaborative field.

I joined the group not long after the senseless and cruel murders George Floyd and Breonna Taylor this summer. I am passionate about social justice and the treatment of disadvantaged groups. While there are numerous ways to help, I believe that communication is key. In an age in which there is an abundance of information and misinformation, I wanted to use my abilities in graphic design to give others a platform and connect them to the resources they need.
One important facet of NGSD is our monthly book club, which is run by Vice President Taylor McCorkle. The purpose of this book club is to promote education and dialogue on the intersection of science and society with racism, gender expression, neurodiversity, etc. “To me, it serves as an essential stepping stone to further impacting marginalized communities. As a group that intends on creating real change in our community, NGSD must be committed to learning what problems exist in society and how to take actionable steps to combat these issues” said Taylor. On the last Thursday of every month, both members and non-members of NGSD join via Zoom to participate in a rich discussion on the assigned chapters for the book of the month. Book club first met in August and since that time, vivid conversations about Dr. Ibram X. Kendi’s “How To Be Antiracist” and Angela Saini’s “Superior: The Return of Race Science” have taken place. The success of the book club thus far is largely owed to Taylor, who takes time each month to come up with thoughtful discussion questions that have promoted open and honest dialogues among the group. These monthly dialogues help to create new knowledge and understanding between students of different backgrounds. Taylor explained, “our book club meetings are a safe space where we can cultivate antiracist ideals and unlearn unintentionally harmful behaviors. We talk about uncomfortable topics and truly dive into the ways in which systemic racism has plagued the systems of our current society. It is through this process of constant learning and unlearning that I believe NGSD will have the greatest impact.” The education that Taylor provides her fellow students through facilitation of book club discussions is invaluable to their growth as well-rounded scientists and members of society. “We have truly developed in our understanding of policies and practices that hinder historically excluded minorities and it is our mission to break these walls down,” says Taylor. Currently, the book club is reading “The Immortal Life of Henrietta Lacks” by Rebecca Skloot.

Outreach

Outreach is another important component of the NGSD group, and Ashley Opalka serves as the chair of NGSD’s outreach operations. In order to partake in outreach with NGSD, volunteers must be in regular attendance at NGSD’s meetings. This requirement is in place to ensure that volunteers are well versed in issues of race and diversity before entering diverse communities to provide educational material. This academic year, the mission of the outreach portion of NGSD is fostering Black representation in neuroscience within our local community. This initiative was kicked off with NGSD’s “Real Talk” series that took place as virtual webinars this November. The Real Talk series was designed to spread awareness of science careers, graduate school and research opportunities to traditionally excluded minority undergraduate students and increase representation of Black students and students of color in STEM. The success of the Real Talk initiative is largely due to the hard work of our departmental members of NGSD that assist with outreach. These panels generated fruitful discussion, drawing participation from many undergraduates from numerous local schools who asked extremely thoughtful questions. Support from departmental faculty Dr. Ramesh Ragupathi and Theresa Connors has allowed the outreach portion of NGSD to blossom. These outreach activities will continue into the spring through an extension of the “Real Talk” panels, which will be geared toward college students and discuss mental health in academia. In addition, through collaboration with the Office of Community Engagement, “Drexel Med Mentors” talks will allow medical students to engage in discussions that inform high school students and their parents about current health topics. In addition, several NGSD volunteers partnered with Big Brothers and Big Sisters through an already established collaboration with Drexel University. This opportunity allows our NGSD volunteers to further support local students by providing mentorship to middle and high school students on a regular basis. “As scientists, it is crucial for us to not only educate our local community, but also train the next generation of scientists. Being a part of NGSD has taught me that we [graduate students] can make positive change in academia, especially by advocating for inclusivity and showing local students of all ages that anyone can become a successful, passionate scientist!” said outreach chair, Ashley Opalka. •
Creations

A Bird
Jani Bilchak

Tried Pour-painting for the First Time
Shrobona Guha

Election Night
Jani Bilchak

Multifunctional Hobby That is Great for Stress Relief & Gifts!
Candace Rizzi-Wise

