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Institutions Added in 2015
Ghent University
Italian Institute of Technology
University of Vienna, Ferris University
National Scientific Council of Argentina (CONICET)
Second University of Naples
University of Cadiz
University of Kansas
University of Rennes, University of Basque Country
University of Trento
University of Tulsa

Grants
IN 2015
Young Investigators
712 Applications
191 Awarded
179 New Grantees
12 Prior Grantees
Independent Investigators
315 Applications
40 Awarded
16 New Grantees
24 Prior Grantees
Distinguished Investigators
181 Applications
15 Awarded
6 New Grantees
9 Prior Grantees

SINCE 1987
Total Amount Awarded
$342 Million
Total Grants Awarded
5,000+ In total
4,100+ In the U.S.
900+ Outside of the U.S.

GRANTS BY STATE SINCE 1987
New York: 757
Maryland: 306
Texas: 177
Georgia: 93
Ohio: 82
Virginia: 38
Minnesota: 33
Florida: 25
Alabama: 16
Louisiana: 15
Arizona: 10
Arkansas: 7
Kansas: 4
Maine: 1
California: 642
Connecticut: 302
North Carolina: 153
Michigan: 89
Missouri: 58
Washington: 48
New Jersey: 35
Indiana: 31
South Carolina: 19
New Hampshire: 16
Kentucky: 13
Mississippi: 10
Nebraska: 6
Hawaii: 4
Delaware: 1
Massachusetts: 452
Pennsylvania: 268
Illinois: 113
Tennessee: 87
Colorado: 49
Wisconsin: 44
Rhode Island: 34
Oregon: 25
Washington D.C.: 18
New Mexico: 16
Utah: 13
Alaska: 1

"The reach of the Brain & Behavior Research Foundation’s Grants knows no borders. The impact of our effort is not only in the development of promising scientists, but also in the focus it brings to the challenge and urgent need of bringing hope and better lives to all those living with mental illness.”
HERBERT PARDES, M.D.
President, Foundation Scientific Council
Executive Vice Chairman of the Board of Trustees
New York-Presbyterian Hospital
Institutions Added in 2015
- Ghent University
- Italian Institute of Technology
- University of Vienna, Ferris University
- National Scientific Council of Argentina (CONICET)
- Second University of Naples
- University of Cadiz
- University of Kansas
- University of Rennes, University of Basque Country
- University of Trento
- University of Tulsa

Grants
IN 2015
- Young Investigators
  - 712 Applications
  - 191 Awarded
  - 179 New Grantees
  - 12 Prior Grantees
- Independent Investigators
  - 315 Applications
  - 40 Awarded
  - 16 New Grantees
  - 24 Prior Grantees
- Distinguished Investigators
  - 181 Applications
  - 15 Awarded
  - 6 New Grantees
  - 9 Prior Grantees

TOTAL NUMBER OF COUNTRIES SINCE 1987
34

Total Amount Awarded
$342 Million

Total Grants Awarded
5,000+ In total
4,100+ In the U.S.
900+ Outside of the U.S.

TOTAL NUMBER OF STATES IN THE U.S.
46
Including Washington, D.C.

Our Global Footprint
- 529 Institutions (including subsidiaries and affiliates)
  - 329 In the U.S.
  - 200 Outside of the U.S.
- Number of Grants in a Country
  - Orange indicates a new institution was added in 2015

GRANTS BY STATE SINCE 1987
- New York: 757
- California: 642
- Massachusetts: 452
- Maryland: 306
- Connecticut: 302
- Pennsylvania: 268
- Texas: 177
- North Carolina: 153
- Illinois: 113
- Georgia: 93
- Michigan: 89
- Tennessee: 87
- Ohio: 82
- Missouri: 58
- Colorado: 49
- Iowa: 49
- Washington: 48
- Wisconsin: 44
- Virginia: 38
- New Jersey: 35
- Rhode Island: 34
- Minnesota: 33
- Indiana: 31
- Oregon: 25
- Florida: 25
- South Carolina: 19
- Washington D.C.: 18
- Alabama: 16
- New Hampshire: 16
- New Mexico: 16
- Louisiana: 15
- Kentucky: 13
- Utah: 13
- Arizona: 10
- Mississippi: 10
- Oklahoma: 7
- Arkansas: 7
- Nebraska: 6
- Vermont: 5
- Kansas: 4
- Hawaii: 4
- West Virginia: 4
- Maine: 1
- Delaware: 1

Herbert Pardes, M.D.
President, Foundation Scientific Council
Executive Vice Chairman of the Board of Trustees
NewYork-Presbyterian Hospital
Beginning in 1987, long before the venture capital tech boom and the Internet Bubble (1995–2000), the Brain & Behavior Research Foundation was providing seed money to neuroscientists to invest in “out of the box” research that the government and other sources were unwilling to fund. That same year the Foundation awarded $250,000 in NARSAD Young Investigator Grants to its first 10 early career scientists at $25,000 each to fund their promising research ideas. As of December 2015, we have awarded more than $342 million in more than 5,000 grants, to more than 4,000 scientists in the United States and 34 other countries, in over 525 universities and medical centers.

The $342 million in grants awarded by the Foundation since 1987 has resulted in over $3 billion in additional research funding for these scientists.

We can measure our success through the multiplier effect. A survey of our grantees revealed:

- NARSAD Grants increase researchers ability to secure additional grant support
- NARSAD Grants result in subsequent funding (federal and private) of at least 10 times the amount invested by the Foundation

Government budgets are declining for basic research and many major pharmaceutical companies are backing away from neuropsychiatric research and development. The Foundation is unique in that it relies on private contributions of individuals and family foundations to accelerate funding of the most promising brain research to find better treatments and cures for mental illness. We seek answers in understanding how the brain functions and can malfunction; answers in developing preventative and early intervention techniques and answers in finding improved treatments for those whose illness has progressed. In 2015, the Foundation awarded a total of $18.5 million to our Young Investigator, Independent Investigator and Distinguished Investigator Grantees.

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.

An independent measure of the success of our grants is in a recent RAND Europe analysis of the global mental health research funding landscape over the past five years. This report found that we are the top non-government mental health research funder mentioned in published articles.

The Foundation is a driving force in advancing what is known about mental illness and how to better treat, prevent and ultimately cure it. A few examples of research progress in 2015 include:

**Gene Expression Analysis Points Toward Pathways Involved in Major Depression**

Dr. Patrick Sullivan (2014 Lieber Prizewinner and 2010 Distinguished Investigator) and Dr. Dorret Boomsma (2011 Distinguished Investigator) identified 119 genes whose activity differs significantly in people with major depressive disorder. Whether stemming from inherited genetic factors and/or environmental influences, these gene expression changes help point scientists toward biological pathways likely to be involved in the disorder. The study also pointed to 19 genes whose expression was more likely to have returned to normal if an individual had recovered from an earlier depression.

**Hopeful News on Comprehensive Team Treatment of Early Psychosis**

Dr. Nina Schooler (Scientific Council Member and 1998 Distinguished Investigator), Dr. Kim Mueser (2003 Distinguished Investigator and 1988 Young Investigator) and five other grant recipients, along with other colleagues, demonstrated that early intervention and coordinated team care can make a real, positive difference in outcomes for first-episode psychosis patients. Over two years, the team treated 223 patients with a protocol called NAVIGATE, a first-episode intervention stressing low-dose antipsychotic medications; cognitive behavioral therapy to support resiliency and illness self-management skills; family psychoeducation and support; and provided employment and educational opportunities. The better outcomes suggest the importance of early and coordinated intervention after a first psychotic episode.
New Compounds Show Promise in Treating Schizophrenia Symptoms

Dr. Marc Caron, (Scientific Council Member, 2013 Lieber Prizewinner and 2005 Distinguished Investigator) found two new small-molecule drugs tested in mice alleviated some symptoms of schizophrenia-like behaviors, including social avoidance and cognitive performance. The team found that drugs called UNC9975 and UNC9994 influence the beta-arrestin communication pathway and reduced hyperactive movements, improved memory for novel stimuli, and made the test mice more social. The work shows that hitting other pathways in schizophrenia has the potential to treat symptoms in more individualized, fine-tuned ways.

We Support Scientists and Research in Its Early Stages

We understand that some outcomes may be groundbreaking, like our early support of the use of Clozaril for schizophrenia, transcranial magnetic stimulation for treatment resistant depression, deep brain stimulation for depression, and optogenetics, the breakthrough technology that uses light to control activity patterns in the brain. But all research generates new findings that can help advance the understanding of the brain. Foundation funded grants are like venture capital support for our scientists.

Most of our grants go to Young Investigators. By funding these scientists, you are supporting a career in brain research. We have a unique arrangement with the universities and institutions in which no overhead costs are taken from the grants given to our Young Investigators—every dollar goes to scientific research. With our Independent Investigators and Distinguished Investigators, institutions may only take up to eight percent maximum per year of overhead costs.

Because of the generous support of two family foundations which cover the Foundation’s operating expenses, 100 percent of your contributions for research are invested in our grants leading to advances and breakthroughs in brain and behavior research. Your donations have a tremendous impact.

Our mission to alleviate the suffering of mental illness through scientific advances and understanding is based upon our steadfast commitment to patients, family members and friends. We believe that this past year more people were able to live happy, productive lives. This progress could not have been accomplished without the extraordinary dedication of our 165-member Scientific Council. Their volunteer effort is at the heart of the Foundation’s achievements and the basis for its success in continuing to make advances in research.

