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Spin off Company by Nobel Laureate Chooses MPFI as U.S. Headquarters

Abberior Instruments America LLC (AIA), a Max Planck Society spinoff chose MPFI for its U.S. headquarters. AIA manufactures and sells the most advanced version of Nobel Prize-winning imaging technology, available for the first time in this country.

The announcement was made at MPFI’s Sunposium™ 2017. “The addition of Abberior Instruments America on our Life Science Campus will elevate the reputation of our county, state and nation for our best-in-class research tools,” said Dr. David Fitzpatrick, CEO and Scientific Director of MPFI. “The latest enhancements to super-resolution microscopy are key to unlocking discoveries in brain research and beyond. We’re honored that AIA selected our institute to facilitate U.S. access to this unprecedented level of imaging that will go on to benefit the U.S. life science industry as a whole.”

Dr. Stefan Hell, co-founder of Abberior Instruments, the mother company of AIA, is also the founder of super-resolution fluorescence microscopy as a scientific field of its own.

Dr. Hell’s discoveries in this field went on to shape the patent-protected technology sold by AIA. Dr. Hell has received many national and international honors for this technology including The Nobel Prize for Chemistry in 2014.

“We chose to establish our U.S. presence at MPFI based on the collective reputation for scientific excellence on the Life Science Campus in Jupiter, Florida, which includes MPFI, Florida Atlantic University and Scripps,” said Dr. Hell. “This unique super-resolution imaging platform will extend the limits of what is technologically possible today, and we’re proud to make it available to researchers in the U.S. by way of our South Florida headquarters,” said Dr. Hell.

AIA opened its U.S. headquarters in March 2017. The company’s U.S. headquarters will be operated by Dr. Christian Wurm, a biologist who has worked in the field of super-resolution microscopy for more than ten years. Dr. Wurm will serve as the CEO of AIA.
Sunposium™ 2017
Features Two Nobel Laureates Among
World-Renowned Speakers

MPFI’s popular research conference attracted its largest audience yet. Twenty of the field’s most esteemed researchers spoke at the third international conference highlighting some of the most complex issues at the forefront of understanding neural circuits.

The prestigious two-day event hosted by MPFI was held February 13-14 at the Palm Beach County Convention Center in Downtown West Palm Beach. The biennial event that takes its name from Florida’s characteristic year-round sunshine attracted its largest crowd to date of the world’s brightest neuroscientists and students.

“The tremendous contributions made by our panel of speakers have led to the development of innovative research techniques in neuroscience and significant advancements in our understanding of the brain. The participation of such renowned scientists over the course of six years has put Palm Beach County on the map as a destination of choice for research-based dialogue within the global neuroscience community,” said Dr. David Fitzpatrick, CEO and Scientific Director of MPFI.

This year’s main event included two Nobel laureates, Dr. Thomas Südhof from Stanford School of Medicine and Dr. Susumu Tonegawa from the Massachusetts Institute of Technology. Also presenting were Vice President of the Max Planck Society, Dr. Bill Hansson and Max Planck Director Dr. Emmanuelle Charpentier, a 2015 Breakthrough Prize in Life Sciences winner and one of Time Magazine’s “100 Most Influential People in the American World.”

A combined total of approximately 600 scientists and students have traveled to South Florida over the last four years for the two prior MPFI-hosted Sunposiums™. The inaugural 2013 scientific exchange took place at The Breakers Resort and featured three Nobel laureates and others from research institutes and universities throughout the United States and Europe. The 2015 event was held at the PGA National Resort and Spa in Palm Beach Gardens and featured 24 national and international leaders in neuroscience research including 2014 Nobel laureate, Dr. Eric Betzig. To accommodate the larger 2017 crowd, the more expansive site of the Palm Beach County Convention Center was selected.

The scholarly impact of this year’s symposium was evident in the nearly doubled number of scientific posters presented on Monday evening as compared to the 2015 event. The impressive group consisted of over 120 scientists and students representing 35 institutions from 13 states and seven different countries.

Over the course of the last six years, all three Sunposium™ have successfully highlighted the challenges, latest findings, and advances in neuroscience. Comprehending the functional organization of neural circuits, and specifically how the activity of neural circuits mediates behaviors, provides the knowledge base critical for treatment advances in neurologic and psychiatric disorders. Educational forums like Sunposium™ encourage a collaborative, problem-solving approach to multiple aspects of brain function including the neural basis of sensory processing, motor control, learning and memory.

During this year’s conference, the inaugural Peter Gruss Young Investigator Award was presented to Dr. Viviana Gradinaru who then delivered a plenary lecture. Paying homage to Dr. Peter Gruss, former Max Planck Society president, the biennial accolade recognizes young neuroscience investigators for significant contributions to the scientific community. Dr. Gradinaru is Assistant Professor of Biology and Biological Engineering and Heritage Principal Investigator at the California Institute of Technology. Her work focuses on developing and using optogenetics and tissue clearing to better understand brain circuitry underlying neurological disorders such as Parkinson’s disease. In 2016, Dr. Gradinaru was honored by President Obama as one of the recipients of the Presidential Early Career Awards for Scientists and Engineers, the highest honor bestowed by the government on science and engineering professionals in the early stages of their independent research careers. Dr. Gradinaru, who received complimentary Sunposium™ tuition and lodging, also received a monetary award, underwritten by a longtime supporter of MPFI and the life science industry, Ms. Raquel Rodriguez.
With an eye on the next generation, MPFI also sponsored over 20 undergraduate neuroscience students from four Florida universities: University of Florida, University of Miami, Palm Beach State College and Nova Southeastern University. Along with five university faculty members, the students enjoyed all educational sessions and had opportunities to directly engage with speakers at a private lunch. This Max Planck Florida Scientific Fellows program is made possible by a generous Florida state appropriation.

As part of the Max Planck Society’s dedication to scientific exchange and engagement both within the scientific community and across all public audiences, Max Planck Neuroscience, a network representing all neuroscience-focused research within the Society, sponsored three Scientific Communications Fellows to take part in the event: Meeri Kim (freelance science/health writer; Washington Post, Philly Voice contributor), Luis Quevedo (filmmaker/podcaster/TV producer and host; NTN24; El Mundo contributor) and Kayleen Schreiber (content editor and visual designer; Knowing Neurons).

Reflecting on the event’s success, Jorge Pesquera, president and CEO for Discover The Palm Beaches, the official tourism-marketing corporation for Palm Beach County, was pleased the arrival of the international audience coincided with the ongoing development of downtown’s new Convention, Arts and Entertainment District. “Showcasing the world-class scientific research and educational assets available in The Palm Beaches along with our increasing capabilities as a convention and international congress destination highlights the dual benefits of hosting Sunposium™ in this location,” he said.

Dr. Fitzpatrick agreed. “Along with our presenters, attendees and guests, we were very pleased with the new location this year, particularly in terms of its proximity to Palm Beach International Airport for those who were traveling from longer distances. We’re already deep in our MPFI strategic planning sessions for attracting an even larger crowd to Sunposium™ 2019,” he said.
Institute Showcases World-Class Training Programs at the Society for Neuroscience 2017 Meeting

The Society for Neuroscience’s (SfN) 47th Annual Meeting brought together some of the world’s brightest scientific minds for five days of learning and networking in Washington, D.C.
SfN 2017 meeting took place from November 11 – 15 at the Walter E. Washington Convention Center and provided unique scientific voices and perspectives that helped strengthen the global scientific community. In attendance were 30,021 individuals from 80 countries, who participated together in 902 sessions and 13,552 abstract presentations.

There were 534 exhibiting companies, and, as in previous years, MPFI sponsored a recruitment booth to advertise training programs to potential students and postdoctoral researchers. Among the MPFI programs highlighted in the booth were the International Max Planck Research School (IMPRS) for Brain and Behavior graduate program and the Integrative Biology and Neuroscience (IBAN) graduate program with Florida Atlantic University (FAU). By showcasing these, and other programs, the Institute further enhanced its global reputation as a leader in basic scientific research with SfN’s world-class audience.

MPFI also hosted a two-hour social event at Cuba Libre restaurant on Monday evening. The tropical venue was chosen for its South Florida flare, with upbeat Latin music and contemporary Cuban cuisine. The successful evening included light food and drinks for more than 220 attendees, and was generously sponsored by Spectra-Physics, Newport, Thorlabs and Bruker.

Two Max Planck Society scientists visited with attendees of the social throughout the evening. Edvard Moser, Ph.D., External Scientific Member of the Max Planck Institute of Neurobiology, and one of three recipients of the Nobel Prize in Physiology or Medicine 2014 for discoveries of cells that constitute a positioning system in the brain, was on hand. Dr. Moser’s research provides fundamental insights into how spatial location and spatial memory are computed in the mammalian brain. Eva Mandelkow, Ph.D., German Center for Neurodegenerative Diseases and Center for Advanced European Studies and Research (CAESAR), also visited with guests. Dr. Mandelkow’s research concentrates on the cell biology of tau protein and its role in Alzheimer’s disease, with emphasis on cell models, transgenic mouse models, and the development of therapeutic approaches. Afterward, attendees shared how they enjoyed connecting socially with both Max Planck Society scientists while learning more about their important work.

Plans to promote new MPFI recruitment opportunities at next year’s conference are already in progress. SfN’s Neuroscience 2018 will be held November 3 – 7 in San Diego, California.

**SCIENTIFIC POSTERS PRESENTED BY THE MPFI DELEGATION:**

Bonnan A*, Gaffield MA, Zhang K, Christie JM: Cerebellar-dependent motor memory depends on patterned changes in molecular layer interneuron activity.


Goral RO*, Lübbert M, Thomas C, Putzke T, Satterfield R, Guerrero-Given D, Kamasawa N, Young, Jr SM: Cav2.1 expression levels impact Cav2 abundance and neurotransmitter release before and after circuit maturation.


Lee K-S*, Fitzpatrick D: The functional synaptic architecture of the receptive field surround of layer 2/3 pyramidal neurons in the tree shrew visual cortex.

Phan A*, Thomas CI, Chakraborty M, Berry JA, Kamasawa N, Davis RL: Stromalin is a master regulator of synaptic vesicle biogenesis.

Pusdekar S*, Schummers J: Temporal characteristics of contrast adaption in ferret visual cortex.


Smirnov MS*, Yasuda R: Automated identification of dendritic spines for live imaging.


Whitney DE*, Smith GB, Hein B, Kaschube M, Fitzpatrick D: Binocular integration of orientation selectivity in the developing ferret visual cortex.


*Presenter
MPFI International Outreach
Breaking the Boundaries of Science and Community

As part of MPFI’s mission statement, the Institute is committed to engaging the global scientific community, building lasting connections and international collaborations. Due to its location and affiliation with the Max Planck Society, MPFI is uniquely poised as a conduit, connecting the best and brightest neuroscientists from Latin America with those from the US and Europe.

