

# BRAIN & BEHAVIOR RESEARCH FOUNDATION

## 2022 ANNUAL REPORT

Awarding research grants to develop improved treatments, cures, and methods of prevention for mental illness.



# \$1 MILLION CHALLENGE MATCH

*Goal: To accelerate momentum in brain research as further advancements are still needed.*

Contributions will be matched from:

- New Donors
- Former Donors who have lapsed, but make a 2023 contribution
- Current Donors who increase their 2023 contribution (the increase amount is matched)

As you plan your 2023 charitable donations, we hope you will help us successfully reach this generous \$1 Million Challenge Match. The cutting-edge mental health breakthroughs of BBRF grantees depend on you, so please consider making a gift this year to advance our vital research.

This match is made possible by two very generous family foundations that are passionate about BBRF's vital mission.

# MISSION

THE BRAIN & BEHAVIOR RESEARCH FOUNDATION IS COMMITTED TO ALLEVIATING THE SUFFERING CAUSED BY MENTAL ILLNESS BY AWARDING GRANTS THAT WILL LEAD TO ADVANCES AND BREAKTHROUGHS IN SCIENTIFIC RESEARCH.

**100%** OF EVERY DOLLAR  
DONATED FOR RESEARCH  
GOES TO RESEARCH



**Jeffrey Borenstein, M.D.**  
President & CEO



**Herbert Pardes, M.D.**  
President, Scientific Council



**Geoffrey Simon**  
Chair, Board of Directors

The Brain and Behavior Research Foundation (BBRF) is proud of its large, global impact on mental health. Over the past 35 years, it has become the world's largest private funder of mental health research grants.

BBRF has such a far-reaching impact because it does not limit its focus to one brain illness or mental health condition. In 2022 BBRF funded more than \$12.7 million in new research grants across a broad spectrum of brain illnesses which include: Addiction, ADHD, Anxiety, Autism, Bipolar Disorder, Borderline Personality Disorder, Depression, Eating Disorders, OCD, Psychosis, PTSD, Schizophrenia, as well as Suicide Prevention.

Since 1987, BBRF has awarded more than \$440 million in research grants to more than 5,300 scientists around the world who are searching for better treatments, cures, and methods of prevention for mental illness.

BBRF is a unique collaboration between generous donors and dedicated scientists that support new ideas that have an impact on the field of mental health. This support has led to important breakthroughs that improve our understanding of the brain and have produced new treatments for psychiatric illnesses.

All BBRF grant recipients are chosen by our world-renowned Scientific Council which is comprised of 184 scientists who rigorously evaluate every grant application, identifying the most promising, innovative science, with the greatest potential for significant breakthroughs. This past year the Council evaluated more than 750 grant proposals and awarded 150 Young Investigator grants, funding two-years of research for \$35,000 per year.

***BBRF grants serve as a springboard for talented scientists to get new ideas off the ground, including basic science and clinical research. This crucial funding early in their careers often leads to additional funding from the National Institutes of Health (NIH) and other sources, both governmental and private.***

Many significant Foundation-funded research breakthroughs were documented in leading psychiatric and medical journals during 2022. This annual report features Leading Research Achievements by BBRF Grantees, Prizewinners & Scientific Council Members in 2022, illustrating some of the remarkable progress being made by grant-winning investigators. These important advancements, as well as other scientific discoveries, are part of the vital role BBRF plays in helping people who live with mental illness.

Summer 2022 saw the return of BBRF's in-person Scientific Council Dinner where we awarded the highly esteemed Klerman & Freedman Prizes. In October at BBRF's fall Symposium, five outstanding scientists presented their research on schizophrenia, suicidal behavior in bipolar disorder, pediatric mood and anxiety disorders, and cognitive neuroscience.

Presentations were also given by the two winners of the Pardes Humanitarian Prize in Mental Health. All presentations from the 2022 International Mental Health Symposium are available to watch online at: [www.bbrfoundation.org/event/international-mental-health-research-symposium](http://www.bbrfoundation.org/event/international-mental-health-research-symposium). At our Annual Awards Dinner that evening we honored and presented the BBRF Outstanding Achievement Prizes as well as the Pardes Humanitarian Prize in Mental Health.

BBRF's periodic print publication, *Brain & Behavior Magazine*, continues to highlight some of the most important advancements in scientific research. This is supplemented by our weekly email newsletter "eNews," that's available free-of-charge to donors and the public. It features research breakthroughs of BBRF grantees, prizewinners, and Scientific Council members.

Through these and other efforts, BBRF shares current information with our donors as often as possible about what is happening in the labs, and about work that is carrying new knowledge and insights from bench to bedside.

BBRF also produces the award-winning television series, *Healthy Minds*, which is broadcast on public television (PBS). The series provides useful information to the public about psychiatric conditions and treatments as well as cutting edge research advancements. Season 8 launched in May and is available to watch on PBS stations around the U.S. and online at <https://www.pbs.org/show/healthy-minds-with-dr-jeffrey-borenstein/>

BBRF celebrated 35 years as a leader in support of global mental health research in 2022. Working alongside the BBRF Board, Scientific Council, and its donors is an honor, and we thank you for your dedication to our mission.

While continuous advancements in brain research are being made, more still needs to be done.

We are very pleased that in 2023, a gift from you can be matched through a \$1 Million Challenge Match from two very generous family foundations that are passionate about BBRF's vital mission.

Donor contributions will be matched dollar-for-dollar if they're from:

- a new donor to BBRF
- a former BBRF donor who's lapsed, but makes a new 2023 contribution
- a current BBRF donor who increases their 2023 contribution (the increased amount is matched)

**As always, 100% of your contribution for research directly supports research, as our operating expenses are covered by separate foundation grants.**

We very much appreciate your support. Together we will continue to fund innovative and impactful research that is making a difference in the lives of those living with brain and behavior disorders.

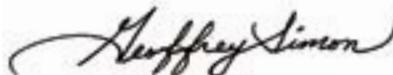
Sincerely,



Jeffrey Borenstein, M.D.  
President & CEO



Herbert Pardes, M.D.  
President, Scientific Council



Geoffrey Simon  
Chair, Board of Directors

# BBRF Major Advancements

## NEW TREATMENTS

### Clozapine in the Treatment of Schizophrenia

Schizophrenia is a chronic and often disabling brain disorder that affects 1 in 100 (about 2.5 million) American adults. Symptoms include delusions, hallucinations, disorganized speech, trouble with thinking, and lack of motivation. With treatment, symptoms of schizophrenia can greatly improve.

Yet roughly 750,000 Americans have “treatment-resistant schizophrenia” (TRS). *Clozapine* was the first antipsychotic drug proven to be effective in treating TRS and remains the “gold-standard” treatment. It has also been found to significantly lower the risk of suicidal behavior in schizophrenia patients.

Clozapine’s effectiveness in treating schizophrenia was demonstrated in a clinical trial in the 1980s co-led by a scientist who was working on a BBRF research grant. His work provided a scientific underpinning for the FDA’s approval of Clozapine in 1989.

This, in turn, led to the development of a whole new “second generation” of antipsychotics such as Abilify, Risperdal, and Seroquel—that are now treating millions of patients globally.

### Development of the First Rapid-Acting Antidepressants

Depression is the leading cause of disability worldwide. The annual economic impact of major depressive disorders is an estimated \$400 billion in the U.S. and more than \$2 trillion worldwide.

Symptoms of major depressive disorder include: feeling worthless, having thoughts of suicide, losing interest in most or all activities, significant impairment of appetite and sleep, and having difficulty concentrating.

Each year about 8% of adults—nearly 20 million Americans—experience major depression; 8% of adolescents experience at least one depressive episode; and an estimated 3 million American adults make a suicide plan.

Unfortunately more than 50% of Americans with depression remain untreated. While many Americans who are treated for depression respond to therapy, at least one-third do not respond or do not have a full response. Non-responders have “treatment-resistant depression” (TRD).

Over the past 20 years, BBRF has awarded over 90 grants to scientists studying the use of rapid-acting

agents, like the drug ketamine, to treat TRD. In recent years, BBRF grantees have been instrumental in developing *esketamine*, a ketamine derivative, to rapidly reduce TRD and suicidal ideation. In 2019 it became the first rapid-acting antidepressant approved by the FDA. Ketamine and related drugs are now being tested by BBRF grantees for use in other disorders including post-traumatic stress disorder (PTSD) and obsessive-compulsive disorder (OCD).

### Development of Transcranial Magnetic Stimulation (rTMS) to Treat Depression

In 1975, Hollywood gave moviegoers its interpretation of electroconvulsive therapy (ECT) in a mental hospital in *One Flew Over the Cuckoo’s Nest* and it wasn’t a pretty picture. While the modern application of ECT has in fact enabled tens of thousands of people with severe, treatment-resistant depression to carry on with their lives, it involves a medical procedure that must be performed under general anesthesia, usually in a clinic or hospital, and is usually considered a treatment of last resort due to side effects.

In the 1990s, a researcher used BBRF grants to study and develop a very different way of using “neuromodulation” to alter connectivity in brain circuits implicated in depression. Called rTMS (repetitive transcranial magnetic stimulation), this technology is non-invasive and is delivered on an outpatient basis. Patients experience only minor side effects such as headaches, which typically pass in minutes, and have no loss of memory. BBRF grantees demonstrated that rTMS was effective in a substantial percentage of treatment-resistant depression (TRD) patients. This led to FDA approval in 2009. The treatment is used around the country and across the globe today. More powerful and equally safe rapid-acting versions of TMS are now being tested in clinical trials and show promise not only in TRD but as treatments for hospitalized patients experiencing a suicidal crisis. Other advanced neuromodulation therapies are being tested in PTSD, OCD, and other psychiatric disorders.

### **Prevention: Decreasing Schizophrenia Risk Via Maternal Choline Supplements During Pregnancy**

Schizophrenia is a disabling condition whose first clear symptoms often don't appear until the late teens or twenties. What if something could be done to reduce the risk of schizophrenia developing?

BBRF grantees and others have shown that the illness is highly complex. Factors thought to contribute to its causation are remarkably diverse. Chief among these are genetics: variations in one's DNA that one carries from the beginning of life and environmental factors in the months and years following birth. BBRF-funded research has shown that complications during pregnancy can greatly increase the chance that genetic risk factors in the fetus actually trigger changes in the brain development. These can affect the formation of neural cells and circuits in the fetal brain and the crucial thinning of synaptic connections early in life.

What if something as simple as taking a nutritional supplement by the mother during pregnancy could be shown to reduce risk or even prevent the future onset of schizophrenia? Researchers with BBRF funding have performed pioneering clinical studies that supplemented the diet of pregnant women with the nutrient choline. The research has shown that choline supplements during pregnancy do indeed appear to reduce the risk that a child will go on to develop psychotic disorders including schizophrenia. While the research is ongoing, the American Medical Association now recommends including choline in prenatal vitamin supplements.

### **Research Leading to the First Medicine to Specifically Treat Postpartum Depression**

Having a baby is a life-changing event. During pregnancy and after a baby is born, parental mood shifts are much more common than many people realize. It's been estimated that 50% to 75% of new parents experience “baby blues” after delivery. Symptoms are frequent prolonged bouts of crying, sadness, and anxiety. Although unpleasant, the condition usually subsides within weeks without treatment.

## BASIC RESEARCH

More worrisome is postpartum depression (PPD). It affects about 1 in 7 mothers in the perinatal period stretching from pregnancy into the months following childbirth. Its symptoms include alternating emotional highs and lows, frequent crying, irritability and fatigue, suicidal thoughts, as well as feelings of guilt, anxiety, and inability to care for one's baby or oneself. Symptoms of PPD may appear even up to a year after giving birth. In many cases, treatment with psychotherapy or antidepressants is effective.

But as with major depression, a substantial portion of PPD patients don't respond to standard depression therapy. BBRF provided research grant funding that revealed patterns of neurotransmitter fluctuations during the menstrual cycle. This led to development of *brexanolone*, a rapid-acting drug that in 2019 became the only therapy specifically approved by the FDA to treat postpartum depression.

### Optogenetics Launches a Revolution in Brain Research, Enabling Manipulation of Individual Neural Cells and Circuits

The 6000+ grants awarded over 35 years by BBRF have enabled a rising generation of neuroscientists to shape a revolution in brain science. They are the generation that has begun to establish direct linkages between the devastating symptoms of mental illnesses and biological processes underlying them that alter the structure and function of genes, cells, and circuits across the brain. It's very hard to examine or perform experiments in the living brain. But BBRF grantees have devised remarkable methods and new technologies that have catapulted research forward.

BBRF support was instrumental, for instance, in the development of optogenetics, a game-changing technology that gives researchers precise control over brain circuitry in awake, behaving animals. In 2021 a BBRF-funded scientist won the prestigious Albert Lasker Basic Medical Research Award for his role in developing optogenetics.

Optogenetics involves the use of light to rapidly open and close the membrane channels that make neurons fire and cease firing, and allows for observation of the effects on behavior. Now in use at thousands of labs all over the world, this new technology is helping to enable the identification of mechanisms that give rise to depression, anxiety, schizophrenia, autism and other brain and behavior disorders.

### Stem-Cell Technology Provides a Window on Developing Brain Cells and Circuits as Pathologies Arise

One of the challenges in studying the brain is not being able to sample living brain cells in patients with psychiatric disorders or healthy controls. To figure out how pathology related to mental illness arises, BBRF grantees have pioneered applications of stem-cell technology to obtain views of the brain in its earliest stages of development, a time when pathology associated with autism, schizophrenia and other disorders is thought to begin.

Harnessing the power of stem cells, BBRF-funded scientists have harmlessly sampled skin cells from people diagnosed with illnesses such as autism and schizophrenia, both of which are thought to have a strong genetic component, and "reprogrammed" them to return to the stem-cell state that marks the beginning of every cell's life.

These cells can then be induced to re-develop as mature brain cells. Using this method, scientists can study such "reborn" brain cells with the hope of seeing when and how abnormalities develop. This remarkable technology has already yielded insights into abnormalities in autism and schizophrenia that can be traced to the earliest stages of life.

# Our Scientific Council

- 184** Scientific Council Members (21 Emeritus)
- 50** Members of the National Academy of Medicine
- 42** Chairs of Psychiatry & Neuroscience Departments
- 16** National Institute of Health Chiefs & Directors
- 7** Members of the National Academy of Sciences
- 3** Recipients of the National Medal of Science
- 2** Directors of the National Institute of Mental Health
- 1** Nobel Prize Winner

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# Our New Scientific Council Members

The high quality of the research we fund is made possible by the BBRF Scientific Council.

This group of 184 prominent mental health researchers, led by Dr. Herbert Pardes, reviews each grant application and selects the most promising ideas with the greatest potential to lead to breakthroughs.

The Scientific Council guides the Foundation to fund creative and impactful basic, translational, and clinical research relevant to the whole spectrum of mental health.



***“We are seeing significant advances in psychiatric research on multiple fronts. We are so pleased that these 13 leading experts have joined the Council to help keep the momentum going. They will help us continue to identify the best and brightest ideas in brain research — the very basis for awarding BBRF grants .”***

- Herbert Pardes, M.D.



**Paola Arlotta, Ph.D.**  
 Chair, Harvard Department of Stem Cell and Regenerative Biology  
 Stanley Center for Psychiatric Research, Broad Institute  
 Harvard University / McLean Hospital



**André Fenton, Ph.D.**  
 Professor of Neural Science  
 New York University  
 2004 BBRF Young Investigator



**Christoph Kellendonk, Ph.D.**  
 Associate Professor of Pharmacology and Surgeons  
 Vagelos College of Physicians and Surgeons  
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 2019 Maltz Prize for Innovative and Promising Schizophrenia Research  
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**Rita Z. Goldstein, Ph.D.**  
 Professor in Neuroimaging and Addiction, Department of Psychiatry  
 Icahn School of Medicine at Mount Sinai  
 2003 BBRF Young Investigator



**Arnold Kriegstein, M.D., Ph.D.**  
 Professor of Neurology  
 University of California, San Francisco



**Ronald Cowan, M.D., Ph.D.**  
 Distinguished Professor and Chair  
 University of Tennessee Health Science Center



**Dorothy E. Grice, M.D.**  
 Director of the Tics, OCD and Related Disorders Program, Department of Psychiatry  
 Icahn School of Medicine at Mount Sinai  
 1996 BBRF Young Investigator



**Cecile D. Ladouceur, Ph.D.**  
 Professor, Department of Psychiatry  
 University of Pittsburgh  
 2008, 2006 BBRF Young Investigator



**Kathryn R. Cullen, M.D.**  
 Head of the Child & Adolescent Mental Health (CAMH) Division  
 Associate Professor, Department of Psychiatry and Behavioral Sciences  
 University of Minnesota  
 2009 BBRF Young Investigator



**Alicia Izquierdo, Ph.D.**  
 Professor, Behavioral Neuroscience  
 UCLA



**David A. Morilak, Ph.D.**  
 Professor, Dept of Pharmacology  
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 Center for Biomedical Neuroscience  
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**Shafali Spurling Jeste, M.D.**  
 Chief, Division of Neurology Co-Director  
 Neurological Institute Las Madrinas  
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# PLAN YOUR FUTURE, SHAPE YOUR LEGACY

There are many ways to support the Brain & Behavior Research Foundation during your lifetime and one particularly meaningful way is through planned giving.