But more still needs to be done and we are poised and ready. With your ongoing commitment we will continue to invest your contributions into promising ideas that get results. Results that in turn will improve lives. Thank you for your support.

With sincere thanks and regards,

JEFFREY BORENSTEIN, M.D.
President and CEO

STEPHEN A. LIEBER
Chair, Board of Directors

HERBERT PARDES, M.D.
President, Scientific Council

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.
2015 was an exciting year in brain and behavior research thanks to you and the many others who generously support our grantees and the groundbreaking discoveries they are making.
Listed in Order of Publication

1. Long-Term Effects of Marijuana on the Brain
2. Lithium Linked to Lower Incidence of Dementia in Older People with Bipolar Disorder
3. Parent’s History of Suicide Attempts Helps Predict Suicide Attempts in Their Children
4. Combined Drug Treatment Improved Results in Geriatric Depression
5. Omega-3 Relieves Depression Symptoms in People with Bodily Inflammation
6. Estrogen Drug Improves Cognition in Schizophrenia Patients
7. Gene Expression Analysis Points Toward Pathways Involved in Major Depression
8. Non-Invasive Stimulation Reworks Brain Waves, Improves Cognition
9. New Compounds Show Promise in Treating Schizophrenia Symptoms
10. Drug Helps Mice Respond Normally to Fear After Traumatic Experience
11. Watching Patient-Derived Brain Cells Take Shape in the Lab Reveals Autism Defect
12. Omega-3 Supplements Linked to Reduced Risk of Developing Psychosis
13. Size of Brain Structure May Predict Effectiveness of Ketamine
14. Distinguishing Childhood and Adult Forms of ADHD
15. Hopeful News on Comprehensive Team Treatment of Early Psychosis
BRAIN & BEHAVIOR RESEARCH FOUNDATION

1

BASIC RESEARCH: ADDICTION

Long-Term Effects of Marijuana on the Brain

Marijuana use is on the rise nationally, a fact that is not surprising in view of recent efforts to legalize the drug in several states. Scientific Council member Nora Volkow, Director of the National Institute on Drug Abuse in Washington, D.C., has repeatedly warned of the harmful impact of heavy marijuana use on the brain, particularly among those who use the drug regularly beginning at a very young age, and among those who happen to be at elevated risk for psychotic illness.

Scientific studies of the long-term effects of marijuana on the brain have generated controversy, providing an inconsistent picture in part due to variations in research methods. With this in mind, a research team that included Vince D. Calhoun, Ph.D., recipient of a NARSAD Young Investigator grant in 2004, set out to perform a comprehensive study to characterize brain alterations associated with chronic marijuana use.

The team, led by Francesca Filbey, Ph.D., of the University of Texas at Dallas, measured the volume of the brain’s grey matter brain-wide with structural magnetic resonance imaging, as well as abnormal grey matter regions and the integrity of the brain’s white matter via diffusion tensor imaging. Subjects included 48 marijuana users and 62 matched control subjects who did not use the drug.

Reporting in the Proceedings of the National Academy of Sciences, the team found changes in grey matter volume and potential functional abnormalities in grey matter as well in connections within white matter. Specifically, they found that chronic use reduces grey matter volume in the brain’s orbitofrontal cortex; increases structural and functional connectivity; and leads to neural alterations that are affected by the age of onset and duration of use.

These findings suggest chronic marijuana use results in complex neuroadaptive processes. Future long-term studies will be needed to determine whether there is a reversion to normal following prolonged abstinence from marijuana use.

2

BASIC RESEARCH/TREATMENT: BIPOLAR DISORDER

Lithium Linked to Lower Incidence of Dementia in Older People with Bipolar Disorder

People with bipolar disorder are thought to be more likely to develop dementia than those who don’t have the disorder. Hence the importance of a finding by Tobias Gerhard, Ph.D., of Rutgers University, and colleagues*, who reported in 2015 that regular treatment with lithium may reduce the risk of dementia in people with bipolar disorder.

Lithium is an effective mood stabilizer for people with bipolar disorder. It was approved by the U. S. Food and Drug Administration in the 1970s, but its use has declined in the last 20 years as alternative treatments, such as the anticonvulsants valproic acid (Depakote and others) and lamotrigine (Lamictal), have become available.

In the January 22, 2015 issue of the British Journal of Psychiatry Dr. Gerhard and team set forth the results of their analysis of data from more than 40,000 adults. They had examined Medicare and Medicaid records of patients over 50 years of age diagnosed with bipolar disorder. For those who took lithium more than 300 days during the prior year, dementia occurred less frequently than for those who took the drug less frequently or not at all during the same period. Using lithium sporadically or intermittently did not affect the incidence of dementia, nor did treatment with anticonvulsants regardless of how often they were used.

Lithium blocks an enzyme called GSK3, known to contribute to Alzheimer’s disease. Scientists have suspected that the drug might protect broadly against neurodegeneration, but clinical evidence has been inconsistent. The Gerhard team’s analysis is the largest to date of dementia among people taking lithium to treat bipolar disorder. According to Dr. Gerhard, the findings “strengthen the hypothesis that lithium exerts a protective effect on the development of dementia in patients with bipolar disorder, and support clinical trials to further investigate the neuroprotective effects of lithium.”
PREVENTION/DIAGNOSIS: SUICIDAL BEHAVIOR

Parent’s History of Suicide Attempts Helps Predict Suicide Attempts in Their Children

As public health experts debate the best ways to reduce suicides—the 10th leading cause of death in the United States—new research by Foundation Scientific Council member and 2008 Distinguished Investigator grantee J. John Mann, M.D., and colleagues’ calls attention to the importance of early intervention based on long-term risk factors.

In a study published in the February 2015 issue of *JAMA Psychiatry*, Dr. Mann and colleagues probed the extent to which suicidal behavior in a parent gets passed on to children. The team tracked 701 children of 334 people diagnosed with mood disorders for an average of six years to identify factors that predicted suicide attempts among the children.

The investigators found that having a parent who had attempted suicide made it nearly five times more likely that one of their children would make an attempt. It has been known that both genetic and non-genetic factors related to the predisposition for suicidal behavior, or to psychiatric illnesses that trigger suicidal behavior, are transmitted in families. This study sought to identify the factors responsible for familial transmission.

Suicide attempts were more likely among those children who, like their parents, were diagnosed with a mood disorder such as major depression or bipolar disorder. Such diagnoses are typically present at least a year before the first attempt. Most people diagnosed with depression do not attempt suicide because they do not have a predisposition to suicidal behavior. Independent of family history of depression, impulsive and aggressive behavioral traits among the children also made it more likely that they will attempt suicide.

The findings highlight the importance of three long-term risk factors: a family history of suicide attempts, a family history of mood disorders, and a personal history of impulsive aggression.

NEXT-GENERATION TREATMENTS: DEPRESSION (GERIATRIC)

Combined Drug Treatment Improved Results in Geriatric Depression

Helen Lavretsky, M.D., of the University of Southern California, was first author on an important paper reporting results of the first comprehensive and well-controlled trial to find out if the drug methylphenidate (Ritalin) can enhance clinical and cognitive outcomes in patients with geriatric depression. Their results appeared in *The American Journal of Psychiatry* on February 13, 2015.

The research team specifically set out to discover whether methylphenidate improved patients’ response to the widely prescribed antidepressant citalopram (Celexa). They conducted a 16-week randomized double-blind placebo-controlled trial for geriatric depression in 143 older outpatients diagnosed with major depression. They compared results in three treatment groups of equal size: one group received methylphenidate plus placebo; a second, citalopram plus placebo; and a third, citalopram plus methylphenidate.

Daily doses ranged from 20 mg to 60 mg for citalopram and from 5 mg to 40 mg for methylphenidate. All groups showed significant improvement in depression severity and in cognitive performance. However, the improvement was more prominent in the citalopram plus methylphenidate group compared with the other two groups.

Additionally, the rate of improvement in the citalopram plus methylphenidate group was significantly higher than that in the citalopram plus placebo group in the first four weeks of the trial. The groups did not differ in cognitive improvement or number of side effects.

Combined treatment with citalopram and methylphenidate demonstrated an enhanced clinical response profile in mood and well-being, as well as a higher rate of remission, compared with either drug alone. All treatments led to an improvement in cognitive functioning, although augmentation with methylphenidate did not offer additional benefits, the team reported.
Estrogen Drug Improves Cognition in Schizophrenia Patients

A team led by University of New South Wales researcher Cynthia S. Weickert, Ph.D., discovered in 2015 that the estrogen-like drug raloxifene—often prescribed for osteoporosis—can improve attention and memory in men and women with schizophrenia.

A growing body of evidence suggests that estrogen plays a beneficial role in the brain, supporting growth and protecting neurons from damage. From work supported by her NARSAD Young Investigator Grants, Dr. Weickert and her colleagues found that brain estrogen receptors are altered in some people with schizophrenia, blunting their ability to respond to estrogen’s beneficial effects. Raloxifene stimulates estrogen receptors and can help overcome a blunted estrogen response. The drug also stimulates estrogen receptors in the brain and may guard against memory loss in aging, making it potentially useful for cognitive problems in schizophrenia patients.

Dr. Weickert and colleagues reported May 18, 2015 in the journal *Molecular Psychiatry* on the drug’s effect in 98 people diagnosed with schizophrenia or schizoaffective disorder (which combines symptoms of schizophrenia and a mood disorder). All of the patients received a daily dose of raloxifene along with their usual antipsychotic medications in one phase of the clinical trial and a placebo in another phase.