This past October MPFI’s own Dr. David Fitzpatrick, Scientific Director and CEO and Dr. James Schummers, Research Group Leader traveled to Búzios, Brazil to take part in the IV International Symposium: Frontiers in Neuroscience. This intimate four-day conference hosted by the Federal University of Rio de Janeiro (UFRJ), consisted of 150 graduate/undergraduate students and 50 scientists. Attendees were given the opportunity to listen to lectures by distinguished international neuroscientists visiting from over 10 different countries including Brazil, Chile, Colombia, Argentina, the US, Belgium, Austria, New Zealand, Israel, the UK, France and China.

Dr. David Fitzpatrick was invited as the symposium’s keynote speaker, giving the opening lecture and also representing MPFI in the International Opportunities section titled “Meet the Institute”. Both Dr. Fitzpatrick’s and Dr. Schummers’ lectures were very well received by the symposium’s attentive audience.

In addition to building international partnerships and collaborations, MPFI seeks to recruit talented, aspiring young neuroscientists from around the world. This past July, during the Annual Meeting of the Brazilian Society for Neuroscience and Behavior (SBNeC), MPFI sent each attendee home with a special brochure detailing its world class training programs and promoting awareness of the Institute. The meeting, a celebration of the society’s 40th anniversary, was held at the Universidade Estadual Paulista “Julio de Mesquita Filho” (UNESP) in Araraquara, São Paulo. MPFI has already begun to see positive effects from the recruitment effort, receiving numerous applications from promising Latin scientists in training.
Dr. Ryohei Yasuda Awarded 2017 Nakaakira Tsukahara Memorial Prize

Ryohei Yasuda, Ph.D., MPFI’s Scientific Director, was one of two outstanding recipients of the 2017 Nakaakira Tsukahara Memorial Prize, awarded July 20 in Chiba-city, Japan. Presented during the 40th Annual Meeting of the Japan Neuroscience Society, the prize is awarded by the Brain Science Foundation to recognize scientists conducting outstanding research in the life sciences.

The award was created in memory of Professor Nakaakira Tsukahara, Ph.D., who made exceptional contributions to the field of neuroscience. Awardees were invited to deliver a special lecture at the Japan Neuroscience Society’s annual meeting and received a prize of ¥1,000,000, approximately $10,000.

Dr. Yasuda’s research group at MPFI is focused on the molecular mechanisms underlying synaptic plasticity – the ability to strengthen or weaken the synapses or sites of communication between neurons. Understanding the mechanisms responsible for the regulation of synaptic strength is critical for understanding how neural circuits function, how they form, and how they are shaped by experience.

Dr. Yasuda has received many recognitions for his outstanding research in neuroscience, including the 2015 National Institute of Health’s (NIH) Pioneer Award, which recognizes scientists demonstrating creativity and ground-breaking approaches in biomedical or behavioral science. Dr. Yasuda was one of only 13 scientists in the country to receive the NIH Pioneer Award in 2015.

Future research in the Yasuda Lab is expected to lead to crucial advances in the understanding of intracellular signaling in neurons and will provide key insights into the mechanisms underlying memory formation and brain diseases. These insights will hopefully lead to the development of drugs that could enhance memory and prevent or more effectively treat epilepsy and other brain disorders.

MPFI Presence at the Lifees Award Ceremony 2017

Dr. Helena Decker provides update on Institute’s progress at the 2017 Lifees Award Ceremony in Miami

On June 12, 2017, life science and tech innovators gathered at Life Sciences South Florida’s (LSSF) second annual Lifees award ceremony. The ceremony honored several organizations that are, like MPFI, leaders in the life sciences, and have demonstrated a commitment to furthering the industry through education and collaboration. As a 2016 Lifees inaugural award-winning institution, MPFI was invited to provide an update on its 2017 educational developments and community outreach programming to students. Helena Decker, Ph.D., former Yasuda lab researcher, and current Scientific Communications Associate, highlighted MPFI’s leadership in many areas.

Dr. Decker covered a number of MPFI advancements in her address including: the second annual advanced neuroimaging course; the third biennial Sunposium™ including the 20 undergraduate students sponsored through the MPFI Scientific Fellows Program and the 120 scientists and students who presented their scientific work in the poster session; the high school summer internship program for both teachers and students, along with ongoing school outreach through events like the Science Career Panel; the Post-Baccalaureate Research Experience Program; and the Institute’s collaborative work with Florida Atlantic University (FAU), both in the creation of an Integrative Biology and Neuroscience doctoral program (IBNS) and efforts to globalize education in brain research via the International Max Planck Research School (IMPRS) for Brain & Behavior with the University of Bonn and the Center for Advanced European Studies and Research (CAESAR), both in Bonn, Germany.

“The pioneering basic research performed in our Institute is laying the framework for tomorrow’s great discoveries. We look forward to continuing to cultivate this culture of education and collaboration within the life sciences in South Florida,” she said.
2017 Scientific Publications


Dendritic Organization
Fitzpatrick and colleagues find that synaptic inputs in the visual cortex are locally but not globally organized. This local functional synaptic clustering applies to a diverse set of inputs and appears to be a fundamental principle of dendritic organization.
Researchers at MPFI discover key underlying feature of the synaptic architecture of visual space

Neurons are the basic information-processing structures in the brain and are composed of three main parts: dendrites, axons, and the soma. Dendrites receive and integrate synaptic inputs that are subsequently processed in the soma and relayed to other neurons via axons. A longstanding question has been to understand how synaptic inputs are arranged on the elaborate dendritic structures of individual neurons in order to better comprehend how dendrites process and transform inputs, ultimately influencing how we perceive the world around us. Recent discoveries in the laboratory of David Fitzpatrick, Ph.D., CEO and Scientific Director at MPFI, have shed additional light on this issue and the universal properties of cortical neurons. "What makes this paper really exciting," said Dr. Fitzpatrick, "is that it bridges that gap, putting cellular principles in the context of how a network operates."

Benjamin Scholl, Ph.D. and Dan Wilson, Ph.D., researchers in the Fitzpatrick lab, have been studying the spatial arrangement of synaptic inputs onto dendrites and how this arrangement impacts computations in visual cortex. Previous work by Wilson et al. (2015) revealed that orientation selectivity and functional clustering of synaptic inputs in visual cortical neurons correlates with localized dendritic events, sharpening somatic tuning. In their recent paper, published in Neuron on November 2, Scholl and Wilson examined whether this clustering exists at a finer scale across the diversity of functional inputs cortical cells receive.

To investigate fine-scale synaptic clustering, the researchers presented simple visual stimuli to activate individual excitatory inputs onto individual dendritic spines, small mushroom-shaped protrusions on the dendritic arbors. These visual stimuli allowed the authors to map spatial receptive fields – regions in visual space where stimuli elicit responses from particular neurons or synaptic inputs – and polarity, which is the preference for luminance increments (ON) or decrements (OFF). Large numbers of spines on individual layer 2/3 neurons were mapped and visualized using in vivo two-photon imaging of a genetically encoded calcium indicator, providing a measure of subcellular and cellular activity.

Within individual dendritic branches and across the dendritic field, they found no evidence for a global organization. Upon closer inspection, however, they discovered robust functional synaptic clustering locally. Neighboring spines separated by less than 10 μm share similar functional properties across the diversity of sensory features they encode. Furthermore, neighboring spines exhibit spontaneous and sensory-driven co-activity that can occur independent of global dendritic calcium events, driven largely by action potentials initiated at the soma. Distance-dependent relationships for these features exist at a spatial scale of 5-10 μm, and this omnipresent spatial length constant may indicate a fundamental biological limit to short-range plasticity mechanisms operating within the dendrite. "The clustering of inputs appears more universal than we might have previously thought," said Scholl. "We are just beginning to appreciate the complexities of the dendritic field."

They also revealed, via machine learning, that fine-scale functional synaptic clusters exist within the broader population of spines, and these clusters appear to be selective for features both resembling and distinct from the somatic output. Clustered inputs could amplify such functional features, but the role of synaptic clustering in shaping somatic response is more complex. These distributed functional clusters could enhance the computational power of neurons by allowing greater flexibility of responses to a wide range of sensory inputs, increasing dendritic sensitivity without sacrificing dynamic range and facilitating nonlinear interactions within individual dendrites.

Appreciating the integration and processing of distributed networks at the subcellular level is key to understanding organization at the cellular level and beyond. "It is critical that we understand how the inputs to a given neuron are arranged within its dendritic field so that we can understand how individual neurons integrate the information arising from thousands of synaptic inputs," said Dr. Fitzpatrick.
iTango: New Technique Studies Neuromodulation in Real Time

Researchers at MPFI developed a light-sensitive technique to visualize and manipulate neuromodulation with unprecedented spatial and temporal precision

When we think of neuronal communication, we often picture a single neuron releasing molecular neurotransmitters into a junction called a synapse where they stimulate another neuron. But sometimes, instead of crossing a synapse, neurotransmitters flow widely throughout the brain—flooding different types of receptors and stimulating many other neurons at a time. In this scenario, they are known as neuromodulators. Identifying and manipulating specific neurons impacted by neuromodulation has been a challenge for researchers. Hyungbae Kwon’s lab at MPFI and collaborators from University of Geneva, Korea University and Max Planck Institute of Neurobiology, have recently developed a technique with a newly designed gene expression system that allows researchers to visualize and manipulate neuromodulation in real time.

The Inducible Tango technique (iTango), builds upon the Tango system, a technique developed nearly a decade ago. With the Tango technique, individual neurons that had been stimulated by neuromodulators would express a green fluorescent protein, so researchers could identify them. However, once sensor proteins are overexpressed, it continuously produces fluorescence regardless of neuromodulators, meaning that over time as more and more neurons would fluoresce researchers wouldn’t be able to tell which populations of neurons were stimulated. Because of this limitation, the Tango technique was not practical for studying neuromodulatory states in mammals.

iTango uses a light-sensitive labeling system. Cells will only fluoresce if the particular neuromodulator is present and the researchers are simultaneously shining a special blue light on the neurons of interest. Once the researchers turn the light off, the protein stops glowing. The Kwon Lab’s reengineering of the original Tango system with a “light switch” gives researchers control over the timing of the fluorescence so that the signal-to-noise ratio is increased over tenfold, making it much easier for scientists to identify specific populations of neurons in model species such as mice. The work led by Drs. Dongmin Lee, Meaghan Creed and Kanghoon Jung was published in Nature Methods in April 2017.

In this study, Hyungbae Kwon’s team used iTango to identify specific neurons in a mouse’s brain that were activated by neuromodulatory dopamine during specific animal behaviors. They were able to identify two populations of neurons—one involved in the increased locomotion and one involved in the reward feeling. His team took the research a step further—expressing ion channels sensitive to light, they were able to selectively inhibit or induce behaviors associated with the neuronal populations they had previously identified. Furthermore, they were able to control cocaine-responsive behavior by using the iTango technique.