When you include BBRF as part of your legacy plan, you help ensure that our groundbreaking research continues.

Gifts which benefit the Foundation also personally benefit its donors by helping to fulfill important family and financial goals and ensure that our scientists will have the resources to continue making advances in mental health research, today and tomorrow.



“Marla and I donate to the Brain & Behavior Research Foundation in support of science and the hope of finding better treatments for mental illness.

Better treatments came too late for my brother, Stewart, who lost his battle with schizophrenia, and too late for my father, Ken, who suffered from depression. But we believe that with ongoing research, it will not be too late for millions of other people thanks to BBRF. We know this because we have seen the scientific breakthroughs and results that have come from funding scientists. Marla and I are dedicated to helping people who live with mental illness and doing what we can to be a part of the solution by our continued giving to BBRF.”

—Ken Harrison, Board Member

To learn more, please contact us at **646-681-4889** or [plannedgiving@bbrfoundation.org](mailto:plannedgiving@bbrfoundation.org).

# 2022 Leading Research Achievements by Foundation Grantees, Prize Winners, & Scientific Council Members

## NEXT-GENERATION THERAPIES: Depression

### Discovering How tDCS Brain Stimulation Therapeutically Modifies Brain Circuits in Depression



**Evangelia G. Chryssikou, Ph.D.**

*Drexel University*

2015 BBRF Young Investigator

*Journal: Biological Psychiatry: Cognitive Neuroscience & Neuroimaging*  
January 1, 2022

Researchers found mechanistic evidence supporting the ability of tDCS (transcranial direct current stimulation), a form of non-invasive brain stimulation, to help patients with moderate to severe depression. Among other things, they showed that tDCS influences connections between the medial prefrontal cortex and the amygdala, both of which have been implicated in emotional processing and emotion regulation. Results represent an important step toward understanding mechanisms of action of tDCS as a potentially safe, low-cost, and effective treatment for depression.

## NEXT-GENERATION THERAPIES: Depression

### Non-Invasive TMS Brain Stimulation Activates Deep-Brain Region Important in Depression



**Sarah H. Lisanby, M.D.**

*National Institute of Mental Health; Duke University*

BBRF Scientific Council; 2010 BBRF Distinguished Investigator; 2003 Independent Investigator; 1996 Young Investigator; 2001 BBRF Klerman Prize

*Journal: NeuroImage*  
January 1, 2022

Individually targeted transcranial magnetic stimulation (TMS) was used to activate an important depression-related target located deep within the brain. This suggests the potential of non-invasive stimulation therapies to reach important brain areas previously thought beyond their reach, in depression and other psychiatric illnesses.

The research team included: **Zhi-De Deng, Ph.D.**, 2017 BBRF Young Investigator

## BASIC RESEARCH: Depression, Anxiety, PTSD, Borderline Personality Disorder

### Researchers Identify a Neural Signature Centrally Important in Restructuring Negative Self-Beliefs



**Trevor Steward, Ph.D.**

*University of Melbourne, Australia*

2020 BBRF Young Investigator

*Journal: Molecular Psychiatry*  
January 1, 2022

Little is known about what happens in the brain when CBT or other therapies succeed in helping patients in the task of cognitive reappraisal. This research describes a novel neural signature that comes into play when a person restructures negative self-beliefs and proposes a new theory about brain mechanisms responsible for enabling people to sustain complex mental representations of the self. The findings have potential implications for targeting brain stimulation treatments to help alleviate symptoms of self-impairing negative self-beliefs.

## NEXT-GENERATION THERAPIES: Depression, Anxiety, PTSD

### Evidence That Cognitive Behavioral Therapy Can Help People With Insomnia Who Also Are Depressed or Anxious



**Lauren D. Asarnow, Ph.D.**

*University of California,  
San Francisco*

2019 BBRF Young Investigator

*Journal: Current Psychiatry  
Reports  
January 21, 2022*

A large body of research has demonstrated the effectiveness of CBT-I, a specialized form of cognitive behavioral therapy, in treating chronic insomnia in adults without psychiatric co-morbidities. Dr. Asarnow and colleagues conducted a review of recent research and found evidence of the importance of treating insomnia symptoms in people who also suffer from either depression, anxiety, or PTSD. Comorbid participants of such trials who did experience an improvement in insomnia symptoms were more likely to have better depression outcomes; more research is needed to determine how it impacts symptoms in anxiety and PTSD.

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## NEXT-GENERATION THERAPIES: Addiction

### A Molecule Tested in Higher Primates Reduced Alcohol Consumption By Half



**Kyle H. Flippo, Ph.D.**

*University of Iowa*

2019 BBRF Young Investigator

*Journal: Cell Metabolism  
February 1, 2022*

Administering a hormone called FGF21, researchers were able to reduce alcohol consumption by about 50% in monkeys exhibiting a strong preference for alcohol. The experiments also provided evidence of a liver-to-brain circuit that specifically regulates alcohol consumption.

The research team included **Brad A. Grueter, Ph.D.**, 2016 and 2014 BBRF Young Investigator.

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## NEXT-GENERATION THERAPIES: Schizophrenia, Psychosis

### Comprehensive Analysis Suggests Metacognitive Training Can Be Effective in Schizophrenia and Psychotic Disorders



**Martin Lepage, Ph.D.**

*McGill University*

2002 BBRF Young Investigator

*Journal: JAMA Psychiatry  
March 23, 2022*

A meta-analysis of 43 prior clinical trials testing metacognitive training (MCT) for psychosis concluded MCT is an effective treatment, with benefits still evident in patients 1 year following the end of MCT sessions. In MCT, a therapist or facilitator enters into discussions with a group of patients, seeking to discover what they believe about their own thoughts. MCT targets maladaptive thinking styles common to psychosis, which include jumping to conclusions, inflexibly holding on to beliefs, and being overconfident in initial judgments.

The research team included **Steffan Moritz, Ph.D.**, 2014 BBRF Independent Investigator, 2008, 2005 Young Investigator.

## BASIC RESEARCH: Schizophrenia

### Important New Research on Schizophrenia Genetics Provides Strongest Evidence to Date of Problems at the Brain's Synapses



**Tarjinder Singh, Ph.D.**

*Columbia University*

2019 BBRF Young Investigator

Journal: *Nature*

April 8, 2022

In two papers published concurrently, an international team composed of hundreds of scientists provided the most comprehensive picture to date of how variations in the human genome affect schizophrenia risk. Their work contains some of the most compelling indications linking the illness with problems at the synapse—the gaps across which neurons in the brain communicate.

The research teams included several dozen recipients of BBRF grants, members of the BBRF Scientific Council, and recipients of BBRF annual prizes for outstanding achievement in research. Among senior members of the team were **Michael C. O'Donovan, M.D., Ph.D.**, 2012 BBRF Lieber Prize winner; **Stephan Ripke, M.D., Ph.D.**, 2015 BBRF Young Investigator and 2014 BBRF Baer Prize winner; and **Patrick Sullivan, M.D., FRANZCP**, 2014 BBRF Lieber Prize winner.

## BASIC RESEARCH: Schizophrenia

### Stem Cell Technology Helps Identify a Potential Causal Mechanism in Schizophrenia That Could Be Targeted



**Lorna A. Farrelly, Ph.D.**

*Icahn School of Medicine at Mount Sinai*

2019 BBRF Young Investigator

Journal: *Nature Communications*

April 22, 2022

Using stem-cell technology, researchers identified an aberrant gene-regulation pattern called hyperacetylation that may be causally involved in some cases of schizophrenia. Acetyl molecules attach to DNA packaging proteins to encourage or repress gene activation. Hyperacetylation means that there are too many acetyl molecules attaching to bundles of DNA called histones, causing one or more genes to be abnormally regulated. The team identified a specific protein, BRD4, which, if blocked or repressed, might help alleviate the severity of the aberration.

The research team included: included **Kristen Brennand, Ph.D.**, BBRF Scientific Council, 2018 BBRF Maltz Prize, 2016 BBRF Independent Investigator, 2012 Young Investigator; **Carol A. Tamminga, M.D.**, 2011 BBRF Lieber Prize winner, 2010 and 1998 BBRF Distinguished Investigator; **Ian Maze, Ph.D.**, 2014 BBRF Young Investigator.

## NEXT-GENERATION THERAPIES: Depression

### Video Game-Based Intervention Helped Reduce Cognitive Deficits in Depressed Patients



**Richard S.E. Keefe, Ph.D.**

*Duke University*

BBRF Scientific Council; 2003 BBRF Independent Investigator; 1995, 1991 Young Investigator

Journal: *American Journal of Psychiatry*

April 12, 2022

Researchers testing a novel video game-based intervention in depressed patients found that it can reduce the severity of an important form of cognitive deficit—the ability to remain engaged and pay attention to a task over a sustained interval.

The research team included **Amit Etkin, M.D., Ph.D.**, 2012 BBRF Young Investigator.

**BASIC RESEARCH: Addiction**

## Researchers Discover Potentially Targetable Brain Circuit Controlling Cocaine Withdrawal Anxiety and Relapse



**Kevin Beier, Ph.D.**

*University of California Irvine  
School of Medicine*

2017 BBRF Young Investigator

*Journal: Cell Reports*  
May 3, 2022

Researchers discovered an extended brain circuit involved in cocaine addiction. The circuit regulates withdrawal anxiety and the urge to take cocaine again. Distinct from reward circuits driven by dopamine, the newly identified circuit might be targeted by novel therapeutic agents to reduce the negative affect that develops during withdrawal as well as to prevent relapse.

**BASIC RESEARCH: All Mental Illnesses**

## Precise Imaging Reveals How a Key Receptor's Signaling Is Modulated — A Spur to Improving Psychiatric and Other Drugs



**Wesley B. Asher, Ph.D.**

*Columbia University*

2014 BBRF Young Investigator

*Journal: Cell*  
May 12, 2022

Researchers have obtained powerful new insights into mechanisms involved in GPCRs, cellular receptors whose signaling is implicated in many psychiatric disorders. GPCRs are the target of one-third of all approved drugs, including therapeutics prescribed for psychiatric disorders such as schizophrenia, bipolar disorder, and depression. The dopamine D2 receptor, which is the target of all current antipsychotic medicines, is a GPCR, for example. The research will aid efforts to improve the action of drugs that interact with GPCRs, including psychiatric drugs, to make them more effective and/or to reduce side effects.

The study's senior author was **Jonathan Javitch, M.D., Ph.D.**, BBRF Scientific Council, 2010 Distinguished Investigator, 2003 Independent Investigator, 1992, 1990 Young Investigator.

**BASIC RESEARCH, NEXT-GENERATION THERAPIES: Addiction**

## A Circuit Causally Linked With Spontaneous Nicotine Addiction Remissions May Be a Powerful Addiction Treatment Target



**Shan H. Siddiqi, M.D.**

*Harvard Medical School*

2022 BBRF Klerman Prize  
2019 BBRF Young Investigator

*Journal: Nature Medicine*  
June 3, 2022

By studying 129 people who were addicted to nicotine at the time they suffered brain damage, a team of researchers has identified a brain network they believe is causally linked with remission from nicotine addiction and that can be targeted with non-invasive brain stimulation.

The research team included **Nora D. Volkow, M.D.**, BBRF Scientific Council; Director, National Institute on Drug Abuse.

## NEXT-GENERATION THERAPIES: PTSD

# Clinical Trial Comparing Different Forms of Exposure and Drug Therapy in Combat Veterans with PTSD Is Step Toward Individualized Treatment



**Francis S. Lee, M.D.**

*Weill Cornell Medicine*

BBRF Scientific Council; 2010 BBRF Independent Investigator; 2005, 2002 Young Investigator

Journal: *Translational Psychiatry*  
July 22, 2022

In a step toward precision medicine, a clinical trial found that two forms of exposure therapy enabled combat veterans to significantly reduce PTSD symptoms. Whether or not a patient also experienced depression affected which form of treatment was more effective. Those carrying either of two common genetic variations affecting processes that may impact fear extinction also showed evidence of having distinct therapy responses.

The research team included: **Barbara O. Rothbaum, Ph.D.**, 2012 BBRF Distinguished Investigator; **Christopher Reist, M.D.**, 1996 and 1993 BBRF Young Investigator; **Tanja Jovanovic, Ph.D.**, 2015 BBRF Independent Investigator, 2010 Young Investigator; **Seth D. Norholm, Ph.D.**, 2002 BBRF Young Investigator; **Charles E. Glatt, M.D., Ph.D.**, 2003 and 2001 BBRF Young Investigator.

## BASIC RESEARCH: Depression, Anxiety, PTSD

# Researchers Identify Molecule That Orchestrates Association of Events With Positive and Negative Memories



**Kay M. Tye, Ph.D.**

*Salk Institute for Biological Studies*

BBRF Scientific Council Emeritus, 2016 BBRF Freedman Prize, 2013 BBRF Young Investigator

Journal: *Nature*  
July 20, 2022

Researchers discovered that neurotensin, a neurotransmitter, orchestrates a process in the brain's amygdala that enables us to assign positive and negative "tags" to specific memories. Targeting this molecule might be the aim of future treatments for individuals who fixate on or overstress negative memories.

The team included **Kerry J. Ressler, M.D., Ph.D.**, BBRF Scientific Council, 2009 BBRF Freedman Prize, 2005 and 2002 BBRF Young Investigator; **Romy Wichmann, Ph.D.**, 2016 BBRF Young Investigator; **Cody A. Siciliano, Ph.D.**, 2017 BBRF Young Investigator; **Xin Jin, Ph.D.**, 2018 BBRF Young Investigator; **Anna Beyeler, Ph.D.**, 2015 BBRF Young Investigator.

## NEXT-GENERATION THERAPIES: ADHD

# Home-Based tDCS Brain Stimulation Treatments Reduced Inattention in Adults with ADHD



**Douglas Teixeira Leffa, M.D., Ph.D.**

*Universidade Federal do Rio Grande do Sul, Brazil*

Journal: *JAMA Psychiatry*  
August 3, 2022

Researchers have obtained promising results in a clinical trial of a home-based non-invasive brain stimulation treatment for adults with ADHD. The treatment, using low-power transcranial direct current stimulation (tDCS) technology, was associated with lower inattention symptoms in patients.

The research team included: **Joan Camprodon, M.D., Ph.D., MPH**, 2010 BBRF Young Investigator; **André Brunoni, M.D., Ph.D.**, 2013 BBRF Young Investigator.

**NEXT-GENERATION THERAPIES: Depression**

## FDA Clears SAINT Rapid-Acting Brain Stimulation Approach for Those Suffering From Resistant Major Depression



**Nolan R. Williams, M.D.**

*Stanford University*

2019 BBRF Klerman Prize  
2018, 2016 BBRF Young Investigator

*FDA announcement made  
September 6, 2022*

The FDA gave clearance for a commercial application of the SAINT brain stimulation protocol developed by Dr. Williams and colleagues. In a recent clinical trial, SAINT enabled 79 percent of patients with refractory major depression to achieve remission after only 5 days of accelerated non-invasive treatments.

