



# BrainStorm

Fall 2024

## PROGRAM IN NEUROSCIENCE

University of Maryland School of Medicine  
<http://lifesciences.umaryland.edu/neuroscience>  
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## Junior Faculty Researcher:

### INSIDE THIS ISSUE

- 1 Junior Faculty  
Researcher: Joyce Da  
Silva, PhD
- 2 Neuroscience Outreach  
& Volunteer Association
- 3 Faculty Research  
Highlights
- 4 Junior Faculty  
Researcher (cont'd)
- 6 Recent PIN Graduates
- 7 Faculty Spotlight:  
Q & A with Tom  
Blanpied, PhD
- 10 UM-MIND IDEAS Day
- 13 Student Highlights
- 14 Photo Gallery



Joyce Da Silva, PhD

Joyce Da Silva, PhD, a translational chronic pain researcher affiliated with the Program in Neuroscience and UMB's School of Dentistry, has fulfilled her life-long dream of becoming a scientist. At just five years old, Joyce accurately cited her future profession as a scientist on an interest survey administered at school. College-attending Joyce, however, was not so accurate. Although still interested in pursuing a scientific career, at that point narrowed down to the biomedical sciences, Joyce had her sights set on *anything but* neuroscience. Her resolute interest in developing cures for heart and lung diseases was suddenly, and serendipitously, replaced by the pursuit of pain research and, eventually, neuroscience.

Joyce pursued her undergraduate studies at a small private institution in Brazil, where she grew up. "I started my undergraduate studies in February," says Da Silva, "One of my professors, on the first day, [told the class], 'You should reach out to professors from public universities, the really big names, because they always take student for research fellowships.'" In Brazil, in contrast with the general pattern for U.S. institutions, public universities are generally ranked higher than private universities. Joyce, determined to pursue research, emailed every heart and lung researcher in the Anatomy department at a local institution, but also decided to reach out to just one professor from the neuroscience list, on a whim.

*Jr. Faculty Researcher continued on page 4*

# Neuroscience Outreach & Volunteer Association

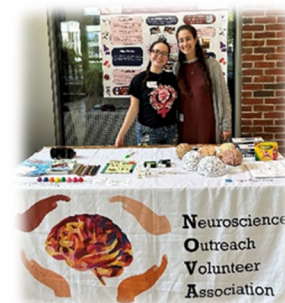
by Christie Dionisos and Kali Engel,  
PIN students and Co-presidents of NOVA



*Brewing Biology: Mind your Mental Health*



**N**euroscience  
**O**utreach  
**V**olunteer  
**A**ssociation



*Baltimore City Brain Bee*



*Blossoming Brains*



*Brain Awareness Week*



Neuroscience Outreach and Volunteer Association (NOVA) is a graduate student-led organization that sponsors monthly outreach events to foster a relationship between the Baltimore city public and the scientific community at UMB. NOVA's volunteers accomplish this mission by connecting with community members of all ages through interactive learning demonstrations and public discussions which foster enthusiasm for science. Additionally, we would like to give a HUGE thank you to Cassie Stapf for leading NOVA the past 2 years and paving the way for NOVA's future success!

## What have we been up to?

This past fall, NOVA volunteers visited the Maryland Science Center at the Inner Harbor for the **Blossoming Brains** event. Volunteers conduct neuroscience activities for kids ages 3-8 to introduce basic neuroscience concepts. In January, NOVA helped organize the Baltimore City Brain Bee at the Maryland Science Center, an international brain trivia competition for high school students, founded by UMB's Dr. Norbert Myslinski. In the spring semester, NOVA participated in **Brain Awareness Week** (BAW) at Mother Mary Lange Catholic School. NOVA volunteers provided lessons and demonstrations on fun neuroscience topics. In April, NOVA continued our **Brewing Biology** event series. This event brought together UMB researchers, city councilmembers, and nonprofit groups to host a forum entitled "Mind Your Mental Health." Lastly, we closed out the year with "Halal on the Lawn" in which, in exchange for some of the most scrumptious food on campus, we collected donations for Paul's Place where we will have an in-person volunteer event in the fall. We are always open to new ideas and opportunities for broadening our impact!

If you have questions about this volunteer organization or are interested in participating, please email Christie Dionisos and/or Kali Engel:

[cdionisos@som.umaryland.edu](mailto:cdionisos@som.umaryland.edu)  
[kjengel@som.umaryland.edu](mailto:kjengel@som.umaryland.edu)

## Faculty Research Highlights



**Linda Chang, PhD**, Professor, Department of Diagnostic Radiology published "Quantifying the Neuropsychiatric Symptoms in Post-Acute Sequelae of COVID-19 (PASC) using the NIH Toolbox(®) and PROMIS", and "Abnormal brain diffusivity in participants with persistent neuropsychiatric symptoms after COVID-19," in *NeuroImmune Pharmacology and Therapeutics*. Dr. Chang is also involved in two large ongoing studies, the ABCD study, which explores adolescent brain development, and research aiming to develop the use of focused ultrasound to eradicate HIV from the brain.



**Seth Ament, PhD**, Associate Professor, Department of Psychiatry, **Brian Herb, PhD**, Research Associate, Department of Pharmacology, and **Margaret McCarthy, PhD**, Professor, Chair, Department of Pharmacology, Director UM-MIND Institute published two papers with the BRAIN Initiative Cell Census Network in *Science Advances* and *Science Translational Medicine* using single-cell genomics to produce atlases for the development of cell types in the human hypothalamus and cerebellum and the effects of early-childhood inflammation.