Dr. Kwon explains that while his laboratory is primarily interested in basic neuroscience and the ways in which neuromodulators impact neuronal circuits and their formation, he anticipates that the iTango method will be applied to drug development, targeted cancer therapy, and many other research areas. One of the molecules that comprises the iTango system is a G-protein sensor that could be replaced by any G-protein. G-proteins are common targets for pharmaceutical drugs so companies could use this technique to screen potential drug candidates with incredible specificity. Sometimes viable drug candidates get thrown out because the signal-to-noise ratio in the existing screening method is very low. Because the light sensitivity of the label increases the signal-to-noise ratio over ten times, the iTango technique has the potential to clearly identify these overlooked candidates without requiring any additional time investment.

“The most important part of this story is that we made this technique light sensitive. The light sensitivity provides a huge advantage because you can apply it to basically any signaling,” said Dr. Kwon. “iTango will be useful for visualizing and manipulating the neuronal circuitry that underlies drug-induced behaviors and psychiatric diseases related to neuromodulation, such as mood disorders or schizophrenia.”
New Insights into the Information Processing of Motor Neurons

Scientists at MPFI are working to understand how neurons in the cerebellum, a region in the back of the brain that controls movement, interact with each other.

In a study published in Cell Reports in February 2017, Matt Rowan, Ph.D., a post-doctoral researcher in the lab of Dr. Jason Christie, sought to understand the molecular mechanisms behind a type of short-term neuronal plasticity that may have importance for motor control. The team showed that this type of plasticity can impact neurotransmission in as little as 100 milliseconds and depends upon inactivation of Kv3 channels. Interestingly, the team also found that this type of plasticity occurs more readily in juvenile brains than in mature ones.

Neuronal communication is frequently described simply as an all-or-nothing event. If a neuron is depolarized enough, it will fire and release neurotransmitters to communicate with another neuron; if it doesn’t reach the threshold to fire, it doesn’t send a signal at all. However, depolarizations that don’t reach the threshold to make the neuron fire can still impact neurotransmission. The depolarization spreads throughout the neuron, and when the neuron does eventually reach the threshold to fire, it releases a stronger signal with more neurotransmitters. This is known as analog-to-digital facilitation, a type of short-term plasticity.

“This has been seen before, and we’re adding a molecular mechanism showing exactly the molecule you need to get this sort of facilitation,” explained Rowan. Researchers were already aware that this type of short-term plasticity exists, but they had struggled to view it directly because the axons that utilize this type of plasticity are difficult for scientists to access. This means that some of the molecular mechanisms behind the phenomenon remain mysterious. For the current study, the team used novel techniques for voltage imaging and patch clamp recordings that allowed them to visualize and record from these tiny sections of individual neurons.

The researchers observed analog-to-digital facilitation as it occurred in experimental models. They showed that subthreshold depolarization spreads from the body of the neuron down its axon, the long extension through which action potentials travel before causing the neurons to release neurotransmitters into a synapse. Here, subthreshold depolarizations impacted neurotransmission in the juvenile models by briefly making Kv3.4 subunit containing channels unavailable thereby increasing the duration of the presynaptic spike and enhancing neurotransmitter release.

A form of short-term neuronal plasticity known as analog-to-digital facilitation can result from brief somatic depolarizations lasting as little as 100 milliseconds. Such activity transiently makes Kv3.4 subunit containing channels unavailable thereby increasing the duration of the presynaptic spike and enhancing neurotransmitter release.
Researchers at MPFI identify the wiring process of a unique type of inhibitory cell implicated in several diseases

A basic tenet of neural development is that young neurons make far more connections than they will actually use, with very little specificity. They selectively maintain only the ones that they end up needing. Once many of these connections are made, the brain employs a use-it or lose-it strategy; if the organism’s subsequent experiences stimulate the synapse, it will strengthen and survive. If not, the synapse will weaken and eventually disappear.

Researchers from Hiroki Taniguchi’s lab at MPFI published a study in eNeuro in May 2017 showing for the first time that a unique type of inhibitory interneuron called chandelier cells – implicated in several diseases affecting the brain such as schizophrenia and epilepsy – seem to develop their connections differently than other types of neurons.

Neurons have several dendrites, which are thin protrusions through which they receive input from many other cells, but they have only one axon, where all the information the cell receives is integrated and sent as a single outgoing signal. Most cells’ axons reach out and form synapses on other cells’ dendrites or cell bodies, but chandelier cells elicit an exclusively inhibitory synapse on other cells’ axon initial segments (AIS), right where the cell begins to send its own signal down the axon. At this location, the chandelier cells have a greater impact on another cell’s behavior.

“Chandelier cells are the final gatekeeper of the action potential,” said Dr. Taniguchi. “We believe this role makes them an especially important factor in controlling epilepsy, where over-excitement spreads throughout the brain unchecked.”

Using their own recently-developed genetic labeling techniques for tracking these cells in early development in mice, Taniguchi and his team observed that, like most neurons, the cells remodeled their axonal organization through development. They also found excessive axonal varicosities that have been considered morphologically synaptic structures.

To investigate whether these varicosities actually contained synaptic molecules, the team expressed synaptic markers in the chandelier cells using transplantation techniques.

What they found was surprising. Only those varicosities that were associated with the AIS contained synapses – the rest appeared to be empty throughout development. This was also corroborated by their ultrastructures obtained with electron microscopy.

These findings provide a big clue to understanding how this important cell type properly wires a unique circuit. Now the researchers must ask new questions: What purpose do these empty varicosities service, and what molecules help direct chandelier cells to recognize the AIS? The team plans to use live cell imaging to explore the function of the empty varicosities in axonal wiring.

“There must be some genes that are necessary and possibly also sufficient to guide the chandelier cell axons to this subcellular target,” said Andre Steineke, Ph.D., Postdoctoral Researcher and lead author on the study. He explained that it’s likely that these genes do not function properly during development in patients suffering from schizophrenia, epilepsy, or other diseases. Once identified, they may be valuable targets for drug development. Future studies on the molecular and cellular mechanisms of chandelier cell wiring will uncover important insights into how inhibitory circuits are assembled during development.
Gene Editing in the Brain Gets a Major Upgrade

MPFI scientists develop a new tool for precise genome editing in neurons

Genome editing technologies have revolutionized biomedical science, providing a fast and easy way to modify genes. However, the technique allowing scientists to carry out the most precise edits doesn’t work in cells that are no longer dividing, which includes most neurons in the brain. This technology had limited use in brain research, until now.

Research Fellow Jun Nishiyama, M.D., Ph.D., Research Scientist, Takayasu Mikuni, M.D., Ph.D., and Scientific Director, Ryoei Yasuda, Ph.D. at MPFI have developed a new tool that, for the first time, allows precise genome editing in mature neurons, opening up vast new possibilities in neuroscience research.

This novel and powerful tool utilizes the newly discovered gene editing technology of CRISPR-Cas9, a viral defense mechanism originally found in bacteria. When placed inside a cell such as a neuron, the CRISPR-Cas9 system acts to damage DNA in a specifically targeted place. The cell then subsequently repairs this damage using predominantly two opposing methods: one being non-homologous end joining (NHEJ), which tends to be error prone; and the other is homology directed repair (HDR), which is very precise and capable of undergoing specified gene insertions. HDR is the more desired method, allowing researchers flexibility to add, modify, or delete genes depending on the intended purpose.

Coaxing cells in the brain to preferentially make use of the HDR DNA repair mechanism has been rather challenging. HDR was originally thought to only be available as a repair route for actively proliferating cells in the body. When precursor brain cells mature into neurons, they are referred to as post-mitotic or non-dividing cells, making the mature brain largely inaccessible to HDR – or so researchers previously thought. The team has now shown that it is possible for post-mitotic neurons of the brain to actively undergo HDR, termed the strategy “vSLENDR” (viral mediated single-cell labeling of endogenous proteins by CRISPR-Cas9-mediated homology-directed repair). The critical key to the success of this process is the combined use of CRISPR-Cas9 and a virus.

Adeno-associated virus (AAV) is a low immunogenic, nontoxic virus utilized by scientists as an efficient delivery mechanism for all kinds of genes. This virus can effectively provide the donor template necessary for HDR, increasing its efficiency. The team first packaged the necessary machinery for genome editing into the AAV and delivered it to neurons of transgenic Cas9 expressing mice, achieving spectacularly efficient HDR in post-mitotic neurons of the brain.

Next, the team created a dual-viral system allowing them to use the technology in animals that had not been engineered to express Cas9. They tested this dual-viral system in an aged Alzheimer’s disease mouse model showing that the vSLENDR technique can be applicable in pathological models even at advanced ages.

vSLENDR is a powerful new tool for both basic and translational sciences alike, capable of the precise editing of genetic information regardless of cell type, cell maturity, brain region, or age. The new vSLENDR is more efficient, flexible, and concise, allowing researchers the potential to study a myriad of brain processes and functionalities with unprecedented ease. Equally important is its potential use in studying neuropathological disease models, accelerating research, and developing novel therapeutics. This example illustrates that establishing today’s basic science is the foundation for tomorrow’s cures.
EMPLOYEE SPOTLIGHT

Frank Niedzialek
INVENTORY CONTROL SPECIALIST

While scientists tend to receive the brightest spotlight, behind every great researcher there is an equally exceptional support staff member keeping the day to day of a bustling institute running smoothly. MPFI is incredibly fortunate to have a truly outstanding support team that makes our innovative science possible. One such staff member, Frank Niedzialek, is famous around the institute for his infectious positivity, engaging personality and approachable disposition. No matter who you ask, be it Technician or Research Group Leader, everyone at Max Planck knows Frank. When you need something special shipped in or out of the institute, he’s the man you turn to, efficiently accomplishing his task with a smile.

How would you describe your job?
At MPFI I’m what’s known as an Inventory Control Specialist, which is a fancy way of saying that I am in charge of shipping and receiving all inbound and outbound materials for the Institute. I oversee deliveries from companies or if a scientist needs something special shipped to another Institution, no matter how big or small, I assist by coordinating both the preparation and outbound shipping processes. Since MPFI is highly collaborative, many times my job includes taking special steps necessary to ship research related materials like viruses, DNA, and even whole disassembled microscopes to other institutions. Specialty packaging for research is a very methodical process and I’ve gone through extensive training to be able to do it. Additionally, I am in charge of completing all returns for inaccurate orders as well as purchasing and replacing the gasses used by the MPFI scientists. That’s pretty much everything in a nutshell!

What do you like most about your work?
For me, the best part of my job is getting to interact with all the members of our remarkable institute. From our CEO to the IT team, my job gives me the chance to work with every department and get to know my coworkers a little better, I really enjoy that aspect. One of the things that I love about Max Planck in particular, is that everyone comes from such diverse backgrounds. We are an international institute so people come to work here from all over the world, bringing with them rich experiences and different ways of thinking. Each day I learn something new and broaden my view of the world.