After the first six-week period, patients taking raloxifene had improved scores on memory and attention compared to those taking placebo. Raloxifene treatment significantly improved attention and thought processing speed. It did not reduce the severity of schizophrenia symptoms any more than the placebo did, but both groups showed fewer symptoms overall during the study, and none of the patients had severe side effects from the treatment.
BASIC RESEARCH: DEPRESSION
Gene Expression Analysis Points Toward Pathways Involved in Major Depression

While there is good evidence that genetics influences a person’s likelihood of developing major depression, scientists have only just begun to uncover specific genetic variations that may increase risk. In a study published May 26, 2015 in *Molecular Psychiatry*, scientists led by Patrick F. Sullivan, M.D., at the University of North Carolina School of Medicine, sought out depression-relevant genes by measuring and comparing gene activity in the cells of more than 1,800 individuals. To date, this is the largest analysis of gene expression in people with major depression.

Using blood samples collected as part of the Netherlands Study of Depression and Anxiety, Dr. Sullivan and Dr. Dorret Boomsma measured gene expression in the cells of 882 people with depression, 635 people who were not experiencing major depression at the time of the study but had in the past, as well as a control group of 331 people who reported no current or past depression.

They found 119 genes whose activity differed between the control group and people with current depression. Many of these were genes that affect immune function. This was consistent with other research suggesting a link between the immune system and mood disorders.

Two years after their initial analysis, Dr. Sullivan and colleagues collected additional data from a subset of the people in the study. This enabled them to compare gene activity between those who had recovered from their depression and those who didn’t. Of the 119 depression-associated genes they had already identified, they found 19 genes whose activity also correlated with changes in depression—in these 19 genes, expression was more likely to have returned to normal among those who had recovered from their depression.

NEXT-GENERATION THERAPY: SCHIZOPHRENIA
Non-Invasive Stimulation Reworks Brain Waves, Improves Cognition

Transcranial direct current stimulation (tDCS) is an affordable and portable way to stimulate the brain. It can help induce normal neural activity and make thought processes more flexible in people with schizophrenia, according to a study published online June 29, 2015 in *Proceedings of the National Academy of Sciences*.

The study suggests a drug-free and safe way of treating debilitating cognitive problems, for which antipsychotics are not completely effective.

Among the cognitive impairments present in schizophrenia are problems with learning from mistakes and adapting to changing conditions. In lab tests, people with schizophrenia may stick with wrong answers or strategies even if the outcome is not successful. They do not tend to slow down to reconsider their responses after making a mistake. These difficulties can interfere with learning at all levels.

“In order to optimally interact with our complicated environment, we constantly adjust our behavior,” explains Dr. Sohee Park. “People with schizophrenia have difficulty adjusting. This results in inflexibility of actions and thoughts. Importantly, they may not even notice their errors when they make them.”

Twenty minutes of low-voltage tDCS applied to the scalp over the medial prefrontal cortex improved error-monitoring and accuracy in a test of adaptive control in people with schizophrenia. After stimulation, specific brain waves measured by scalp electrodes were observed to “normalize,” by showing greater synchrony—in this respect more resembling patterns seen in healthy controls.

Scientific Council Member Cameron Carter, M.D. wrote: “these findings reinforce our growing understanding that the disordered brain is not locked away inside the skull but is indeed within our reach and accessible for neuromodulation.”
Two new small-molecule drugs tested in mice can alleviate some symptoms of schizophrenia-like behaviors, including movement abnormalities, social avoidance, and cognitive performance. This preliminary success in work toward better treatments for schizophrenia, was reported July 1, 2015 in *Neuropsychopharmacology*.

Currently used antipsychotic drugs block the dopamine D2 receptor, an important communication port for some neurons in the brain. These drugs are used mainly to treat schizophrenia’s “positive” symptoms such as delusions and hallucinations. They are less effective, and often ineffective, in treating “negative” symptoms such as a lack of pleasure in everyday life, or concentration and memory problems (schizophrenia’s “cognitive symptoms”).

The research team, which included Marc G. Caron, Ph.D., and William C. Wetsel, Ph.D., a 1998 NARSAD Independent Investigator, both of Duke University Medical Center, decided to look for drug candidates that would block signaling pathways related to the dopamine D2 receptor that are not affected by existing antipsychotic medicines, in the hope that this might reveal novel ways to treat a wider variety of schizophrenia symptoms.

They tested two dopamine D2 receptor-targeting compounds called UNC9975 and UNC9994 that influence the beta-arrestin communication pathway. The research showed that the compounds could normalize schizophrenia-like symptoms in mice by reducing their hyperactive movements, improving their memory for novel stimuli and making them more social around other mice.

The new compounds also produced a much lower level of catalepsy—a rigid muscle side effect of schizophrenia treatment—than traditional antipsychotic drugs. Targeting different pathways connected to the dopamine D2 receptors may facilitate treating patients in more individualized, fine-tuned ways.

In treating post-traumatic stress disorder (PTSD), the goal is to find ways to help patients “extinguish” abnormal and exaggerated fear responses that can continue long after a traumatic event. In a new study with mice, Kerry J. Ressler, M.D., Ph.D., and his colleagues showed that treatment with the corticosteroid drug dexamethasone can help the animals lose their PTSD-related fear response, possibly through the drug’s effects on a gene called Fkbp5.

The findings, published online July 15, 2015 in the journal *Neuropsychopharmacology*, may reveal an opportunity to halt the disorder soon after people experience a traumatic event. Dr. Ressler, of Emory University, who in 2002 and 2005 received NARSAD Young Investigator Grants, and colleagues, trained a group of mice using sounds and mild electrical shocks to learn and then to inhibit a specific fear. Animals that had experienced a traumatic event before the fear training were more likely to inhibit or extinguish the fear if they were given a low dose of dexamethasone four hours beforehand to suppress the internal stress response. The fear was also more likely to remain “extinguished” 24 hours later in those same animals.

Dr. Ressler and colleagues also showed that the dexamethasone dose affected how Fkbp5 is expressed in the amygdala, a part of the brain involved in regulating fear and anxiety. They suggest that dexamethasone may help to extinguish fear learning after a trauma through its effects on Fkbp5, specifically in that gene’s role in helping regulate the response to stress.

The study adds to the body of research implicating Fkbp5 in PTSD, including earlier reports by Dr. Ressler and others that have indicated certain mutations in the gene may be related to whether childhood victims of trauma grow up to develop PTSD as adults.
NEXT-GENERATION TECHNOLOGY/ BASIC RESEARCH: AUTISM

Watching Patient-Derived Brain Cells Take Shape in the Lab Reveals Autism Defect

Scientists using a new technology that involves reprogramming stem cells reported July 16, 2015 in Cell that overproduction of certain cell types during early development could lead to faulty wiring in the brains of people with autism. The study was led by Flora M. Vaccarino, M.D., Ph.D., of Yale University and included Gianfilippo Coppola, Ph.D.*

To follow early brain development in cells with the same genetic makeup as those in people with autism, Dr. Vaccarino’s team sampled skin cells from four people with the disorder and then reprogrammed them to redevelop as neurons. The scientists watched as the reprogrammed cells divided, became more specialized, and organized themselves into structures called organoids, composed of neurons at a developmental stage equivalent to the first trimester of human fetal development.

The team compared organoids derived from the cells of people with autism to a set derived from cells of the patients’ fathers, who did not have autism. In the patient-derived organoids, they found an overabundance of inhibitory neurons which dampen the signals of other cells. Cells in the autism-derived organoids also divided more quickly than those in the organoids derived from the cells of unaffected individuals.

The researchers linked excessive numbers of inhibitory neurons at least in part to the over activity of a gene called FOXG1. When they grew new brain-like organoids from the same autistic individuals but this time artificially decreasing the activity of the FOXG1 gene, some of the key developmental defects did not appear. The normal balance of excitatory and inhibitory neurons was restored.

The findings suggest that measuring FOXG1 activity could help clinicians more accurately diagnose autism spectrum disorders. They also suggest that targeting FOXG1 may be an effective strategy for developing new drugs to treat autism.

NEXT-GENERATION TREATMENTS: PSYCHOSIS, SCHIZOPHRENIA, BIPOLAR DISORDER

Omega-3 Supplements Linked to Reduced Psychosis Risk

The Foundation’s 2015 Lieber Prizewinner for schizophrenia research, Patrick McGorry, M.D., Ph.D., of the University of Melbourne, Australia, along with study leader Dr. G. Paul Amminger and colleagues, reported that a 12-week course of omega-3 polyunsaturated fatty acid (PUFA) supplements reduced the risk that young adults would develop schizophrenia or other psychiatric illnesses.

A decade ago, the same team conducted the first trial showing that omega-3 PUFAs prevented a first episode of psychotic disorder for up to one year. On August 11, 2015 they reported results of their new research in Nature Communications.

Several controlled trials have shown that supplementation with omega-3 PUFAs can reduce psychotic symptoms. Since these have no clinically relevant adverse effects and are considered beneficial to health, they are ideal candidates for prevention of psychosis,” the team said.

The new study looked at the longer-term impact of the supplements, among 81 people aged 13 to 25 with early psychosis. After following the patients for an average of 6.7 years after treatment, 9.8% who received the omega-3 PUFAs had at some point developed a psychotic disorder, compared to 40% of those who received placebos.

The team investigated whether omega-3 PUFA supplementation reduced need for antipsychotic medication. The proportion of individuals who reported having been prescribed antipsychotic medication at follow-up was 29.4% (10/34) in the omega-3 PUFA group and 54.3% (19/35) in the placebo group.