Magnemite, the Pokemon,
or a Cluster of SCGs
Ankita Patil
I [heart] Neurons
Ankita Patil

Beta Amyloid Deposits (Alzheimer’s Culprits)
in Artificially-aged Plasma
Dr. Tim Cunningham

Rocky Seas and
We’re All in the Same Boat Now
Shrabona Guha

Radial Glial Cells & My Favorite Protein
(or Most Hated, Depending on the Day)
Sara Blazejewski
An alumna of the Neuroscience program and former graduate student of Dr. Wen-Jun Gao, Brielle Ferguson, PhD, was named to Forbes magazine’s list of “30 Under 30” to watch in science, which highlights young innovators on the brink of making it big.

Brielle graduated with a degree in Neuroscience from Drexel in 2017 and joined the laboratory of Dr. John Hugenholtz at Stanford University as a postdoctoral fellow, where she now conducts National Institute of Mental Health-funded research on attentional impairments in a genetic mouse model of absence epilepsy.

The “30 Under 30” list was not the first time Brielle appeared in the international business magazine this year. Brielle’s science advocacy was earlier recognized by Forbes magazine in their article highlighting the new #BlackInNeuro campaign. As a co-founder of Black In Neuro, Brielle created an online platform with fellow neuroscientists to highlight and support Black voices in neuroscience. Black Americans are currently largely underrepresented in science and can often feel isolated, as they lack peers and mentors with shared experiences. Black In Neuro seeks to correct this by building a supportive network of Black neuroscientists and conducting outreach. The campaign quickly gained thousands of supporters and has recently held a virtual scientific conference as an opportunity for trainees to present their research.

Currently, Brielle serves on the board of Black In Neuro as the director of programs. Check out the Black In Neuro website to see the amazing platform Brielle has been contributing to: blackinneuro.com. •
Scientist Support Animals

Due to the pandemic, we all began spending a lot more time at home this year. Some of us used that as an opportunity to add new furry friends to our families...

Meet the Pandemic Pets!

- **Chomchom**
  - Shrobona Guha

- **Comet**
  - Emily Black

- **Echo & Luna**
  - Sara Blazejewski

- **Fuzi**
  - Beanie Sun

- **Hazel**
  - Ashley Opalka & Kyle Samson

- **Moka**
  - Dr. Cote & Julien Bouyer

- **Sass**
  - Dr. Smith

- **Rosie**
  - Philip Yates

- **Tullamore Dew (Tully) & Smithwicks (Smitty)**
  - John Walker
Scientist Support Animals, *cont.*

**Bella**  
Nancy Mack

**Fritz**  
Dr. Detloff

**Max**  
Dr. Barson

**Robin**  
Ankita Patil

**Stevie & Jack**  
Dr. Shumsky

**Winter**  
Jani Bilchak

**Nemo & Lilly**  
Dr. Fischer

**Mazie**  
Sadie Bennison

**Paris (learning about neuronal migration from Dr. Tooyoka)**  
Shayna Singh
Graduates of 2020

Linda Chamberlin, PhD
Adviser: Wen-Jun Gao, MD, PhD
Thesis Title: Targeting prefrontal parvalbumin cells to rescue cognitive deficits in a rodent model for Schizophrenia
Defense Date: April 17, 2020
Current Position: 3rd year medical student at Drexel University College of Medicine

Hemalatha Muralidharan, PhD
Adviser: Peter Baas, PhD
Thesis Title: The role of mitotic motor forces of KIFC1 on microtubule array during development
Defense Date: December 3, 2020
Current Position: Postdoctoral fellow with Jeffery Haines at Regeneron

Erik Li, PhD
Adviser: Kimberly Dougherty, PhD, and Catherine Von Reyn, PhD
Thesis Title: Modulation of spinal Shox2 interneurons by synaptic input from sensory afferents and local locomotor circuits
Defense Date: April 24, 2020
Current Position: 3rd year medical student at Drexel University College of Medicine