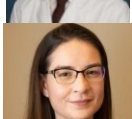
**Thomas Longden, PhD**, Assistant Professor, Department of Physiology was awarded, "Interceptive Vascular Plasticity in Neurodegeneration," a Chan Zuckerberg Initiative Collaborative Pairs Pilot Award, which will allow him to elucidate how loss of interoceptive mechanisms, which drive plasticity in vascular signaling pathways to adapt blood delivery to areas of neuronal energy need, contribute to neurodegeneration. Tom also authored two publications, titled "Pericytes and the Control of Blood Flow in Brain and Heart," in *Annual Review of Physiology* and "Electrometabolic signaling," in the *Journal of General Physiology*.



**Joyce Da Silva, PhD**, Assistant Professor, and **Jin Ro, RO, BS, MA, PhD**, Professor, Department of Neural and Pain Sciences have been awarded a multi-PI NIH grant to investigate the potential of testosterone in transforming our understanding and treatment of chronic orofacial pain conditions.



**Barbara Juarez, PhD**, Assistant Professor, Department of Neurobiology published "Temporal scaling of dopamine neuron firing and dopamine release by distinct ion channels shape behavior," in *Science Advances*.



**Marco Venniro, PhD**, Assistant Professor, Department of Neurobiology, in collaboration with **Todd Gould, MD, Professor**, Department of Psychiatry published "Relative to females, male rats are more willing to forego obtaining sucrose reward in order to prevent harm to their cage mate" in *Psychopharmacology*. Dr. Venniro also received a coveted invitation to attend The Nobel Foundation symposium on The Social Brain, which will be held in Stockholm this November.



**Todd Gould, MD**, Professor, Department of Psychiatry published "Entactogen Effects of Ketamine: A Reverse-Translational Study," in the *American Journal of Psychiatry*.



**Andrea Meredith, PhD**, Professor, Department of Physiology, received a 3-year appointment to the Patient Engagement Collaborative working group, a joint project between the FDA and the Clinical Trial Transformation Initiative, in addition to authoring a multitude of publications, including, "Effect of an autism-associated *KCNMB2* variant, G124R, on BK channel properties," published in *Current Research in Physiology* and "Disease-associated *KCNMA1* variants decrease circadian clock robustness in channelopathy mouse models" appearing in the *Journal of General Physiology*.



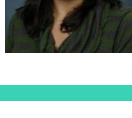
**Xiaofeng Jia, BM, PhD**, Professor, Department of Neurosurgery published "Metabolically Glycoengineered Neural Stem Cells Boost Neural Repair After Cardiac Arrest" in *Advanced Functional Materials*.



**Iris Lindberg, PhD**, Professor, Department of Neurobiology was awarded a Discovery Grant from the Maryland Stem Cell Research Fund (MSCRF), focused on "Neuroprotection by an endogenous chaperone in stem cell model of Parkinson's disease."



**Mary Kay Lobo, PhD**, Professor, Department of Neurobiology published a review article, "Refining the circuits of drug addiction: The ventral pallidum," in *Current Opinion in Neurobiology*.



“I opened her profile because [her name stood out to me],” recalls Joyce, “She was working with snake venoms, trying to develop new analgesics for pain.” Intrigued by the concept of working with snake venom, Joyce sent her an email of interest. “Long story [made] short,” Joyce laughs, “she was the only one who accepted me.” Beginning in March of that year, Joyce began going to the lab every afternoon, after class, a habit which continued for the next four years of her undergraduate studies.

During her PhD studies, Dr. Da Silva continued to explore peripheral interventions for chronic pain but began to wonder what the impact of these interventions might be on the central nervous system. As her graduate mentors weren’t experienced with functional Magnetic Resonance Imaging (fMRI), a neuroimaging technique which resolves brain activity in real-time and the appropriate technique to explore her novel pondering, she connected with Dr. Dave Seminowicz, who was a UMB faculty member and pioneer in fMRI animal studies at the time (he is now affiliated with The Brain and Mind Institute at Western University). She secured a competitive international fellowship which allowed her to work in Dave’s lab and explore the brain mechanism’s underlying chronic pain, using fMRI in rats. Following this one-year fellowship, and just 3.5 years after beginning her PhD studies, Joyce returned to Brazil where she defended her thesis on anti-Nerve Growth Factor as a pain treatment. Da Silva, motivated by a fresh passion for brain research, returned to the U.S. to pursue her postdoctoral studies under the supervision of Dr. Seminowicz.

Dr. Seminowicz was happy to have Joyce return to his lab for her postdoctoral research, but only had funding for a project that was distinctly different from Joyce’s previous expertise. In typical Joyce fashion, she was up for the challenge, and began researching the efficacy of Cognitive Behavioral Therapy as a treatment for both chronic pain and sleep impairment in sickle cell anemia patients. To explore this, Joyce used both behavioral outputs and fMRI scans to detect brain abnormalities and treatment-associated corrections. For Joyce, studying chronic pain in humans, rather than animals, was both challenging and eye-opening. “[It] made me more passionate, as I saw people who were living with terrible diseases, who have pain every day,” says Joyce. Seeing how variable patients are also shifted Joyce’s focus. “Sometimes,” she says, “we are so focused on one protein in the brain and then we see real patients and [wonder], ‘How can I make my animal work translate and impact people’s lives?’ The goal, at least, of my lab, is to conduct studies that will help people.”