It’s not clear exactly how omega-3 PUFAs affect the development of psychosis. It has been postulated to reduce inflammation in the brain and aid the growth of new neurons.
BRAIN & BEHAVIOR RESEARCH FOUNDATION

NEXT-GENERATION DIAGNOSTIC/TREATMENT: DEPRESSION

Size of Brain Structure May Predict Effectiveness of Ketamine

Among the symptoms experienced by people who develop post-traumatic stress disorder (PTSD) is “anxious arousal”—feeling tense or easily startled much of the time. New research published in the April 2015 issue of the journal JAMA Psychiatry linked these symptoms to a reduction in the size of the amygdala, a structure deep in the brain that is associated with fear processing and emotion.

The team, led by Robert H. Pietrzak, Ph.D., of the Department of Veterans Affairs National Center for PTSD in Connecticut and included Chadi Abdallah, M.D. of Yale University, wanted to evaluate whether amygdala size correlates with certain clusters of symptoms, rather than the overall disorder.

The scientists used magnetic resonance imaging to assess the size of the hippocampus and the amygdala in 48 combat veterans who served in Iraq or Afghanistan, 23 of whom had been diagnosed with PTSD.

For each patient, the team correlated the size of the amygdala and hippocampus to the severity of each of five categories of symptoms: 1) anxious arousal; 2) dysphoric arousal (sleep difficulties), 3) re-experiencing (through dreams, flashbacks, or frightening thoughts), 4) avoidance (of reminders of the traumatic event) and 5) emotional numbness.

There was one significant correlation: in veterans with the most severe anxious arousal symptoms, the right amygdala was smaller than it was in other study participants. They also found that the right amygdala was smallest in veterans who had been exposed to the most severe combat.

The findings suggest that combat exposure may contribute to shrinking of the amygdala, which is in turn associated with increased anxious arousal.

BRAIN & BEHAVIOR RESEARCH FOUNDATION

NEXT-GENERATION DIAGNOSIS: ADHD

Distinguishing Childhood and Adult Forms of ADHD

Despite assumptions that adult ADHD is a childhood-onset neurodevelopmental disorder, no long-term study has described the childhood period of adults diagnosed with ADHD. A team led by Avshalom Caspi, Ph.D., the 2010 Ruane Prize winner, performed retrospective analyses of people with ADHD diagnosed in adulthood and compared them with analyses of people diagnosed in childhood.

The team, which also included Terrie E. Moffitt, Ph.D., co-winner with Dr. Caspi of the 2010 Ruane Prize, and Guilherme V. Polanczyk, M.D., Ph.D., of the University of São Paulo School of Medicine, Brazil, reported results in the American Journal of Psychiatry on October 1, 2015.

They found that during childhood, six percent of the group, mostly boys, was diagnosed with ADHD. But in adulthood, only three percent received an ADHD diagnosis, with males and females affected about equally. The great surprise was that almost none of those with adult ADHD were among the portion of the group that had been diagnosed during childhood. Ninety percent of adult ADHD cases lacked a history of childhood ADHD.

If this finding is replicated in other studies, i.e., if a childhood ADHD group and a demographically comparable adult ADHD group are found to comprise virtually non-overlapping sets, then it is possible, the researchers say, that adult ADHD is not a neurodevelopmental disorder that begins in childhood, as is widely believed, but may in fact be a separate condition with other causes.
NEXT-GENERATION TREATMENT: PSYCHOSIS, SCHIZOPHRENIA

Hopeful News on Comprehensive Team Treatment of Early Psychosis

There was hopeful news in 2015 for people suffering from psychosis. Early intervention and coordinated team care can make a real, positive difference in outcomes for first-episode psychosis patients; and there is a way of delivering such care that has been demonstrated to work effectively in a series of randomly selected community-based mental health clinics located in various places across the U.S.

When compared with 181 people with a similar history (a single episode of psychosis) who received the usual care offered in community care settings, 223 people who received the NAVIGATE treatment approach: 1) remained in treatment longer; 2) experienced greater improvement in quality of life, including interpersonal relationships; 3) experienced greater relief from overall symptoms as well as depression; and 4) improved more in involvement in work and school.

Two important observations based on two years of clinical testing of the NAVIGATE approach merit special attention. One was that earlier implementation of the full, coordinated treatment approach following a first episode of psychosis correlated directly with better outcome. A second notable observation: patients who received the full coordinated treatment needed lower doses of antipsychotic medication, on average, to maintain a good quality of life.

These and other important related results are based on two years of treating patients in the NAVIGATE program, which was evaluated in the RAISE Early Treatment Program (ETP), organized by the National Institute of Mental Health (NIMH).

The research team, reporting October 20, 2015 in the American Journal of Psychiatry, was led by John M. Kane, M.D., of Hofstra North Shore-LIJ School of Medicine, and included seven recipients of NARSAD Grants, including Nina R. Schooler, Ph.D. and Kim T. Mueser, Ph.D.

At the heart of the program studied were comprehensive first-episode psychosis intervention that emphasizes low-dose antipsychotic medications, cognitive-behavioral therapy to increase resiliency and illness self-management skills for the patient, family psychoeducation and support and supported employment and education.
Many of our grantees go on in their careers to serve in leadership positions in the mental health field.
Since 1987, the Foundation has awarded more than $342 million to fund more than 5,000 grants to more than 4,000 leading scientists around the world.

NARSAD Grants Support The Most Promising Ideas in Brain Research:

- **Basic Research** to understand what happens in the brain to cause mental illness.
- **New Technologies** to advance or create new ways of studying or understanding the brain.
- **Next Generation Therapies** to reduce symptoms of mental illness and ultimately cure and prevent brain and behavior disorders.

**NARSAD Distinguished Investigator Grants**

- Enable outstanding scientists to pursue new, cutting edge ideas with the greatest potential for breakthroughs.
- $100,000 for one year.
- More than $38 million funded.

**NARSAD Independent Investigator Grants**

- Initiated in 1995.
- Support mid-career scientists during the critical period between initiation of research and receipt of sustained funding.
- Up to $100,000 for two years.
- More than $74 million funded.

**NARSAD Young Investigator Grants**

- Initiated in 1987.
- Help researchers launch careers in neuroscience and psychiatry and gather pilot data to apply for larger federal and university grants.
- Up to $70,000 for two years.
- More than $230 million funded.

**OUR IMPACT:** NARSAD Grant recipients have gone on to receive more than $3 billion in additional research funding in next stage NIMH and NIH grants.
The NARSAD Distinguished Investigator Grants provide support for experienced investigators (full professor or equivalent) conducting neurobiological and behavioral research. One-year grants of $100,000 each are provided for established scientists pursuing particularly innovative project ideas.

Distinguished Investigator Grants fund talented, established scientists with a record of outstanding research accomplishments. These research projects might provide new approaches to understanding or treating severe mental illness. If successful, the grants could result in later funding from other sources. These grants are among the most competitive in mental health research and demonstrate the power of investigator-initiated research to bring out new and creative ideas.
“We received a large number of outstanding proposals. Some deal with a specific research problem in one area of mental illness; many are relevant for a number of illnesses; some involve basic research that will serve as the basis of clinical or translational research; and others start from a translational or clinical foundation. We are able to see the growth of the field and the manifestations of the enhanced power of research related to mental illness that have come about with the remarkable support of the Brain & Behavior Research Foundation.”

JACK D. BARCHAS, M.D.
Chair, Distinguished Investigator Selection Committee
Founding Member of the Foundation’s Scientific Council
Chair and Barklie McKee Henry Professor of Psychiatry
Weill Cornell Medical College
Psychiatrist-in-Chief
Weill Cornell Medical Center, NewYork-Presbyterian Hospital and Payne Whitney Clinic

Basic Research

<table>
<thead>
<tr>
<th>AREA</th>
<th>RESEARCHERS</th>
</tr>
</thead>
</table>
| ADDICTION                   | Yavin Shahan, Ph.D.  
National Institute on Drug Abuse |
| AUTISM SPECTRUM DISORDER    | Daniel H. Geschwind, M.D., Ph.D.  
University of California, Los Angeles |
|                             | Nahum Sonenberg, Ph.D.  
McGill University, Canada |
| DEPRESSION                  | Michel Barrot, Ph.D.  
Centre National de la Recherche Scientifique and University of Strasbourg, France |
|                             | Catherine G. Dulac, Ph.D.  
Harvard University |
| BIPOLAR DISORDER            | Alan Stewart Brown, M.D., M.P.H.  
Columbia University |

MENTAL ILLNESS: GENERAL

<table>
<thead>
<tr>
<th>RESEARCHERS</th>
</tr>
</thead>
</table>
| Bernice Ann Pescosolido, Ph.D.  
Indiana University |
| Moses V. Chao, Ph.D.  
New York University |
| Paul J. Kenny, Ph.D.  
Icahn School of Medicine at Mount Sinai |
| Anthony John Koleske, Ph.D.  
Yale University |
| Jonathan S. Mill, Ph.D.  
University of Exeter, United Kingdom |
| David L. Sulzer, Ph.D.  
Columbia University |

Next Generation Therapies

<table>
<thead>
<tr>
<th>AREA</th>
<th>RESEARCHERS</th>
</tr>
</thead>
</table>
| DEPRESSION                  | Jeffrey H. Meyer, M.D., Ph.D., FRCP(C)  
University of Toronto, Canada |
| POST-TRAUMATIC STRESS DISORDER (PTSD) | Ismene L. Petrakis, M.D.  
Yale University |
| SCHIZOPHRENIA               | Edwin S. Levitan, Ph.D.  
University of Pittsburgh |
Ground-breaking scientists already proven in their field receive the NARSAD Independent Investigator Grant. These scientists seek to produce experimental results that will put them in a position to initiate major research programs. This support comes at the critical middle period in the investigators’ careers—the phase between the initiation of research and the receipt of sustained funding. With proven success as highly productive scientists, they seek to make clinically relevant advances in the study and treatment of a range of brain and behavior disorders.

