





# PRESIDENT'S LETTER

*Dear Friends:*

As we enter our seventh year as an organization, I'm incredibly proud of our growth and the progress we have inspired in the autism research community.

This is an exciting time in autism science, and the Autism Science Foundation is very much in the middle of the most innovative and promising research happening today.

Our work is focused on supporting important, cutting-edge research and catalyzing meaningful advancements. We continue to concentrate on encouraging the work of emerging researchers whose ideas are changing the thinking in our field. I'm pleased to report that our scientific grant making – including pre- and postdoctoral fellowships, accelerator grants and undergraduate research awards – increased by more than 30% in 2015.

We've been calling 2015 “the year of the female” in autism research, as scientists start to focus more on girls and women with autism. We learned that the brains of males and females with autism are physically different. And more attention is being paid to the “female protective effect,” the unknown reasons why girls who carry autism mutations don't always express clinical symptoms. ASF, in partnership with the Seaver Autism Center at the Icahn School of Medicine at Mount Sinai and the Hilibrand Foundation, has launched the Autism Sisters Project to find out what this protective effect really is and how it could benefit people of both genders down the road.

Last year saw real progress in many other areas of autism science as well – for example, we gained a better understanding of the underlying genetic causes of autism and made important progress in both behavioral and medical interventions. Some of those researchers delivered TED-style talks at our 2015 ASF “Day of Learning” event. We again brought together outstanding researchers and impassioned advocates, and you couldn't help but leave feeling inspired and optimistic.

Thank you for everything you do to support the work of the Autism Science Foundation. We're looking forward to another productive year for our organization and the work we do for every family affected by autism.

Sincerely,



Alison Singer  
President, Autism Science Foundation



# ACCOMPLISHMENTS

In 2015, our sixth year of operation, the Autism Science Foundation:

Increased our annual grant funding by almost 30%, pushing our seven-year funding total to just under \$2.5 million.

Created and produced the autism community's second annual Autism TED talks, featuring eight distinguished autism scientists.



In partnership with the Autism Sequencing Consortium and Mount Sinai School of Medicine, launched the Autism Sisters Project to search for the female protective effect.

Registered 879 people to donate postmortem brain tissue for autism research through our “It Takes Brains” campaign.



Held our first annual “Ride FAR” (For Autism Research) bicycling event, raising over \$175,000 for research.



Added 9,768 new iTunes listeners to our weekly science podcast.



Posted over 500 up-to-the-minute news items on Facebook and Twitter, providing critical information for families about new scientific advances.



# FUNDING SCIENCE

In 2015, ASF increased its scientific grant funding by more than 30%, focusing on pre- and postdoctoral fellowships, research accelerator grants and undergraduate research awards. Below are summaries of the projects funded by these awards.

## POSTDOCTORAL FELLOWSHIPS



**Dr. William Brandler and Dr. Jonathan Sebat**  
University of California, San Diego

### Uncovering the Spectrum of De Novo Mutation in Autism through Whole Genome Sequencing

Drs. Brandler and Sebat will sequence the entire genome of individuals with autism in an effort to understand the function of some of the newly identified mutations using cell culture models.



**Dr. Natasha Marrus and Dr. John Constantino**  
Washington University School of Medicine

### Quantifying Offspring ASD Risk for Unaffected Sisters of Males with ASD

Many parents of children with autism ask about the probability of their undiagnosed daughters having a child with autism. Drs. Marrus and Constantino will use the Interactive Autism Network (IAN) to examine symptom profiles and recurrence in children of these sisters, and launch a new phase of studying risk factors for ASD using IAN.



**Dr. Daniel Nedelcu and Dr. Joshua M. Kaplan**  
Massachusetts General Hospital

### Calcium Channels as a Core Mechanism in the Neurobiology of ASD

Mutations of the SHANK gene are known to be an important risk factor for autism, and pharmacological manipulation of the gene may offer some therapeutic benefit. This study will explore how this gene affects a certain type of channel known to be important in cell-to-cell communication. These results may provide targets for pharmacological modulation and thus lead to immediate therapeutic benefits for treating individuals with autism.