Today, Joyce’s own lab explores age and sex differences, as well as the influence of mood disorders, in/on the brain mechanisms of chronic pain conditions and their treatment. Joyce uses a multipronged approach to explore these mechanisms, pairing invasive circuit manipulations in animals with fMRI and behavioral outputs in both animals and humans. Because humans possess very few variables that we may manipulate and control (a process that is central to systematic experiments), as well as having varied histories and environments, it is helpful to study animal models alongside humans. This approach allows scientists to compare results and determine where there might be overlap, to then better understand which mechanisms and research may translate from animals to humans living in diverse, complex, and changing environments.

Just one of the complexities, Joyce cited, when studying chronic pain human subjects is the comorbidity of mood disorders (anxiety and depression) and chronic pain in 60% of patients. When asked to theorize about why she thinks this relationship exists (as it is also a relationship that she directly explores in her work), she cited that she *believes* that this may be due to dysregulation of shared circuitry which is involved in emotional regulation and pain regulation; such that those experiencing anxiety and depression have abnormalities in their limbic and emotional circuitry, which also functions to process chronic pain, leaving these individuals more susceptible to developing chronic pain. This, in theory, may also work in the reverse, such that those who suffer from chronic pain, with abnormalities in these networks which are also related to emotional processing and the limbic system, are more susceptible to developing mood disorders. This theory aligns with the common treatment of both mood disorders and chronic pain with antidepressants (albeit the different conditions are addressed with distinct doses).

Antidepressants, however, are often not sufficient to treat severe chronic pain. Thus, pharmacological treatments with many adverse side effects, such as opioids, are often prescribed. While these are still some of the most effective, and therefore necessary, interventions to date, their disruptive side effects motivate chronic pain researchers, Da Silva among them, to explore alternative treatments. One such alternative is green light therapy. Exposure to wavelengths of 525 nm for 2 hours has been shown to improve chronic pain in humans, across a variety of chronic pain conditions including migraine, osteoarthritis, and fibromyalgia; Joyce is currently quite interested in understanding the brain mechanisms of green light therapy, and how sex, age, and mood disorders may influence the efficacy of this therapeutic approach.

The story presently unravelling in Joyce's lab is one of the neural pathway between the Anterior Cingulate Cortex (ACC), a limbic system structure which plays a role in pain processing and emotional regulation, and the Periaqueductal gray (PAG), a midbrain structure which plays a role in emotional reactions, such as anxiety, and endogenous analgesic effects, or our inherent ability to inhibit our own pain. When this ACC to PAG pathway is blocked, we lose our natural ability to attenuate our pain response. Joyce's lab is exploring the ACC to PAG pathway as a mechanism by which (A) chronic pain and a comorbid anxiety response may be mediated (if pathway signaling is reduced), (B) green light's analgesic effect on chronic pain may act (if pathway signaling restored), and (C) increased female susceptibility to chronic pain, as compared to males, may be mediated (comorbid anxiety appearing in females but not males may further reduce activity of this pathway, resulting in resistance to recovery). Stay tuned into Dr. Da Silva's publications to learn more!

The Da Silva Lab group currently conducting this research is a diverse group of trainees, who each bring unique and valuable perspectives to the work. Dr. Da Silva, alongside exceptional science, prioritizes a positive and respectful work environment in which trainees can thrive both scientifically and personally. Her trainees are encouraged to maintain a work-life balance, and she facilitates gatherings, such as spur-of-the-moment lab lunches or birthday cakes for each members' birthday, to allow them to bond. Further, Joyce encourages open communication and maintains availability and an approachable demeanor so that her trainees feel comfortable approaching her with any issues they may encounter, scientific or otherwise.

Joyce brings the same open-minded approach that she brings to both her research program and her training environment to her life outside of the lab. She watches action movies, such as Marvel and Star Wars, or binges the latest Netflix series over a bowl of popcorn (or any type of food) to unwind. She greatly enjoys both playing (via piano or French horn) and listening to a variety of music genres, ranging from classical to the latest pop. She is also exploring a new-found interest in the outdoors (perhaps inspired by her green-light research, which likely mimics nature), and enjoys riding her bike through the park and visiting desolate beaches (blue light also has some analgesic effects, they're just not quite as robust as the green-light effects).

**Shown to the right:** Joyce and her lab near the Puyblic Market in Seattle, Washington while attending the National Pain Meeting (USASP) in Seattle in April .

Follow Dr. Da Silva on Twitter/X:



## Recent PIN Graduates



**Poorna Dharmasri, PhD** defended his thesis “Postsynaptic Control of Trans-Synaptic Nanostructure,” work he accomplished while in the lab of **Thomas Blanpied, PhD**. We’re excited for Dr. Dharmasri, who is now a Senior Biosystems Engineer at Nikon!



**Garrett Crutcher, PhD** defended his thesis “The fractal brain: investigating the Inc between genetics, architecture and computation,” work he accomplished in the lab of **Alexandros Pouloupoulos, PhD**. We wish Garrett the best of luck in his new position as a Machine Learning Engineer at Signal Systems Corporation!



**Roxy Cundiff O’Sullivan, PhD** defended her thesis “Biological, psychological, and sociocultural contributions to pain processing in the central nervous system: A whole-person approach to understanding chronic pain,” work she accomplished in the lab of **Luana Colloca, MD, PhD, MS**. We wish Roxy well in her Postdoctoral Studies in the Pain in Adolescence Lab at Washington University School of Medicine in St. Louis!



