

# BrainStorm

Fall 2019

Program in Neuroscience  
University of Maryland School of Medicine  
<http://lifesciences.umaryland.edu/neuroscience>

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## New Director of the Program in Neuroscience:



### Dr. Margaret McCarthy

The Program in Neuroscience (PIN) welcomes Dr. Margaret “Peg” McCarthy, James & Carolyn Frenkil Endowed Dean’s Professor and Chair of the Department of Pharmacology to her newly appointed position of Director of the Program

Dr. McCarthy succeeds the founding director of the Program, Dr. Michael Shipley, who has recently stepped down from 23 years of service in this position. We wish Michael a healthy and happy [not to mention well-earned] retirement!

Transferring directorship over to Dr. McCarthy seemed an obvious choice. She is a leading neuroscientist who has made significant discoveries related to sex differences and the brain throughout her distinguished career. While here at UMB, she has graduated 12 PhD students and trained 15 postdoctoral scholars. Thirteen of her former trainees are at the rank of Assistant Professor or above including three tenured Professor.

*New Director: Peg McCarthy continued on page 4*



**N**EUROSCIENCE  
**O**UTREACH &  
**V**OLUNTEER  
**A**SSOCIATION

## NOVA

*By Sam Bacharach and Andreas Wulff, PIN students and co-Presidents of NOVA*

Neuroscience Outreach Volunteer Association, NOVA, is a graduate student led organization whose mission is to foster civic responsibility within the neuroscience community through outreach in the Baltimore area organized by students, faculty, and staff. Our goal is to establish the Program in Neuroscience as a strong presence in the Baltimore area and to promote brain and scientific awareness that enriches the community through STEM and neuroscience related activities.



*Brain Awareness Week*

A keystone of NOVA's community outreach are our monthly visits to Spring Grove Psychiatric Hospital. Here, we interact and visit with patients through providing snacks/drinks, playing games, and giving out prizes to everyone (which consist of donations we collect from our Annual Halal on the Lawn Fundraiser in the spring). The aim is to provide a fun and welcome break for the men and women at Spring Grove who are often struggling with severe psychiatric illness. These patients always look forward to our visits, and volunteers and patients alike find it extremely rewarding.



*Fall Lab Tours*

NOVA is also incredibly active with local Baltimore students. In October we host our annual Fall Lab Tours event where local high school seniors (who are interested in biomedical careers), are invited to come to UMB to engage and interact with students, faculty, and staff in order to see what a career in academic research entails. The students attend lab demonstrations put on by participating labs and short lectures from Ph.D. students about their path to graduate school and possible career tracks. Additionally, representatives from local congressional offices also attend this event to speak with the high schoolers as well as to interact with the researchers and see first-hand the exciting work happening at our university.



*Local students get hands on experience with the brain*

Naturally, NOVA participates every year in the National Brain Awareness Week (BAW), sponsored by The DANA Foundation. In a span of a week, we visit several local middle schools to put on neuroscience demonstrations for the students. This is not only our largest event of the year, meaning it requires the most UMB student participation, but it is also, in our opinion, the most fun. There is nothing quite like watching a group of students' eyes widen when they realize the brain in front of them is from an actual human being.

These are just a some of the many opportunities NOVA makes possible throughout the year. I encourage you to get involved because NOVA can only thrive through your participation.

Email Sam ([szbacharach@umaryland.edu](mailto:szbacharach@umaryland.edu)) or Andreas ([Andreas.wulff@umaryland.edu](mailto:Andreas.wulff@umaryland.edu)) if you're interested in hearing more!

## Program in Neuroscience Faculty and Postdoctoral Fellow Research Highlights

**Tracy Bale, Ph.D.**, delivered the Keynote Lecture “Paternal transmission of stress: a tale of mice and men” at the Dutch Society for Neuroscience Meeting (Lunteren, The Netherlands)

**Thomas Blanpied, PhD**, Associate Professor in Physiology presented “Dynamic Control of Synaptic Nanostructure and Function by Adhesion Molecules” at the Cold Spring Harbor Asia Conference Meeting (Suzhou, China).

**Donna Calu, PhD**, Assistant Professor in Anatomy & Neurobiology, was awarded the Presidential Early Career Award for Scientists and Engineers (PECASE), the highest bestowed by the United States Government on science and engineering professional in the early stages of their independent research careers.

**Joseph Cheer, Ph.D.**, Professor in Anatomy and Neurobiology, was awarded a 5 year R01 from NIDA/NIH for “Cannabinoid Receptor Control of a DRN to VTA Pathway and its Role in Affective States”.