Independent Investigator Grants provide each scientist with up to $50,000 per year for two years to support their work during the critical period between the start of the research and the receipt of sustained funding.
Basic Research

ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD)
Satinder K. Singh, Ph.D.
Yale University

TOMAS HAJEK, M.D., PH.D.
Dalhousie University, Nova Scotia

DEPRESSION
Chadi A. Calarge, M.D.
Baylor College of Medicine

Ming-Hu Han, Ph.D.
Icahn School of Medicine at Mount Sinai

Yingxi Lin, Ph.D.
Massachusetts Institute of Technology

MOOD DISORDERS
Samer Hattar, Ph.D.
Johns Hopkins University

GREGG D. STANWOOD, PH.D.
Florida State University

POST-TRAUMATIC STRESS DISORDER (PTSD)
Tanja Jovanovic, Ph.D.
Emory University

BO LI, PH.D.
Cold Spring Harbor Laboratory

Rajesh Narendran, M.D.
University of Pittsburgh

SCHIZOPHRENIA
Alan Anticevic, Ph.D.
Yale University

Murray J. Cairns, Ph.D.
University of Newcastle, Australia

Ana Luisa M. Carvalho, Ph.D.
University of Coimbra, Portugal

Michael Andrew Fox, Ph.D.
Virginia Tech

Wen-Jun Gao, M.D., Ph.D.
Drexel University College of Medicine

Jay Baker, Ph.D.
Massachusetts General Hospital, Harvard University

Christopher Barnaby Nelson, Ph.D.
Orygen Youth Health Research Centre (OYHRC),
University of Melbourne, Australia

Francesco Papaleo, Ph.D.
Italian Institute of Technology

Kevin M. Spencer, Ph.D.
VA Boston Healthcare System, Brockton, Harvard University

Joseph Ventura, Ph.D.
University of California, Los Angeles

Stanislav S. Zakharenko, M.D., Ph.D.
St. Jude Children’s Research Hospital

Karen Zito, Ph.D.
University of California, Davis Medical Center

SUICIDE
Daniel Paul Dickstein, M.D.
Brown University

TIC DISORDERS
Christopher J. Pittenger, M.D., Ph.D.
Yale University

Next Generation Therapies

AUTISM SPECTRUM DISORDER
Suzanne Paradis, Ph.D.
Brandeis University

BIPOLAR DISORDER
Jean-Martin Beaulieu, Ph.D.
Laval University, Québec

Christopher E. Ramsden, M.D.
National Institute of Neurological Disorders and Stroke

DEPRESSION
Venetia Zachariou, Ph.D.
Icahn School of Medicine at Mount Sinai

MULTIPLE DISORDERS
Jay A. Gottfried, M.D., Ph.D.
Northwestern University

Sachin Patel, M.D., Ph.D.
Vanderbilt University

POST-TRAUMATIC STRESS DISORDER (PTSD)
Adriana Feder, M.D.
Icahn School of Medicine at Mount Sinai

Ilan Harpaz-Rotem, Ph.D.
Yale University

SCHIZOPHRENIA
Raymond Y. Cho, M.D., M.Sc.
University of Texas Health Science Center at Houston

Dean Francis Salisbury, Ph.D.
University of Pittsburgh School of Medicine

New Technologies

DEPRESSION
Gilles R.C. Pourtois, Ph.D.
Ghent University, Belgium

Laura Rachel Stroud, Ph.D.
The Miriam Hospital, Brown University

MULTIPLE DISORDERS
Adam Kepecs, Ph.D.
Cold Spring Harbor Laboratory

Kirsty Millar, Ph.D.
University of Edinburgh, Scotland

Jason James Radley, Ph.D.
University of Iowa

SCHIZOPHRENIA
Judith Gault, Ph.D.
University of Colorado, Denver
NARSAD Young Investigator Grants cover a broad spectrum of mental illnesses and serve as catalysts for additional funding, providing researchers with "proof of concept" for their work. The Foundation awarded a total of $13 million to its 2015 Young Investigators, strengthening its investment in the most promising ideas to lead advancements in understanding and treating brain and behavior disorders.

Young Investigator Grants provide each scientist with up to $35,000 per year for two years totaling $70,000 to enable promising investigators to either extend research fellowship training or begin careers as independent research faculty. Every Young Investigator gets support and guidance from a scientific mentor designated by the Scientific Council.
<table>
<thead>
<tr>
<th>Basic Research</th>
</tr>
</thead>
</table>

### ADDICTION
- Amit Agarwal, Ph.D.
  Johns Hopkins University
- Stephan Lammel, Ph.D.
  University of California, Berkeley
- Jocelyn Margaret Richard, Ph.D.
  Johns Hopkins University
- Benjamin Thomas Saunders, Ph.D.
  Johns Hopkins University
- Lucas Sjulson, M.D., Ph.D.
  New York University

### ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD)
- Lisa Anne Briand, Ph.D.
  Temple University
- Joseph Stephen Ralker, Ph.D.
  Florida International University
- Shona Lee Ray-Griffith, M.D.
  University of Arkansas for Medical Sciences
- Karen E. Seymour, Ph.D.
  Johns Hopkins University School of Medicine
- Robert Whelan, Ph.D.
  University College Dublin, Ireland

### ANXIETY
- Jiook Cha Ph.D.
  Columbia University
- Jacek Debiec, M.D., Ph.D.
  University of Michigan
- Edward Korzus, Ph.D.
  Neuropsychiatric Institute & Hospital at the University of California, Los Angeles
- Sabine Krabbe, Ph.D.
  Friedrich Miescher Institute, Switzerland

### AUTISM SPECTRUM DISORDER
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- Kimberly Lynn Hills Carpenter, Ph.D.
  Duke University Medical Center
- Daniel H. Ebert, M.D., Ph.D.
  Johns Hopkins University School of Medicine
- Min Fu, Ph.D.
  Duke University
- Theofanis Karayannis, Ph.D.
  New York University
- Miranda M. Lim, M.D., Ph.D.
  Portland VA Medical Center and Oregon Health and Science University
- Olga Penagarikano, Ph.D.
  University of the Basque Country, Spain
- Susan B. Perlman, Ph.D.
  University of Pittsburgh
- Tyler K. Perrachione, Ph.D.
  Boston University
- Caroline Elizabeth Robertson, Ph.D.
  Massachusetts Institute of Technology
- Stephan J. Sanders, BMBS, Ph.D.
  University of California, San Francisco
- Nasim Vasli, Ph.D.
  Centre for Addiction and Mental Health, University of Toronto, Canada