**Sydney Ashton, PhD** defended her thesis “A “personality test” for rats reveals subtle but distinct effects of sex and early life inflammation on brain & behavior” in the lab of **Margaret McCarthy, PhD**. We wish Sydney the best as she continues her studies as a Postdoctoral Fellow in the Matthew Roesch lab at University of Maryland, College Park!

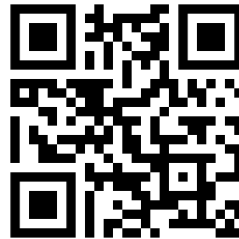


**Soad Elziny, PhD** defended her thesis “Defining the Role of SLC35A2 in Cortical Development and Epilepsy,” work she accomplished in the lab of **Peter Crino, MD, PhD**. Best of luck to Soad as she pursues a career in industry!



**Jewel White, PhD** defended her thesis “A Biopsychosocial Model to Study Interindividual Differences in Placebo Effects: Translational Approaches for Acute and Chronic Pain Management” work she accomplished in the lab of **Luana Colloca, MD, PhD**. We’re excited for Jewel, who is headed to Stanford for her Postdoctoral Fellowship!

## Faculty Spotlight:



### Q&A with Tom Blanpied

**Q:** *How did you end up becoming a scientist?*

**A:** This is a good question, since I grew up in a house steeped in the liberal arts. My parents are both very much on the arts and literature side of the brain, yet my brother and I are each hard-core scientists thriving down in the weeds of mechanisms and numbers. It's a bit of a family mystery how this generational transition came about! The explanation that appeals to me the most is simply that curiosity is curiosity. If you're motivated by exploring the things you don't know, there are a lot of directions you might end up taking those instincts in your life and career.

**Q:** *When is the first time you actually felt like you were a "real" scientist?*

**A:** I actually entered college split, in my mind, between the sciences and literature, but I had almost no experience outside the classroom in anything scientific. I even avoided lab classes my first year in college, since they were, by all accounts, much too hard. But when the opportunity arose to try some real neuroscience in a real lab as an undergraduate, the experiences were pretty awe-inspiring for me (thanks to my professor then, Don Weisz) and pretty quickly set my path. I don't know that I've ever, deep down, felt like "a real scientist" though, rather than someone just trying to do the things he wants to do; with the thrilling freedom to explore ideas.

**Q:** *What do you study?*

**A:** The truth is, I'm funded by a shadowy criminal mastermind to engage in a 30-year study of how much challenge graduate students can withstand. I can't discuss that work until we publish, but until then, my cover story is that I study the molecular basis of cell-cell communication in the brain...

I've studied glutamate synaptic transmission for most of my career, and our focus now is on figuring out the variety of mechanisms by which different synapses function differently. If there are, say, 3,300 neuron types, then, transcriptomically alone, that gives you the potential for many millions of synapse types. Plus, every synapse can be modified based on the experience and activity of the cells involved, and by the unique influence of the other cell types around it. This creates an enormous variety of synapse functions, which are a critical aspect of the brain's computational prowess.

There are a lot of interesting ways to approach this problem, but one of the angles we've had the most fun with over the last few years is thinking about it "architecturally." That is, if you take a set of certain, well-conserved molecules that carry out a lot of the basic functions within synapses, you might then consider how are they arranged within a synapse to mediate those jobs. To understand this, we use a set of imaging approaches that allow us to measure the locations of single molecules within the cell, so we can build maps of protein organization where the accuracy of the map is about at the scale of a protein molecule. It turns out that there are very particular organizations of molecules within individual synapses, and if you arrange the proteins differently, you get a different functional state for the synapse, overall. In some ways that's not surprising, but it's still eye-opening every day to think about how small these structures are, how amazing it is that we can actually measure them, and how big of an influence that this intricate molecular construction has on how information moves around in neural circuits.

**Q:** *Why in the world is that research possibly even a little bit important?*

**A:** Well, the typical answer to that question is that you're studying an important problem, like addiction, or depression. And I definitely think my lab is studying important problems! But of course, you never know whether *your research* on the problem is important until you see how it comes out. Thus, it's critical to choose ongoing research questions that will lead to useful outcomes, regardless of whether they turn into the breakthrough idea or the blockbuster drug. I'd always say aim big and think about how you can attack important questions—but don't forget that 99.9% of what we do is useful mostly because we are engaged in a gigantic undertaking with tens of thousands of people, that spans more people-years than you can imagine. My guess is that the impact of most work that turns out to have been valuable will not be in the ways that we imagined at the time.

**Interviewer begins to question D. Blanpied's focus:** *That just sounds like a defense of basic research, Dr. Blanpied...*

**Response:** Yeah, I suppose it is, though I don't think this argument applies only to basic research. For us, though, yes, I think what we do is important not because I'm studying a disease model where I guess I'd hope to be the one to solve the disease or develop a treatment, but because we are supplying information that I genuinely believe is so broadly important that it is going to be critical in the long run for understanding human behavior or improving the human condition.

**Interviewer attempts to re-ask the question:** *OK, I like that, but you didn't answer my question; Why is your research important?*

**A:** Oh right, yeah, fair enough. So, I guess I'd say that, to me, our work is important in two ways. First, I am fascinated by the phenomena of memory storage and retrieval. The dynamic adjustment of synaptic strength is critical for both of these, and so it's easy to say we're studying the molecular mechanisms of memory. In part this seems important to me personally because my brain seems to lack, almost entirely, one or both of those... But regardless of that, being able to improve information retention would dramatically improve human health in cases like dementia, where memory is badly degraded, and controlled or enhanced memory might be useful for many people, not just me. Plus, on the flip-side, we certainly all have many things we'd like to forget, even aside from cases we'd consider pathological like substance misuse or PTSD.