**Peter Crino, MD, PhD**, Professor & Chair, Department of Neurology was awarded a patent for “sICAM-5 as Biomarker of Epilepsy and Potential Treatment”

**Eldin Jasarevic, PhD**, Postdoctoral Fellow in Pharmacology, and **Tracy Bale, PhD**, Professor in Pharmacology were lead and corresponding authors of “The Maternal Vaginal Microbiome Partially Mediates the Effects of Prenatal Stress on Offspring Gut and Hypothalamus in *Nature Neuroscience*.”

**Iris Lindberg, Ph.D.**, Professor in Anatomy & Neurobiology was awarded a 5 year grant from NIA/NIH for “ProSAAS-Mediated Neuroprotective Mechanisms in Alzheimer’s and Parkinson’s Diseases: The Role of Secondary Chaperones in Neurodegeneration” along with co-principal investigator Nigel Maidment from UCLA.

**Tara LeGates, Ph.D.**, Postdoc in Physiology in Pharmacology, published in *Nature* “Reward behavior is regulated by the strength of hippocampus-nucleus accumbens synapses.”

**Mary C. McKenna, Ph.D.**, Professor Department of Pediatrics received the 4<sup>th</sup> annual J. Tyson Tildon Award for Excellence in Pediatric Research. She presented the awardee lecture “From Studies of Astrocytes and Neurons”.

**Dennis Sparta, Ph.D.**, (May) was awarded a 5 year grant from NIAAAA/NIH) for “CRF Neural Circuits of Binge Drinking”



Donna Calu



Joe Cheer



Iris Lindberg



Dennis Sparta

*We welcome our newest PIN faculty members: Isaiah Amal, Dan Covey, Thomas Longden, and Panos Zanos. Congratulations to faculty and postdocs in the Program in Neuroscience on their many publications, grants, presentations and achievements!*

*New Director: Peg McCarthy continued from page 1*

Despite her many titles, honors and accolades, here in PIN, Dr. McCarthy is simply “Peg”, as she has always been. Having been part of UMB since 1993, she is a staple of the institution and has been at the heart of the Program in Neuroscience since its inception. While she certainly could lead with a persona that reaffirms her otherworldly level of distinction, she exudes an accessible and amiable quality that makes her a constant favorite among students and faculty alike.

Never one to subscribe to conventions, Peg has just freshly returned from sabbatical which, by her design, purposely positioned her exactly where she longed most to return - the lab bench. Alongside her graduate students and postdocs, Peg spent the last year diving headfirst into a sea of new scientific ideas and techniques. She has emerged reenergized, refocused and most of all re-inspired on how to further her field of study. With already over 200 papers on her research - 80+ senior author papers alone-, currently 3 RO1s and a PO1, we are eager to see how she can surpass her current level of achievement. She may just redefine the word ‘success’ altogether.

## Research Spotlight on:



### Dr. Peter Crino

Dr. Peter Crino, MD, PhD, Chair and Chief of Neurology, is helping to bridge the gap between benchside discoveries and clinical applications. His translational approach to researching mechanisms of altered brain developmental disorders has led to numerous discoveries in underlying genetics associated with epilepsy, intellectual disability, and autism. Notably, work in his lab has directly resulted in forging new pathways toward therapeutics for these types of disorders.

Dr. Crino’s lab has extensively researched mTOR (mammalian target of rapamycin) signaling. mTOR plays a key role in development and aging and has been implicated in disorders such as cancer, cardiovascular disease, obesity and diabetes. Dr. Crino’s lab was the first to demonstrate signaling pathways involving mTOR are also implicated in a number of neurodevelopmental disorders characterized by malformations of cortical development (MCD). This research has been seminal in leading to clinical trials for new medicines targeted to treat patients with mTOR gene mutations. Indeed, his past and present collaborations have led to FDA approval for everolimus for tuberous sclerosis complex, a mTOR associated disorder.

*Faculty Spotlight: Peter Crino continued on page 5*

## *Congratulations* to our Most Recent PIN Graduates



**Jon Van Ryzin, Ph.D.** successfully defended his thesis “Microglia Regulation of Sexually Dimorphic Amygdala Development”, work he accomplished while in the lab of **Margaret McCarthy, PhD**. Shortly thereafter Jon was published a 1<sup>st</sup> author paper in *Neuron* entitled “Microglial Phagocytosis of Newborn cells is induced by endocannabinoids and sculpts sex differences in juvenile rat social play”. We wish Jon the best of luck as he continues his postdoctoral studies at the University of Maryland School of Medicine and await great things from him in the future.