### BIPOLAR DISORDER
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  Brown University

### DEPRESSION
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  Weill Cornell Medical College
- David Bulkin, Ph.D.
  Cornell University
- Ramesh Chandra, Ph.D.
  University of Maryland
- Revathy U. Chottekalapanda, Ph.D.
  The Rockefeller University
- Esther M. Berrocoso, Ph.D.
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- George Dragoi, M.D., Ph.D.
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- Poornima A. Kumar, Ph.D.
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- Kathryn M. Lenz, Ph.D.
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- Byungkook Lim, Ph.D.
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- Sarah Ordaz, Ph.D.
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  University of British Columbia, Canada
- Marisa S.P. Toups, M.D.
  University of Texas Southwestern Medical Center at Dallas
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<tr>
<th>Disorder</th>
<th>Name</th>
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<td><strong>MULTIPLE DISORDERS</strong></td>
<td>Todd Hancock Ahern, Ph.D.</td>
<td>Quinnipiac University</td>
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<td>Samuel Alan Barnes, Ph.D.</td>
<td>University of California</td>
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<td>Anna Verena Beyeler, Ph.D.</td>
<td>Massachusetts Institute of Technology</td>
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<td>Gwendolyn Gabrielle Calhoon, Ph.D.</td>
<td>Massachusetts Institute of Technology</td>
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<td>Daniel Cavanaugh, Ph.D.</td>
<td>University of Pennsylvania</td>
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<td>Catherine Christian, Ph.D.</td>
<td>University of Illinois</td>
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<td>Joanna Molly Dragich, Ph.D.</td>
<td>Columbia University</td>
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<td>Monica Dus, Ph.D.</td>
<td>University of Michigan</td>
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<td>Christina Marie Gremel, Ph.D.</td>
<td>University of California, San Diego</td>
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<td>Michael H. Halassa, M.D., Ph.D.</td>
<td>New York University</td>
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<td>Gretchen L. Hermes, M.D., Ph.D.</td>
<td>Yale University</td>
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<td>Kathryn Leigh Humphreys, Ph.D.</td>
<td>Tulane University</td>
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<td>Katherine M. Nautiyal, Ph.D.</td>
<td>Columbia University</td>
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<td>Ramin Pashale, Ph.D.</td>
<td>University of Wisconsin-Milwaukee</td>
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<td>Robert Mark Richardson, M.D., Ph.D.</td>
<td>University of Pittsburgh</td>
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<td>Nicolas W. Simon, Ph.D.</td>
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<td>Nien-Pei Tsai, Ph.D.</td>
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<td>Taehong Yang, Ph.D.</td>
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<td>Erika Yeh, Ph.D.</td>
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<tr>
<td><strong>OBSESSIVE COMPULSIVE DISORDER</strong></td>
<td>Patricia A. Gruner, Ph.D.</td>
<td>Yale University</td>
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<td></td>
<td>Joshua L. Plotkin, Ph.D.</td>
<td>State University of New York at Stony Brook</td>
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<tr>
<td><strong>POST-TRAUMATIC STRESS DISORDER (PTSD)</strong></td>
<td>Mark Paul Brandon, Ph.D.</td>
<td>McGill University/Douglas Mental Health University Institute, Canada</td>
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<td></td>
<td>Nikolas P. Daskalakis, M.D., Ph.D.</td>
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<td>Diasynou Fioravante, Ph.D.</td>
<td>University of California, Davis Medical Center</td>
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<td>Talya Greene, Ph.D.</td>
<td>University of Haifa, Israel</td>
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<td>Dmitri Young, Ph.D.</td>
<td>University of California, San Francisco</td>
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<td>Moriel Zelikowsky, Ph.D.</td>
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<td><strong>SCHIZOPHRENIA</strong></td>
<td>Renata Batista-Brito, Ph.D.</td>
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<td>Estefania Pilar Bello, Ph.D.</td>
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<td>Francois Bourque, M.D.</td>
<td>McGill University/Douglas Mental Health University Institute, Canada</td>
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<td>Icahn School of Medicine at Mount Sinai</td>
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<td>Alana May Campbell, Ph.D.</td>
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<td>Francesco Errico, Ph.D.</td>
<td>Ceinge Biotecnologie Avanzate, Italy</td>
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<td>Ragy R. Girgis, M.D.</td>
<td>Columbia University</td>
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<td>Jill R. Glusker, Ph.D.</td>
<td>University of Pittsburgh</td>
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<td>Jacob Gratton, Ph.D.</td>
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<td>John A. Gray, M.D., Ph.D.</td>
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<td>Stephanie Mary Groman, Ph.D.</td>
<td>Yale University</td>
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<td>Marc Aaron Heiser, M.D., Ph.D.</td>
<td>University of California, Los Angeles</td>
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<td></td>
<td>Jonathan D. Hommel, Ph.D.</td>
<td>University of Texas Medical Branch at Galveston</td>
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<td>Shantanu P. Jadhav, Ph.D.</td>
<td>Brandeis University</td>
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<td>Abigail Susan Kalmbach, Ph.D.</td>
<td>Columbia University</td>
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<td></td>
<td>Said Kourrich, Ph.D.</td>
<td>University of Texas Southwest Medical Center at Dallas</td>
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<td>Viviane Labrie, Ph.D.</td>
<td>Centre for Addiction and Mental Health, University of Toronto, Canada</td>
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<td>Hammi Lee, Ph.D.</td>
<td>Stanford University</td>
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<td>Hiroshi Makino, Ph.D.</td>
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<td>Alex S. Nord, Ph.D.</td>
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<td>Gaurav H. Patel, M.D., Ph.D.</td>
<td>New York State Psychiatric Institute/ Columbia University</td>
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<td>Albert R. Powers, M.D.</td>
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<td></td>
<td>Matthew David Puhl, Ph.D.</td>
<td>McLean Hospital/Harvard University</td>
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<td></td>
<td>Stephen Ripke, M.D., Ph.D.</td>
<td>Charlie—University Medicine Berlin, Freie Universitat Berlin, Germany</td>
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<td></td>
<td>Antonio Sanz-Clemente, Ph.D.</td>
<td>Northwestern University</td>
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<td></td>
<td>Jeffrey N. Savas, Ph.D.</td>
<td>Northwestern University</td>
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</tbody>
</table>
MUSEUMS
Shushruth Shushruth, M.B.B.S., Ph.D.
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Katharine Natasha Thakkar, Ph.D.
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Marie-Eve Tremblay, Ph.D.
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Gemma Margaret Williams, MBBCh
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Katharine Natasha Thakkar, Ph.D.
University Medical Center Utrecht, Holland

Summer Fontaine Acevedo, Ph.D.
Southwestern Medical Center of the University of Texas in Dallas

Elisa S. Na, Ph.D.
University of Michigan

OTHER DISORDERS

EATING DISORDERS

Kiw Jun Yoon, Ph.D.
Johns Hopkins University

BIPOLAR DISORDER

Alexis Estelle Whitton, Ph.D.
Maclean Hospital/Harvard University

NEW TECHNOLOGIES

AUTISM SPECTRUM DISORDER (ASD)

Kwanghun Chung, Ph.D.
Massachusetts Institute of Technology

DEPRESSION

Priti Balchandani, Ph.D.
Icahn School of Medicine at Mount Sinai

George M. Slavich, Ph.D.
University of California, Los Angeles

Mariano Soiza-Reilly, Ph.D.
INSERM, France

Amber Leaver, Ph.D.
University of California, Los Angeles

OTHER DISORDERS

SUICIDE PREVENTION

Megan Lee Fitzgerald, Ph.D.
Columbia University

NEXT GENERATION THERAPIES

ADDICTION

David Louis Pennington, Ph.D.
Northern California Institute for Research and Education University of California, San Francisco

James J. Prisciandaro, Ph.D.
Medical University of South Carolina

ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD)

Merideth Alice Addicott, Ph.D.
Duke University

Hadi Hosseini, Ph.D.
Stanford University

ANXIETY

Dylan Grace Gee, Ph.D.
Weill Cornell Medical College

Catherine Alexandra Hartley, Ph.D.
Weill Cornell Medical College

Emily Sue Kappenman, Ph.D.
University of California, Davis Medical Center

Stephen Eric Nybo, Ph.D.
Ferris State University

Lauren M. Osborne, M.D.
Johns Hopkins University

Laura Sagliano, Ph.D.
Second University of Naples, Italy

Simona Scaini, Ph.D.
San Raffaele Vita-Salute University, Italy

Shari A. Steinman, Ph.D.
New York State Psychiatric Institute, Columbia University

Richard Michiel van Rijn, Ph.D.
Purdue University

AUTISM SPECTRUM DISORDER

Marta Biagioli, Ph.D.
University of Trento, Italy

Julien Christian Roger Dubois, Ph.D.
California Institute of Technology

BIPOLAR DISORDER

Alexis Estelle Whitton, Ph.D.
Maclean Hospital/Harvard University
## Meet the Scientist

### A Free Monthly Q&A Webinar Series
Join By Phone or On The Web Tuesdays at 2:00PM EST

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### MODERATOR
Jeffrey Borenstein, M.D.
President & CEO, Brain & Behavior Research Foundation
Host of the Public Television Series *Healthy Minds*

Our cutting edge educational programs are a resource to hundreds of individuals each year.
OUR SCIENTIFIC COUNCIL

165 MEMBERS

2  Nobel Prize Winners
4  Former Directors of the National Institute of Mental Health
4  Recipients of the National Medal of Science
13 Members of the National Academy of Sciences
21 Chairs of Psychiatry & Neuroscience Departments at Leading Medical Institutions
47 Members of the Institute of Medicine
President
Herbert Pardes, M.D.

Vice President Emeritus
Floyd E. Bloom, M.D.
Led by Dr. Herbert Pardes, the founding President of our Scientific Council, the all-volunteer group of preeminent mental health researchers review more than 1,000 NARSAD Grant applications each year and select the most promising research ideas with the greatest potential to lead to breakthroughs.

The Foundation’s Scientific Council is composed of 165 world renowned scientists representing every major discipline in brain and behavior research including two Nobel Prize winners, four former directors of the National Institute of Mental Health, four recipients of the National Medal of Science, 13 members of the National Academy of Sciences, 21 Chairs of Psychiatry and Neuroscience Departments at leading medical institutions, and 47 members of the National Institute of Medicine.

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

We welcome our newest members.
TED ABEL, PH.D. is the Brush Family Professor of Biology in the School of Arts and Sciences at the University of Pennsylvania. Dr. Abel is also Co-Director of the Biological Basis of Behavior Program and he directs an NIMH-funded pre-doctoral training program in behavioral and cognitive neuroscience. His laboratory’s primary focus is on understanding the molecular and cellular basis of learning and memory as well as the role of sleep in memory storage. Using mouse models, Dr. Abel seeks to identify novel therapeutic approaches to treat cognitive deficits associated with many psychiatric and neurodevelopmental disorders. Dr. Abel has been a leader in applying molecular and genetic approaches to define how neural circuits mediate behavior, making creative use of genetically modified mouse lines to study the biological basis of behavior. He has published widely in journals that include Nature, Neuron, Journal of Clinical Investigation and Journal of Neuroscience. He is a Fellow of the American College of Neuropsychopharmacology, Editor-in-Chief of Neurobiology of Learning and Memory, and an Associate Editor of Behavioral Neuroscience.

DEANNA M. BARCH, PH.D. is the Gregory B. Couch Professor of Psychiatry and the Chair of the Department of Psychological & Brain Sciences at Washington University in Saint Louis, MO. She was the Editor of Cognitive, Affective and Behavioral Neuroscience, is currently Deputy Editor at Biological Psychiatry and is on the Editorial Boards of Schizophrenia Bulletin, Current Directions in Psychological Science, Journal of Abnormal Psychology, and Clinical Psychological Science. Dr. Barch is immediate past President of the Society for Research in Psychopathology, is on the DSM-V Revision Committee, is on the Steering Committee for the NIMH Research Domain Criteria initiative, and is a member of the NIMH Scientific Council. Her research is focused on understanding the interplay among cognition, emotion, and brain function to better understand the deficits in behavior and cognition found in illnesses such as schizophrenia and depression. She uses functional MRI, structural MRI, and cognitive neuroscience methods to examine neural basis of disturbances in cognitive control and emotional processing in individuals with schizophrenia and those at risk for the development of schizophrenia, as well as in individuals with mood disorders.