The second way this is important, in my opinion, is simply because: "Wow! Don't you want to know how we remember things? Or, for that matter, how we do any of the cognitive things we do as humans?" Cellular communication, with precise, millisecond-level timing is one of those enabling technologies of our biology that underlies all of the thought, action, and behavior that lets us be us. So, to me, yeah, we should definitely figure this out. Luckily, NIH is still, so far, allowed to retain its mission to seek fundamental knowledge about the nature and behavior of living systems, and I'm in that camp.

Oh, and there is a fifth way, too, which...



**Interviewer interjects:** *Tom, you never listed a third way in which your research is important...*

**Response:** ... third, yes, which again just gets back to the interconnectedness of all biological research. That is, in my lab, we often adapt or develop tools that are pretty unique or cutting-edge for measuring things at the near-molecular scale or manipulating proteins in cells. There's always going to be a need for that level of work, regardless of whether you're aiming to understand a disease or figure out how drugs interact with biological systems. So, I definitely hope that the methods we use will be helpful in stimulating science and understanding on all sorts of questions being studied here at UMB or elsewhere, neuroscience or not.

**Q:** *What is your general philosophy for running your lab?*

**A:** I think science evolves through passion and curiosity, and so I hope to have the people working with me push their own work in the direction(s) that they are excited about. That's the best thing for science, and much better for the lab and each person in it. You're much more likely to make a lasting impact if you love what you do. I never wanted to stand around at a bench running the same assay over and over again, and I don't expect that people coming to my lab will want that either, so I'm eager to have them explore. Of course, I can only realistically help people within a certain swath of biology, and so obviously the more overlap there is between you and the rest of the lab, the more productive your work is likely to be. I've seen, over and over again, how influential someone's personal interests can be on the rest of us, so that's something to capitalize on as a PI, for sure. Sometimes it slows people down if there's not someone telling them what to do, but hopefully it's helpful to them as they figure out what they'd like to do in the future.

**Q:** *What are the next steps for your research?*

**A:** So many things! Every single person in the lab has a whole slate of things I would absolutely LOVE to do, so we'll see if we can get to all of them. Right now, there's a lot we still don't know about synaptic molecular organization, or how it is dictated by, for instance, the adhesion molecules that are thought to control cell-specific synapse types, so we are pushing on multiplexed imaging to image more proteins at once and see more aspects of how different proteins work together to produce complex behaviors in synapses. That will all be facilitated by AI and Big Data types of analyses. We have spent a long time on experiments in cell cultures that have produced a few hypotheses that we are looking now test in vivo with Brian Mathur and Steffen Wolff, with Alex Medina, and with Saima Riazuddin, which is all really exciting. We are also starting to look in human synapses, rather than animal synapses, to see how they differ in these architectural features that we've discovered and documented. Further, we are working with Seth Ament to see whether or not transcriptomic variation among individuals predicts the details of synaptic structure as we expect it should. There's so much new technology around that there's going to be an absolute tidal wave of data about this kind of thing in human cells, so it will be really fun to be a part of that.

We're also pushing hard in the ever-more molecular direction with new approaches that are spawning collaborations in the U.S. and abroad. We built a great tool that allows us to see specific heteromeric protein configurations, and we're now testing a new approach to measure their molecular position in the cell with even greater clarity. I mean, we're talking about measuring the distance between the subunits of a single receptor and doing so while the receptor is still in the synapse, not as part of a crystal structure. It's kind of crazy what is possible now, and you can imagine that being able to visualize and document, within cells, the conformations of single proteins and multiprotein complexes is a totally new way of determining mechanisms of signaling or drug action.

**Interviewer:** *Allegedly, Tom has hobbies, like photography, and has dogs and cats and a family that he enjoys spending time with, but he has hit is spatiotemporal maximum for this issue of Brainstorm. He can probably be found in the lair of the shadowy mastermind if you want to know more...*

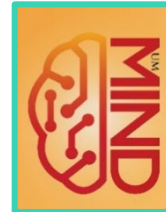
## UM-MIND IDEAS Day



Folks visit the marketplace, which followed event talks



*Inclusion,  
Diversity,  
Equity &  
Anti-racism in  
Science*



Krystal, Isaiah, & Maithily display marketplace swag

This year, UM-MIND'S IDEAS (Inclusion, Diversity, Equity, and Antiracism in Science) Committee hosted its inaugural "IDEAS Day," an event to both **celebrate and increase awareness of the diverse experiences** of UMB's neuroscience, neurology, and psychiatry trainees, faculty, and physicians, and the patients they study and treat in the Greater Baltimore community.

The event began with a series of talks given by neuroscience trainees. PIN Student Loryn Johnson gave a talk entitled, "*Beyond the Pages: A Look into the Experiences of Underrepresented Minorities in STEM.*" In her talk, Johnson shared both her own journey into STEM, which began with a 5<sup>th</sup>-grade math teacher who saw potential in her, and a well-researched and informative collection of **challenges that may be faced by those who identify as underrepresented minorities in the sciences**. According to Johnson, these hurdles include, but are not limited to, (1) beginning their education in school systems where many individuals fail to graduate, (2) experiencing financial strain in the pursuit of (higher) education, (3) feeling the weight of the Minority Tax, or shouldering the burden of serving as the (token) representative for the minority group with which they identify, often leading to pressure, high (and often uncomfortable) levels of visibility, and additional work along the way, and (4) lacking supportive mentorship and training experiences to allow and encourage individuals to move through the challenging path that is higher education in the sciences. Loryn also shared the importance of considering how (5) intersectionality of minoritized identities, such as identifying as both African American and female, can lead to an additional level of isolation and challenge.