**NEXT-GENERATION THERAPIES: Suicide Prevention**

## Folic Acid Supplements Were Associated With Lower Suicidality in Large Database Study



**J. John Mann, M.D.**

*Columbia University/NY State  
Psychiatric Institute*

BBRF Scientific Council;  
2022 BBRF Colvin Prize;  
2008 BBRF Distinguished Investigator

*Journal: JAMA Psychiatry  
September 28, 2022*

In a promising lead in suicide prevention, researchers found that in a cohort of over 866,000 people prescribed folic acid supplements over 5 years, there was a 44% lower rate of suicidal events during periods when the supplements were being taken vs. when they were not being taken.

**NEXT-GENERATION THERAPIES: Depression**

## Adding an Antibiotic Improved Brain Stimulation Results in Depression



**Alexander McGirr M.D.,  
Ph.D.**

*University of Calgary, Canada*  
2018 BBRF Young Investigator

*Journal: JAMA Psychiatry  
October 12, 2022*

By providing 2 weeks of antibiotic therapy using the drug d-cycloserine during a 4-week treatment course with iTBS, a form of non-invasive brain stimulation, researchers were able to show significantly improved outcomes in patients with moderate to severe major depression.

## BASIC RESEARCH: All Mental Illnesses

### Lab-Grown Human Neurons Transplanted into the Rat Brain Grew, Connected, and Promise to Shed Light on Psychiatric Illness



**Sergiu Pasca, M.D.**

*Stanford University*

2017 BBRF Independent Investigator; 2012 Young Investigator

Journal: *Nature*  
October 12, 2022

Researchers grew organoids composed of human cortical neurons and transplanted them into the rat sensory cortex. The human cells integrated functionally into the rat brain—could receive sensory stimulation and drive behavior. The same approach enabled the team to study pathology in human cells transplanted from patients with a neuropsychiatric disorder, a strategy that can also be applied in other disorders.

The research team included: **Karl Deisseroth, M.D., Ph.D.**, BBRF Scientific Council, 2013 BBRF Goldman-Rakic Prize winner, 2007 and 2005 BBRF Young Investigator; **Felicity Gore, Ph.D.**, 2019 BBRF Young Investigator; **Neal D. Amin, M.D., Ph.D.**, 2021 BBRF Young Investigator

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## NEXT-GENERATION THERAPIES: Depression

### After 'Priming' with Ketamine, Patients Receiving Self-Esteem Training Had Extended Antidepressant Benefits, Study Finds



**Robert H. Howland, M.D.**

*University of Pittsburgh*

1991 BBRF Young Investigator

In a randomized placebo-controlled clinical trial, ketamine's rapid antidepressant effect which normally fades within a week was still present after 30 days for treatment-resistant participants who received a single ketamine injection and 4 days of computer-administered self-esteem training.



**Sanjay J. Mathew, M.D.**

*Baylor College School of Medicine*

2009 BBRF Independent Investigator;  
2006, 2001 Young Investigator

Journal: *American Journal of Psychiatry*  
December 1, 2022

# BBRF Grants Drive Scientific Breakthroughs Leading Toward Improved Treatments, Cures, and Methods of Prevention

**SINCE 1987:**



## **THE MULTIPLIER EFFECT**

BBRF Grant recipients have gone on to receive an estimated \$4.4 billion in additional research funding in next stage NIMH and NIH grants.

**No other organization outside of the federal government has funded the number of mental health research grants that the Foundation has—or been responsible for more breakthroughs in the field.**

Our Grants support a broad range of the best ideas in brain research. Funding is focused on four priority areas to better understand and treat mental illness, aiming toward prevention and cures:

## **Research Categories**

### **Basic Research**

To understand what happens in the brain to cause mental illness

### **Diagnostic Tools/Early Intervention**

To recognize early signs of mental illness and treat as early as possible

### **New Technologies**

To advance or create new ways of studying and understanding the brain

### **Next-Generation Therapies**

To reduce symptoms of mental illness and ultimately cure and prevent brain and behavior disorders

The path to being awarded a BBRF Grant starts with an application. Grant applicants describe why they think their project could help lead to new insights and advances in the field of mental illness. Applicants represent the best and the brightest talent from world-class institutions.

The BBRF's Scientific Council, which is made up of 184 preeminent mental health researchers and led by Dr. Herbert Pardes, volunteer their time to review and evaluate applications. The Scientific Council not only looks for projects with the greatest potential for immediate advances in neurobiological and psychiatric research, but also at projects which can yield additional benefits for many years to come.

This venture capital-like approach to research funding has had tremendous success in advancing the field and helping more people live full, happy, and productive lives.

***“BBRF Young Investigator Grants have led to innovative research that has improved the lives of people living with mental illness. These early-career scientists are making significant strides in basic research, early intervention, diagnostic tools, new technologies, and next-generation therapies that will offer the best hope for advances in treatments for psychiatric illness.”***

**Herbert Pardes, M.D.**

President, BBRF Scientific Council

# BBRF Young Investigator Grants in 2022



BBRF Young Investigator Grants give early-career scientists the initial funding they need to begin to test their ideas and solidify their academic research careers. Young Investigator Grants provide scientists with \$35,000/year for two years totaling \$70,000. This seed money enables them to generate the preliminary data, or “proof of concept” that they need to compete for larger grants from traditional funding sources like the National Institute of Health.

The 2022 Young Investigators are focused on a broad range of psychiatric illnesses, including depression, schizophrenia, and PTSD. Nearly two dozen grantees will perform innovative research on addiction, including the epidemics of opioid- and alcohol-use disorders, which appear to have intensified during the pandemic. As rates of suicide in the U.S. continue to increase, seven grantees are creatively addressing new and better ways of predicting who among us is at greatest risk of suicide, and on ways of preventing or reducing suicidal behavior.

It is also notable that a dozen of the 2022 projects involve brain stimulation, including approaches that are both invasive and non-invasive, and new applications which are rapid-acting. Several seek to better understand how transcranial magnetic stimulation (TMS) changes neural cells and circuits to achieve therapeutic effects.

Some 2022 Young Investigators are performing pioneering studies of new and yet unproven methods of brain stimulation. Several are working with t-FUS (focused transcranial ultrasound stimulation), which delivers acoustic energy to targets of interest deep in the brain. This potentially could be a non-invasive alternative to deep-brain stimulation.

These are just a few highlights of the research projects that our grantees will be working on. It’s an exciting and very promising time in brain research that we hope will lead to improved treatments in the years to come.

## Co-Chairs of the Young Investigator Grant Selection Committee



**Judy M. Ford, Ph.D.**

Professor, Department of Psychiatry

University of California, San Francisco

BBRF Scientific Council Member  
2003 BBRF Independent Investigator



**Suzanne N. Haber, Ph.D.**

Professor, Department of Pharmacology and Physiology

University of Rochester School of Medicine and Dentistry

BBRF Scientific Council Member  
2011 BBRF Distinguished Investigator

***“BBRF Young Investigators represent a new generation of researchers who will pioneer breakthroughs in mental health research. We are excited to be able to support the work of these young scientists, who will apply powerful new technologies and insights to finding better treatments, cures, and methods of prevention for mental illness.”***

**Dr. Jeffrey Borenstein**

# 2022 BBRF Young Investigator Grants by Illness

Some grantees are listed under multiple categories as their grant projects are relevant to more than one illness.

## ADDICTION / SUBSTANCE-USE DISORDERS

**Aditi Banerjee, Ph.D.**

 *Basic Research*

**Inbal Ben-Ami Bartal, Ph.D.**

 *Next-Generation Therapies*

**Sujan Chandra Das, Ph.D.**

 *Basic Research*

**Matthew P. Gardner, Ph.D.**

 *Basic Research*

**Ahmed N. Hassan, M.D.**

 *Diagnostic Tools/Early Intervention*

 *Basic Research*

**Max Emanuel Joffe, Ph.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Kari A. Johnson, Ph.D.**

 *Basic Research*

**Thang M. Le, Ph.D.**

 *Basic Research*

**Emilia M. Lefevre, Ph.D.**

 *Basic Research*

**Snigdha Mukerjee, Ph.D.**

 *Basic Research*

**Lyonna F. Parise, Ph.D.,**

 *Basic Research*

**Rachel Rabin, Ph.D.**

 *Next-Generation Therapies*

**David J. Reiner, Ph.D.**

 *Basic Research*

**Zhenhao Shi, Ph.D.**

 *Basic Research*

**Benjamin M. Siemsen, Ph.D.**

 *Basic Research*

**Hua Tang, Ph.D.**

 *Basic Research*

**Victor M. Tang, M.D.**

 *Next-Generation Therapies*

**Sarah A. Thomas, Ph.D.**

 *Basic Research*

**Jason M. Tucciarone, M.D., Ph.D.**

 *Basic Research*

**Mark Wagner, Ph.D.**

 *Basic Research*

**Kevin S. Weiner, Ph.D.**

 *Basic Research*

**Genevieve J. Yang, M.D., Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

**Farhana Yasmin, Ph.D.**

 *Basic Research*

## ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD)

**Samuel William Centanni, Ph.D.**

 *Basic Research*

**Xiaomo Chen, Ph.D.**

 *Basic Research*

**Sarah M. Clark, Ph.D.**

 *Basic Research*

**Ahmed Eltokhi, Ph.D.**

 *Basic Research*

**Aaron Kucyi, Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

**Kristina Lanko, Ph.D.**

 *Basic Research*

**Violeta G. Lopez-Huerta, Ph.D.**

 *Basic Research*

**Jessica Taubert, Ph.D.**

 *Next-Generation Therapies*

**Genevieve J. Yang, M.D., Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

## ANXIETY DISORDERS

**Ryan T. Ash, M.D., Ph.D.**

 *New Technologies*

**Jessica Lynn Bolton, Ph.D.**

 *Basic Research*

**Stefano Brigidi, Ph.D.**

 *Basic Research*

**Samuel William Centanni, Ph.D.**

 *Basic Research*

**Joseph M. Cichon, M.D., Ph.D.**

 *Basic Research*

**Romain M. Durand, Ph.D.**

 *Basic Research*

**Carlos Fernandez-Pena Acuna, Ph.D.**

 *Basic Research*

**Jakob Hartmann, Ph.D.**

 *Basic Research*

**Daniel A. Jercog, Ph.D.**

 *Basic Research*

**Erin Kang, Ph.D.**

 *Basic Research*

**Sabine Krabbe, Ph.D.**

 *Basic Research*

**Shibin Li, Ph.D.**

 *Basic Research*

**Indira Mendez-David, Ph.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Saptarnab Naskar, Ph.D.**

 *Basic Research*

**Nancy Padilla-Coreano, Ph.D.**

 *Basic Research*

**Lyonna F. Parise, Ph.D.**

 *Basic Research*

**Zachary T. Pennington, Ph.D.,**

 *Basic Research*

**Jose Rodriguez-Romaguera, Ph.D.**

 *Basic Research*

**Stefanie Russman Block, Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

**Anna Schroeder, Ph.D.**

 *Basic Research*

**Sheila R. Shanmugan, M.D., Ph.D.**

 *Basic Research*

**Thomas Steinkellner, Ph.D.**

 *Basic Research*

**Michelle E. Stepan, Ph.D.**

 *Next-Generation Therapies*

**Alex Tang, Ph.D.**

 *Next-Generation Therapies*

**Hua Tang, Ph.D.**

 *Basic Research*

**Sarah M. Tashjian, Ph.D.**

 *Basic Research*

**Xinzhu Yu, Ph.D.**

 *Basic Research*

## **AUTISM SPECTRUM DISORDER (ASD)**

**Sarah M. Clark, Ph.D.**

 *Basic Research*

**Ahmed Eltokhi, Ph.D.**

 *Basic Research*

**Erin Kang, Ph.D.**

 *Basic Research*

**Saskia B.J. Koch, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Kristina Lanko, Ph.D.**

 *Basic Research*

**Violeta G. Lopez-Huerta, Ph.D.**

 *Basic Research*

**Adele Mossa, Ph.D.**

 *Basic Research*

**Aya Osman, Ph.D.**

 *Basic Research*

**Nancy Padilla-Coreano, Ph.D.**

 *Basic Research*

**Nisha Raj, Ph.D.**

 *Basic Research*

**Jeff L. Waugh, M.D., Ph.D.**

 *Basic Research*

**Xingjian Zhang, Ph.D.**

 *Basic Research*

## **BIOLOGY OF THE BRAIN**

*These projects focus on how the brain works*

### **CELLULAR MATURATION**

**Fernando C. Alsina, Ph.D.**

 *Basic Research*

### **EMOTION REGULATION/AGGRESSION**

**Macià Buades-Rotger, Ph.D.**

 *Basic Research*

### **IMMUNITY & BRAIN DEVELOPMENT**

**Maria Ester Coutinho, M.D., Ph.D.**

 *Basic Research*

### **OXYGENATION & BRAIN DEVELOPMENT**

**Laura R. Fenlon, Ph.D.**

 *Basic Research*

### **TRANSDIAGNOSTIC MARKERS**

**Antonia N. Kaczurkin, Ph.D.**

 *Diagnostic Tools/Early Intervention*

### **MARKERS OF MEMORY IMPAIRMENT**

**Darrin J. Lee, M.D., Ph.D.**

 *Basic Research*

### **RESPONSE INHIBITION**

**Aqilah M. McCane, Ph.D.**

 *Basic Research*

### **CHROMATIN REGULATORS**

**Hume Akahori Stroud, Ph.D.**

 *Basic Research*

### **IMPULSIVITY & REWARD**

**Karly M. Turner, Ph.D.**

 *Basic Research*

### **MATERNAL MICROBIOME & DEVELOPMENT**

**Denise M. Werchan, Ph.D.**

 *Basic Research*

### **ULTRASONIC NEUROMODULATION**

**Sangjin Yoo, Ph.D.**

 *New Technologies*

 *Next-Generation Therapies*

## **BIPOLAR DISORDER**

**Ahmed Eltokhi, Ph.D.**

 *Basic Research*

**Judit García-González, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Inge R. Holtman, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Rebekah S. Huber, Ph.D.**

 *Basic Research*

 *Diagnostic Tools/Early Intervention*

**Anouar Khayachi, Ph.D.**

 *Next-Generation Therapies*

 *Diagnostic Tools/Early Intervention*

**Camila Nayane D.C. Lima, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Sarah H. Sperry, Ph.D.**

 *Diagnostic Tools/Early Intervention*

## **BORDERLINE PERSONALITY DISORDER**

**Sarah Kathryn Fineberg, M.D., Ph.D.**

 *Basic Research*

**Jenna M. Traynor, Ph.D.**

 *Diagnostic Tools/Early Intervention*

## **DEPRESSION**

**Jessica Lynn Bolton, Ph.D.**

 *Basic Research*

**Davide Balos Cappon, Ph.D.**

 *Next-Generation Therapies*

**Samuel William Centanni, Ph.D.**

 *Basic Research*

**Kenny L. Chan, Ph.D.**

 *Next-Generation Therapies*

**Jun Chen, Ph.D.**

 *Diagnostic Tools/Early Intervention*

 *New Technologies*

**Tina Chou, Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

**Joseph M. Cichon, M.D., Ph.D.**

 *Basic Research*

**Ana Paula Costa, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Adam J. Culbreth, Ph.D.**

 *Basic Research*

**Romain M. Durand, Ph.D.**

 *Basic Research*

**Immanuel Elbau, M.D., Ph.D.**

 *Next-Generation Therapies*

**Joline M. Fan, M.D.**

 *Basic Research*

**Itay Hadas, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Jakob Hartmann, Ph.D.**

 *Basic Research*

**Frederick L. Hitti, M.D., Ph.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Inge R. Holtman, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Caroline P. Hoyniak, Ph.D.**

 *Diagnostic Tools/Early Intervention*

 *Next-Generation Therapies*

**Kyle D. Ketchesin, Ph.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Daniel C. Kopala-Sibley, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Thang M. Le, Ph.D.**