**Nina Klimova, Ph.D.** successfully defended her thesis “Neuroprotective role of nicotinamide adenine dinucleotide precursor in modulation of mitochondrial fragmentation and brain energy metabolism”, work she accomplished while in the lab of **Tibor Kristian, Ph.D.** During her tenure here, Nina published 4 first author papers in high impact peer reviewed journals! We wish Nina the best of luck as she joins NIH in Bethesda as a postdoctoral fellow.



**Sarah Metzbower Ph.D.** successfully defended her thesis “Protein organization and receptor activation at individual synapses” work she accomplished while in the lab of **Tom Blanpied, Ph.D.** Shortly prior her first author paper entitled “Properties of Individual Hippocampal Synapses Influencing NMDA-receptor activation by spontaneous neurotransmission” was published in *eNeuro*. Congrats to Sarah!

### **Faculty Spotlight: Peter Crino continued from page 4**

In addition to being a board-certified neurologist, Dr. Crino is also a trained epileptologist. As such, a large number of patients that he treats have been diagnosed with some form of epilepsy. It is no wonder that he is motivated to research underlying mechanisms of this disorder in his lab. Consequently Dr. Crino, along with his colleague, Dr. John Pollard, MD from University of Pennsylvania’s Department of Neurology, have recently been granted a patent for sICAM-5, a cellular adhesion molecule for use as a biomarker and potential treatment for seizures and epilepsy.

It is clear that Dr. Crino’s background as a physician scientist specializing in developmental brain disorders uniquely positions him to be able to see research questions in a light that have the potential to directly impact patient needs. His inspiring work has genuine promise for changing the trajectory of patients’ lives. He welcomes interest in his work and is actively recruiting talented graduate students.

## Visiting Capitol Hill to Advocate for Science

*By Amanda Labuza, PIN student*

This past March, I attended the Society for Neuroscience's (SfN) 13<sup>th</sup> annual Capitol Hill Day to advocate for increased, reliable scientific funding. It is vital that scientists speak up to our



government about the importance of funding basic science. If we do not ask for increased funding, we will not receive it. I was joined by 48 other society members, from 25 states and five countries, to bring our request to Congress. SfN members visited 83 Congressional Offices, two Congressional Committees, and dropped off materials at an additional 17 offices. Together, over 20% of Congress was visited in one day. In addition to in-person meetings, members took to social media and posted using the hashtags #SfNHillDay over 250 times and #NeuroAdvocate 180

times to engage others as well. Hundreds more wrote, called, or tweeted their Congressmen from their home states echoing our request.

The message to Congress has been agreed upon across the scientific community. Various societies and advocates visited and wrote Congress to request a \$2 billion increase to the National Institutes of Health (NIH) budget, a \$900 million increase to the National Science Foundation (NSF) budget, and release of the \$500 million dollars to the [BRAIN Initiative](#) that was promised in the 21st Century Cures Act for fiscal year 2020. This has been such a unified request across advocacy groups this year that Senator [Sherrod Brown](#)'s staff members knew these exact numbers before I even asked.

Advocacy work has helped the NIH increase their funding for the last four years. However, advocacy work does not end with a single day on Capitol Hill. Follow-up is essential in politics. Some offices were so busy we could only meet for five minutes at the end of the day. Sending follow-up emails or notes helps them remember who we are; it holds them accountable and ensures that the message gets passed from the staff to the Congressmen. It is important to be diligent about following up. Scientists can continue to be resources to those who support science funding, and persuaders for those who don't. I urge all scientists to be involved, even if it is as simple as tweeting their representative. Speak up. Be diligent. Keep fighting.

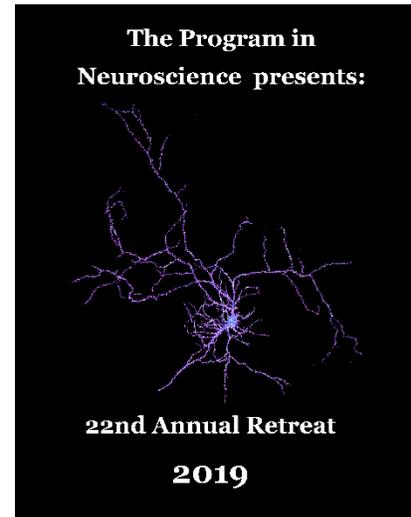
## The 22<sup>nd</sup> Annual PIN Retreat

Our PIN retreat lived up to its usual high standards this year under the direction of Dr. Donna Calu, who chaired the event. This year's retreat was held at the Cylburn Arboretum, a delightful oasis in Baltimore City. Retreat participants were impressed by this state-of-the-art sustainable "green" space and welcomed the change of venue and pace. Between sessions, attendees were able to recharge as the grounds were comprised of multiple gardens and woodland trails to explore.