Beyond merely listing the challenges, Johnson provided some suggestions for **support that may help offset these trials and promote equity**. She first presented a three-step model for change, which provides the framework for how educational (and other types of) entities might move towards developing more equitable systems. These steps include (1) "refreezing the system" or **becoming aware of issues** that may be present, (2) identifying appropriate action to take by collecting and evaluating information, then developing strategies to **address concerns**, and (3) **implementing change** by updating practices and tracking metrics to determine the effectiveness of these new approaches.

Additionally, Loryn shared that **retention (of minoritized students)** may be improved by (1) instating peer/faculty mentorship programs, (2) encouraging students to join professional organizations, (3) offering implicit bias training for faculty and students, (4) establishing transparent institution-wide policies and metrics, and (5) facilitating events to celebrate diversity!

Loryn's talk concluded with a strong statement of **why diversity matters in STEM**. Her message was this: Modern research continues to be biased towards the Western, educated, industrial, rich, and democratic subset of the world's population. Only recently did the NIH mandate that both Male and Female subjects be included in every funded study, and this was only very minor progress toward the scientific world that we need to aim for. **We need to begin considering humanity as a whole through our research, and this starts in our communities.**

Following Loryn's research-based, actionable, and impactful talk, PIN Student Phylcia Cooper took a deeper dive into her own challenges and growth experiences, illustrating the concepts shared by Loryn. Phylcia referenced how as a young child, the messaging in her household was always that she needed to "push through" the challenges that presented themselves. She implied that this had a negative impact on her later in life, and that this messaging may be a common cause of many **mental health issues in marginalized communities**. On the flip side, Phylcia suggested that her experiences as a student at Morgan State University, a historically black college/university (HBCU), were incredibly encouraging. Here, women of color acted as inspirational models and supportive mentors for her as she navigated a research project here at UMB with PIN alumnus Andreas Wulff, an opportunity provided to her through the ASCEND (A *Student-Centered, Entrepreneurship Development Training Model to Increase Diversity in the Biomedical Research Workforce*) Program. Further, these mentors encouraged her to present her work and pursue a PhD. Phylcia emphasized **how instrumental a supportive community can be to the development of a minoritized scientist**.

After Phylcia's talk, PIN student America Bustos Segura recounted her experience with the **abrupt and somewhat jarring transition of finding herself amongst a different culture and language** as she moved away from home to pursue her graduate studies. She shared aspects of the cultural isolation she experienced, including moving to a city where the grocery store didn't sell any of the ingredients that she was accustomed to cooking meals with. As a first-generation college student, America also described the difficulty she experienced in finding a way to explain her research and educational experiences to her Spanish-speaking family members, as much of the scientific vernacular in English doesn't translate well to other languages. She noted, with regret, that **the people who are closest to her are the furthest from her knowledge**.

Finally, Jimmy Olusakin, PhD, a Postdoctoral Scholar in Mary Kay Lobo's lab, then shared his intercontinental scientific tour, which took him from his homeland in Africa, to Europe, to his current laboratory here at UMB. Dr. Olusakin highlighted **the immense support he received, through several programs and serendipitous networking connections, which scaffolded his scholarly journey**. Dr. Olusakin's initial research opportunity took place in Uganda, where he participated in a Drosophila neurogenic workshop, a program which subsequently grew into Teaching and Research in Natural Sciences for Development in Africa (TReND), which provides African universities with equipment and support. From here, he was able to participate in several workshops and conferences including European Synapse Summer School, offered through the International Brain Research Organization. Eventually, Olusakin entered the ENP Graduate Program based in Paris, through which he studied alongside his cohort of international scholars from Nigeria, India, Spain, Italy, Poland, The UK, and Chile. A few experiences later, Jimmy's wife connected with Dr. Mary Kay Lobo through Twitter, and her generous support of Jimmy, both as an individual and as a scientist, facilitated his current postdoctoral role. Olusakin's talk culminated in an emphasis of the "heroes" who have been paramount to his scientific advancement.

Following these moving trainee talks, event attendees heard from Faculty members and Faculty Physicians in our community. First, Sarah Kattakhuzy, MD, MPH, described the clinical research that she conducts, which is focused on improving community-based treatment for those diagnosed with both Hepatitis C and Opioid Use Disorder in **clinics aiming to facilitate welcoming, safe, and accessible environments for those living in the surrounding community**. Further, Greg Elmer, PhD, **shared the profound and disturbing impact of childhood trauma on wellbeing later in life**, and Peter Crino, MD/PhD, described the devastating **inaccessibility of health care for many individuals** in both the Baltimore urban and greater rural Maryland communities. Dr. Crino elaborated on its degree/impact, and how we, as both a cutting-edge biomedical research (UMSOM) and healthcare institution (UMMC), may work to continue addressing these disparities.