 *Basic Research*

**Stephanie L. Leal, Ph.D.**

 *Basic Research*

**Shibin Li, Ph.D.**

 *Basic Research*

**Dong Liu, Ph.D.**

 *New Technologies*

 *Next-Generation Therapies*

**Hermany Munguba, Ph.D.**

 *Basic Research*

**Corina Nagy, Ph.D.**

 *Basic Research*

**Saptarnab Naskar, Ph.D.**

 *Basic Research*

**Sean M. Nestor, M.D., Ph.D.**

 *Next-Generation Therapies*

**Nancy Padilla-Coreano, Ph.D.**

 *Basic Research*

**Lyonna F. Parise, Ph.D.**

 *Basic Research*

**Zachary T. Pennington, Ph.D.**

 *Basic Research*

**Dominique Piber, M.D.**

 *Next-Generation Therapies*

**Stefanie Russman Block, Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

**Sheila R. Shanmugan, M.D., Ph.D.**

 *Basic Research*

**Thomas Steinkellner, Ph.D.**

 *Basic Research*

**Michelle E. Stepan, Ph.D.**

 *Next-Generation Therapies*

**Yue Sun, Ph.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Tuan Leng Tay, Ph.D.**

 *Next-Generation Therapies*

**Joseph J. Taylor, M.D., Ph.D.**

 *Next-Generation Therapies*

**Sarah A. Thomas, Ph.D.**

 *Basic Research*

**Nicholas T. Trapp, M.D.**

 *Next-Generation Therapies*

**Akina Umemoto, Ph.D.**

 *Basic Research*

**Manuel Valero Garcia, Ph.D.**

 *Basic Research*

**Akila S. Weerasekera, Ph.D.**

 *Next-Generation Therapies*

 *Diagnostic Tools/Early Intervention*

**Kevin S. Weiner, Ph.D.**

 *Basic Research*

## **EATING DISORDERS**

**Sofia Beas Parodi, Ph.D.**

 *Basic Research*

**Lauren Breithaupt, Ph.D.**

 *Basic Research*

**Marie A. Labouesse, Ph.D.**

 *Basic Research*

**Fernando Midea Cuccovia V. Reis, Ph.D.**

 *Basic Research*

**Alejandro Ramirez, M.D., Ph.D.**

 *Basic Research*

**Chen Ran, Ph.D.**

 *Basic Research*

**Rachel Amy Ross, M.D., Ph.D.**

 *Basic Research*

## **OBSESSIVE-COMPULSIVE DISORDER (OCD)**

**Samuel William Centanni, Ph.D.**

 *Basic Research*

**Iakovos Lazaridis, Ph.D.**

 *Basic Research*

**Nan Li, Ph.D.**

 *Basic Research*

**Dong Liu, Ph.D.**

 *New Technologies*

 *Next-Generation Therapies*

**Alex Tang, Ph.D.**

 *Next-Generation Therapies*

**Hua Tang, Ph.D.**

 *Basic Research*

**Nicholas T. Trapp, M.D.**

 *Next-Generation Therapies*

**Jeff L. Waugh, M.D., Ph.D.**

 *Basic Research*

**Brian Zaboski, Ph.D.**

 *Diagnostic Tools/Early Intervention*

## **OTHER DISORDERS**

### **EPILEPSY**

**Allison M. Ahrens, Ph.D.**

 *Basic Research*

### **CONDUCT DISORDER**

**Gregor Kohls, Ph.D.**

 *Basic Research*

### **TOURETTE SYNDROME**

**Iakovos Lazaridis, Ph.D.**

 *Basic Research*

### **TOURETTE SYNDROME**

**Jeff L. Waugh, M.D., Ph.D.**

 *Basic Research*

### **FRAGILE X**

**Nisha Raj, Ph.D.**

 *Basic Research*

### **SEVERE MENTAL ILLNESS**

**Jie Song, Ph.D.**

 *Basic Research*

### **PARKINSON'S DISEASE**

**Yue Sun, Ph.D.**

 *Basic Research*

### **PERSONALITY DISORDERS**

**(General)**

**Jenna M. Traynor, Ph.D.**

 *Diagnostic Tools/Early Intervention*

## **POST-TRAUMATIC STRESS DISORDER (PTSD)**

**Ryan T. Ash, M.D., Ph.D.**

 *New Technologies*

**Jessica Lynn Bolton, Ph.D.**

 *Basic Research*

**Stefano Brigidi, Ph.D.**

 *Basic Research*

**Samuel William Centanni, Ph.D.,**

 *Basic Research*

**Kirstie A. Cummings, Ph.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Daniel A. Jercog, Ph.D.**

 *Basic Research*

**Shibin Li, Ph.D.**

 *Basic Research*

**Saptarnab Naskar, Ph.D.**

 *Basic Research*

**Zachary T. Pennington, Ph.D.**

 *Basic Research*

**Stefanie Russman Block, Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

**Anna Schroeder, Ph.D.**

 *Basic Research*

**Alex Tang, Ph.D.**

 *Next-Generation Therapies*

**Sarah M. Tashjian, Ph.D.**

 *Basic Research*

**Nicholas T. Trapp, M.D.**

 *Next-Generation Therapies*

**Hein Johan Floris van Marle, M.D., Ph.D.**

 *Next-Generation Therapies*

 *New Technologies*

## PSYCHOSIS

**Marieke J. H. Begemann, Ph.D.**

 *Next-Generation Therapies*

**Kara Dempster, M.D.**

 *Next-Generation Therapies*

**Ilvana Dzafic, Ph.D.**

 *Basic Research*

**Roselinde (Roos) M.C.A. Pot-Kolder, Ph.D.**

 *Next-Generation Therapies*

**Alejandro G. Szmulewicz, M.D.**

 *Next-Generation Therapies*

**Sunny Xiaojing Tang, M.D.**

 *Diagnostic Tools/Early Intervention*

**Umit H. Yesilkaya, M.D.**

 *Basic Research*

**Tingting Zhou, Ph.D.**

 *Basic Research*

## SCHIZOPHRENIA

**Aurina Arnatkeviciute, Ph.D.**

 *Basic Research*

**Marieke J. H. Begemann, Ph.D.**

 *Next-Generation Therapies*

**Anya Bershada, M.D., Ph.D.**

 *Next-Generation Therapies*

**Sean P. Carruthers, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Jingyuan Chen, Ph.D.**

 *Basic Research*

**Sarah M. Clark, Ph.D.**

 *Basic Research*

**Adam J. Culbreth, Ph.D.**

 *Basic Research*

**Kara Dempster, M.D.**

 *Next-Generation Therapies*

**Shalini Dogra, Ph.D.**

 *Next-Generation Therapies*

**Ilvana Dzafic, Ph.D.**

 *Basic Research*

**Ahmed Eltokhi, Ph.D.**

 *Basic Research*

**Chris Greene, Ph.D.**

 *Basic Research*

**Jia Guo, Ph.D.**

 *Basic Research*

 *Diagnostic Tools/Early Intervention*

**Inge R. Holtman, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Kiyohito Iigaya, Ph.D.**

 *Basic Research*

**Agnieszka Kalinowski, M.D., Ph.D.**

 *Basic Research*

**David B. Kastner, M.D., Ph.D.**

 *Basic Research*

**Linda Katona, Ph.D.**

 *Basic Research*

**Kristina Lanko, Ph.D.**

 *Basic Research*

**Dong Liu, Ph.D.**

 *New Technologies*

 *Next-Generation Therapies*

**Violeta G. Lopez-Huerta, Ph.D.**

 *Basic Research*

**Tina Fabia Notter, Ph.D.**

 *Basic Research*

**Aarron J. Phensy, Ph.D.**

 *Basic Research*

**Roselinde (Roos) M.C.A. Pot-Kolder, Ph.D.**

 *Next-Generation Therapies*

**Seung-Eon Roh, Ph.D.**

 *Basic Research*

**Audrey Sederberg, Ph.D.**

 *Basic Research*

**Zhixiong Sun, Ph.D.**

 *Basic Research*

**Alejandro G. Szmulewicz, M.D.**

 *Next-Generation Therapies*

**Hua Tang, Ph.D.**

 *Basic Research*

**Sunny Xiaojing Tang, M.D.**

 *Diagnostic Tools/Early Intervention*

**Fumihiko Ueno, M.D.**

 *Basic Research*

 *Next-Generation Therapies*

**Milene Vandal, Ph.D.**

 *Basic Research*

**Umit H. Yesilkaya, M.D.**

 *Basic Research*

**Tingting Zhou, Ph.D.**

 *Basic Research*

## SUICIDE PREVENTION

**Sean P. Carruthers, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Rebekah S. Huber, Ph.D.**

 *Basic Research*

 *Diagnostic Tools/Early Intervention*

**Autumn Joy Kujawa, Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Gonzalo Martinez-Ales, M.D., Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Eric T. Monson, M.D., Ph.D.**

 *Diagnostic Tools/Early Intervention*

**Jenna M. Traynor, Ph.D.,**

 *Diagnostic Tools/Early Intervention*

**Kevin S. Weiner, Ph.D.**

 *Basic Research*

# 2022 Young Investigators

## Institutional Affiliation at the Time of the Grant

(in alphabetical order)

Abarbanel Mental Health Center  
Tel Aviv University, Israel

Albert Einstein College of Medicine

Amsterdam University Medical Centers,  
Netherlands

Bakirköy Prof. Mazhar Osman Training and  
Research Hospital, Turkey

Boston University (2)

Bradley Hospital, Brown University

Brigham and Women's Hospital

California Institute of Technology (2)

Centre for Addiction and Mental Health,  
University of Toronto, Canada (3)

Chan School of Public Health, Harvard University

Charité – Universitätsmedizin Berlin, Germany

Freie Universität Berlin, Germany

Columbia University (6)

Concordia University

Deutsches Zentrum für Neurodegenerative  
Erkrankungen, Germany

Douglas Mental Health University Institute,  
Canada (2)

Duke University

Emory University

ETH Zurich, Switzerland

Erasmus Medical Center, University Medical Center  
Rotterdam, Netherlands

Feinstein Institute for Medical Research /  
Northwell Health

Georgia State University

Harvard Medical School (3)

Harvard University (9)

Icahn School of Medicine at Mount Sinai (8)

INSERM, France

Johns Hopkins University

Karolinska Institute, Sweden

McGill University, Canada

McLean Hospital (2)

Massachusetts General Hospital (4)

Massachusetts Institute of Technology (2)

Medical University of Vienna, Austria

Monash University, Australia

Montclair State University

National Autonomous University of Mexico

National Institute of Mental Health (NIMH/NIH)

National Institute on Drug Abuse (NIDA/NIH)

National Institutes of Health (NIH)

New York University (2)

Northeastern University

Northwestern University (2)

Nova Scotia Health Authority, Canada

Oregon Health and Science University

Paris-Saclay Univeristy, France  
Radboud University, Netherlands  
Rice University  
St. Jude Children’s Research Hospital  
Stanford University (5)  
Sunnybrook Health Sciences Centre, University of Toronto, Canada,  
Swinburne University of Technology, Australia  
Technical University of Dresden, Germany  
Trinity College, Dublin, Ireland  
Uniformed Services University of the Health Sciences  
University of Alabama at Birmingham (2)  
University of Barcelona, Spain  
University of Calgary, Canada (2)  
University of California, Berkeley  
University of California, Los Angeles (4)  
University of California, Davis  
University of California, Irvine  
University of California, San Diego  
University of California, San Francisco (3)  
University College Cork, Ireland  
University of Coimbra, Portugal  
University of Florida  
University of Freiburg, Germany  
University of Illinois  
University of Iowa  
University of Maryland  
University of Maryland, Baltimore (2)  
University Medical Center Groningen, Netherlands (2)  
University of Melbourne, Australia (2)  
University of Michigan (2)  
University of Minnesota (2)  
University of New South Wales, Australia  
University of North Carolina at Chapel Hill  
University of Pennsylvania (2)  
University of Pennsylvania School of Medicine  
University of Pittsburgh (2)  
University of Pittsburgh School of Medicine  
University of Queensland, Australia (2)  
University of Southern California  
University of Texas Health Science Center at Houston  
University of Texas Southwestern Medical Center at Dallas (4)  
University of Utah (3)  
University of Washington  
University of Western Australia  
University of Zurich, Switzerland  
Vanderbilt University (4)  
Wake Forest University  
Washington University, St. Louis  
Weill Cornell Medical College (3)  
Yale University (3)

# Scientific Council Dinner Honoring Stephen A. Lieber



**August 30, 1925–March 31, 2020**

In 2022, the Brain & Behavior Research Foundation honored and recognized the extraordinary life of Stephen A. Lieber, a global champion of psychiatric research. Steve, along with his wife Connie, passionately believed in seeding the field of neuropsychiatric research with as many talented scientists as possible to make a substantive impact on the broad spectrum of mental health research. Steve fervently understood that

research holds our best hope for alleviating the immense suffering caused by mental illness. Steve saw the need to nurture and encourage young scientists.

The evening also celebrated the exceptional work of six outstanding young researchers, who have previously received awards through BBRF's Young Investigator Grant program, with its annual Klerman & Freedman Prizes for exceptional clinical and basic research in mental illness.

These prizes pay tribute to Drs. Gerald L. Klerman and Daniel X. Freedman, whose legacies as researchers, teachers, physicians, and administrators have indelibly influenced neuropsychiatry. The prizewinners are selected by committees of the Foundation's Scientific

Council, led by its founding President, Dr. Herbert Pardes.

The researchers were recognized for significant findings related to schizophrenia, psychosis, depression, neurodevelopmental disorders, and the biology of brain circuitry. Their important work is furthering the quest to identify the biological roots of mental illness to enable the development of new diagnostic tools, more effective and targeted treatments, and to pave the way toward prevention.



**ANNUAL KLERMAN PRIZE FOR EXCEPTIONAL CLINICAL RESEARCH**

**Shan H. Siddiqi, M.D.**  
*Brigham & Women's Hospital  
Harvard Medical School*

**HONORABLE MENTIONS**

**Rachel Emma Lean, Ph.D.**  
*Washington University School of Medicine, St. Louis*

**Sunny Xiaojing Tang, M.D.**  
*Feinstein Institutes for Medical Research, Institute of Behavioral Science  
Zucker School of Medicine, Hofstra/Northwell Health*

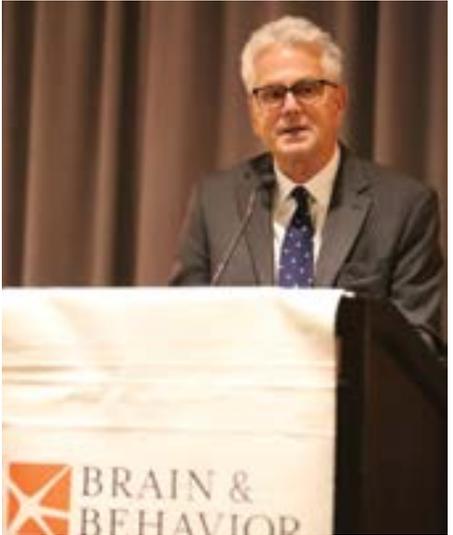
**ANNUAL FREEDMAN PRIZE FOR EXCEPTIONAL BASIC RESEARCH**

**Antonio Fernandez-Ruiz, Ph.D.**  
*Cornell University*

**HONORABLE MENTIONS**

**Chandramouli Chandrasekaran, Ph.D.**  
*Boston University, Boston University School of Medicine*

**Mohsen Jamali, M.D., Ph.D.**  
*Massachusetts General Hospital, Harvard Medical School*



**Clockwise from top left:**  
Geoffrey Simon, Chairman of the BBRF Board  
Dr. Herbert Pardes, President of the BBRF Scientific Council with the 2022 Klerman & Freedman Prizewinners  
Dr. Jeffrey Borenstein, BBRF President & CEO



# STRIVING TOWARD CURES THROUGH RESEARCH

# Scientist Spotlight with: Shan H. Siddiqi, M.D.

2022 BBRF Klerman Prize for Exceptional Clinical Research

2019 BBRF Young Investigator Award

Dr. Siddiqi's research is focused on causal mapping of human brain function and dysfunction. Using techniques such as functional connectivity MRI, he maps brain circuits to link brain lesions and brain stimulation sites that can modify different psychiatric symptoms. His BBRF-funded project, which sought to validate the existence of personalized circuit-based treatment targets for different depressive symptom clusters, has grown greatly in scope. Dr. Siddiqi's team is testing these treatment targets in a clinical trial which may indicate how to personalize treatment targets based on a patient's symptom profile. They have also developed methods to expand their approach to different syndromes and comorbidities, such as addiction and PTSD. The lab is also implementing precision brain network mapping techniques to further personalize treatment targets based on brain connectivity.