EDWIN H. COOK, JR., M.D. is interested in the genetics of autism, attention-deficit hyperactivity disorder, obsessive-compulsive disorder, and the development of improved pharmacologic treatments of these disorders. As Director of The Laboratory of Developmental Neuroscience and Professor, Department of Psychiatry at The Conte Center for Computational Neuropsychiatric Genomics based at The University of Chicago, Dr. Cook and his team are dedicated to studying the developmental neurobiological basis of pediatric-onset neuropsychiatric disorders. They use neurochemical and molecular genetic research tools to develop new knowledge that may lead to improvement in clinical pharmacology. They began as a neurochemistry lab studying the relationship between hyperserotonemia and autistic disorder. The team is now working with collaborators on molecular genetic and clinical pharmacological studies of autism, attention-deficit hyperactivity disorder, childhood-onset obsessive-compulsive disorder, stuttering, adolescent depression, and pediatric and early onset bipolar mood disorder.
RAQUEL E. GUR, M.D., PH.D. is Professor of Psychiatry, Neurology and Radiology at the University of Pennsylvania’s Perelman School of Medicine where she directs the Neuropsychiatry Section and the Schizophrenia Research Center and is Vice Chair of Research Development in the Department of Psychiatry. Her combined training in Neurology and Psychiatry has provided the tools to pursue an academic career working with basic and clinical neuroscientists to advance the understanding of schizophrenia. In directing these research endeavors, she has interacted with scientists of diverse backgrounds, conducted collaborative interdisciplinary research, mentored junior faculty and trainees, and has come to know many patients and their families. She is a member and has served in organizations including the Institute of Medicine of the National Academy of Sciences, the NIMH Council and the American Psychiatric Association task forces including the DSM-5 Psychosis work group. She is Past President of the Society of Biological Psychiatry and President of the American College of Neuropsychopharmacology. NIMH has supported her research efforts and she has over 440 publications in peer-reviewed journals.

1999 Distinguished Investigator
2009 Lieber Prize

TAKAO K. HENSCH, PH.D. is a joint professor of Neurology at Harvard Medical School at Boston Children’s Hospital, and Professor of Molecular and Cellular Biology at Harvard’s Center for Brain Science. Dr. Hensch’s research focuses on critical periods in brain development. By applying cellular and molecular biology techniques to neural systems, his lab identified pivotal inhibitory circuits that orchestrate structural and functional rewiring of connections in response to early sensory experience. His work affects not only the basic understanding of brain development, but also therapeutic approaches to devastating cognitive disorders later in life. He currently directs the NIMH Silvio O. Conte Center for Basic Mental Health Research at Harvard. He serves on the editorial board of various journals, including Journal of Neuroscience, Journal of Neurodevelopmental Disorders, Neural Development, Neuroscience Research, Frontiers in Neural Circuits and Neuron.

AMANDA J. LAW, PH.D. is a Professor in the Departments of Psychiatry and Cell and Developmental Biology, the Dr. Nancy L. Gary Chair in Children’s Mental Disorders Research and Director, Neuropsychiatric Genetics Lab at the University of Colorado, School of Medicine. The primary goal of Dr. Law’s research is to identify and understand the role of genetic factors in psychiatric, neurodevelopmental and behavioral disorders. Her research focuses on understanding the molecular, cellular and biochemical mechanisms underlying genetic susceptibility to severe neurodevelopmental disorders, including schizophrenia; with a view to identifying affected neurobiological processes and cellular pathways for the development of next generation treatments. Dr. Law has focused her research on a multidisciplinary, translational neuroscience approach to understanding neurocognitive and neurodevelopmental disorders, combining studies of human postmortem brain tissue, human peripheral cell systems, primary cell culture models and transgenic animal models with neuropharmacology and clinical genetics.

2006 Young Investigator
2011 Sidney R. Baer, Jr. Prize
GARY LYNCH, PH.D. is a Professor, Psychiatry & Human Behavior and a Professor, Anatomy & Neurobiology at the School of Medicine at the University of California, Irvine. Dr. Lynch is one of the most cited authors in neuroscience, holds 25 patents, and co-founded two publicly traded companies. Dr. Lynch’s work led the way to the modern theory of how synapses encode memory. This involves a change in the shape, and thus potency, of connections that is stabilized by a reorganization of the subsynaptic cytoskeleton. He is also the co-inventor of ampakines, a class of drugs that enhance memory and stimulate the production of growth factors. He is currently using ampakines in an attempt to reverse the negative effect of aging on the anatomy and physiology of brain cells.

KATHLEEN R. MERIKANGAS, PH.D. is a Senior Investigator and Chief of the Genetic Epidemiology Research Branch in the Intramural Research Program at the National Institute of Mental Health. The major areas of her research are: studies of the patterns and components of familial aggregation of mental disorders and familial mechanisms for comorbidity of mental and medical disorders; identification of early signs and risk factors for psychiatric disorders among high and low risk youth using prospective longitudinal high risk studies; and large-scale population-based studies of mental disorders including high risk designs and prospective longitudinal research. The major project underway in her research group is a community-based family study of affective spectrum disorders and their overlap with other mental disorders, especially anxiety disorders, and medical disorders such as migraine and cardiovascular disease. The goal of this research is to identify the endophenotypes that are closer to the biologic expression of genes underlying these disorders and environmental moderators of genetic expression. Findings from this research are likely to have important implications for targets of prevention and treatment of affective illness.

DOST ÖNGÜR, M.D., PH.D. is a native of Istanbul, Turkey. Dr. Öngür is currently Associate Professor of Psychiatry at Harvard Medical School and Chief of the Psychotic Disorders Division at McLean Hospital. His research is funded by the NIMH and focuses on MRI studies of brain abnormalities in individuals with schizophrenia, bipolar disorder, and related conditions as well as on the cardiovascular health of these patients. In recent years he has had a special focus on abnormal brain bioenergetics and white matter integrity as pathophysiologic factors in these common and severe conditions. In addition to his clinical responsibilities and research, Dr. Öngür has received awards for his teaching and mentorship and holds a K24 award from the NIMH.

2004 Young Investigator
2013 Independent Investigator
MARINA R. PICCIOTTO, PH.D. is the Charles B. G. Murphy Professor of Psychiatry and Professor in the Child Study Center, of Neuroscience and of Pharmacology; Deputy Chair for Basic Science Research, Department of Psychiatry at Yale University. Her research focuses on defining molecular mechanisms underlying behaviors related to psychiatric illness, with a focus on the function of nicotinic acetylcholine receptors in the brain. Her laboratory uses molecular genetic strategies to identify the role of individual molecules in behaviors related to depression, addiction, cognitive function and food intake. Dr. Picciotto is Treasurer of the Society for Neuroscience, Interim Editor in Chief of the Journal of Neuroscience, and serves as handling editor on the editorial board of several journals. She is a fellow of AAAS and a member of the National Academy of Medicine.

1996 Young Investigator
2004 Independent Investigator

GERARD SANACORA, M.D., PH.D. is currently a Professor of Psychiatry at Yale University and the Director of the Yale Depression Research Program. His work has concentrated largely on elucidating the pathophysiological mechanisms associated with mood and other neuropsychiatric disorders, and using this information to guide future treatment development. His basic science laboratory explores the effects of chronic stress on brain function, and examines the molecular, cellular and behavioral effects of newly developed treatment strategies. His clinical laboratory employs novel imaging methodologies to investigate the pathophysiology of neuropsychiatric disorders and is very active in clinical trial research. Dr. Sanacora has received the Anna-Monika Stiftung International Award for the investigation of the biological substrate and functional disturbances of depression in 2009 and the Joel Elkes Research Award for Outstanding contributions to Psychopharmacology from the American College of Neuropsychopharmacology in 2011.

1999 & 2001 Young Investigator
2007 Independent Investigator
2014 Distinguished Investigator
2003 & 2005 Klerman Honorable Mention

MATTHEW W. STATE, M.D., PH.D. is the Oberndorf Family Distinguished Professor and Chair of the Department of Psychiatry at the University of California, San Francisco School of Medicine. Dr. State is a child psychiatrist and human geneticist studying pediatric neuropsychiatric syndromes. His lab focuses on gene discovery as a launching point for efforts to illuminate the biology of these conditions and to develop novel and more effective therapies. He co-leads several international genomics collaborations, including the NIH-funded Autism Sequencing Consortium and has been the recipient of multiple awards, including recent induction into the Institute of Medicine and The AACAP George Tarjan Award for Contributions in Developmental Disabilities.

2012 Ruane Prize
SUSAN M. VOGLMAIER, M.D., PH.D. is an Associate Professor in the Psychiatry Department at the University of California, San Francisco School of Medicine. Dr. Voglmaier’s lab has developed precise optical tools to investigate the mechanisms that control neurotransmitter release over the course of synapse development. The long-term goal of this line of research is to target specific differences in the membrane trafficking of synaptic vesicle proteins to normalize the balance of excitatory and inhibitory inputs in autism; and of subcortical pathways that carry sensory information that is compared with information about meaning, conveyed by cortical pathways, in schizophrenia circuits.