Subsequently, the audience listened to a student-organized panel, led by trainees Daniela Franco, Cassie Stapf, Lacey Greer, Zachary Hough and Erin McDonnell in association with UM-MIND IDEAS, the PIN Student Training Committee, the Neuroscience Outreach Volunteer Association, and the Promoting Belonging in Neurobiology Committee. This panel was composed of accomplished and diverse scientists and leaders from both our campus and the NIH, including Dr. Margaret McCarthy, Director of UM-MIND; Dr. Greg Carey, Executive Director of Student Research and Community Outreach and Assistant Dean for Student Research and Education; Rosemary Ferreira, M.Ed., Associate Director of the Intercultural Center; Dr. Sharron Graves, Executive Director of GPILS Diversity, Equity, and Belonging and Strategic Initiatives; Dr. Megan Rizzo, Director of the Training Program in Integrative and Membrane Biology; Dr. Yeka Aponte, NIDA IRP Chief and Associate Director of Diversity and Inclusion. They responded to audience questions about diversity-centered topics as they relate to the academic and biomedical environments. For example, Dr. McCarthy shared her experience of **often being the only female faculty member in the room**. By being asked to engage with nearly every committee and leadership entity to increase female representation, which is an example of the Minority Tax, Peg learned to **strategically select the opportunities that were best for her, to prevent the distraction of overcommitment from deterring her research**. Another panelist, Dr. Rizzo, emphasized how important it is to **give trainees, particularly those with health-related challenges or disabilities, the space and support that they need to thrive in the research environment**. This was a great opportunity to hear thoughts on some challenging but crucial topics that often go undiscussed.

The day of genuine, sobering, and encouraging enlightenment ended with socialization and snacks to reflect on the day. This session included informational booths to help individuals connect with the leaders of many community resources, including 1) UMSOM Equity, Diversity and Inclusivity (EDI) Office, presented by JP Pierre and Sandra Quezada, 2) Diversity, Equity and Belonging (DEB) and Strategic Initiatives in GPILS, presented by Sharron Graves and Melissa Kroeger, 3) Neuroscience Outreach Volunteer Association (NOVA), presented by PIN student Cassie Stapf, 4) UMB Intercultural Center, presented by Rosemary Ferreria, 5) BUGSS: Baltimore Underground Science Space, presented by Lisa Scheifele, 6) NIDA Scientific Director's Fellowship for Diversity in Research, presented by Yeka Aponte and Christie Brannock, 7) STAR-PREP, presented by Greg Carey, 8) Association for Women in Science (AWIS) Baltimore, presented by Cosette Schneider, 9) RISE UPP Promise Academy Alliance, presented by Jenn Aumiller, and 10) Brain Bee, presented by PIN student Christie Dionisos. Further, session attendees viewed trainee-created artwork, which colorfully illustrated their vision of diversity in neuroscience. Thanks to all who participated in planning, executing, and attending this successful inaugural IDEAS Day; a special thanks to Dr. Mary Kay Lobo, former Committee Chair, and Daniela Franco, former Student Chair of the Committee, who worked hard to organize this event (and all the IDEAS activities preceding it). I can't wait to learn more next year!



Johnson introduces her talk, "Behind the Pages: A look into the experiences of underrepresented minorities in STEM"



Bustos-Segura illustrates the journey from Bakersfield, CA to Baltimore, MD



Cooper highlights the faculty who supported her during her undergraduate experience at nearby HBCU, Morgan State University



Olusakin begins his scientific tale in Uganda, at a neurogenic Drosophila workshop



## Student Highlights

### PIN Graduate Students who are independently funded:

Congratulations to **Daniela Franco** for obtaining independent funding through an NIH F99/K00 grant!

Three cheers to **Catherine Stapf, Katie Kruk, Molly Pruitt, Meghann Ryan, Rebecca Lorsung, Anna Maximova, Mitchell Moyer** and **Emily DeMarco** who are currently independently funded by NRSA (F30 or F31) NIH Grants! Check out their grant titles on NIH Reporter!

### Students funded by internal Training Grants:

Shout out to those currently funded by UMB's Neuroscience, Cancer or Cardiovascular T32 Training Grants: **Hassan Saadi, Ruchael McNair, Loryn Johnson, Maisie Ahern, Ren Thigpen, Ben Swack, Sophie Ogunsanmi** and **Sam Mitias!**

### Recent Student Publications:

**Pedro Rodriguez Rivera**, PIN student in the lab of **Dr. Linda Chang**, authored "Prenatal tobacco exposure on brain morphometry partially mediated poor cognitive performance in preadolescent children" in *NeuroImmune Pharmacology and Therapeutics*.

Check it out:



**Hassan Saadi**, PIN Student in the labs of **Drs. Graeme Woodworth** and **Jeffrey Winkles**, co-authored a paper titled, "Impact of Targeting Moiety Type and Protein Corona Formation on the Uptake of Fn14-Targeted Nanoparticles by Cancer Cells," published in *ACS Nano*.

Check it out:



### Other Student Accomplishments:

**Molly Pruitt**, PIN Student in the lab of **Dr. Alexandre Medina**, received the Society for Neurosciences' Trainee Professional Development Award, and the Research Society on Alcoholism's Fetal Alcohol Spectrum Disorder Study Group

travel award, allowing her to attend both conferences with travel coverage!

**Laura Ventura**, PIN Student in the lab of **Dr. Joyce Da Silva**, received a travel award to attend the National Pain Meeting (USASP) in Seattle, where she gave a talk and won an award for best Sex Differences poster.

**Rebecca Lorsung**, PIN Student in the lab of **Dr. Asaf Keller**, was awarded the Best Poster Award at the annual Center to Advance Chronic Pain Research Symposium, as well as a travel fellowship to attend the 2024 Winter Conference on Brain research in Breckenridge, Colorado.