**Dr. Shuo Wang and Dr. Ralph Adolphs**  
California Institute of Technology

### Investigating Autism with Direct Intracranial Recordings

In this rare but exciting opportunity, the researchers at CalTech will be able to record the activity of brain cells in individuals with autism and epilepsy while they are awake and experiencing symptoms. Until this study, this type of procedure was only able to be done in animals. The results will improve our understanding of how cells in the brains of people with autism communicate with one another.

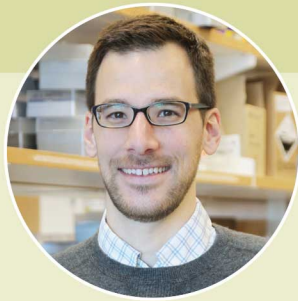
## PREDOCTORAL FELLOWSHIPS



**Melissa Co and Dr. Genevieve Konopka**  
University of Texas Southwestern Medical School

### Genetics Behind Brain Connectivity in ASD

Using new, advanced molecular biology techniques, this project will investigate how two genes called TBR1 and FOXP2, both implicated in autism risk, affect connections between the brain's cortex and thalamus. This study will help elucidate the different cell types in the brain and uncover cell pathways that will be important targets for treatment.



**Jason Keil and Dr. Kenneth Kwan**  
University of Michigan

### Brain Somatic Mosaicism at ASD-Associated Loci

Many studies have investigated genetic mutations that arise from sperm and egg, called germline mutations. However, some recent research has also investigated mutations that occur in tissue that is generated after the embryo has formed. These types of mutations, called somatic mutations, are found in some cells but not others, resulting in mosaicism. Somatic mutations have been well studied in cancer and other brain disorders but, until now, not autism. The findings of this project will better illustrate whether neural somatic mosaicism may contribute to cortical development and neural circuitry defects in ASD.



**Nathan Kopp and Dr. Joseph Dougherty**  
Washington University

### A Unified Molecular Mechanism Explaining Social Behavior and Oxytocin Levels in ASD

Oxytocin has been shown to improve some symptoms of autism, but little is known about how oxytocin levels are altered in individuals with ASD. This study will provide more insight into the therapeutic potential of oxytocin and factors that control oxytocin levels.



**Rachel Zamzow and Dr. David Beversdorf**  
University of Missouri

### Combined Effects of Early Behavioral Intervention and Propranolol on ASD

Ms. Zamzow is conducting a pilot study investigating the combination of early intervention and an antianxiety medication called propranolol. This will be one of the few scientific investigations of multiple modalities of treatment in ASD, and the first to examine propranolol in children.

“The postdoctoral fellowships that ASF supports are encouraging the brightest young scientists to study autism, and are uniquely productive in creating a pipeline that feeds directly into new federal grants.”

– DR. GORDON RAMSAY, MARCUS AUTISM CENTER



ACCELERATOR AWARDS

Accelerator Awards are designed to rapidly fund novel findings or explore unexpected opportunities. This year’s awards will examine a potential new treatment target and will explore a new method for improving data collection.



**Rachel Greene, Dr. Garret Stuber and Dr. Gabriel Dichter**  
University of North Carolina at Chapel Hill

**The Effects of Oxytocin on Functional Neural Connectivity in Autism**

Studies in 2015 showed that intranasal oxytocin may be helpful in treating some symptoms of ASD. Ms. Greene will be using data from an oxytocin clinical trial to understand how different regions of the brain regulate the rewarding aspects of social cues in people with autism and to determine if oxytocin affects these brain regions. If successful, this project will reveal the potential mechanisms of action of a novel ASD therapeutic agent and provide a new neural target by which to evaluate future promising ASD treatments.