## **WHAT IS THE CURRENT STATE OF YOUR BBRF FUNDED RESEARCH?**

My BBRF-funded project, which sought to validate the existence of personalized circuit-based treatment targets for different depressive symptom clusters, has grown greatly in scope. First, we are testing these treatment targets in a real-world clinical trial which will hopefully show us how to personalize treatment targets based on a patient's symptom profile. Second, we have developed methods to expand our approach to different syndromes and comorbidities, such as addiction and PTSD. Third, we are implementing precision brain network mapping techniques to further personalize treatment targets based on brain connectivity.

***“My BBRF grant provided much-needed early support towards my vision of bringing circuit-targeted neuromodulation to clinical psychiatry. This was instrumental in launching my career at a stage when many investigators struggle to find their footing.”***

## **HOW DO YOUR INTERACTIONS WITH PEOPLE LIVING WITH MENTAL ILLNESS AFFECT YOUR RESEARCH AND VICE-VERSA?**

Mental illness can impose a form of suffering that is nearly unparalleled in its impact on patients and their families. I have seen this not only as a psychiatrist, but also as a family member. On multiple occasions, I have agonizingly watched as loved ones were tormented by their own mind for months or years. I am grateful that many of them now have their lives back after treatment, and I am eternally motivated to ensure that everybody has the same opportunity.

## **WHAT HAS BBRF SUPPORT MEANT TO YOUR CAREER?**

BBRF has provided enduring support not only for our group, but also for many of our esteemed collaborators. This has perpetually reassured me of the significance of our line of research. In addition to my Young Investigator grant itself, I have immensely appreciated BBRF's interest in highlighting our work (and other brain stimulation studies) in their public communications. In this way, BBRF has been invaluable in spreading awareness of novel circuit-based treatment approaches.

## **IN THE BEST POSSIBLE SCENARIO, HOW WOULD YOUR WORK IMPACT THE PEOPLE LIVING WITH MENTAL ILLNESS AND THEIR FAMILIES?**

We all agree that our current treatments are ineffective for many patients. But for another important and under-recognized group of patients, our treatments are too slow. Even when a patient loses months or years of their youth while waiting for treatment to work, we often consider this to be a “treatment success.” If we can find the right treatment targets for the right patients, we will hopefully learn how to alleviate human suffering faster and more effectively. We have already seen the beginnings of this with accelerated TMS treatments for depression, and it is now time to apply these lessons to other mental illnesses. We hope to give these valuable years back to our patients.

# Scientist Spotlight with: Antonio Fernandez-Ruiz, Ph.D.

2022 BBRF Freedman Prize for Exceptional Basic Research

2019 BBRF Young Investigator Award

The aim of Dr. Fernandez-Ruiz's research is to understand how neuronal dynamics in distributed brain circuits support complex cognitive functions and how small imbalances can lead to pathological states. This process is supported by the fine-tuned coordination of different neuronal populations in distributed brain circuits. A major obstacle to answering this question is limitations imposed by current technology; thus, the lab seeks to develop new methods for a more precise interrogation and manipulation of brain circuit dynamics in behaving animals. The team is investigating alterations in hippocampal and cortical circuit dynamics underlying memory deficits in genetic mouse models of Alzheimer's disease and schizophrenia. They seek to develop novel intervention strategies, such as closed-loop optogenetic manipulations of neural dynamics, to reverse pathological memory deficits.

## **WHAT IS THE CURRENT STATE OF YOUR BBRF FUNDED RESEARCH?**

My current research on the neural mechanisms of memory deficits in schizophrenia is funded by a BBRF Young Investigator Award. In this project, which is still ongoing, we have characterized the mechanisms underlying impaired hippocampal-cortical communication that lead to learning and memory deficits in a mouse model of schizophrenia predisposition. We are currently employing closed-loop optogenetic manipulation to try restore those memory deficits.

## **HOW DO YOUR INTERACTIONS WITH PEOPLE LIVING WITH MENTAL ILLNESS AFFECT YOUR RESEARCH AND VICE-VERSA?**

My interest in understanding the neural mechanisms of schizophrenia sparked when I was growing up living with a relative affected by the disease. I realized how the lack of knowledge and stigma about the disease in rural Spain was a big burden for my relative, and many other people living in similar circumstances. That made me

***"The BBRF grant provided me with the necessary funds in a key stage of my early career, enabling me to jump-start my independent research program."***

aware of the importance of understanding the biological basis of the disease and educating the public about it.

## **WHAT HAS BBRF SUPPORT MEANT TO YOUR CAREER?**

The BBRF Young Investigator Award provided fundamental support in a key stage of my career. I was able to use the funds to hire my first postdoc and start a new research project that culminated in my first publication as a senior author. This award also helped me start a completely new line of research in my lab on the neural mechanisms of cognitive deficits in schizophrenia, which would not have been possible without the BBRF support.

## **IN THE BEST POSSIBLE SCENARIO, HOW WOULD YOUR WORK IMPACT THE PEOPLE LIVING WITH MENTAL ILLNESS AND THEIR FAMILIES?**

One of the goals of our research is to develop more selective intervention strategies to revert cognitive deficits in schizophrenia and other mental illnesses. While this work is being conducted in rodents, our findings open the door to potential clinical applications aimed at improving memory deficits in schizophrenia patients. In most neuropsychiatric disorders, traditional therapies are based on changes in clinical symptoms measured over time. These therapies involve typically surgical interventions or the administration of drugs and thus are either irreversible or cannot be adjusted rapidly to changes in the symptoms. On the other hand, closed-loop methods based on neural activity provide intervention only when needed by detecting abnormal neurological patterns. We aim to develop minimally invasive closed-loop manipulation approaches that one day can be translated to patients.



# STRIVING TOWARD CURES THROUGH RESEARCH

# 2022 INTERNATIONAL MENTAL HEALTH RESEARCH SYMPOSIUM

The Brain & Behavior Research Foundation's annual symposium was held both in-person and virtually in 2022. Five 2022 Outstanding Achievement Prizewinners gave presentations on topics that included schizophrenia, suicidal behavior in bipolar disorder, pediatric mood and anxiety disorders, and cognitive neuroscience.

The symposium also featured informative presentations from the two winners of the 2022 Pardes Humanitarian Prize in Mental Health.

This year's program was reflective of the greatly accelerating pace of discovery in mental health research as well as the expanded range of studies the Brain & Behavior Research Foundation has grown to support.

An overview of the entire Symposium was provided by Dr. Robert Hirschfeld, a BBRF Scientific Council member who had served as the moderator at the in-person Symposium since its inception more than 30 years ago.

The symposium is available to watch on the BBRF You Tube channel:

**<https://www.bbrfoundation.org/event/international-mental-health-research-symposium>**



2022 BBRF Symposium Speakers. From L to R: Dr. J. John Mann, Dr. Sophie Erhardt, Dr. Robert Schwarcz, Dr. Robert Hirschfeld, Dr. Altha Stewart, Dr. Jeffrey Borenstein, Dr. Peter Strick, Dr. Robert van Voren, and Dr. Boris Birmaher. Photo by Chad David Kraus.

## Presentations

### From Obscurity to Hot Topic: The Kynurenic Acid Story

**Robert Schwarcz, Ph.D.**

*University of Maryland  
School of Medicine*

BBRF LIEBER PRIZEWINNER FOR  
OUTSTANDING ACHIEVEMENT IN  
SCHIZOPHRENIA RESEARCH

### New Evidence for Translationally Relevant Roles of Kynurenic Acid in Schizophrenia

**Sophie Erhardt, Ph.D.**

*School of Global Public Health,  
Karolinska Institutet*

BBRF MALTZ PRIZEWINNER FOR INNOVATIVE  
AND PROMISING SCHIZOPHRENIA  
RESEARCH

### Unlocking the Mysteries of Mood Disorders by Science Instead Of Guesswork

**J. John Mann, M.D.**

*Columbia University & New York State  
Psychiatric Institute*

BBRF COLVIN PRIZEWINNER FOR  
OUTSTANDING ACHIEVEMENT IN MOOD  
DISORDERS RESEARCH

### Who is at Risk To Develop Bipolar Disorder?

**Boris Birmaher, M.D.**

*University of Pittsburgh Medical  
Center & Western Psychiatric Institute*

BBRF RUANE PRIZEWINNER FOR  
OUTSTANDING ACHIEVEMENT IN CHILD &  
ADOLESCENT PSYCHIATRIC RESEARCH

### Solutions to the Brain-Body Problem: Neural Substrates for Psycho-somatic Disease

**Peter L. Strick, Ph.D.**

*University of Pittsburgh School of  
Medicine*

BBRF GOLDMAN-RAKIC PRIZEWINNER FOR  
OUTSTANDING ACHIEVEMENT IN COGNITIVE  
NEUROSCIENCE

### Recommendations for Addressing Mental Health Disparities Through Research

**Altha J. Stewart, M.D.**

PRIZEWINNER, BBRF PARDES  
HUMANITARIAN PRIZE IN MENTAL HEALTH

### Providing Psychological Support to Victims of State Repression and War

**Robert van Voren,  
FRCPsych (HON.)**

PRIZEWINNER, BBRF PARDES  
HUMANITARIAN PRIZE IN MENTAL HEALTH

We would also like to thank our  
2022 Sponsors



# The Pardes Humanitarian Prize in Mental Health

Bestowed annually since 2014, the Pardes Prize recognizes a person(s) or organization whose humanitarian work is transformative and of great magnitude, changing the lives and bringing the joy of living to those facing challenges to mental health.

It was established to honor those who comprehensively care, teach, investigate, work, and passionately advocate for improving the mental health of society and have had a powerful impact on reducing the pain inflicted by psychiatric illness.

The recipient of the Pardes Humanitarian Prize in Mental Health is chosen by a distinguished international Selection Committee from nominations solicited worldwide. The Prize focuses public attention on the burden of mental illness on individuals and on society, and the urgent need to expand and enhance mental health services in the United States and globally.

Established in 2014, the Pardes Humanitarian Prize is named in honor of Dr. Herbert Pardes, the first recipient of the award.



From L to R: Joel Corcoran, Sean Mayberry, Dr. Jeffrey Borenstein, Dr. Altha Stewart, and Dr. Robert van Voren.  
Photo by Chad David Karus



The 2022 Pardes Humanitarian Prize in Mental Health honored two extraordinary mental health advocates committed to serving people disadvantaged by structural racism and a lack of human rights.

The winners are:



**Altha J. Stewart, M.D.**



**Robert van Voren, FRCPSYCH (Hon.)**

Two 2022 Pardes Honorary Prize Recipients were also announced and acknowledged for their important work in mental health.

They are:



**Sean Mayberry**



## PREVIOUS PRIZE WINNERS

### 2021

Kay Redfield Jamison, Ph.D.,  
Elyn R. Saks, J.D., Ph.D., &  
Charlene Sunkel

*Honorary Tribute:*

*John M. Davis, M.D.,  
Michael R. Phillips, M.D., MPH, &  
Norman Sartorius, M.D., Ph.D., FRCPsych*

### 2020

Myrna M. Weissman, Ph.D.  
& Sir Michael Rutter, FRS

*Honorary Tribute:*

*E. Fuller Torrey, M.D.*

### 2019

William T. Carpenter, Jr., M.D.

*Honorary Tribute:*

*Cynthia Germanotta &  
Born This Way Foundation*

### 2018

Judge Steven Leifman

*Honorary Tribute:*

*Suzanne and Bob Wright*

### 2017

Doctors Without Borders/  
Médecins Sans Frontières

*Honorary Tribute:*

*Constance E. Lieber*

### 2016

Vikram Patel, Ph.D., F.Med.Sci. &  
Charles F. Reynolds, III, M.D.

*Honorary Tribute:*

*Senator Edward M. Kennedy*

### 2015

Beatrix (Betty) A. Hamburg, M.D.  
and David A. Hamburg, M.D.

*Honorary Tribute:*

*Rosalynn Carter*

### 2014

Herbert Pardes, M.D.

In 2022 the Pardes Humanitarian Prize in Mental Health was sponsored in part by Janssen Research & Development, LLC, one of the Janssen Pharmaceutical Companies of Johnson & Johnson.

# INTERNATIONAL AWARDS DINNER 2022

The BBRF International Awards Dinner honored the winners of the Pardes Humanitarian Prize in Mental Health as well as the five Outstanding Achievement Prizewinners who are advancing the science that is changing what it means to live with a mental illness.

## LIEBER PRIZE

Outstanding Achievement in Schizophrenia Research



### Robert Schwarcz, Ph.D.

Professor of Psychiatry,  
Pharmacology and Pediatrics,  
*University of Maryland School of Medicine*

Foreign Adjunct Professor (elected) of  
Physiology and Pharmacology,  
*Karolinska Institute, Stockholm*

- BBRF Scientific Council
- 2002 BBRF Distinguished Investigator

## RUANE PRIZE

Outstanding Achievement in Child & Adolescent Psychiatric Research



### Boris Birmaher, M.D.

Distinguished Professor of Psychiatry

Endowed Chair in Early Onset Bipolar Disorder

Directors of the Child and Adolescent Bipolar Spectrum Services

*University of Pittsburgh Medical Center and Western Psychiatric Institute*

## MALTZ PRIZE

Innovative & Promising Schizophrenia Research



### Sophie Erhardt, Ph.D.

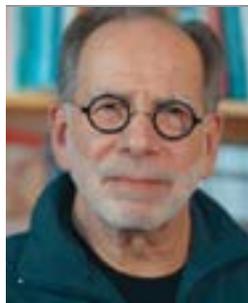
Professor of Experimental Psychiatry

Chair, Department of Physiology and Pharmacology

*Karolinska Institute, Stockholm*

## GOLDMAN-RAKIC PRIZE

Outstanding Achievement in Cognitive Neuroscience



### Peter L. Strick, Ph.D.

Detre Professor & Chair of Neurobiology

Scientific Director,  
*University of Pittsburgh Brain Institute*

Director, *Systems Neuroscience Center*

Co-Director, Center for Neuroscience  
*University of Pittsburgh*

## COLVIN PRIZE

Outstanding Achievement in Mood Disorders Research



### J. John Mann, M.D.

Professor of Translational Neuroscience in Psychiatry and Radiology and Director, Molecular Imaging and Neuropathology Division,

*Columbia University and New York State Psychiatric Institute*

Co-Director, *Columbia Center for Prevention and Treatment of Depression*

- BBRF Scientific Council
- 2008 BBRF Distinguished Investigator

# Healthy Minds with Dr. Jeffrey Borenstein



*“Today there is increased openness to discussing mental health, however stigma and misunderstanding remain prevalent and still often keep people from seeking help for themselves or their loved ones. Healthy Minds inspires conversations about mental illness, provides understandable information and resources for viewers, and demonstrates that with help, there is hope.”*

– Dr. Jeffrey Borenstein

Healthy Minds

Managing a Mental Health Crisis and the New #988:  
A Conversation With William H. Carson, M.D.

**Healthy Minds** aims to remove the stigma of mental illness and demonstrate that with help, there is hope. The series features inspiring personal stories from people who have experienced mental health issues, as well as the latest information from experts on new approaches to the diagnosis, treatment, and prevention of mental illness.

**Healthy Minds** is available on PBS stations around the U.S. and online at [PBS.org](https://www.pbs.org).

**Season 8** is now available to watch at: <https://www.pbs.org/show/healthy-minds-with-dr-jeffrey-borenstein/>

Previous seasons can be found online at: [www.bbrfoundation.org/healthyminds-tv](http://www.bbrfoundation.org/healthyminds-tv)

## Season 7 Episodes:

- 701 – *How COVID-19 Affects the Brain*
- 702 – *National Institute of Mental Health: An Update on Promising Research*
- 703 – *Rapid-Acting Transcranial Magnetic Stimulation*
- 704 – *Optogenetics with Karl Deisseroth, M.D., Ph.D. — Part One*
- 705 – *Optogenetics with Karl Deisseroth, M.D., Ph.D. — Part Two*
- 706 – *Deep Brain Stimulation — Treatment-Resistant Depression*
- 707 – *Psychedelic-Assisted Psychotherapy and Post-Traumatic Stress*
- 708 – *Bipolar Disorder, What You and Your Family Need to Know*
- 709 – *Living with Bipolar: A Conversation with Maurice Benard*
- 710 – *Managing a Mental Health Crisis and the New # 988*
- 711 – *Depression — Intersection of Faith and Mental Health*

## Meet the Scientist Webinar Series

Dr. Jeffrey Borenstein hosts the free monthly “Meet the Scientist” webinar series where leading brain and behavior researchers discuss their current work on the latest in new technologies, early intervention strategies, and next-generation therapies for mental illness. Each hour-long webinar includes time for researchers to answer questions posed by the audience participants. This popular series offers the public access to some of the world’s top scientists who discuss their cutting-edge research.