**Phylcia Cooper**, PIN Student in the lab of **Dr. Todd Gould**, won an award for her research design poster at UMSOM Department of Psychiatry's Annual Research Day! View the Research Day photo on next page.

**Carolyn Doty**, PIN Student in the lab of **Dr. Daniel Roche**, received a travel award for the upcoming Research Society on Alcohol annual meeting. She also received a poster award at UMB's Psychiatry Research Day.

**Ryan Mayers**, PIN Student in the lab of **Dr. Brian Polster**, received two travel awards, one allowing him to attend an international conference, and was invited to be one of seven speakers at the inaugural "Einstein Dialogues in Graduate Education" symposium hosted by the Albert Einstein College of Medicine's Department of Neuroscience in the Bronx!

**Sissi Huang**, PIN Student in the lab of **Dr. Marco Venniro**, received the McEwen Fellowship to investigate the effect of aging in social craving on cerebellar-thalamic circuit level.

We're proud of you all!



**Left:** Da Silva Lab enjoys dinner with colleagues. **Below:** The lab then gets skeleton-spooked in Seattle during the National Pain Meeting. Pictured left to right: Joyce Da-Silva, PIN Student Laura Ventura, & Lab Analyst Michael Keaser.



**Above:** Poster award winners, including PIN Students Phylcia Cooper (in teal) & Carolyn Doty (in bright red), pose with the Dean (in a suit) at UMSOM's Department of Psychiatry's Annual Research Day!

PHOTO GALLERY



**Left:** PIN Advanced Neuroscience Investigation students (left to right) Mikah Green, Noury Khim, Sonia Malaiya, & Amanda Pacheco-Spiewak learn by slicing open a sheep's brain.



**Above:** The Chang Lab looking futuristic as they watch the Solar Eclipse. Pictured left to right: Pedro Rodriguez-Rivera, Postdoc Stephanie El Omeiri, Mahsa Mayeli, Research Associate Huajun Liang, & Meg Ryan.

**Right:** The Chang lab, including (left to right) PIN Student Pedro Rodriguez-Rivera, Postdoc Mahsa Mayeli, & PIN Student Meg Ryan at the inaugural ABCD Insights and Innovations Meeting (AIIM) at NIH in March. Each of them presented a poster!



**Right:** The Mathur lab gets all matchy-matchy in their hip sweatshirts. Pictured left to right: Postdoc Andreas Wolff, PIN Student Alli Siclair, & GPILS student Eliza Douglass.



**Left:** PIN Students in the McCarthy Lab gather to watch the rising second years present about one of their lab rotation projects. Pictured left to right: Neema Moin Afshar, Kali Engel, and Christie Dionisos.

**Right:** PIN Student, and member of the Melanie Pina Lab, Colin Johnston presents on his rotation project.





**Above:** A diverse IDEAS Day Faculty panel shares their thoughts and experiences, as individuals identifying as underrepresented in academia.



**Above:** The Mathur Lab visits nearby Baltimore Orioles Stadium to watch a professional baseball game. Pictured left to right: Lab Technician Ellie Abel, PIN Student Alli Sicclair, Postdoc Andreas Wolff, GPILS Student Eliza Douglass, Lab Technician Sam Sheats, & PIN Student Tomi Oladunni.



**Above:** Faculty members Tom Jhou and Barbra Juarez pose (one clad in an eyeball necklace) at a festive social hour!



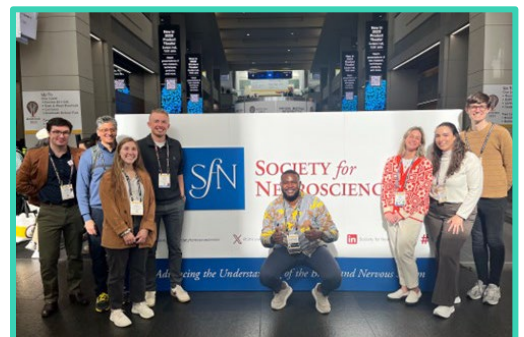
**Left:** The Blanpied lab is very proud of their holiday door décor award, a contest won fair and bow... I mean square. Pictured left to right: Postdoc Aaron Levy, PIN Students Emily Demarco, Mike Anderson and Alex Wiltse (down a bit)... and now back upwards: Postdoc, Stehanie Pollitt, PI Tom Blanpied, & Postdoc Sam Barlow.



**Above:** PIN Students (left to right) Christie Dionisos, Sophie Elvig, & Lakota Watson show off their coordinating oversized earrings at a PIN Social Hour!



**Right:** Mathur Lab attends the 2023 SFN Meeting in Washington DC! Pictured left to right: Maxwell Madden, Brian Mathur (himself), Eliza Douglass, Sam Sheats, Tomi Oladunni, Ellie Abel, Alli Sicclair, & Andreas Wolff.



**Left:** Much of the PIN first-year cohort enjoys socializing, once again, at a PIN Social Hour. You may be able to tell we have a lot of these. Pictured left to right: Dexter Nguyen, Binita Vedak, Ria Parikh, Chloe Schafegen, Maithily Hingmire, Dan Freeman & Isaiah Williamson.



**Left:** PIN Students Chloe Schafegen and Ria Parikh pose in front of some spooky spiderwebs (I promise they are not the result of housekeeping neglect).



**Right:** Mysterious individual and Rick Sanchez pose at the same spooky event!

## Program in Neuroscience

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