Are there any moments that really stand out to you?
In my 8 years working for MPFI, I’ve realized it’s not the big moments but rather the little things that really stand out to me. My position allows me the opportunity to provide a small but necessary service to the MPFI scientists. The overwhelmingly positive response that I get from them makes it all worthwhile. When I hear just how appreciative the scientists are, my day is complete. If I can make the members of the institute happy, that makes me happy. It only takes a small effort on my part to anticipate what is needed throughout the institute and make sure that MPFI functions like a well-oiled machine.

What do you consider to be your greatest achievements?
I’ve actually had a few achievements in my life that I’m very proud of. Receiving an award from Schering-Plough Corporation as their vendor of the year was a great honor for me. In addition my very first year working for the Palm Beach Post, I received the Outstanding New Employee Award. This particular award recognizes an employee who has made significant contributions to the company over the course of a year. It was a monumental award for me because I was just starting in a completely new field with no significant experience under my belt. The time I spent researching the needs of the Post, hours of hard work planning logistics and the thousands of shipments that I was coordinating, coming from ports all across the world, was recognized and appreciated. It was a very humbling and special moment for me.
MPFI Builds Bridges Across the Globe With Neuroscience Retreat

In November, MPFI hosted the Max Planck Society’s annual Neuroscience Retreat, bringing together directors and group leaders from 14 Max Planck Institutes worldwide who are engaged in neuroscience research. The goal of this three-day event was to share advancements across the institutions and discover new areas of potential collaboration.

The panel of expert speakers featured three keynotes: Prof. Dr. Axel Borst, Max Planck Institute of Neurobiology; Prof. Dr. David Poeppel, Max Planck Institute for Empirical Aesthetics; and Prof. Dr. Reinhard Jahn, Max Planck Institute for Biophysical Chemistry.

Prof. Dr. Axel Borst from the Max Planck Institute of Neurobiology in Martinsried, Germany discussed how nerve cells compute the direction of motion. His work involves how neural information is processed at the level of single cells and small circuits.

Prof. Dr. David Poeppel, from the Max Planck Institute for Empirical Aesthetics in Frankfurt, Germany, spoke on the brain’s basis of speech perception and language comprehension. The Max Planck Institute for Empirical Aesthetics aims to use scientific methods to explain the psychological, neuronal and socio-cultural basis of aesthetic perceptions and judgements.

Prof. Dr. Reinhard Jahn, who has served as Director and Scientific Member at the Max Planck Institute for Biophysical Chemistry since 1997, discussed Exocytosis of synaptic vesicles – a closer look at the fusion machine. His work includes studying how synaptic vesicles are filled within seconds with thousands of neurotransmitter molecules.

MPFI builds on strategies to continuously improve and grow the thriving neuroscience community in South Florida. “We are honored to have hosted such a diverse and talented group of researchers,” said Dr. David Fitzpatrick, CEO and Scientific Director at MPFI. “The weekend was filled with discussion about opportunities and challenges within our Max Planck neuroscience research community. Collaboration is key to unlocking major scientific discoveries, and we are proud to have served as the catalyst for work that has great implications for the public.”

Leaders from 14 different Max Planck Institutions build lasting connections and exchange innovative ideas.
MPFI Recruits New Research Group Leader

Starting in late February of 2018, MPFI will warmly welcome its newest Research Group Leader, Dr. Yingxue Wang. Joining the ranks of MPFI’s distinguished neuroscientists, Dr. Wang will be leading the “Neuronal Mechanisms of Episodic Memory” research group.

While at MPFI, Dr. Wang will explore the neural circuitry of the hippocampus, a specialized part of the brain that is involved in the formation and retention of episodic memory. This unique type of memory is responsible for processing and storing novel events that we experience in our day to day lives.

Dr. Wang brings with her a diverse skill set, training as an electrical engineer at the Swiss Federal Institute of Technology Zurich (ETHZ) and most recently as a Research Scientist at the Janelia Research Campus of the Howard Hughes Medical Institute. This past year, due to her research excellence and accomplishments, Dr. Wang won a free floating Research Group Leader position within the Max Planck Society. After visiting various Max Planck Institutes, Dr. Wang has decided to make MPFI her future home. MPFI is excited to have Dr. Wang join the Institute, contributing her high-caliber research and impactful science.

Bonhoeffer and Fitzpatrick Labs Launch the First Joint Retreat

The Fitzpatrick Lab at MPFI hosted the first Bonhoeffer-Fitzpatrick Lab joint retreat on October 11-13 at the Palm Beach Marriott Singer Island Resort & Spa. With the goal to foster a collaborative environment between the two labs, scientists at all levels discussed major challenges of the neuroscience field, shared their discoveries, and built scientific partnerships.
Tri-Institutional Seminar Series
Interconnects Scientific Community

With the establishment of a triumvirate of outstanding scientific institutions, cutting-edge research and discovery are starting to bloom in Palm Beach County.

Residing in a singular campus, The Scripps Research Institute, Florida Atlantic University Honors College and Max Planck Florida have carved out an alcove for scientific excellence in Jupiter. With the growing number of Institutions there becomes a need for greater interconnectivity among them, an environment that fosters collaboration and sharing of expertise. Dr. Lesley Colgan, a Research Fellow in the Neuronal Signal Transduction Lab at MPFI has set out to do just that, establishing a seminar series that aims to further unite the triumvirate.

The Tri-Institutional Seminar Series, TIPS for short, was established this past year as an extension of the MPFI Postdoctoral Association. The goal was to create a more formal platform for Postdocs to present current research and attain feedback from peers across the three Institutions. Meetings are held at each Institute on a rotating basis, containing two presentations from postdocs, a Q&A style discussion followed by a more informal networking reception.

In total, thirty-three students and scientists came together from the Bonhoeffer Lab at the Max Planck Institute of Neurobiology in Martinsried, Germany, and the Fitzpatrick Lab. Dr. Tobias Bonhoeffer, Director of the Max Planck Institute of Neurobiology, leads his German lab in its focus on synapses, circuits and plasticity and its investigation into the fundamental principles of synaptic plasticity at a number of different levels, ranging from molecular approaches to studies of the intact nervous system. The Fitzpatrick Lab, led by Dr. David Fitzpatrick, CEO and Scientific Director for MPFI, is focused on understanding neural circuits in the cerebral cortex by using in vivo imaging techniques to study the synaptic interactions in the visual cortex and examine circuit organization at columnar, cellular, and synaptic levels of resolution.

Guests were welcomed with an evening mixer and dinner, followed by a special lecture by Dr. Stefan W. Hell, one of three recipients of the Nobel Prize in Chemistry 2014 for the development of super-resolved fluorescence microscopy. Morning lectures on multiple topics were followed each day by lunch, and recreation was also on the agenda, as attendees had opportunities for relaxing by the beach or touring JFK’s bunker on Peanut Island. The retreat concluded with a tour of MPFI’s facilities, dinner and evening fun in Jupiter.
Dan Wilson – Reflections on The International Max Planck Research School

As the party was winding down, Dan Wilson stood in the beautiful, naturally lit Alexander and Renate Dreyfoos Atrium of MPFI quietly reflecting. He thought of the countless hours spent in the lab working to learn, refine and perfect his craft and of the many obstacles, frustrations and challenges that had been overcome. Especially, he recalled the invaluable, lasting connections made with his fellow students, colleagues and scientists.

It was only fitting that while celebrating the monumental accomplishment of successfully defending his thesis, the very same colleagues who had made a huge impact on his life, came together to congratulate and wish Dan luck in the next chapter of his career as “Dr. Wilson.”

Community and collaboration are two words that Dr. Wilson often uses to describe his time in the International Max Planck Research School (IMPRS) for Brain and Behavior. From day one, he noted a tangible sense of interconnectivity between MPFI’s scientists. “It was evident to me from the beginning how close the community at MPFI was. The more time I spent in the building, the more I noticed it,” he said.

In addition to collaborations that MPFI scientists have with renowned labs from across the country and around the globe, it was the small things that caught Dr. Wilson’s attention.

On the second floor of the Institute, there is an industrial-sized espresso machine that beckons to individuals seeking their caffeine fix. What started as a simple coffee spot, has transformed into a vibrant space where scientists from different labs discuss current research. “You can find students comfortably speaking with scientists who aren’t necessarily their assigned mentor for advice or expertise,” said Dr. Wilson.

Scientific research is a highly competitive environment that doesn’t always lend itself to this type of openness and collaboration. However, Dr. Wilson describes the celebration and comradery whenever someone within MPFI receives an award, grant or recognition. This environment played a major role in his choice of graduate school and ability to thrive in IMPRS. He says it’s also why MPFI students and scientists are so successful.

While finishing his undergraduate degree at Duke University, Dr. Wilson came to admire the work of MPFI’s CEO and Scientific Director Dr. David Fitzpatrick, as well as Scientific Director Dr. Ryohei Yasuda. In his free time, Dr. Wilson read publications from the Fitzpatrick and Yasuda labs, becoming better acquainted with their research. He was inspired by the creative and innovative ways these two neuroscientists addressed critically important questions in the field.

His dream of working with these world-renowned scientists was fulfilled as he became a part of the Fitzpatrick lab. Dr. Fitzpatrick has high accolades for his student. “Dan is a strong collaborator and relationship builder. What’s truly impressive is that as a graduate student, he is already known in the field by other scientists who seek him out for collaboration,” said Dr. Fitzpatrick.

Collaboration is something Dr. Wilson especially enjoys. “As major scientific endeavors tend to require knowledge that extends across disciplines, collaboration becomes more and more essential to have a successful career in science,” said Dr. Wilson.

The IMPRS program, created in 2015, gives students the unique opportunity to learn from leading neuroscientists from both Florida and Germany. Students attend seminars presented by experts in the field and receive specialized training in modern neuroscience techniques.

Learning of the program, Dr. Wilson knew that he couldn’t pass it up. As a new IMPRS student, he became one of the very first to work side-by-side with world-class neuroscientists in the state-of-the-art facility of an up-and-coming institute.

Wilson joined MPFI’s Functional Architecture and Development of Cerebral Cortex Lab helmed by Dr. Fitzpatrick and impressively became a student in two different graduate programs: the Integrated Biology and Neuroscience (IBAN) joint program with MPFI, Florida Atlantic University (FAU), and Scripps; and IMPRS, an international collaboration between Max Planck Florida and FAU in the U.S. and the Center for Advanced European Studies and Research (CAESAR) and the University of Bonn (Uni Bonn) in Germany.

Dr. Fitzpatrick described one of the many benefits of the IMPRS program as the opportunity to learn from the amazing technology that exists within the MP Society. In addition
to laboratory work, specific coursework taught by experts in the field gives students hands-on experience with new technologies. “It’s a wonderful opportunity for students to learn from the scientists who are creating the tools of tomorrow that are applied to understanding brain circuits,” said Dr. Fitzpatrick.