Of course, there was no shortage of exciting findings to be discussed. Both graduate and postdocs alike delivered talks to bring the community up to date with their latest research. Posters, too, were displayed for all to see, with a fierce competition for "Best Poster". We also had the pleasure of hearing from Adam Katz, an advocacy expert from the Society for Neuroscience, who opened our eyes to the challenges we face as scientists in need of federal funding. The day was rounded out by an excellent talk by our keynote speaker, Amy Bastian, a chief science officer at Kennedy Krieger Institute.

Perhaps the most entertaining moment of the day belonged to our first-year students' whose video depicting life during the 1<sup>st</sup> year of graduate school was received with applause and uproarious laughter.

Retreat goers agreed that this was another one for the books! Until next year!



*Keynote Speaker: Dr. Amy Bastian  
Professor of Neuroscience  
Solomon H. Snyder Department of  
Neuroscience  
Johns Hopkins School of Medicine  
Kennedy Krieger Institute*



*Between session nature walk  
at the Cylburn Arboretum*



*The ever popular poster session*



*The Vollmer Center*

## Program in Neuroscience Student Highlights

*In the past academic year alone:*

*over 60% of PIN students that have attempted to procure funding for their own research from NIH were successful.*

*PIN students produced 18 first author papers in high impact journals - 2 of which were in Neuron.*

*PIN students traveled nationally and internationally to share their research with other neuroscientists.*



**Sam Bacharach**, PIN student in the lab of Donna Calu, published 2 first author papers this past year: “Cannabinoid receptor-1 signaling contributions to sign-tracking and conditioned reinforcement in rats” in *Psychopharmacology* and “Stability of individual differences in sucralose taste preferences in *PLoS One*.”

**Cheryl Brandenburg**, PIN student in the lab of Gene Blatt, was granted a travel award to International Society for Autism Research Meeting (Montreal, Canada).

### Program in Neuroscience Graduate Program in Life Sciences University of Maryland School of Medicine

685 W. Baltimore St.  
HSF1 Room 312  
Baltimore, MD 21201

**Phone:**  
(410) 706-4701

**E-mail:**  
Georgia Rogers, Academic Services Specialist  
[grogers@som.umaryland.edu](mailto:grogers@som.umaryland.edu)



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**Kara Cover**, PIN student in the lab of Brian Mathur, published 2 first author publications this past year: “Activation of the Rostral Intralaminar thalamus drives reinforcement through striatal dopamine release in *Cell Reports* and “The best defense is a strong offense: preventing alcohol abstinence-induced depression” in *Neuropsychopharmacology*.

**Kasey Girven**, PIN student in the laboratory of Dennis Sparta, was awarded the Victor E. and Dorothy M. McIntosh Award within the Meyerhoff Graduate Fellowship Program for meritorious service to humanity.

**Houman Qadir**, PIN student in the lab of Brian Mathur recently published as 1st author in *Frontiers in Neuroanatomy*: “Structural connectivity of the anterior cingulate cortex, claustrum, and the anterior insula of the mouse.

**Sam Krimmel**, PIN student in the lab of Dave Seminowicz, published 2 1<sup>st</sup> author papers this past year: “Resting State Functional Connectivity of the Rat Claustrum” in *Frontiers in Neuroanatomy* and “Resting state functional connectivity and cognitive task-related activation of the human claustrum” in *Neuroimage*.

**Lace Riggs**, PIN student the lab of Todd Gould, has published her 2<sup>nd</sup> first author paper while at UMSOM: “(2R, 6R)-hydroxynorketamine rapidly potentiates hippocampal glutamatergic transmission through a synapse-specific presynaptic mechanism” in *Neuropsychopharmacology*.

**Andreas Wulff**, PIN student in the lab of Scott Thompson, co-first authored 2 papers this past year: “Monitoring hippocampal glycine with the computationally designed optical sensor GLyFS” in *Nature Chemical Biology* and “Pain related nucleus accumbens function: modulation by reward and sleep disruption in *Pain*.”