**All webinars are available for viewing on the BBRF website.**



### **Prenatal Exposures and Experiences: Impact on Children’s Early Brain Development and Risk for Disease**

Tuesday, January 11, 2022

**Claudia Lugo-Candelas, Ph.D.**  
Columbia University Medical Center  
New York State Psychiatric Institute



### **When Medicine is Not Enough for Schizophrenia and Psychosis**

Tuesday, July 12, 2022

**Dawn Velligan, Ph.D.**  
University of Texas Health Science  
Center in San Antonio



### **Investigating Neurobiology and New Treatments for Addiction, Depression, and Anxiety**

Tuesday, February 8, 2022

**Nii A. Addy, Ph.D.**  
Yale School of Medicine



### **Manipulating Memories to Help Treat Brain Illness**

Tuesday, August 9, 2022

**Steve Ramirez, Ph.D.**  
Boston University



### **Rapid-Acting Treatments for Pediatric Depression and Suicidality: Where are We Now?**

Tuesday, March 8, 2022

**Jennifer Dwyer, M.D., Ph.D.**  
Yale School of Medicine



### **Identification of Symptom-Specific Brain Circuit Abnormalities in Obsessive-Compulsive Disorder**

Tuesday, September 13, 2022

**Brian P. Brennan, M.D., MMSc**  
McLean Hospital / Harvard Medical School



### **How Does a Fearful Experience Alter Our Past Memories?**

Tuesday, April 12, 2022

**Denise Cai, Ph.D.**  
Icahn School of Medicine at Mount Sinai



### **Exploring New Pathways of Discovery for Eating Disorders**

Tuesday, October 11, 2022

**Sahib S. Khalsa M.D., Ph.D.**  
University of Tulsa  
Oxley College of Health Sciences



### **Brain/Behavior Alterations Underlying Self-Injury and Suicide Among Children and Adolescents**

Tuesday, May 10, 2022

**Daniel P. Dickstein, M.D., FAAP**  
McLean Hospital and Harvard Medical School



### **The Neurobiology of Pain Processing and Suicide: A Potential Marker for Suicide Risk**

Tuesday, November 8, 2022

**Sakina Rizvi, Ph.D.**  
University of Toronto



### **Does Early Life Inflammation Contribute to the Risk for Developing Psychiatric Conditions?**

Tuesday, June 14, 2022

**Galen Missig, Ph.D.**  
Cerevel Therapeutics



### **Online Video Education and Assessment to Empower Individuals with Borderline Personality Disorder**

Tuesday, December 13, 2022

**Lois W. Choi-Kain, M.D. M.Ed.**  
McLean Hospital / Harvard Medical School

# Warning Signs & What to Look for: **Anxiety and Depression in Childhood** With Joan Luby, M.D.



## **Joan Luby, M.D.**

Samuel and Mae S. Ludwig  
Professor of Psychiatry (Child)

Director and Founder,  
Early Emotional Development Program

*Washington University School of Medicine  
in St. Louis*

**The webinar was broadcast via Zoom on  
December 1, 2022.**

Teachers, school counselors and other educational professionals are on the front line of dealing with kids with mental health issues and can often be among some of the first people to see that a child is struggling.

Enhancing the potential for early intervention is important and because educational professionals have relationships with students and their families, they are often the people who guide students and their families to resources. As educational professionals learn more about mental health issues, their ability to make appropriate referrals for evaluation will improve for students and their families.

This new series is hosted by Jeffrey Borenstein, M.D., President & CEO of the Brain & Behavior Research Foundation and host of the public television series *Healthy Minds*.

This special program was created to help inform parents and educators who are on the front line of dealing with children and teens with mental health issues and can often be among some of the first people to see that a child is struggling.



**The webinar is available on the BBRF website:**

<https://www.bbrfoundation.org/event/warning-signs-what-look-anxiety-and-depression-childhood>



In 2019, the **Moritz Hilder Innovative Brain Research Fund** was established by the Trustee of the Jane Hilder Harris Trust with an endowment gift of \$3.5 million. It was created to preserve and honor the memory of Moritz Hilder, the father of the late Jane Hilder Harris.

This generous endowment will be held in perpetuity to advance medical research with the objective of gaining a basic understanding of post-traumatic stress disorder (PTSD) and its prevention, treatment and cure. Primary emphasis will be given to research involving innovative concepts where, although there may be a high risk of failure, the rewards of success would be substantial, and to researchers who typically would not be in a position to secure funding from more traditional funding sources.

The Moritz Hilder Innovative Brain Research Fund is held in a professionally managed, separate endowment fund. On an annual basis, 5% of the endowment fund will be expended to support PTSD research. A special committee of the BBRF Scientific Council selects which BBRF Grants will be funded by this Endowment. In 2022, the Endowment provided \$203,489 for the first year of funding of six PTSD research projects.

We are deeply honored to have received this generous and impactful gift.

# THANK YOU TO OUR DONORS

Your support this year enabled us to fund \$12.7 million to scientists looking for better treatments, cures, and methods of prevention for mental illness.

Since 1987, in partnership with you, our donors, BBRF has awarded more than \$440 million to fund more than 6,200 grants to more than 5,300 leading scientists around the world.

With your help BBRF has been able to foster new research pathways that led to transformative breakthroughs. We deeply appreciate your support and commitment to advance psychiatric research.



# BENEFITS OF BECOMING A RESEARCH PARTNER

**Barbara Toll**

BBRF Board Member & Research Partner

Many BBRF donors have a very personal interest in brain and behavior research. They know from often difficult, first-hand experience the devastation mental illness can bring upon family and friends, and they know that research will ultimately bring about better understanding and treatments.

Our **Research Partners Program** offers donors the opportunity to personally select and support scientists based on various criteria, including, but not limited to, illness specialty area or specific institutions, or a combination of these. Researchers are selected by the donor (our Research Partner) after members of our all-volunteer Scientific Council have conducted an independent peer review of the submitted applications and have made their recommendations for grant awards.

The **Research Partners Program** enables donors to choose among the best and brightest scientists and the most promising, cutting-edge proposals in mental illness research.

The results from these studies often provide the pilot data needed to apply for much larger federally funded grants (from the National Institute of Mental Health and the N.I.H., for example).

To date the BBRF **Research Partners Program** has funded more than 1,500 research grants.

To learn more about the Research Partners Program, please contact us at **646-681-4889** or **researchpartner@bbrfoundation.org**.

**Visit us at [bbrfoundation.org/researchpartners](http://bbrfoundation.org/researchpartners).**

# Research Partners Program

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Jan Abrams Investigators

Young Investigator

**Aparna Bhaduri, Ph.D.**

*University of California, Los Angeles*

Young Investigator

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*Hugo W. Moser Research Institute at  
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*University of Wisconsin-Madison*

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*Centre for Addiction and Mental Health,  
University of Toronto*

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Nancy Coles Investigators

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**Takashi Sato, Ph.D.**

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*Center for Clinical Intervention and  
Neuropsychiatric Schizophrenia Research  
(CINS, CNSR)*

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**Maria Rogdaki, M.D., Ph.D.**  
King's College London

Young Investigator  
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*Zucker Hillside Hospital Campus of The  
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**Nadia Cattane, Ph.D.**  
*IRCCS Centro San Giovanni di Dio  
Fatebenefratelli*

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Dartmouth-Hitchcock Medical Center*

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*Sunnybrook Health Sciences Centre,  
University of Toronto*

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*Santa Clara University*

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*University of Minnesota*

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**Mario Alexander Penzo, Ph.D.**  
*National Institute of Mental Health  
(NIMH/NIH)*

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*The Medical Research Council Laboratory  
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*Massachusetts General Hospital,  
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**David Root, Ph.D.**  
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# TeamUp

for RESEARCH

With the support of family, friends and your community, you can make a difference in the fight against mental illness. The Brain & Behavior Research Foundation relies on the generosity of our donors to help fund leading brain and behavior research. You fuel the hope and promise of future discoveries that will improve the lives of those living with a mental illness. 100% of all donor contributions for research are invested in research grants. When you hold a fundraiser, you play a key role in helping us fund research toward improved treatments, cures, and methods of prevention for our loved ones.

*“Every event brings us that much closer to a day free of mental illness. Thank you for partnering with BBRF.”*

– Jeffrey Borenstein, M.D.

# Team Up for Research

## \$100,000+

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Holly Baxter  
John C. Bayat and family  
Brian Becker  
Steven Beigler  
Christy Bello  
Amy Berg  
Esther Bergknoff  
Ellen Bernstein  
Bettina Bierly  
Xi Bing Su  
Genie Birman  
Tristen Bitner  
Maureen Black  
Theresa Blong

Ken Blue  
Lindsay Bohon  
Lee Booth  
Elizabeth Borders  
Jeffrey Borenstein, M.D.  
The Boudreau Family  
Dr. Charles Bowden  
Brynn Bowers  
Paul Braden  
David (Chip) H. Bradley, Jr.  
Sally Brause  
Nicholas J.K. Breitborde, Ph.D., ABPP  
Martha Bommer Lawlor  
Ace Brown's fiancé  
James E. Brown, Jr.  
Spencer Brown  
Lynn Brunk's daughter  
Genevieve Buccieri  
Robert Buhrman  
Taiya Burdette  
Christine Burrows  
Ryan Cannon  
Christopher P. Capparell  
Anthony Carney and family  
Helen Carney-Backer and family  
Maria Carolina  
Michael Carpenter  
JoAnn Carter  
John R. Caruso  
The Chalfin Family  
Kate Chance  
Wendy Chavez  
Allan K. Chavez (WSNC)  
Sho Tin Chen  
Tristin Chen  
Cynthia Cheung  
Amy Chung-Yu Chou  
Natalie Cizik  
Eileen Clark  
Becca Clark McMullen  
Katherine Clinch  
Chris Coates  
Jill Cochran  
Heather Coffey  
Debbie Cohen  
Diane Coleman  
Michelle Coleman  
Thomas B. Coles, M.D.  
Cliff Cone  
Corinne Cook  
Kellie I. Cook  
The Corley Family  
Thomas S. Cosentino  
Tracie Costa

Sally Cousins  
Colin J. Crawford  
Emily Crouch  
Bettina Crump  
Emma Czajka  
Lisa Daidone  
Maxwell R. Danoff  
Barbara B. Davison's friends and family  
Stephen P. Dean  
Casey Deidrick  
Rocco DelGuercio  
Marlene Dembin  
Amit Desai  
Nick DeSantis  
Diana  
Nicholas D. Dieter  
Camille Dirago  
Reed B. Donat  
Doug Dooley  
Angela L. Dormire  
Lauren Duban  
Rachel Dunlap-Foley  
Darius Dunning  
Lauren R. Duran  
Christopher and Lindsay Eginton  
Alan J. Einstein  
Jen Eldridge  
Nicole C. Elton  
Tim Erickson  
Judith Esposito on her 80th birthday  
Jim Esterling  
Curtis M. Estes  
Jan A. Fawcett, M.D.  
Alisha Feickert  
Dr. Veronica Fellman  
Judith M. Ferguson  
Randy Ferguson  
Geoffrey Fichtl  
The 2022 Fiesta Bowl  
Jennifer Finkelstein  
Laura and Scissors Flook  
Karin Flowers  
Thomas Frank  
Aaron's Quiet Place  
Natalie Gallagher and Matt Sachtler  
Veronica Gallagher  
John T. Gann  
James Gautreau  
Elizabeth A. Geringer  
Shane C. Geringer  
Eduardo Germann  
Jeffrey F. Gerner's sister  
Brent and Gretchen Getlin  
Jennifer Gibbs' beautiful daughter, Haley

## Honor Tributes (continued)

Joshua Gifford  
Frank Giglio  
Mickey Gilbert  
Timothy H. Gillis  
GKC  
Donald M. Glessner's Mom and Dad  
Isabella Glessner  
Barbara Godt  
Suzanne and John Golden  
The Goldfeder Family  
Jill Goldin  
Lalleh Gordy  
Alex Gornish  
Al Graber  
Addison (Addie) Gralen  
Melody Grant  
AnAllyse Gravlee  
Shellie Green  
Derek Greene  
Sharon S. Greenstein  
Joshua Gregory  
Jill Griffith  
Jill Groebner  
Declan Groesbeck  
Carl M. Gropper  
Alexander D. Guitar  
Basho Gunji  
Christine Gunther  
Tracy Hall  
Ali Hamed  
Layla Hamed  
Lida Hamed  
Bob Hare  
Melanie Hare  
Alex Ann Harford Power  
Bruce Harlow, Sr. and his unconditional love for his three children  
Susan Harper  
Huda Harrison  
Susan Harrison  
Patrick B. Hart  
Hannah Hartley  
Rev. Marcus Hartlief  
Olin Hatch  
Elaine Healy  
Kris Heid Santiago  
John Heller  
Maggy Helwig  
Jason and Matisa (Tisa) Herndon  
Deb Herzfeld  
Jennifer Hesterman  
Natalie Hoague  
Daniel J. Hoffman  
Susan M. Hoffman  
Sarah Holbrook  
Logan M. Hood and Apeksha Chauhan  
Brian Hook  
Christina Hook  
Denise Hooker-White  
Paul Horelick  
Marissa Howell  
Stephanie Hsu  
Michelle Hull  
Linda Hunt  
Angela Hurtado  
Kenneth Hyacinthe  
Impact Team, University of Iowa –  
Thanks for all you do!  
Louis Innamorato, C.P.A.  
Justin Isaac and Elana Schwartz  
Julie Isaacs  
Chris Jacobsen  
Casey Jacobson  
Janet  
Janna  
Jason  
Russell and Sherry Jelks  
Vania Jenny  
jenny779  
Kari A. Jensen  
John's birthday  
Sena Johnson  
Carri Jones  
Ian Jones  
Kate Jones  
Jordan  
Julia  
Mariel Kagan  
Kai  
Michael and Shelley Karpaty's son  
Miriam E. Katowitz, C.P.A.  
Joel and Elinor Katz  
Dr. and Mrs. Richard S.E Keefe  
Jane Keitzer  
Andy Keller, Ph.D.  
Alice M. Kennedy  
Kera  
Yvonne S. Kilbourne  
Minsun Kim  
Yoon-Young Kim  
Deborah King  
Anita Kirk  
Peter Kirk  
The Kirk Family  
Nicholas Kirkpatrick  
The Kirsics: Michael, Lisa, King Khaya  
and Chloe Superstar  
Edwin Kleinman, M.D.  
Janet Knauff  
Alexander Kocinsky  
Tanya Konitzer  
Karl F. Korpela  
Miral Kotb  
Krista  
Howard and Shelley Kristol  
Rachel Kugelmass and  
John El-Kordi Hubbard  
Amy Kurzweil and Jacob Sparks  
Danielle D. Ladensack  
Marcia LaGrega  
The Laitman Family  
Skylar Lake  
Martin Langer  
Landen Langhammer  
Bryant Lathrop  
Noëlle Leavy-Yetts  
Heather Lee  
The Lee Family  
Leah Lenchner  
Sarah Leonard-James  
Daniel and Sherry Levy on  
celebrating 57 years of wedded bliss  
David Levy on his 53rd birthday  
The Levy's granddaughter, Ella,  
on her 14th birthday  
The Levy's granddaughter, Esme,  
on her 11th birthday  
The Levy's granddaughter, Jordyn,  
on her 19th birthday  
Charlie Lewin  
Margaret Librizzi  
David E. Lieber  
Janice R. Lieber  
Robb Liekes  
Kara Lilliestierna  
Rosemary Linden  
Helen Link Campbell  
Caitlin Linkin  
Michael Llerena  
Cheyenne Loesser  
Rola Lola  
Jennie Lombardino  
Ricardo Lopez  
Curtis M. Lyle  
Kristy Lynn  
Charles and Paula Maahs  
Daniel Maahs  
Dorene MacVey  
Theodore Madden  
Pierre Magistretti  
Justin Magleby