Neurobiology and Anatomy master’s students who transitioned into the PhD program:
Taylor McCorkle
Breanne Pirino
John Walker
Samuel Wechsler

Shunyi Zhao, MS
Adviser: Shaoping Hou, PhD
Thesis Title: Alterations of DA-related transcripts in A11 diencephalospinal pathways after spinal cord injury
Defense Date: July 31, 2020
Current Position: Research assistant in Longjun Wu’s lab at Mayo Clinic

First Years of 2020

PhD Students:
Kendra Case
Christina Curran-Alfaro
Adam Hall
Arron Hall
Andrew Lockhart
Joya Maser
Jenna McGrath

Master's Students:
Brody Carpenter
Amber Hilbish
Abby Keith
Pryscilla Santos Acevedo
Mariah Wulf

MD/PhD Student:
Joseph Arena
2020 Awards & Grants

F31 Fellowship

**Sara Blazejewski**, mentored by Dr. Kazuhito Toyooka

Graduate Student Excellence Awards

Graduate College Winners

**Teaching Assistant Excellence Award**

**Nancy Mack**, mentored by Dr. Wen-Jun Gao

**Research Excellence Award (pre-candidacy)**

**Ashley Opalka**, mentored by Dr. Dong Wang

College of Medicine Finalists

**Research Excellence Award (post-candidacy)**

**Genevieve Curtis**, mentored by Dr. Jessica Barson

Outstanding Mentorship Award

**Sara Blazejewski**, mentored by Dr. Kazuhito Toyooka

Most Original and Creative Work Award

**Hemalatha Muralidharan, PhD**, mentored by Dr. Peter Baas

Outstanding Dissertation Award

**Eugene Mironets, PhD**, mentored by Dr. Veronica Tom

Faculty Awards

**Daniel V. Schidlow, MD, Transformational Leadership Award, Drexel University College of Medicine**

**Itzhak Fischer, PhD**

**Julian Marsh Faculty Scholar Award, Drexel University College of Medicine**

**Veronica Tom, PhD**
External Awards

Runner-up Award for Best Graduate Student Poster at Society for Neuroscience Philadelphia Chapter
Taylor McCorkle, mentored by Dr. Ramesh Raghupathi

Honorable Mention for National Science Foundation Graduate Research Fellowship Program
Ashley Opalka, mentored by Dr. Dong Wang

Faculty Grants 2020

Jessica Ausborn, PhD
NIH

Peter Baas, PhD
NIH
Department of Defense

Jessica Barson, PhD
NIH

Marie Pascale-Côté, PhD
NIH
Craig H. Nielsen Foundation
Department of Defense
Office of Research & Innovation 2020 Scholarly Materials and Equipment Award

Simon Danner, PhD
NIH

Megan Detloff, PhD
NIH

Kimberly Dougherty, PhD
NIH

Wen-Jun Gao, MD, PhD
NIH
Commonwealth of Pennsylvania (CURE)

Shaoping Hou, PhD
NIH
Commonwealth of Pennsylvania (CURE)

John Houle, PhD
NIH

Liang (Oscar) Qiang, MD, PhD
NIH
Moseley Foundation
Commonwealth of Pennsylvania (CURE)

Ilya Rybak, PhD
NIH

Veronica Tom, PhD
NIH
Craig H. Nielsen Foundation

Ramesh Raghupathi, PhD
NIH
Rowan University School of Osteopathic Medicine
Office of Research & Innovation 2020 Racial Equity Rapid Response Research Awards
Commonwealth of Pennsylvania (CURE)

Dr. Kazuhito Toyooka, PhD
Commonwealth of Pennsylvania (CURE)

Tatiana Bezdudnaya, PhD
Paralyzed Veterans of America

Michael Lane, PhD
Craig H. Nielsen Foundation

Rodrigo España, PhD
Commonwealth of Pennsylvania (CURE)

Dong Wang, PhD
Commonwealth of Pennsylvania (CURE)

Claudio Torres, PhD
Commonwealth of Pennsylvania (CURE)
Culture

Hobbies we gained during lockdown:

- Watching TV
- Being a couch potato
- Plant propagation
- Crocheting
- Reading for fun
- Sharpening knives
- Candle making
- Playing the Sims
- Redecorating
- Baking/cooking
- Keeping a diary

Pandemic lifestyle: 'Meeting your fitness goals' or 'Setting new cookie records'?