While daunting to some, the decision to take on a second graduate program was an easy one for Dr. Wilson. He spent two weeks of his first year in Germany receiving advanced training in specialized techniques such as 2-photon microscopy and patch clamp electrophysiology. Wilson described the hands-on training as invaluable, applying the techniques he learned to make breakthroughs in his current projects.

As the first Ph.D. student to graduate from the IMPRS program, Dr. Wilson has set an incredible precedent. Applying cutting-edge techniques like selective optogenetics and electrophysiology, he seeks to understand how neurons in the brain process and compute different qualities of vision such as direction or orientation selectivity. Through his research, he hopes to build a greater understanding of the brain circuitry involved and uncover how our sight works.

To date, Dr. Wilson’s work has been published six times; twice as first-author papers in high impact scientific journals like Nature Neuroscience and Neuron. He has presented his research at a variety of neuroscience conferences and was invited as a Teaching Assistant (TA) to the prestigious Cold Spring Harbor Summer Research Program.

For the next leg of his journey, Dr. Wilson has accepted a post-doctorate position at Harvard University where he will build upon his body of work from MPFI, applying the same techniques and types of reasoning to study other brain areas and the neural circuitry that underlies decision making. Just as Dr. Wilson has experienced the collaborative nature of IMPRS, he is now turning toward the next generation of future scientists with advice to help them on their journey.

He encourages aspiring scientists to explore the field by getting hands-on experience, learning as much as they can about technology, and having a curious and persistent nature. “You’ll try a lot of experiments that don’t work. You have to be able to evaluate why things aren’t working and to come up with solutions,” Wilson said. “It’s part of being a great scientist.”

“As major scientific endeavors tend to require knowledge that extends across disciplines, collaboration becomes more and more essential to have a successful career in science,”

Dr. Wilson

“Dan is a strong collaborator and relationship builder. What’s truly impressive is that as a graduate student, he is already known in the field by other scientists who seek him out for collaboration”

Dr. Fitzpatrick
Armed with nothing but an Expo marker, white board, and quick wits, Postdoctoral candidates wishing to effloresce into full-fledged scientists, have only 20 minutes in front of a panel of distinguished faculty to showcase their scientific acumen and outline an entire career’s worth of research goals.

Infamously known by the colloquial name “Chalk Talk”, this informal yet demanding presentation requires the distillation of complex scientific research, effective and engaging communication, as well as approachability and flexibility; all without the convenience or assistance of technology. What may seem like a daunting task is actually a very typical and crucial aspect of the interviewing process for aspiring scientists. Mastery over this 20 minute scientific gauntlet becomes a pivotal step in the career path of a Postdoc, progressing from novice trainee to adept scientist.

The jump from Postdoctoral Research Fellow to a tenured professorship, is a notoriously arduous transition. Due to an abundance of post Ph.D. trainees (Postdocs), dwindling university tenure availability and the current, competitive academic climate, this transition is certainly one of the most formidable obstacles facing those that aspire to one day become a Principal Investigator (PI). Despite the difficulty, determined researchers stave off discouragement to pursue the exceptional opportunity to one day lead their own lab and conduct their own research.

To achieve this monumental goal, Postdocs must first complete a rigorous interviewing process consisting of: a formal, typically hour long, well-attended lecture centered around their research projects, rife with data, charts and scientific figures; the informal and intimate “Chalk Talk” given to a small panel of research faculty; as well as personal interviews with several scientists in the department.

Developing the skills necessary to command each of the three unique interview types, is essential in order to quickly become a standout candidate. Training and conferring those critical skills to its Postdocs, MPFI’s recently formed Postdoctoral Association, is helping them conquer and excel in all facets of the interview process.

Assisting Postdocs in attaining their career goals is something that Dr. Paul Evans, Post-Doctoral Fellow and President
of the MPFI Postdoc Association, considers to be a critically important role of the organization. He comments that since its inception, “The association has developed unique programs that are in place to foster a community among MPFI Postdocs and help acquire professional development skills that will prepare them for the next steps in a career in science.” Vital initiatives like practice “Chalk Talks”, monthly journal clubs, and scientific presentation/writing workshops are extremely advantageous opportunities for Postdocs to gain familiarity and practice with interviewing. Two talented, former Postdocs at MPFI noted in particular, that active participation in the Postdoc association enabled them to become successful in the interview process.

Drs. Won Chan Oh and Gordon Smith have recently traversed the transition between trainee and independent scientist, joining the faculty of distinguished universities and paving the way for future MPFI Postdocs. Dr. Oh, a former Postdoc in the Kwon Lab, joined the University of Colorado Denver, Department of Neuroscience as an assistant professor. In his new lab, Oh will build upon his previous work at MPFI, studying the role of neurotransmitters and neuromodulators in developing neural circuitry using highly advanced imaging. Dr. Smith, a former Postdoc in the Fitzpatrick Lab, is now an assistant professor in the Department of Neuroscience at the University of Minnesota. Like Dr. Oh, Dr. Smith will incorporate the cutting-edge imaging techniques he learned and refined at MPFI to take a deeper look into the functional networks of the visual system in order to better elucidate how the brain processes vision.

Actualizing their dreams of becoming Principal Investigators, Drs. Oh and Smith demonstrate that though difficult, even the dreaded “Chalk Talk” portion of the scientific interview is unmistakably conquerable with the right amount of practice, preparation and dedication. MPFI’s Postdoc Association is doing just that, helping to facilitate the future success of its members.

Highly Successful Neuroimaging Techniques Course 2017

From January 13–25, MPFI hosted the second advanced Neuroimaging Course. The intensive and comprehensive laboratory-oriented program focused on applying imaging techniques to neuroscience research.

The objective was for pre-doctoral students, postdoctoral students, and young investigators in the beginning of independent research careers to gain exposure to cutting-edge imaging tools from principle optics to applications in modern neuroscience.

John O’Keefe, Ph.D., Professor of Cognitive Neuroscience and Director of the Sainsbury Wellcome Centre for Neural Circuits and Behaviour at University College of London, gave a special lecture. Dr. O’Keefe was one of three joint recipients of the 2014 Nobel Prize for Medicine or Physiology for discoveries of cells that constitute a positioning system in the brain.

The course featured a dedicated Correlative Light and Electron Microscopy (CLEM) Techniques Module and was formatted to include morning lectures and laboratory sections throughout the afternoon and evening. Students rotated through all laboratory sections, focusing on one section (and one optional section) for the remainder of the course.

The intensive, two-week event was made possible thanks to the generosity of sponsors, including: Spectra-Physics, Thorlabs, Hamamatsu, Techniplas, Hitachi, Zeiss, and Bruker.

Participants of the Neuroimaging Course 2017
Exceptional Science Flourishes Under the Max Planck Philosophy

Growing up, do you remember reading those widely popular “choose your own adventure books?” For those unfamiliar, these novels tell a story in a rather untraditional manner. Instead of giving the reader a linear, predestined experience it introduces the element of decision making. When arriving at a pivotal moment in the protagonists’ story arc these novels ask how would you, the reader like to proceed? Giving the iconic, “To avoid the bandits by circling back through the forest turn to page 54. To remain and bargain your way out, turn to page 87.” These are the type of novels that contain hundreds of different story lines within them, keeping the reader both interested and able to read the same book in a variety of different ways. Most importantly it gives the power of choice, allowing the reader to become the architect of their own story.

Adaptability is a cardinal virtue in science. Despite a researcher’s best effort, scientific discovery doesn’t come about through a linear process; It meanders, making unexpected turns and taking on many different shapes as a project progresses. The ability to pivot one’s mindset in the almost guaranteed event that unexpected results arrive, obstacles are encountered or promising findings force a different turn, becomes one of the most powerful items in a scientist’s tool box.

Often times this critical virtue is constrained by our modern day academic system. Even before starting a project, securing funding for scientific research is a difficult endeavor. Grants, the primary source of funding for scientists, are often limited in number, highly competitive, and typically specialized to one field or subfield. When starting a project, grants typically require researchers to pursue the single, ultra-specific topic outlined in the award without the flexibility to explore related topics even if new data emerges. Many times these hindrances leave interesting data untouched and important avenues unexplored.

The Max Planck Society aims to break the typical constraints of academia, replacing the concept of linear scientific pursuit with a philosophy that better resembles those popular “choose your own adventure novels.” In order to recruit the world’s most promising and exceptional young scientists, The Max Planck Society provides the time, resources and funding necessary for flexibility of scientific pursuit. The talented Research Group Leaders recruited, are free to set their own research topics, pursue cutting-edge science that is on the frontier of possibility and explore roads not taken.

Conducting research for a period of 5 years, with an optional 2 year extension, MP group leaders receive annual funding in addition to access to state-of-the-art facilities and the combined resources and expertise of over 80 Institutes within the Max Planck Society. After their term is completed, Group Leaders move on, contributing their skill to major universities and academic institutions around the world.

Dr. David Fitzpatrick, CEO and Scientific Director of MPFI remarks that this unique philosophy “Is a wonderful way to broadcast the research fundamentals, that have made the Max Planck Society so successful over the years, to the broader scientific community; contributing to the growth of scientific excellence and the next generation of scientific progress.”

One of these contributors Dr. Samuel Young Jr., a former MPFI Research Group Leader, flourished under the Max Planck philosophy and is an exemplar of scientific success.
Dear MPFI Family, it is my great pleasure to share some exciting news with you. From the beginning, MPFI’s mission has been to create a vibrant research environment where creativity, innovation, and dedication drive impactful scientific discovery. I am proud to say that in a short time we have made great progress, generating new discoveries, developing novel technologies, building powerful global collaborations, and establishing renowned academic training and educational outreach programs.

As a direct result of MPFI’s accomplishments, the Max Planck Society under President Martin Stratmann’s leadership has been granted approval from the German government to provide annual funding to the institute, a base level of support that is so critical for research efforts in the uncertain times surrounding scientific funding in this country. With this core support, we are in a strong position to attract new, talented scientists. Together with your help, we can accelerate our trajectory of scientific discovery and expand our global impact on the field of neuroscience, creating the knowledge base that is critical for addressing a broad range of neurological and psychiatric disorders.

I am deeply grateful to all the people who have been so integral to MPFI’s continued success. This includes all of the scientists, technicians, students, and administrators within the Max Planck Florida Institute whose hard work has made exceptional science possible. I would also like to recognize our colleagues in Germany, particularly President Stratmann and Vice President Bill Hansson as well as the administrative staff in Munich whose strong support and hard work was critical in receiving approval for this funding.

I especially want to thank you, our Max Planck Florida family, our loyal friends, who have supported our research and education programs, have celebrated our successes, and have brought friends and families to our events. You are our ambassadors here in Palm Beach County, and your unwavering support has been monumental. As the institute enters its next phase of growth, we look forward to working with you to reach even greater successes. Further advancing today’s basic science, bringing us closer to tomorrow’s cures.