## Honor Tributes (continued)

Tammy Maiola  
Carole and Harvey Mallement  
Robert Malone  
Arick L. Mann  
Mari  
Stephen M. Marshall  
James Mastakouris  
The Maybank Family  
Helen S. Mayberg, M.D.  
Joe McCoy  
Liam McGinnis  
Andrew McIntosh  
Kathleen McKenna  
Jamie McKeown  
Jeffrey McKnight  
Dr. Michael McLeod  
Julissa Mendoza  
Samruddhi Mhatre  
Michael's birthday  
Andrea J. Miehlich  
Rosanna Miguel  
Sharon Milgram, Ph.D.  
Celeste Miller  
Deborah and Jeffrey Miller's son, Tim  
Gabriel Miller  
Mary Miller  
Allysa Million's family  
Hayden Milne  
Parker Mizerak  
Rose Molitor  
Victor Montalvao  
Dr. Bruce Montgomerie  
Andrew L. Morrison, M.D.  
Jack Morton  
Anne K. Muellerleile  
Matthew Muessig  
Emmie Mullarky  
Patrick T. Murphy  
Serena E. Murphy  
George Nachum  
Andrew Nadeau  
Grace Nagaur  
Chad Narburgh  
Ilana Bellowe-Neenan and  
James P. Neenan  
Neil  
Mirna Nelson  
Charles Newcomb  
Dr. Jacqueline Newcomb and  
Mr. Peter Newcomb  
The Newcomb Family  
Lucas Newman  
Alissa Nicholls  
Carolyn Nichols  
The Noble Family  
Ryan Nolfe  
Jenna Nosal  
Stephen J. Novak  
David Novick  
Kyle A. Oates  
Joe O'Brien  
Arron N. O'Callaghan and  
Sean D.O. Smith  
Kristen Olson  
Teneil Olson  
Tyler O'Malley  
The Orange & Blue  
Nieves A. Ortiz  
Mary Pat and John Osterhaus  
Jacob Oveson  
Gloria Palma-Olsavsky  
The Pamulas Family  
George Pap  
Dr. Rohit Pappu  
Dr. Herbert Pardes and Dr. Nancy Wexler  
Patrick W. Parker  
Karen Patel  
Som Pati  
Jason Pelland  
The Penn Medicine Radiation Oncology  
Nurse Practicioners  
Valerie Perdue  
Rebecca Pereira  
Amanda Perez  
Amy Perrino  
Dylan Peterson  
Jed Peterson  
Wiebke Poerschke  
Susan Pohlman  
Luke Poppe and Ali Killam  
Patricia H. Porter  
Shelby Porter  
Sarah Posner  
James and Donna Potter  
Marla S. Press  
Beckie Price Strobel  
Benjamin J. Prosnitz  
Evie Pundt  
Le K Qe  
Loren Railsback  
Romana Rajput  
Ed Ramie  
Dan Rayner  
Leah Rebecca  
Madeline Reed-Johnston  
David A. Reilly  
Payton Reinoehl  
Al Remetch  
Jay Reyburn  
Andy Reynolds  
Richard of NYC  
Hannah Richard-Coody  
Katy Risvold  
Sakina Rizvi, Ph.D.  
Min J. Ro  
Dan Roberts  
Kimberly A. Rock  
Elizabeth Roen  
Robert Ronis, Ph.D.  
Jason Roszak  
Beth Rotchford  
Faith Rothblatt  
Brandon Rowley  
Ann Royall-Bolton  
Claire L. Ruder  
Claud Ruder  
Tyler J. Rutherford  
Ueli Rutishauser, Ph.D.  
Ryan's birthday  
Muhammad Saadi  
Gary S. Sachs, M.D.  
Aileen Salares  
Micki Salge  
Mary Jean Salinas  
Mary C. Salpukas  
Ellen Salter  
Cynthia Santiago  
Mark A. Satterthwaite, M.D.  
Candice Savastio  
Matthew Scalgione  
Mikaela Scholey  
Blake Schultz  
Patrick and Ashley Sears  
Tom Seguin  
Kevin Serenitynow  
Mallyna Elizabeth Sessions  
Aedan Shayne  
Brandi Shelley  
Christina Shelton  
Nyla Sherazi  
Morgan Shubin  
Dr. Brett Shurman  
Robert Silver  
Dr. and Mrs. Mark Silver  
Geoffrey A. Simon and  
Andrea R. Graham  
Sue Simon  
Kimberly Slinkosky  
Jean C. Sloan's loved ones  
Nai Audrey P. Smiddy  
Eugene (Gene) Smith

## Honor Tributes (continued)

Richard and Sue Smith  
Alan J. Spandorf  
Savannah Speer  
David J. Starck  
Kristin Stark Mitchell  
Sherri M. Stephenson  
Ripley Stetten Gero  
Joelle Stocks-Dunnwald  
Jean L. Stone  
Kaitlyn Rose Strobe  
Brenda Swanson  
The Swenson Family  
Peter J. Tarr, Ph.D.  
Floyd Taylor  
Warren Teo  
Reggie Terrazas  
Alex Thiel  
Alina Thiele  
James C. Thies  
Barry D. Thomasson  
Chengyuan Thornberry  
Those service members who battle  
the unseen enemy everyday  
Gil Tiamsic  
Dan Tierney  
Janet Tierney  
Kristen Tizon  
Bosworth M. Todd, Jr.  
Barbara Toll  
Victoria Tom  
Princessa Topping  
Linda M. Tortorice  
Steven R. Town  
Tracy's birthday  
Siddharth Tripathi  
George Tsanos  
Chi Tsui  
Travis Tuerff  
Trillian Turner  
Kay M. Tye, Ph.D.  
John Tyler and Caroline Kelly  
David M. Unger  
Susan E. Unvarsky  
Martin Ureel  
Josh Valdez  
Barbara Van Noppen  
Vipin Vats  
Olivia Veri  
Vijayaellementa  
Gustavo Villota  
Irantha Vinayagachelvan  
Carl Vogtsberger  
Cha VW

Adam Wachs  
Jesse B. Wagner  
Richard E. Wahlfeldt  
Victor Walka, Jr.  
Jen Ward  
Scott Warpool  
Deanna Warrick  
Melynda Wayne  
Robert and Frances Weisman  
The Wells Family  
Rachel Wendorph  
Mike West  
Mr. and Mrs. R. Graham White III  
Perry White  
Drew A. White-Jacobson  
Brooke Wilken  
The kind folks from the livestream  
(W.W. Patreon Server)  
Christian Willenbacher  
William  
Kate Williams' daughter on her  
5th birthday  
Sarah Williams  
Paul Witschger  
Bonnie Wolf  
Jessica Wolfe  
Jonathan and Becca Wonder  
Rebecca Worcester  
Tracy Worcester  
Cheryl Wright, LPC  
Mike Yamanaka  
Keely Young  
Kifayah S. Youssef  
YYES, Co.  
Alex Zeigler

## Memorial Tributes

A friend's father  
A loved one  
A.S.  
Kathy Abaray  
John (Jed) B. Abrams  
William F. Abrams  
Elizabeth Adams-Addorio  
Addison  
Florie Adiutori  
Aria N. Albertelli  
All those who have been affected  
All who have suffered with mental illness  
Laona L. Allen  
Janice M. Allison  
Jose F. Amaya  
Vincent S. Amoroso, Jr.  
Katrina Anderson  
Shirley A. Anderson's twin sister, Sharon  
Susan (Sue) K. Anderson  
Douglas S. Appelman  
Nicholas W. Argall  
Edward Arvey  
Allan G. Atherton, Jr.  
Zerqa Atiq  
Dahl L. Atterbury  
Elizabeth C. Attwood  
Susan Auerbach  
Jonathan T. Aylward  
David Ayres  
Elizabeth E. Bailey, Ph.D.  
John D. Bailey, Sr.  
Jordan A. Bailey  
Susan L. Bair  
Gregory T. Bak  
Anna Balek  
Scott Balgemann  
John G. Banich  
Jason Scott Bankert  
Cynthia L. Barazowski-Kassel  
Teresa C. Barganier  
Colin M. Barkley  
Brandon L. Barnhouse  
Dr. Herbert F. Barrack, Sr.  
Mary Jane Barrack  
Carol A. Barrett  
Marylene (Mary) Barrient-Crawford  
Alan Barsky  
Scott R. Bartlett  
Nicholas (Nick) R. Bartos  
Brian A. Bass  
Panagiota (Pam) Batistas-Koliopoulos  
Michael (Mike) T. Baumgardner  
Tina Beavers

## Memorial Tributes (continued)

Tyler J. Becker  
Robert Beliak  
Little Belle  
Rick Belli  
P. Bruce Benzler  
Ronald Berger  
Virginia J. Berl  
Jamie Bernard  
Kurt M. Bertram  
Kalyan Bhandari  
Stephen J. Binder  
Joyce Blomker  
Susan K. Blume-Babcock  
William (Bill) H. Bodden  
Matthew J. Bogdovitz  
Kathleen P. Bohanon  
Kirk D. Boise  
Aidan J. Bone  
Amy J. Boone  
David W. Borks  
Sebastian Boyum  
Timothy Braggins  
Angela Brancato  
Robert Branch  
Christopher D. Brehl  
Concepcion Breslin  
David Breuer  
Jamie Brickley  
Keli E. Brittain  
Catherine (Cathie) A. Brodie  
John W. Brooke  
Daniel S. Brown  
David Brown  
Bruce Brownlee  
Robert W. Bruno  
Bobbie Buchieri  
Walter W. Bundschuh  
Peter R. Bunning  
Colleen M. Burke  
Amy J. Bush  
C.K.  
Alan E. Cabito  
Patrick M. Caires  
Colin M. Cameron  
Ewan Cameron  
Jon Capaldi  
Robert (Bob) Capparell, M.D.  
Sandra (Sandy) P. Capparell  
Rachel Caprari  
Tyler Carr  
Dr. Edson G. Case, Jr.  
Richard M. Casey  
Paula A. Cassarino

Suzanne L. Castellani  
Patrick J. Chaloux  
Joyce Champion  
Thomas D. Childers  
Michelle Chiles  
Micah Chiotti  
Allison A. Chlan-Fellner  
Patrick O. Clancy  
Chris Cleary  
Gena A. Cleland  
Barbara E. Cole  
James (Jimmy) R. Cole  
Valerie L. Collar  
Andrew Collins  
Lynn Conaway  
Alexander B. Conley  
Andrew Connell-Fraser  
Ryan J. Cook  
Victoria (Tori) Trang Cook  
Grace Cook-Blasingame  
David Cooper-Claire  
Maureen Copper  
Wilson Cory  
Cameron M. Cosentino  
Cassie L. Costanzo  
Mary V. Coughlan  
Christopher M. Cowan  
Joseph (Joe) F. Cronin  
Ryan R. Crookston  
Peter Cross  
James Croves  
Jacob W. Crowder  
Steven E. Cruickshank  
Joan (Joanie) M. Curtin  
Sherry Cusumano, RN, LCDC, MS, DPN  
Steve Daigle  
Colter Dallman  
Richard D. Daly  
Anthony D'Angelo  
Margaret M. Dann  
Stanley F. Dann  
Vincent A. Dann  
Ross M. DaPrato  
Terrence (King Terry) A. Davis  
Marc Davis-Ribatto  
A. Louise DeAngelis  
Alexa DeCapua  
Mary M. Deely  
Eden DeFrain  
Angeline DeLorenzo  
James Demovich  
Amanda Derr  
Peter L. Derrick  
Katherine Deschner

Henry (Hank) J. Deutschendorf II  
Jack V. Devereaux, Jr.  
Nathaniel J. Dickinson  
John Dilanni  
Jane Dissin  
Brandon Dixon  
Jonathan E. Dixon  
Mary Louise Dixon  
Nicholas (Nick) A. Dobbert  
Leonard (LJ) W. Dobson, Jr.  
Steven J. Dolinar  
Una G. Donnelly  
Stephen G. Doochin  
Peter J. Dooher  
Edward Doon  
Eric T. Dorris  
August (Gus) E. Doskey  
Allison Lee Doyle  
Michael Doyle  
Rachel L. Drabenstott  
Max N. Drabkin  
Drew  
William Driscoll  
Lorraine (Lory) Dryden  
Laurin Duban  
Tegan V. Dubey  
John L. Duda  
Marcia K. Duncan  
Ronald P. Dyer  
Christopher (Chip) W. Dzumaryk  
Edward  
Ronald (Ronnie) O. Edwards  
Robert Egan  
Ann Eisner  
Sheldon J. Eifenbein, D.O.  
Sean Elkind  
David W. Elliott  
Heather Rae Elliott Staudacher  
Catherine (Catie) A. Etier  
Justin B. Evarian  
Marian (Molly) P. Everdell  
Benjamin C. Faetanini  
John Farmer  
Garrett R. Farr  
Jonathan S. Farrer  
James (Alec) A. Fentum  
Victoria Ferland  
Vincent P. Ferraro  
Anthony Ferrero-Rankin  
Lucas B. Fesko  
Andy Fischer  
Lucia Anna K. Fischer  
David (Dave) M. Fittro  
Dr. Judith (Judy) A. Fitzpatrick Davis

## Memorial Tributes (continued)

Helen Flanders  
Ruth H. Flick  
Raymond J. Flood, Jr.  
Trocar Flook  
Helen C. Fontana  
Jessica A. Forbes  
Billy Foster  
Dan Foutz  
Jacob J. Fox  
Frank  
Carole Franklin-Monk  
Gail W. French  
Harvey Friedenber  
Jason C. Frisco  
Eric A. Fritts  
Charles Fulton  
Janet S. Funke  
Christopher Furay  
Stanton E. Gagel  
Jack Galante  
Diane N. Galba  
Mary Garson  
Tyler M. Gates  
David Germany  
Vito J. Giambanco  
Chantal Gibli  
Melody D. Gibson  
Erin Gilmer  
Hillary Ginsberg  
Marietta M. Gjessing  
Daniel J. Glorioso  
Brian D. Go  
Marc Goldberg  
Dr. Patricia Goldman-Rakic  
Jerry Goldstein  
Dr. Menek Goldstein  
Zachary Golub-Rosen  
Dr. Jaime L. Gomez  
Susan Goodwin-Cox  
Ellen Gottfried  
Michael Gould-Fadaie  
Adam J. Grainawi  
Annie Granger  
William F. Grant, Sr.  
David E. Green  
Rose K. Greenberg  
Mark J. Greenlee  
Matthew J. Gregory  
Noah J. Grimes  
Phil Grimm  
Wilfred L. Guerin  
Thomas S. Gumport  
Amanda G. Gurley  
Clarence Gushurst  
Evelyn Gutlaizer  
Sharon Guzy-Levine  
Jack Hadley  
Dana A. Hafertepen  
John B. Haldeman  
Stephen B. Ham  
Thomas H. Hambric  
Ruth Handleman  
John R. Hardesty  
Matthew J. Hardin  
John B. Harlow  
Margaret Harrington  
Stewart G. Harrison  
Gary E. Hart  
Dr. S. Ann Hartlage Feltes  
Cynthia (Cindy) M. Harwell-Paar  
Christopher J. Hashim  
Rachel C. Hashim  
Michael Heafield  
Peter A. Healey  
Bradley R. Heilman  
Schuyler Henderson  
Carl A. Hendrickson  
Gary E. Heussler, Ph.D.  
Brian D. Hill  
Daniel (Danny) G. Hinden  
Perry D. Hoffman, Ph.D.  
Michael J. Holbrook  
Jack Holden  
Mark Hollander  
Harold (Hal) B. Hollister  
Corinne H. Holt  
Dr. Philip S. Holzman  
Sheldon K. Hooper  
Marc Hopkinson  
Beth Howard  
Ling Hu  
John D. Huberty  
Rennie E. Hughes  
William (Billy) W. Humphrey  
Alan N. Hundert  
Larry D. Huskey  
Stephen J. Imarata  
Naveed A. Iqball  
Germaine Israel  
Philip Jackson  
Shirley Jackson  
Thomas Jackson  
Vivian B. Jackson  
G. Reed Jameson  
William Jamnik  
Miriam W. Javitch  
Alexander D. Johnson  
Justin Johnson  
Michael D. Johnson  
Ryan P. Johnson  
Scott A. Johnson  
Linda K. Johnston  
Ashley (AJ) O. Jones  
Herbert (Skip) R. Jones, Jr.  
Matt Jorgensen  
Savit Joshi  
Herman Juffer  
Leif Kamara  
Sean B. Kamp  
Zbigniew R. Karas  
John R. Karatheodoris  
Raymond J. Karoly, Sr.  
June Karp's friends whose children  
lost their battle with addiction  
Steven M. Karp  
Titus J. Kauffman  
Claude R. Kaufman  
Brian J. Kelly  
Helen K. Kemp  
Ken  
Michael F. Kenigsberg  
Enya L. Kent  
Rashidul H. Khan-Shibly  
Gerry Kiel  
Paul Killea  
Gilbert D. Kimzey  
Sammy Kins  
Jonathan S. Kinsley  
Jill A. Kirby  
George (Tom) T. Kirkman  
Sharyl K. Kittilson  
Elly Klamo  
Doris M. Knapp  
Michael Knutson  
Allison (Alli) S. Kohl  
Christine Kohlstedt  
Peter C. Kohn  
John N. Kolman  
Robert Kolozsvary  
Arty Kononchik  
Michael Kort  
Diane A. Koskinas  
Adrian Koziel  
Patrick H. Krause  
John C. Kruger  
Michael Krusell Nelson  
Kendal (Ken) A. Kucera  
Marc A. Kuder  
Howard Kusten (Howie Pyro)  
Antonio La Peruta  
Berenice Lancis  
Carole Jean Laping  
Mary Ann Lapinskas  
Jerry L. Lapp