**Maya Mosner, Dr. Edward Brodtkin and Dr. Gabriel Dichter**  
Perelman School of Medicine at the University of Pennsylvania, University of North Carolina at Chapel Hill

**Using Experience Sampling to Evaluate the Effects of Social Skills Treatment**

Current research study environments may not reflect functioning in real life situations. This project will pilot a new method of data collection, called “experience sampling,” which will allow researchers to improve studies that investigate interventions where context and setting are important.

UNDERGRADUATE AWARDS

ASF is the only autism organization to offer summer support to undergraduate researchers, encouraging the best and brightest students to launch a career in autism science.



**Megan Chin and Dr. Theo Palmer**  
Stanford University

Researchers are starting to study the combined effects of genetic mutations plus environmental factors during pregnancy. In this project, Ms. Chin examined the interaction between maternal immune infection and the GABAR gene. This will help scientists understand the mechanism by which both genetic and environmental factors work together to increase risk for ASD, potentially leading to preventative strategies.



**Jordan Grapel and Dr. Fred Volkmar**  
Yale University

Mr. Grapel participated in a follow-up study of adults with autism, which included an analysis of depression and bullying. His project also examined how the new DSM5 category of autism-related diagnosis called “social-communication disorder” overlaps with what was previously known as Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS).

“The undergraduate research grant from the Autism Science Foundation gave me the opportunity to continue my work at Yale and gave me a solid foundation of knowledge to build upon as I go forward in my education.”

– JORDAN GRAPEL, 2015 UNDERGRADUATE AWARD RECIPIENT



**Timothy Kim and Dr. James McPartland**  
Yale University

Researchers are now using real-time EEG imaging to study factors affecting brain development during infancy and early childhood. Mr. Kim examined the resting EEG of infants with an older sibling with autism in the hopes of developing a new diagnostic biomarker for ASD.



**Dylan Ritter and Dr. Scott Dindot**  
Texas A&M University

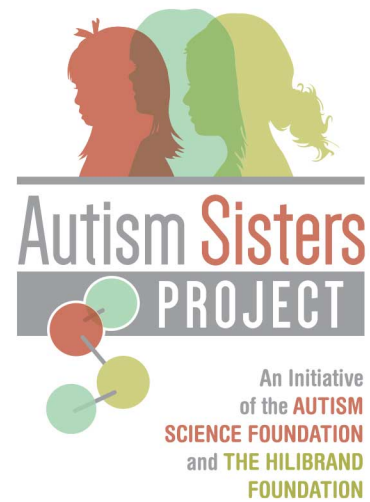
Individuals with mutations on chromosome 15 show high rates of autism symptoms. Mr. Ritter studied brain expression of a gene called UBE3A, which is located on chromosome 15 – providing information on a potential new therapeutic target.



**Zachary Williams and Dr. Ty Vernon**  
University of California, Santa Barbara

Real-time fMRI brain imaging is helping us understand how therapy brings about real changes in the brain and has allowed researchers to begin to predict how people will respond to specific therapies. Mr. Williams examined how brains in children with autism are activated or not activated in real time during different tasks, so that future autism interventions can be specifically tailored and personalized based on an individual’s personal brain function.





In 2015, ASF launched the Autism Sisters Project with the Seaver Autism Center at the Icahn School of Medicine at Mount Sinai Hospital. Our goal is to figure out how girls may be protected from autism. Almost four times as many boys are diagnosed with autism compared to girls, yet the reason why is not understood.

The Autism Sisters Project will build a large database of genetic and behavioral information from the unaffected sisters of people with autism to start to explore this female protective factor. If we can discover how girls are protected, we can use that knowledge to protect both boys and girls from the debilitating symptoms of autism.



Scientists from around the country met in October to plan the Autism Sisters Project protocols.



Eve and Tommy Bak are featured on the Autism Sisters Project "I Gave a Spit for Autism" advertisement.



Bryan Harkins, Melissa Moo Harkins, Alison Singer and Joe Kernan at the Ride FAR event.