21% “Time to try that new workout!”
79% “Treat yo’self, it’s a pandemic!”
How many Zoom calls in a day before you drop?

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>Journal Club</td>
<td>1 - 29.2%</td>
</tr>
<tr>
<td>10:00</td>
<td>Seminar</td>
<td>2 - 12.5%</td>
</tr>
<tr>
<td>11:00</td>
<td>Thesis defense</td>
<td>3 - 29.2%</td>
</tr>
<tr>
<td>12:00</td>
<td></td>
<td>4 - 25%</td>
</tr>
<tr>
<td>13:00</td>
<td>Lab meeting</td>
<td>5+ - 4.2%</td>
</tr>
<tr>
<td>14:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:00</td>
<td>Committee meeting</td>
<td></td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What's on your bottom half during Zoom calls?

- Pajamas: 12.5%
- Boxers/shorts: 25%
- Sweatpants: 20.8%
- Jeans: 8.3%
- Yoga pants/leggings: 20.8%
- Proper pants: 8.3%
Activities & Outreach

2019 Departmental Holiday Party speech from Dr. Dong Wang

BSGSA 2019 Board Members at the Holiday Bowling Party

BSGSA Holiday Bowling Party back in January

Systems Multi-lab Meetings - November 2019, January 2020 and February 2020 - matching outfits!

BSGSA Formal in March 2020
BSGSA-NGSD combined bookclub!

Donations by the department to CampOutForHunger, organized by NGSD and DUCOM

Cooper’s Hawk by Dr. Baird who has combined casual birding and photography into a pandemic hobby

Cooper’s Hawk, as imaged by Dr. Douglas Baird

PPE donated by DUCOM to health care workers and hospitals during the COVID-19 pandemic

BSGSA Virtual Pumpkin Carving
Left: Jani’s pumpkin | Right: Shrobona’s pumpkin
Publications

**Jessica Ausborn, PhD**

# equal contributions

**Peter Baas, PhD**
Baas PW. (2020)
PMID: 32259406

Fischer, I Baas PW (2020)
PMID: 324664. Review

**Jessica Barson, PhD**
Pandey S & Barson JR (2020)


Gargiulo AT, Pirino BE, Curtis GR & Barson JR (2020).
Effects of pituitary adenylate cyclase-activating polypeptide (PACAP) isoforms in nucleus accumbens subregions on ethanol drinking. Addict Biol, Online ahead of print.

Barson JR, Mack NR, Gao WJ (2020)
The Paraventricular Nucleus of the Thalamus is an Important Node in the Emotional Processing Network. Front Behav Neurosci, In Press.

Pirino BE, Spodnick MB, Gargiulo AT, Curtis GR, Barson JR & Karkhanis AN (2020).
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, 181:108341.

**Barson JR, Morganstern I & Leibowitz (2020)**

Gargiulo AT, Curtis GR & Barson JR (2019).
Brain Res, 1729:146626.

**Tatiana Bezdudnaya, PhD**
Bezdudnaya T, Lane MA, Marchenko V. (2020)
Pharmacological disinhibition enhances paced breathing following complete spinal cord injury in rats. Respiratory Physiology & Neurobiology, 282:103514; DOI: 10.1016/j.resp.2020.103514

**Marie-Pascale Côté, PhD**
Bilchak JN, Yeakle KC, Caron G, Malloy DC, Côté M.-P. (2020)
Enhancing KCC2 activity decreases hyperreflexia and spasticity after chronic spinal cord injury. Exp. Neurology, In press

Caron G, Bilchak JN, Côté M.-P. (2020)
Direct evidence for decreased presynaptic inhibition evoked by PBST afferents after chronic SCI and recovery with step-training in the rat.