## Memorial Tributes (continued)

Susan Lasker-Brody, MPH

Jenna R. Laubach

Brendan L. Lauderdale

Robert E. Lauer

Justin A. LaVenter

Megan Lavin

Rodrigo Leclerc

Peter Lee

Virginia (Ginny) A. Lee-Hopseker

Marvin Leichtung

Ryan Lennon

Jorie Lester-Mark

Eva Levin Dalkoff

Judy Levine

Michael S. Levine

Paulette Levy

Paul A. Lewalski

Jacob Lichtenstein

Constance E. Lieber

Mary M. Lieber

Samuel A. Lieber

Stephen A. Lieber

Hans K. Lindgren

Richard E. Little

Frank J. Lodosky

Cleta F. Logan

John (Jack) S. Logue II

Danielle M. Lorenz

Victor G. Lottmann

Joanna Lowry

Thomas A. Luby, Jr.

Michael Lucente

Gary A. Lund

Robert Lynne

Shirley S. Lynne

Steve Lynne

Barbara Lyons

Matthew C. Lyons

Nicola Lyons

Marissa N. MacLaughlin

Antal Magosi

Roman Makuch

Robert T. Malison, M.D.

Merrill M. Manning III

Rajneesh Manocha's beloved mother

Phillippe Marchiset

Roland Marchiset

Albert Mark

Kathleen A. Marnock

Matthew Marshall

Jonathan D. Martin

Kim Martin

Stephen C. Martinelli

Adam (Atom) Martinez

Elizabeth Martino

Louise Maskell

Liam Masters

Michael D. Mattoon

Thomas Matye

Travis Matye

Andrew B. Mayer

Elizabeth L. McAnulty

Kevin P. McAward

Timothy P. McBride

Michael P. McClain

Lynne McClure, Ph.D.

Skye McCole-Bartusiak

Jacob A. McConkey

Adam T. McCurry

Elmer (Mac) H. McGilvray

Ann B. McGrory

John R. McLain, D.C.

Donald P. McPherson III

Kelsey (Kissie) H. McSwain

Larry A. McWilliams

Theodore (Ted) A. McWilliams

Dani Meadows

Victor P. Medellin-Sterling

Ann (Annie) M. Meehan

Peter Melnik

Jeffrey M. Mercer

Abigale O. Merrifield

Jake Meyer

Elisabeth Z. Meyers

Stuart Meyers

Daniel Michaels

Apphia Michelich

Ronald Michelich

Christopher F. Miehlich

Darlene C. Miller

Lori Miller-Levine

Pete Mills

Angela (Angie) M. Minestra

Mir

Keith Mirailh

Duncan N. Mitchell

Linda Mitchell

Neil Molberger

Gregory A. Monk

Juan (Joj) Maniquis Montelibano

Dakota Moon

Jeffrey D. Moon

Laura M. Moreau

Morgan (Mort) L. Morton

Ellen Mosher

Rick Mosher

Virginia (Ginny) L. Mott

Truly Mount

Juliet D. Mowrey

Patrick Rory Muldoon

Ronald (Ronnie) P. Mullan

Jack T. Mulos

Bradley Munroe

Andrew (Andy) L. Munson

Lisa (Tish) P. Murphy

Adam Neely

Connor D. Neely

Jonathan Nelson

Debjani Neogi

Gregory D. Nerode

Kristina Nestlerode

Christopher J. Neubecker

David Newman Art

Noah

Brandon Norrie

Rachel L. Okon

Aaron D. Olander

Rose A. Olandese

Elizabeth M. O'Neill's beloved spouse

Cameron R. Orr

William J. Osterburg

Rosa Y. Padilla-Seville

Barbara W. Page

Adria Pals

Albert L. Pan

Sue C. Paoletta

Judith E. Pardes

Peter E. Parisi

Alaina (Laney) Chantal Parkhurst

Silas Parry

Brad L. Paschal

Jarad M. Patko

Louis W. Patko

William F. Paul III

Arthur Peck, M.D.

Samantha (Sam) Saint Aubyn

Peluso-Swartzlander

Seymour Pestronk

Daniel L. Peterson

Morgan Phillips' beloved friends

lost to suicide

Parker E. Phillips II

William Brodie Phillips

Gilda N. Pickford

Sybil Pierce

Cecile (Ceci) Pieroni

Jessica A. Piesman

Wright Pillow

Robert A. Pini, Jr.

Dennis (Den) G. Pinson

Dee Ann Pitts

## Memorial Tributes (continued)

Michael C. Polis  
Donald (Donnie) C. Pounders  
George C. Powell, Sr.  
Trisha A. Prante  
Andrew Premo  
Michael Provo  
Peppino Puleo  
Joel M. Purrington  
Vu Huynh Quang  
Dylan Quast  
Bert R. Queen  
Ramez E. Qureshi  
Arthur J. Radin, C.P.A.  
Matthew R. Radula  
Evelyn R. Rafferty  
James Rafferty  
Hotan Rafiee  
Lisa M. Raimondo-Nowell  
Sidharth Ramakrishnan  
Brendan (Kira) Rasenberger  
Rev. Wayne (Ras) R. Rasmussen  
Cassandra (Cassie) N. Ray  
Evan G. Rea  
John D. Reardon  
John Reason  
Carol and Gerry Rees  
Timothy Reese  
Steven (Stevie) R. Reid II  
Samuel (Sam) D. Rendall  
Jay L. Renfro  
Michael Reschke  
Douglas W. Resh  
Chris Reuter  
Dorothy A. Reynolds  
Eamonn P. Reynolds  
Liam C. Rhinehart  
Scott T. Richards  
Linda (Sheryl) Richardson  
Caasi A. Rich-Vogel  
Priscilla Riddick-Trotter  
David A. Rock  
Kylista Rodriguez  
Dr. John P. Rohar  
Elizabeth Rolland  
Brian Rorick  
Thomas Rorick  
Jill Rose  
Melissa Rose's beloved sister  
Zack Rosen  
Diane E. Rosevear  
Dr. John W. Rosevear  
Alan G. Ross  
Christina (Chrissy) Rossi  
Matthew S. Rothman  
David H. Roy  
Donald J. Rully  
John G. Ryan  
Patricia E. Rzasa-Blum  
Gloria F. Sack  
Dr. Rajneesh Salwan  
Dorothy Samels London  
Catherine Sanacora  
Carol Sanchez  
Glory A. Sandberg, M.D.  
Adam Schaffer  
Max Schaffer  
David A. Schaner  
Betsy Scheld  
Victoria Scheld  
Michael W. Schemansky  
Wendy L. Schenck  
Scott W. Scheurer  
Rochelle (Shelly) Schlesinger  
Paul Schnoebelen  
Lee R. Schoolmeesters  
Randolph (Randy) R.A. Schrade  
Andy Schroer  
Lori A. Schuh Fortner  
Briana M. Schutze  
Jack Schwartz  
Timothy P. Scott  
Kelly M. Scruggs  
Michael Scullin  
Ezra Seegull  
Harriet Segal  
Kenneth F. Selig  
Timothy B. Sennott  
Eddy Kwok-Hin Seto  
Gary S. Sevitsky  
William D. Shannon  
Megan L. Sharp  
William (Bill) Shepard  
Edwin N. Sherr  
Sheldon and Elaine Silverman  
Duncan N. Simic  
Kevin Simms  
Frances L. Simon  
Marcia Simon-Kaplan  
James W. Simpson  
Alyssa M. Sinclair  
Dr. Surinder B. Singh  
John T. Sinnott  
Jean C. Sloan's loved ones  
Edmund Smith  
Edward J. Smith  
William H. Smith II  
Donald E. Snyder  
Dr. Anthony (Tony) T. Soares  
Drew Sobotka  
Michael V. Solomon  
Carol A. Solverson  
Chris E. Sorensen  
Kelly L. Sorensen  
Nathan A. Soukup  
Susan K. Soyka  
Gena Spaulding  
Ann Spencer  
Jeffrey T. Sramek  
Gregory St. Amand  
Doretha St. Clair  
Samuel R. Stack  
Ian J. Stancato  
Brian A. Stapleton  
Gregory L. Starling  
Tyler R. Starling  
Jonathan E. Stavis  
John (Wes) W. Stermole  
Evelyn Stoddard-Crane  
John H. Streicker  
Mollie E. Stricker  
Trevor S. Strnad  
Mary J. Strub-Caulkins  
Hilda R. Studebaker  
Kenneth E. Stutzman  
Michael D. Sugarman  
Ms. Sumathi  
Dawn E. Sumlin  
Anthony M. Supino, Esq.  
Martin P. Szuba, M.D.  
Andrew Taddy  
H. Vonn Taylor  
Bruce G. Taymor  
Gerald (Jerry) P. Tchir  
Marc A. Tenenbaum  
Rocky Terrell  
Mary N. Thawley  
William Theos  
Bradley I. Thomas  
George M. Thomas  
Thomas  
Camilla (Cammie) L. Thompson  
George M. Thompson  
Dr. Richard D. Todd  
Ethel M. Toepel  
Emily I. Tomlin  
Jake M. Topley  
C. Dominique Toran-Allerand, M.D.  
Paul A. Truman  
Robert P. Truman  
Donald Trybula  
Alexandros Tsaoussis-Maddock

## Memorial Tributes (continued)

Amanda Tucci  
Robert (Bob) T. Tucker  
Andrew (Andy) J. Tullos III  
Lidia A. Tursini  
Adele C. Tursone  
Joseph Tursone  
Julian B. Tylka  
Mackenzie E. Tynan  
Christian M. Unger  
Marie Upton  
Flor A. Valencia Torres  
Stephanie L. Van Gundy  
Charles Varkoly  
Mary Ann F. Verhaalen  
Joaquin B. Villarreal  
Richard R. Vinyard  
John (JM) M. Visbal  
Gregory Von Burg  
Paul Von Burg  
Dean Voukelatos  
Riley P. Wachhorst  
Wm. F. Wagner, Jr.  
Deniece (Niece) J. Waidhofer  
Capt. Anders (Andy) G. Wallin II  
Tordis Wallin  
Cameron D. Walsh  
Thomas Walsh  
Dannie Wan Fontaine  
Sharon Wang  
Andrew W. Ward  
Kenneth R. Warning  
Leonard Warren  
Paul J. Weintraub  
Kenneth R. Weisz  
James C. Welbourne  
Thomas J. Wendt  
Josh Wertz  
Eugenia (Gene) West Ferrell  
Thomas C. Whisler  
Dan Wicker, Jr.  
Michael G. Wieman  
Jon K. Wilbur  
Gary Williams  
Penny Williams  
Martin S. Willick, M.D.  
Joseph A. Wills II  
Margaret Wills  
Richard K. Wilson  
Timothy (Timo) Wilson  
Marjorie (Margie) Wineburgh  
Douglas Wistner  
Barbara (Bonnie) L. Wolf  
Kenneth A. Wood  
Alan H. Woodard  
Ryan M. Woodland  
Ross Worrell  
Bernard Wortman, Ph.D.  
Christian D. Yeatts  
Ernest M. Yeghian, Jr.  
Charlotte Young  
Marilyn Zalokar  
Anna Zarski  
Peter W. Zartman  
Edward N. Ziegler  
Gladys P. Ziegler  
Barry L. Zimmerman

# Financial Summary\*

## Consolidated Statement of Financial Position

	DECEMBER 31, 2022	DECEMBER 31, 2021
<b>ASSETS</b>		
<b>Current Assets</b>		
Cash and cash equivalents	\$19,059,866	\$16,218,222
Investments, at fair value, current portion	11,104,800	16,798,962
Contributions receivable	2,202,142	281,162
Pledges receivable, current portion	190,277	210,000
Prepaid expenses and other assets	225,037	175,982
<b>Total Current Assets</b>	<b>32,782,122</b>	<b>33,684,328</b>
Assets held in charitable remainder trust	1,701,437	2,127,513
Fixed assets, net	6,884	10,152
Pledges receivable, net, less current portion	9,738	190,015
Investments, at fair value, less current portion	8,947,449	8,947,449
Right-of-Use Asset	424,126	—
<b>Total Assets</b>	<b>\$43,871,756</b>	<b>\$44,959,457</b>
<b>LIABILITIES AND NET ASSETS</b>		
<b>Liabilities</b>		
Accounts payable and accrued expenses	\$95,271	\$243,940
Grants payable	15,522,195	19,354,810
Operating lease liability, current portion	353,580	—
Accrued compensation	40,776	40,007
Annuities payable	778,644	1,013,277
Charitable gift annuities payable	142,918	152,582
<b>Total Current Liabilities</b>	<b>16,933,384</b>	<b>20,804,616</b>
Operating lease liability, net, less current portion	144,891	—
<b>Total Liabilities</b>	<b>17,078,275</b>	<b>20,804,616</b>
<b>Net Assets</b>		
Without donor restrictions	17,792,107	14,145,437
With donor restrictions	9,001,374	10,009,404
<b>Total Net Assets</b>	<b>26,793,481</b>	<b>24,154,841</b>
<b>Total Liabilities and Net Assets</b>	<b>\$43,871,756</b>	<b>\$44,959,457</b>

\* The Foundation's complete audited financial statements are available on our website.

## Consolidated Statement of Activities

	YEAR ENDED DECEMBER 31, 2022	YEAR ENDED DECEMBER 31, 2021
<b>SUPPORT AND REVENUE</b>		
Contributions	\$12,828,748	\$14,201,498
Special events, net	46,716	—
Contribution of services	2,116,704	2,315,959
Bequests	8,618,365	2,563,135
Net realized and unrealized (losses) gains on investments	(4,857,163)	3,426,155
Net (depreciation) appreciation of assets held in charitable remainder trusts	(426,076)	364,528
Dividend and interest income	268,882	234,294
<b>Total Support and Revenue</b>	<b>18,596,176</b>	<b>23,105,569</b>
<b>EXPENSES</b>		
<b>Program Services</b>		
Research grants and awards	8,868,584	9,805,853
Scientific advancement	2,414,690	2,396,220
Program support	2,258,132	2,125,712
<b>Total Program Services</b>	<b>13,541,406</b>	<b>14,327,785</b>
<b>Supporting Services</b>		
Fundraising**	850,240	802,458
Administration**	1,565,890	1,507,275
<b>Total Supporting Services</b>	<b>2,416,130</b>	<b>2,309,733</b>
<b>Total Expenses</b>	<b>15,957,536</b>	<b>16,637,518</b>
Change in Net Assets	2,638,640	6,468,051
Net Assets, beginning of year	24,154,841	17,686,790
<b>Net Assets, end of year</b>	<b>\$26,793,481</b>	<b>\$24,154,841</b>

\*\* All fundraising and administration expenses are funded by specially designated grants.



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