## WALL STREET RIDES FAR FOR AUTISM RESEARCH

Our first annual Ride FAR (For Autism Research) attracted more than 200 cyclists throughout the NY tri-state area and raised over \$275,000 for ASF's science programs. CNBC's Joe Kernan hosted the event, which was chaired by Bryan and Melissa Moo Harkins. Our second annual Ride FAR will take place in Westchester County in October 2016.



Rebekah Travis and Jill Briesch in the "It Takes Brains" booth at the Dallas Autism Walk.



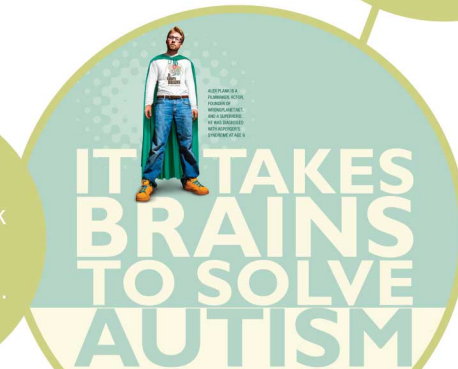
The Briesch boys pose with Darth Vader at the Dallas Autism Walk.



The Ursitti family from Boston poses for an "It Takes Brains" ad. The Ursitti family has opted to donate brain tissue to the Autism BrainNet.



This year, 879 new people registered to donate postmortem brain tissue for research through the Autism BrainNet. ASF's outreach efforts at autism walks, community events and science conferences spread the word about this important resource and the need for more donated tissue to increase the pace of research progress.



Autistic self-advocate Alex Plank is featured in an "It Takes Brains" ad.

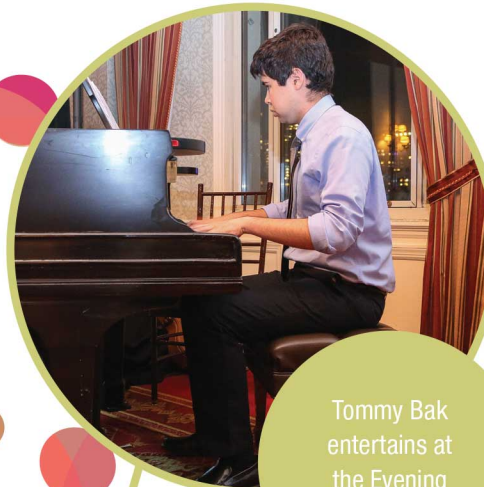


2<sup>ND</sup> ANNUAL  
**AUTISM SCIENCE FOUNDATION**  
**DAY OF LEARNING**  
 APRIL 22, 2015

Our second annual TED-style autism conference featured talks by top autism researchers from across the country for a full day of learning. More than 250 parents, individuals with autism, regular and special education teachers, students and other stakeholders participated.



ASF SAB Chair  
 Dr. Matt State  
 delivering his  
 TED talk.



Tommy Bak  
 entertains at  
 the Evening  
 of Celebration.



Award recipients  
 Gregg Ireland,  
 Paula Apsell, Dr. Tom Insel  
 and Lori Ireland.



Dr. Alycia Halladay,  
 Kathy Koenig, and  
 Dr. Celine Saulnier at the  
 annual TED talk lunch.



Liane and Marc  
 Carter, Lisa Siegel and  
 Lauren Rimland at the  
 TED talk lunch.

2<sup>ND</sup> ANNUAL  
**AUTISM SCIENCE FOUNDATION**  
**EVENING OF CELEBRATION**  
 APRIL 22, 2015

Our annual Evening of Celebration honored Dr. Tom Insel, former Director of the National Institutes of Health, PBS Executive Producer Paula Apsell and ASF board member Gregg Ireland and his wife Lori Ireland for their remarkable commitment to autism advocacy.



Laura Slatkin of  
 New York Collaborates  
 for Autism and Dr. Marilyn  
 Simons of the Simons  
 Foundation.



Larry and  
 Debbie Hilibrand.



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