Locomotor deficits induced by lumbar muscle inflammation involve spinal microglia and are independent of KCC2 expression in a mouse model of complete spinal transection. Exp Neurol, In press.

Côté M.-P. (2020)
Simon Danner, PhD
On the organization of the locomotor CPG: insights from split-belt locomotion and mathematical modeling.

Modeling spinal V3 interneurons and left-right coordination in mammalian locomotion.

Kim Dougherty, PhD
Neural interactions in developing rhythmogenic spinal networks: Insights from computational modeling
Frontiers in Neural Circuits. 14:614615.

Rodrigo España, PhD
Chemogenetic Manipulation of Dopamine Neurons Dictates Cocaine Potency at Distal Dopamine Transporters.

Alonso IP, Pino JA, Kortagere S, Torres GE, España RA (2020)
Dopamine transporter function fluctuates across sleep/wake state: potential impact for addiction.
PMID: 33032296

Black EM, España RA (2020)
D-amphetamine maintenance treatment goes a long way: lasting therapeutic effects on cocaine behavioral effects and cocaine potency at the dopamine transporter.
PMID: 32859997

Study of the release of endogenous amines in Drosophila brain in vivo in response to stimuli linked to aversive olfactory conditioning.

Brodnik ZD, Black EM, España RA (2020)
Accelerated development of cocaine-associated dopamine transients and cocaine use vulnerability following traumatic stress.
PMID: 31539899

Itzhak Fischer, PhD
Tran KA, Partyk PP, Jiny, Bouyer J, Fischer I, Galie PA (2020)
Vascularization of self-assembled peptide scaffolds for spinal cord injury repair.

Fischer I, Baas PW (2020)
Resurrecting the mysteries of Big Tau.
Trends in Neurosciences. DOI:https://doi.org/10.1016/j.tins.2020.04.007
Fischer I, Dulin JN, Lane MA (2020)
Transplanting neural progenitor cells to restore connectivity after spinal cord injury.
Nature Reviews 21, 366–383. PMID 32518349 DOI: 10.1038/s41583-020-0314-2

Wen-Jun Gao, MD, PhD
Yan-Chun Li, Priyalakshmi Panikker, Bo Xing, Sha-Sha Yang, Cassandra Alexandropoulos, Enn P McEachern, Rita Akumu, Elise Zhao, Yelena Gulchina, Mikhail V. Pletnikov, Nikhil M. Urs, Marc G. Caron, Felice Elefant, and Wen-Jun Gao(2020)
Deletion of GSK-3β in D2R-expressing neurons ameliorates cognitive impairment via NMDAR-dependent synaptic plasticity.

Wenceslaus Cid-Jofré, Macarena Gárate-Pérez, Philip J Clark, Viviana Valero-Jara, Rodrigo A España, Ramón Sotomayor-Zárate, Gonzalo Cruz, Georgina Renard (2020)
Chronic modafinil administration to preadolescent rats impairs social play behavior and dopaminergic system
Neuropharmacology In press

Hypocretin receptor 1 involvement in cocaine-associated behavior: Therapeutic potential and novel mechanistic insights.


Simon Giszter, PhD


Shaoping Hou, PhD


Caitlin Howe, PhD

Ying Jin, PhD

Michael Lane, PhD
Bezdudnaya T, Lane MA, Marchenko V (2020) Pharmacological disinhibition improves paced breathing following complete spinal cord injury in rats. Respiratory Physiology and Neurobiology, online [PMID: 32750492]


Ramesh Raghupathi, PhD

Ilya Rybak, PhD

Natalia Shevstova, PhD


Jed Shumsky, PhD
Veronica Tom, PhD


Claudio Torres, PhD

Shah D, Torres C, Bhandari V. Adiponectin deficiency induces mitochondrial dysfunction and promotes endothelial activation and pulmonary vascular injury. FASEB J. 2019

Dong Wang, PhD