To read more about other MPFI success stories, turn to page 22
To find out about MPFI International Outreach, turn to page 06

Dr. Young was recruited from the Max Planck Institute for Biophysical Chemistry in Goettingen, Germany as one of MPFI’s inaugural Research Group Leaders. Leading the “Molecular Mechanisms of Synaptic Function” lab, Dr. Young sought to uncover the mechanisms of neural communication at the level of the synapse, studying how neurotransmitter release encodes information in the auditory system.

During his time at MPFI, Dr. Young has published his work multiple times in high impact journals such as Neuron, The Journal of Clinical Investigation and The Journal of Neuroscience. In 2015 Dr. Young received the Glaxo Smith Kline Neuroscience Discovery Award, honoring him as an exceptional, early-career scientist. Additionally, the Young Lab has been awarded grants from both the Michael J. Fox Foundation for Parkinson’s Research and a $2.4 million grant from the National Institute on Deafness and Other Communication Disorders (NIDCD). Dr. Young has contributed significant advancements to Parkinson’s disease research, has developed new viral vector, gene expression tools for application in neuroscience, and has overturned prevailing theories on calcium channel function during neurotransmitter release; greatly expanding our knowledge of how neurons encode information. Describing his colleague’s work at MPFI, Dr. Fitzpatrick notes that Dr. Young was “remarkably successful.”

True to the Max Planck Society mission of spreading scientific excellence, Dr. Young has transitioned into a new position at the University of Iowa, where he is now an Associate Professor (with tenure) in the Department of Anatomy and Cell Biology and the Director of Molecular Auditory Research in the Department of Otolaryngology. Dr. Young brings with him invaluable expertise and innovative thinking, steeped in the unique principles of the Max Planck philosophy. Allowed to become the architect of his own scientific story at MPFI, Dr. Young contributed significantly to the scientific community and will only continue to excel in the next phase of his career.

To read more about other MPFI success stories, turn to page 22
To find out about MPFI International Outreach, turn to page 06
MPFI continues its seventh year of making a positive local impact on STEM education.

It was another enlightening summer for an elite group of Palm Beach County students and teachers who were able to further their knowledge of science and advanced technologies alongside esteemed MPFI scientists during our 2017 Summer Internship Programs.

Open to high school students preparing to enter their junior or senior year, the MPFI High School Summer Research Internship offers aspiring scientists an immersive laboratory experience with MPFI researchers. This six-week internship is designed for students with an interest in brain structure, function and development, and the advanced imaging techniques and technologies used in neuroscience.

Six high school interns were chosen from a competitive pool of 57 local applicants. Each student was matched with an individual research mentor who assigned an engaging and topical question to investigate over the course of the six week program. From June 12 to July 21, each intern completed a relevant research project in one of three potential programs – neuroscience, mechanical engineering or scientific programming. With the help of their mentors, the students researched pertinent topics, designed and executed high-level experiments, as well as thoughtfully interpreted results.

Six years ago, the internship program started with only two high school students. Thanks to a generous gift from the Celia Lipton Farris & Victor W. Farris Foundation two years ago, the program has flourished. The donation helped the Institute expand the program to include hands-on laboratory experiences and accept more students, as well as provide a daily travel budget for students who may live farther away. Over the course of the past seven years, MPFI interns have continued their education at some of the most elite universities in the world, developing their skills in outstanding STEM programs with myriad research opportunities.
One high school and one middle school teacher learned cutting edge techniques used in neuroscience research in the Teacher Internship Program 2017.

MPFI’s two-week teacher internship offers educators an opportunity to learn how scientists are using technology to gain understanding in the field of neuroscience, so they can take those tools and resources back to the classroom. Some of the topics covered during the internship, which ran from June 7 to 21, included immunohistochemistry, learning and memory, genotyping and imaging.

“This internship program opened my eyes, allowing me to recognize the importance of real-world application of science and technology, while working in a lab setting,” said Brittany Anderson, a seventh grade life science teacher at Bak Middle School of the Arts in West Palm Beach. “My students can now see me as not only their teacher, but a scientist and lifelong learner as well. This program is highly beneficial in allowing science teachers to grasp the importance of science methodology.”

Thanks to these unique summer internships, students and teachers will have an intimate understanding of what it means to be a neuroscientist and the impactful research being done at MPFI.

“Being able to see and have hands-on interaction with scientists who are at the forefront of investigating the biological basis of the human brain, the nervous system and neural communication was invaluable,” said Christy Holt, a psychology, AP psychology and AP U.S. history teacher at Boynton Beach Community High School. “I will incorporate into my lessons the research that [MPFI] is doing, specifically on the disorders that we study, like autism and Alzheimer’s.”
MPFI Molds Inquisitive Minds During Science Career Panel

Local middle and high school students and teachers enjoyed an enriching science experience

MPFI helped inspire the minds of students interested in a career in science by hosting the sixth annual Science Career Panel. The event allowed students from eight middle and high schools in Palm Beach County an opportunity to meet and interact with Max Planck scientists. Students were given the opportunity to hear from scientists who are in various stages of training, from undergraduate interns to senior scientists, with the goal of piquing an interest in a science career. The day included a tour of a laboratory, lunch with MPFI scientists, and a panel discussion.

All Palm Beach County middle and high school teachers were invited to apply, but due to limited space, only 16 schools were selected based on answers to the application question, “How will your students benefit from learning more about careers in science?”

Audra Davis, from Wellington Community High School, answered that she wanted her students to have the opportunity to interact with scientists. When it was over, she said that she found the day personally rewarding as well. “It allowed me to see purpose in what I do,” said Davis.

Carla Case-Sweeney, a teacher from Santaluces High School, said that she was always trying to expose her students to educational opportunities. “Being a part of this makes me even more motivated to seek out experiences like this for my students,” she said.

Thanks to the MPFI panel, students could hear directly from scientists about why they chose a career in science, and what steps led them to where they are today. Stephanie Bie, a senior at Atlantic Community High School, said that this experience has broadened her perspective on neuroscience and inspired her to pursue a career in research.

When asked why he wanted to attend, Bryan Cruz, a junior from Wellington Community High School, answered, “I always like to get my information from someone who has gone through what I’m trying to do.”

This is the sixth installment of MPFI’s Science Career Panel. Plans are already in development for next year’s event because of the impact it continues to make.

Marie Pantel, a senior from Village Academy may have summed it up best of all. “This was great and really enjoyable. It really opened a whole new world to me,” she said.
PRE Program Provides Students With a “Trial” Career in Science

In the 18th century, entrepreneur Josiah Wedgwood pioneered one of today’s most prevalent consumer concepts, “Satisfaction or Your Money Back”.

After making a purchase, this built in grace period gives buyers everywhere the freedom to explore different product options, make an informed decision about quality and determine through actual hands-on testing, if it’s a personal fit. Contemplating the impactful and long-lasting purchase that constitutes a career choice, some students right out of college would warmly welcome the idea of an On-the-Job, trial period guarantee. Luckily for talented, motivated students with a passion for neuroscience, MPFI has just the solution.

The MPFI Post-Bacca laureate Research Experience program (PRE), is a unique opportunity where recently matriculated undergrads get a rare glimpse into the inner workings of a career as a scientist. As part of the program, fellows design and execute an independent research project supported every step of the way by a world-class neuroscientist mentor.

During this 12 month internship, PRE Fellows gain hands-on experience with the cutting-edge techniques and technology used by MPFI scientists, an insight into brain structure and function, and a unique window into multi-leveled, scientific collaboration. Additionally, research fellows participate in a variety of professional development seminars and activities, aimed at providing the skills necessary to excel in the world of science.

Programs like MPFI’s PRE, allow students the opportunity to fully explore a career in research and experience the day-to-day of a neuroscientist; helping to guide scientists in the making and reduce the need for a career “Money Back Guarantee.”

My time in the MPFI PRE program has been an incredible opportunity to apply the skills I learned in undergrad to real-world science. MPFI gives PRE Fellows the freedom to design their own projects and experiments and to operate independently, with constructive feedback and guidance from mentors in the lab.”

Matthew McCann, PRE Fellow
Record Attendance for 2017 Science Meets Music Season
Four Scientific Talks Paired With Exceptional Musical Performances are an Equation for Enjoyment
In response to the continued excitement and overwhelming enthusiasm for the Science Meets Music program, now in its fourth year, this season was expanded from three to four events.

With rousing standing ovations for both the scientific lecture and the musical performances, the series continues to serve as one of Palm Beach County’s cultural highlights. MPFI appreciates the generous commitment of all of its 2017 sponsors including The Benjamin School for hosting the event at Benjamin Hall, and Carmine’s Market and Prosecco Café for providing delicious receptions for guests to enjoy.

“To my knowledge, there is nothing else like our Science Meets Music program – not in La Jolla, not in Silicon Valley and not in the northeast,” said Dr. David Fitzpatrick, CEO and Scientific Director at MPFI, when welcoming the enthusiastic crowd in Palm Beach Gardens. “This program offers a unique opportunity to explore similarities between the awe-inspiring attributes of both science and music while learning more about how scientists and musicians alike are breaking toward new frontiers.”

MPFI hosted over 400 science seekers and music enthusiasts at the first Science Meets Music event of 2017 on January 20.

The evening concert and lecture gave guests an overview of Metabolic Mayhem: The brain’s role in metabolic health and disease. The enlightening lecture by Dr. Jens C. Brüning, who joined Max Planck Institute for Metabolism Research in February 2012, was complemented by performances by Zlatomir Fung, a seventeen-year-old internationally acclaimed cellist who has won numerous awards, presented by the American Friends of Kronberg Academy.

Dr. Fitzpatrick shared MPFI’s 2016 highlights with the crowd before the program began, noting that the Institute’s research was published in 17 publications, including work from a Florida Atlantic University (FAU) graduate student that was featured on the front cover of Nature Neuroscience.
The second Science Meets Music event took place on February 15 with a lecture led by EMMANUEL CHARPENTIER, Ph.D., Director of the Max Planck Institute for Infection Biology.

Dr. Charpentier was awarded the 2015 Breakthrough Prize in Life Sciences and was named one of Time Magazine’s 100 most influential people in the world in 2015 for her work in developing the revolutionary genome editing tool, CRISPR-Cas9. Dr. Charpentier, who had also been a keynote speaker at Sunposium™ 2017 days before, discussed this transformative technology and its rapidly growing applications in the world of science and medicine in her lecture CRISPR-Cas9: A game changer in gene editing and genome engineering. Guests found Dr. Charpentier most extraordinary and were fascinated by insights into the CRISPR-Cas9 discovery, noting the care and attention she gave to intertwine her remarks with the music element of the series by EMMANUEL CEYSSON, Principal Harp of the Metropolitan Opera Orchestra. Presented by the Chamber Music Society of Palm Beach, Ceysson’s commitment to his instrument has earned him the highest international distinctions and, as a result, he is recognized as the first harpist to obtain awards at three major international events. Widely known as the ‘enfant terrible’ of the harp, Mr. Ceysson’s powerful, virtuoso style and his efforts to reach out to the speaker and create a thoughtful and moving repertoire for the evening’s concert component captivated attendees.

The third Science Meets Music event of the 2017 season took place on Friday, March 24 with a lecture led by IAIN COUZIN, Ph.D., Director, Max Planck Institute of Ornithology, Department of Collective Behaviour in Germany.

Dr. Couzin is an expert in biodiversity and the recipient of several awards including: Popular Science’s “Brilliant 10” Award in 2010; National Geographic Emerging Explorer Award in 2012; and the Scientific Medal of the Zoological Society of London in 2013. Dr. Couzin provided a visual guide to collective animal behavior in his presentation From Democratic Consensus to Cannibalistic Hordes: The Principles of Collective Behavior. Dr. Couzin’s talk was bookended with performances by internationally-renowned pianist, SOFIYA URYVAYEVA, D.M.A. The evening concert and lecture featured pieces from the Institute’s inspiring new art exhibition, Threshold to the Unknown, requisitioned by the Florida Department of State’s Division of Cultural Affairs for its February 2017 Convening Culture Conference. On display during the reception, the exhibit is underwritten by David and Nancy Auth, and is described as an exploration into the creativity, curiosity and wonder of brain research at MPFI. The exhibit includes both artistic interpretations as well as actual microscopy images of the brain.

Dr. Fitzpatrick took the opportunity to acknowledge Max Planck Florida Foundation’s two new giving tiers and their respective members were recognized for their significant support of MPFI’s mission and research. In addition to the Max Planck Florida Brain Trust, the annual giving collective established in 2015, the Max Planck Florida Max Trust and the Max Planck Florida Catalyst Council have recently been established.
Max Planck Florida Max Trust members truly revolutionize brain research through transformational gifts of $1 million or more that significantly impact scientific capabilities and advancements for generations to come. Max Planck Florida Catalyst Council members impact brain research through contributions of $100,000 to $1 million that spark discovery and shape the future of our scientific world.

MPFI drew the curtain on the 2017 season on Wednesday, April 19 with speaker SAMUEL M. YOUNG, JR., Ph.D., Research Group Leader of Molecular Mechanisms of Synaptic Function at MPFI.

Prior to joining MPFI in 2010, Dr. Young was an Internal Research Group Leader in the Department of Membrane Biophysics at the Max Planck Institute for Biophysical Chemistry in Goettingen, Germany. His lecture, Breaking the Code: How Molecular Machines Determine Brain Function, was accompanied by a beautiful chamber music recital from acclaimed duo, violinist, ALEKSANDR ZHUH and pianist, TAO LIN. Born into a celebrated musical family in Moscow, Russia, Aleksandr Zhuk began studying violin at age six at the Gnessin Special School for Gifted Children. He has performed extensively throughout Europe and the United States as a soloist, chamber musician, and concertmaster of various orchestras. The Chinese-American concert pianist, Tao Lin, is a Steinway Artist and a winner of numerous piano competitions. He performs both as a soloist, as well as with major orchestras and chamber ensembles.

With fourteen performances since debuting in 2014, the Science Meets Music series has featured speakers from ten different Max Planck Institutes, including four from MPFI. “While ‘season’ might be officially over in Palm Beach County, the science never stops. Our success is in large part due to the support of our community,” said Dr. Fitzpatrick as the final evening concluded with generous applause.

Fans were pleased to know that on January 31, 2018 the next Science Meets Music season will commence with Stefan Hell, Ph.D., Director of Max Planck Institute for Biophysical Chemistry speaking about The Resolution Revolution.

Dr. Hell’s method of stimulated emission depletion (STED) microscopy uses laser beams and fluorescence to allow researchers to study living cells at molecular dimensions. In this lecture, Dr. Hell will discuss the simple yet powerful principles used to overcome the diffraction limit and bring about the entirely new field of imaging known as nanoscopy – allowing researchers to see things they’ve never before been able to, like how molecules build connections between nerve cells in the brain or the interactions between proteins involved in Parkinson’s and Huntington’s disease. The development of this significant advancement in research technology earned Dr. Hell the Nobel Prize for Chemistry in 2014.

Jonathan Roozeman, cellist, will provide the musical aspect of the program. The 18-year-old Finnish-Dutch cellist is quickly building an international reputation as a young instrumental soloist of outstanding potential. A student of the Sibelius Academy and the Kronberg Academy, Jonathan is a major prize winner at the Paulo, Gaspar Cassado and Tchaikovsky International Cello Competitions.
Dr. McLean Bolton Speaks at National Alliance on Mental Illness General Meeting

On August 31, McLean Bolton, Ph.D., an MPFI Research Group Leader focusing on disorders of neural circuitry, addressed the largest-ever general meeting audience of the National Alliance on Mental Illness of Palm Beach County (NAMI/PBC) regarding Marijuana and Brain Chemistry. Nonprofit NAMI/PBC is dedicated to providing education, support and advocacy to individuals living with mental illness and their families. Dr. Bolton has been an active member of the organization’s affiliate board since 2014, serving as Board Secretary 2016-2017. She is a strong asset for its Crisis Interventions Team and Speaker’s Bureau, assists with the evaluation and documentation of program outcomes, contributes scientific articles, helps with fundraising, and lends her professional experience to special events and supportive outreach groups.

At the meeting, Dr. Bolton talked in detail about tetrahydrocannabinol (THC), the chemical responsible for most of marijuana’s psychological effects, and the many ways THC floods the brain’s endogenous Cannabinoid 1 (CB1) receptors, particularly in areas of the brain controlling fear, anxiety, learning, reward and motivation.

“Today’s marijuana is strong, particularly in edibles and resin oils that can be up to 75 percent THC. Daily users of high-potency cannabis are five times more likely than non-users to suffer from a psychotic disorder,” she explained, while also covering some benefits of medically prescribed marijuana and the need for further research.

Sixth Annual Brain Bee Creates a Huge Buzz Across Two Counties

From Belle Glade to Boynton Beach to Jupiter, students came from all corners of Palm Beach and Martin Counties to compete in MPFI’s Sixth Annual Brain Bee on Saturday, February 4. Other highly motivated competitors traveled from areas as far south as Boca Raton and as far north as Jensen Beach for a special behind-the-scenes tour and a chance at coveted prize money. In the end, “Team Yo GABA GABA” made up of students from Palm Beach Gardens High School and Suncoast Community High School was victorious. Congratulations to Patrick Bosco, Barry Cheung and Jax Sprague!

Participants competed in teams of three to answer questions on neuroscience topics such as learning and memory, emotion, sensation, movement, aging, neurobiology, brain anatomy, and neural disorders. Prior to the competitive portion of the event, Brain Bee participants had the opportunity to tour MPFI’s labs and facilities and participate in interactive neuroscience research demonstrations.

This year’s second place Brain Bee team included Winston Cheung, Raghu Radhakrishnan and David Young from Atlantic High School in Delray Beach. Viviana Brooks, Erin Marlow and Christina Marlow from Oxbridge Academy of the Palm Beaches in West Palm Beach made up the third-place team.

Other schools represented at the all-day neuroscience competition included: Boca Preparatory International School, Boynton Beach Community High School, FAU High School, Glades Central Community High School, Jensen Beach High School, Jupiter Community High School, Lake Worth Community High School, Santaluces Community High School, The Benjamin School.

The Mary and Robert Pew Public Education Fund sponsored MPFI’s Brain Bee 2017. The Florida-based public education foundation has supported the event with its generosity since its inception in 2012.

First place team: Patrick Bosco and Barry Cheung (Palm Beach Gardens HS); Jax Sprague (Suncoast Community HS)
MPFI Scientists Inspire the Next Generation in the Pursuit of Science With Special Presentations

MPFI scientists Ben Scholl, Ph.D. and Michael Yetman, Ph.D. participated in the “Meet the Scientist Lecture Series” at Jupiter High School in 2017. MPFI partnered with the Taras Oceanographic Foundation, which hosts the annual series at Jupiter High School. The Taras Oceanographic Foundation, a nonprofit, tax-exempt organization founded in Jupiter, works to increase awareness and support from the general public, and foster collaboration between the science and business communities. Through this partnership, MPFI reaffirms its continued commitment to enhance interest in and foster understanding of bioscience research at all levels of education.

The “Meet the Scientists Lecture Series,” invites world-class speakers to promote and encourage dialogue between scientists and people of the communities in which they live and work. Dr. Scholl, a postdoctoral research fellow in the lab of David Fitzpatrick at MPFI, discussed the current understanding about the functions of cortical circuits, as well as, the questions scientists at MPFI, and across the globe, are still exploring to increase the understanding of the brain. Dr. Yetman, a postdoctoral research fellow in the lab of Hiroki Taniguchi, talked about “A Bloody History of the Brain: Neuroscience as told by Mummies, Cadavers, and Phantom Limbs.”

“Enriching science education in our community is such an important component of our mission,” said Dr. David Fitzpatrick, CEO and Scientific Director at MPFI. “We are grateful to the Taras Oceanographic Foundation, who shares this vision. We will continue to show our support by participating in this lecture series, in addition to creating our community education programs, including the Science Meets Music series, the Science Career Panel and our Summer Internship program.”

MPFI Scientist Presents a Unique “Science on Tap” Event

Those familiar with scientific community events might have heard of the widely popular “Science Meets Music” lecture series hosted by MPFI, but have you heard about the hidden gem called “Science on Tap” presented by the South Florida Science Center? In contrast to a more formal night of scientific learning and musical performances, “Science on Tap” treats guests to an informal night of levity where science meets suds. Hosted at Civil Society Brewing Company in Jupiter, “Science on Tap” attendees get a chance to pair their delicious craft beers with relatable and popular topics in science, delivered by top-notch experts in the field.

Last February, a special lecture in the series was presented by Dr. Joseph Schumacher, a Postdoctoral Research Fellow at MPFI. Dr. Schumacher mesmerized and entranced the audience while discussing the topic of optical illusions in his lecture titled “Use Your Illusion: How the Brain Perceives Reality.” Attendees remarked that the science behind brain perception was fascinating and some playfully noted that the visual examples used by Dr. Schumacher only seemed to get better as the night progressed.
As The Max Planck Florida Brain Trust’s inaugural year came to a close, we were fortunate to celebrate with many of our Brain Trust members. Institute leadership and researchers welcomed our special guests who enjoyed an evening of enlightening conversation, a ‘State of the Institute’ address by CEO and Scientific Director, David Fitzpatrick, Ph.D., and a rousing piano performance by MPFI Scientific Director, Ryohei Yasuda, Ph.D.

MPFF chairman, George T. Elmore, addressed the Brain Trust members and saluted their contributions to the thriving pipeline of research accomplishments and young scientific talent at MPFI. During the evening, Brain Trust members met with members of this pipeline, four of our post-doctoral investigators, and learned about their research in small group demonstrations. Audrey Bonnan, Ph.D., of the Christie Lab, had a popular presentation titled, “The Science Behind the Perfect Swing.” Joe Schumacher, Ph.D., of the Fitzpatrick Lab, shared “Teaching an Old Brain New Tricks.” Andre Steinecke, Ph.D., from the Taniguchi Lab, presented “Connections Matter: Why Do We Care?” David Whitney, Ph.D., also of the Fitzpatrick Lab, presented “Seeing is Believing but Perception is Reality.” The unique opportunity to speak directly with some of MPFI’s brightest young minds was a highlight of the evening.

Guests also heard from two of our Post-Baccalaurate Research Experience students, Shani Peter and Megan Pino, who reflected on their time at MPFI as they near the end of their program and the impact the generosity of Brain Trust members have had on their experiences. After completing their PRE year, both Shani and Megan have gone on to attend prestigious medical schools.
As I transition to this next stage of my career, it is clear the fundamental role that the Max Planck Florida family has played in achieving my goals. I would like to thank the Brain Trust members for their continued support of the institute and young, budding neuroscientists like myself.”

MEGAN PINO  PRE Fellow
and now MD/PhD Student at
The Ohio State University
Special Evening With Prof. Dr. Martin Stratmann

The Max Planck Florida Institute for Neuroscience (MPFI) and Max Planck Florida Foundation (MPFF) Boards of Trustees welcomed instrumental donors, close friends, and academic partners to an exceptional evening of music and science, featuring a special lecture presentation by Max Planck Society President, Prof. Dr. Martin Stratmann.

Dr. Stratmann captivated gathered guests with a lecture emphasizing the beauty and necessity of intellectual curiosity. He conveyed how the search for knowledge is the common thread that connects all Max Planck Society Institutes to each other, despite their varying research focuses. He also shared his own personal journey with guests through photos and videos from his childhood and as his career developed.

Dr. Stratmann was joined by pianist Lylybell Zhou, who’s own scientific journey is just beginning. Lylybell is quite familiar with the connection of science and music, as the Dreyfoos School of the Arts Junior spent her summer conducting a research project in the Yasuda Lab as a MPFI High School Summer Intern. To the audience’s delight, Lylybell performed Beethoven’s Sonata No. 18 and Prokoviev’s Sonata No. 1 with beautiful precision.

Dr. McLean Bolton, a MPFI Research Group Leader, provided insight into brain diseases affecting our loved ones through all stages of life, as well as current findings and potential future treatments. She was joined by respected private banker, Diane McNeal, Vice President and Regional Managing Director with Wilmington Trust, and Rebecca Doane, author and foremost Trust and Estates Attorney with Doane & Doane. Mediating the panel was Beth Kigel, President and CEO of Palm Beach North Chamber of Commerce.

Together, they addressed prudent actions individuals and families can take to prepare and care for their loved ones as they age. One guest shared, “The program helped me realize how intertwined our brain health is to our financial health. I should not delay finalizing my plans any longer! Thank you for providing such a valuable program.”

Prof. Dr. Stratmann (center) engages in conversation with Bruce Balter and John Klein
Donor Feature: Carolyn and Richard Sloane

Carolyn and Richard Sloane’s scientific curiosity and continued pursuit of learning brought them to Max Planck Florida Institute for Neuroscience in its earliest days. Aware of the Max Planck Society’s worldwide reputation in technology and healthcare, the Sloanes were intrigued by the opportunity to become involved with the establishment of its first Institute in the United States.

“We have long been interested in neuroscience, as well as medicine and technology – particularly the combination of these three fields – so MPFI was a culmination of our interests. It was natural for us to become as involved as we could and to try to help it succeed. We are very excited by how much progress MPFI has made in these few short years,” said Carolyn Sloane.

Richard and Carolyn describe the pragmatism of their giving philosophy; they look for the intersection of their personal fields of interest and a gift’s potential for greatest impact. Their gifts to the Institute were motivated by the belief that MPFI’s fundamental research will be the foundation for the future of healthcare and technology, benefitting society through reduced costs, improved treatments and better outcomes.

This year, the Sloanes made their second major gift to MPFI, and in their honor, Scientific Director Ryohei Yasuda’s conference room was named the “Sloane Family Conference Room.” A meeting room in the Yasuda Wing was a natural choice for the Sloanes. Dr. Yasuda, a National Institutes of Health Pioneer Award winning scientist and innovator shares Richard’s entrepreneurial spirit and ingenuity. Over the last 40 years, Richard transformed various technology, software, communications and information industries. More recently, Richard and Carolyn have built, developed, and owned commercial and residential properties across the country.

Their recent philanthropy builds upon an initial gift in 2011, which was recognized by the naming of The Carolyn & Richard Sloane Water Feature gracing the front entrance of MPFI. The Sloanes’ continued generosity creates a living legacy for their own family, as well as for the future of research at MPFI.

For Carolyn and Richard, family is the most vital part of their lives. They enjoy spending time with their three adult children, Jill, Kelly, and Kevin, their grandchildren, and traveling the world. The Sloanes also give of their time and expertise to other nonprofits, such as the Kravis Center for the Performing Arts and Cleveland Clinic Florida.

MPFI is truly grateful to Carolyn and Richard Sloane for their dedication to the advancement of knowledge and enlightenment to improve human health.
MPFI High School Intern Realizes Her Dream of Attending MIT

For Claudia Cabral, a senior at Suncoast Community High School and scientist in the making, the snapshot of her high school journey includes some rather extraordinary experiences and accomplishments.

Those that are fortunate enough to know Claudia describe her as bright, driven, personable, a savvy coder and most importantly cognizant and caring of the world around her. While Claudia’s exceptional grades and demanding course load alone are clear indications of her intelligence and determination, it’s what she does in her free time that truly showcases her passions and commitment to making a difference.

In addition to a busy academic schedule, Claudia is president of two charitable organizations focusing on impactful outreach. The first named “Hugs and Kisses Club” assists local cancer patients and the second, which she is also the founder, named “Two Feet Club” tackles a diverse set of social issues in creative ways. Through the combined efforts of these two organizations, Claudia has raised money and promoted awareness for issues like foster care, Syrian refugees, victims of domestic violence and people with mental disabilities to name a few. Even at her young age, the drive to make a positive impact in her community is evident, a sentiment she describes as “just a part of who I am.”

Poised and articulate, Claudia delivered an engaging final presentation on her work in the Schummer’s lab studying the phenomenon called visual contrast adaptation. This process describes the brain’s ability to acclimate to new surroundings and respond quickly to any changes in it. Although studied previously, the exact mechanisms that drive this process are unknown. Through her work, Claudia both engineered a computational algorithm that could precisely model the events as well as proposed astrocytes as being the cell type responsible.

In that moment, detailing the intricacies of relevant scientific theories, obstacles encountered and innovative solutions developed, it would be hard to think of Claudia simply as a high school student and not a seasoned graduate level researcher.

A common thread linking Claudia’s collegiate future, her internship and the ideals she advocates every day, is another visionary, Alexander W. Dreyfoos a graduate of MIT, board member of MPFI and unwavering supporter of the arts and sciences, champions the very same principles that Claudia does.

“The core values of MPFI align very closely to my own and the ideals of MIT that resonated with me while studying there. I have kept them with me ever since.” – Alexander W. Dreyfoos, Chairman of the Dreyfoos Group

Moving forward with her education at MIT and beyond, Claudia sees herself as a biomedical engineer and neuroscientist, innovating technology to help treat people with movement disorders like Parkinson’s, ALS and essential tremor. Staying true to her philanthropic side she hopes to continue public outreach, engaging in speaking and fundraising events, giving back to her local communities and abroad. There is no one better suited than Claudia to take up the mantle of MIT’s simple but profound motto, “Mens et Manus.”

Due to her remarkable accomplishments and merit, Claudia Cabral was selected as 1 of only 6 interns to participate in the 2017 High School Summer Research Program at MPFI.

The J.M. Rubin Foundation, the Celia Lipton Farris and Victor W. Farris Foundation, and the Gertrude E. Skelly Charitable Foundation make this immersive program possible. They support students in their exploration of science and help to cultivate the next generation of researchers.
THANK YOU!

Max Planck Florida Foundation recognizes the individuals and organizations most deeply invested in the advancement and future success of MPFI. Your transformational gifts make extraordinary discoveries possible and embolden our researchers to take risks, develop new technologies and pursue innovation.

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Howard M. Lester, Trustee of the Max Planck Florida Foundation, one of the earliest and most significant supporters of Max Planck Florida Institute for Neuroscience, passed away on January 27th after a brief illness. Howard, with his wife, Patricia, developed their love for Max Planck Florida early on. Through a donation of land by them and their family, the Jupiter Life Science Initiative was born. Their passion for MPFI was demonstrated by their multiple, significant naming gifts, their dedicated leadership and guidance, and their commitment to ongoing annual support.

Howard Lester was a man of immense integrity with a wry sense of humor who believed a gentleman always wore a jacket and tie. He was also a man of great stoicism who continually put the needs of others ahead of his own. He enjoyed a long and illustrious career as a trial lawyer, and after retirement from the active practice of law, worked full-time in family investment and real estate businesses, played some golf, and with his beloved wife Patricia, travelled the world, collected marine paintings, and supported numerous philanthropic organizations.

Aside from the Max Planck Florida Foundation, Howard was active locally in the Most Venerable Order of St. John (Commander), Sous-Commanderie de Palm Beach de La Confrere des Chevaliers du Tastevin (Grand Senechal), and Palm Beach Opera (Board of Directors).

Howard took great pride in his family and often said that he and his Patsy were one of the great true loves in this world. They were married just short of 63 years. He is survived by his wife Patricia, three children, Peter, Pamela, and Prescott, son-in-law, Billy and daughter-in-law, Karen, grandchildren, Owen and Scott, and sister and brother-in-law, Dale and Josh Sokolow.

Howard Lester will remain in our hearts and minds as we continue to share his commitment, dedication and generosity for the advancement of knowledge for the betterment of society.
Thank You for Your Support

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We would like to express our gratitude to our Institute and Foundation Boards of Trustees for their continued leadership and support
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MPFI offers unique opportunities for companies looking to partner with the institute in its mission of uncovering all that is unknown about the brain. Through the institute’s Corporate Partner Program, companies who share our goal of advancing neuroscience research will be recognized in a variety of ways for their support. These partners are also granted advanced and exclusive access to our “Friends of MPFI” program and provided ample opportunities to engage with the scientific community.

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Learn more about the many ways to join the MPFI Corporate Partners by contacting +1 561-510-3036 or Partner@mpfi.org