2007 Young Investigator

JARED W. YOUNG, PH.D. is an Assistant Professor of Psychiatry at the University of California San Diego. He is also affiliated with the Stein Institute for Research on Aging at UCSD. Dr. Young’s primary interest is understanding causes of cognitive and behavioral dysfunction in serious mental illness with relevance to real world functioning. He developed and uses several cognitive and behavioral tests that can be conducted in rodents and humans so that mechanisms underlying deficient behaviors in humans can be disentangled using rodent studies. His primary interests include developing methodologies to assess putative cognitive therapeutics for schizophrenia patients, but he also collaborates with groups modeling behavior in bipolar disorder patients, as well as identifying genetic contributions to successful aging. Using these paradigms in both humans and animals provides the opportunity for bench-to-bedside translational research, increasing the likelihood of clinical success for treating the numerous behavioral and cognitive abnormalities seen in psychiatric disorders.

2008 & 2012 Young Investigator

L. TREVOR YOUNG, M.D., PH.D. is the Dean, Faculty of Medicine and Vice Provost, Relations with Health Care Institutions Centre for Addiction and Mental Health at the University of Toronto. He is a clinician-scientist who studies the molecular basis of bipolar disorder and its treatment. In his lab Dr. Young is focused on the processes that lead to long-term changes in brain structure and function in patients with bipolar disorder, and how mood-stabilizing drugs can alter those changes. He has supervised more than 30 research and clinical trainees. Dr. Young has received many awards including the Douglas Utting Award for outstanding contributions in the field of mood disorders, and the Canadian College of Neuropsychopharmacology Heinz Lehmann Award. He is a Distinguished Fellow of the American Psychiatric Association and he has led several large clinical programs including the Mood Disorders Program at Hamilton Psychiatric Hospital, which received the American Psychiatric Services Gold Achievement Award.

1989 Young Investigator
1995 Independent Investigator
2015 Colvin Prize
2015

FOUNDATION EVENTS
Our Resilient Brain: Coping with Stress, Anxiety & Memory Loss
January 23, 2015

Dr. Kafui Dzirasa led a lively discussion about how stress and anxiety affect memory and how to best manage them in everyday life. Following his talk was an opportunity for questions and answers.

Discovery to Recovery: A Path to Healthy Minds Mental Health Conference

LOS ANGELES
March 10, 2015

This conference was designed to educate caregivers, family members, and people living with mental illness about the most innovative ideas, research and breakthroughs in neuroscience and psychiatry to better understand the causes and develop new ways to effectively treat brain and behavior disorders. A keynote address on living with bipolar disorder was given by Keith O’Neil, Former NFL Player & Super Bowl Champion.
Women Breaking the Silence About Mental Illness

NEW YORK
June 15, 2015

The women’s luncheon featured a conversation between Hearst Magazine’s Editorial Director Ellen Levine and advocate, and author Lee Woodruff about depression, anxiety and the importance of removing the stigma from mental illness. The luncheon attracted more than 300 people and was held at the Metropolitan Club. More than $150,000 was raised for brain and behavior research.

Klerman & Freedman Awards

NEW YORK
July 24, 2015

This evening honored the hallmark program of the Brain & Behavior Research Foundation—the NARSAD Young Investigator Grant program—that enables aspiring young scientists with innovative ideas to garner pilot data and generate “proof of concept” for their work. The Annual Klerman & Freedman Prizes recognize exceptional clinical and basic research conducted by NARSAD Young Investigator Grantees.

Six Young Investigator Grantees were honored for their outstanding contributions to mental health research at Le Parker Meridian Hotel. These researchers were chosen by a committee of the Foundation’s Scientific Council for their exceptional NARSAD Grant projects in terms of insight and potential new approaches to the treatment of mental illness. Each investigator has demonstrated exceptional promise in the pursuit of deeper understanding of the human brain to ultimately result in cures through research.
Klerman & Freedman Awards

NEW YORK
July 24, 2015

Klerman Prizewinner

Alan Anticevic, Ph.D., of Yale University for his 2012 Grant Research Project: Working Memory Dysfunction in Schizophrenia and in a Ketamine Model of Psychosis: Translating Computational Modeling to Neuroimaging

Chadi G. Abdallah, M.D., of Yale University, for his 2012 Grant Research Project: Examining Glutamate/Glutamine Cycling in the Frontal Brain of Depressed Patients During Ketamine Infusion

Carrie J. McAdams, M.D., Ph.D., of the University of Texas Southwestern Medical Center at Dallas, for her 2012 Grant Research Project: Neurodevelopment of Identity in Adolescent Anorexia Nervosa

Honorable Mentions

Dr. Herbert Pardes and Dr. Alan Anticevic

Dr. Carrie McAdams

Dr. Michael Halassa

Above: Dr. Kristen Brennand
Below: Dr. Nandakumar Narayanan

Freedman Prizewinner

Michael M. Halassa, M.D., Ph.D., of New York University, for his 2012 Grant Research Project: Systematic Optogenetic Dissection of the Link Between Spindle Expression and Schizophrenia Etiology

Honorable Mentions

Kristen J. Brennand, Ph.D., of the Icahn School of Medicine at Mount Sinai, for her 2012 Grant Research Project: Modeling Schizophrenia Using Human Induced Pluripotent Stem Cells: Assessing the Contribution of Glutamatergic and Dopaminergic Neurons to Disease

Nandakumar Narayanan, M.D., Ph.D., of the University of Iowa, for his 2012 Grant Research Project: Prefrontal Dopamine and Temporal Control

Dr. Michael Halassa

2015 Annual Report
New York Mental Health Research Symposium
October 23, 2015

The 27th Annual New York Mental Health Research Symposium featured presentations by the nine 2015 Outstanding Achievement Prizewinners and two exceptionally promising Young Investigator Grantees and was held at The Kaufman Music Center.

Presentations Included

- **Rethinking Schizophrenia—from the Beginning**
  Robert R. Freedman, M.D.

- **Fetal Origins of Mental Illness and Wellness**
  Camille Hoffman, M.D., MSCS

- **Clinical Staging and Personalized Mental Health Care**
  Patrick McGorry, M.D., Ph.D., FRCP, FRANCZP

- **Prediction and Prevention of Psychosis in Clinical High Risk Young People**
  Barnaby Nelson, Ph.D., MPsych

- **Pathways to The Development of Novel Therapies for Psychiatric Disorders**
  Michael Berk, Ph.D., MBBCh, MMed, FF(Psych)SA, FRANCZP

- **Gloria Neidorf Memorial Lecture: Looking Inside the Cell to Understand Bipolar Disorder and its Treatment**
  L. Trevor Young, M.D., Ph.D., FRCPC

- **Treating the Developing Versus Developed Brain**
  BJ Casey, Ph.D.

- **Deconstructing the Neurobiology of ADHD Via Open Neuroscience Approaches**
  Francisco Xavier Castellanos, M.D.

- **Exploring the Higher Brain Circuits Altered in Schizophrenia: Hope for Future Treatments**
  Amy F.T. Arnsten, Ph.D.

- **Personalized Medicine in The Genomic Era: Treating Schizophrenia with Precision**
  Jianping Zhang, M.D., Ph.D.

- **New Technologies to Monitor How Brain Cells Communicate—and Sometimes Miscommunicate**
  Markita Patricia Landry, Ph.D.

- **Symposium Moderator**
  Robert M.A. Hirschfeld, M.D.
The Outstanding Achievement Awards

NEW YORK
October 23, 2015

The Foundation celebrated its 28th Annual Awards Dinner at The Pierre Hotel in New York City. The evening’s honorees included two remarkable humanitarians, one of the world’s most prominent mental health advocates and nine exceptional scientists for their significant contributions to the advancement of our understanding of schizophrenia, mood disorders, child and adolescent psychiatry and cognitive neuroscience.

Lieber Prize for Schizophrenia Research
Robert Freedman, M.D.
Patrick McGorry, M.D., Ph.D., FRCP, FRANCZP

Colvin Prize for Mood Disorders Research
Michael Berk, Ph.D., MBCh, MMed, FF(Psych)SA, FRANCZP
L. Trevor Young, M.D., Ph.D., FRCPC

Ruane Prize for Child & Adolescent Psychiatric Research
BJ Casey, Ph.D.
Francisco Xavier Castellanos, M.D.

Goldman-Rakic Prize for Cognitive Neuroscience
Amy F. T. Arnsten, Ph.D.

Sidney R. Baer, Jr. Prize for Innovative & Promising Schizophrenia Research
M. Camille Hoffman, M.D., MSCS
Barnaby Nelson, Ph.D.

The Pardes Humanitarian Prize in Mental Health
This international Prize recognizes a physician, scientist or public citizen whose extraordinary contribution has made a profound and lasting impact by improving the lives of people suffering from mental illness and by advancing the understanding of mental health.

Honorees
Beatrix A. Hamburg, M.D. and David A. Hamburg, M.D.

Honorary Prize
Rosalynn Carter, former First Lady of the United States
For the families of young people diagnosed with psychiatric disorders, it can be frightening, bewildering, and frustrating. The Brain & Behavior Research Foundation strives to provide helpful information and insights to those parents and family members who may be caring for children with mental illnesses. Beginning in 2015, the Foundation included in its *Quarterly* publication information that can be of practical use to families coping with the diagnosis of a behavioral disorder or mental illness.
“Children have all sorts of experiences that can worry a parent,” said Judith L. Rapoport, M.D., a Foundation Scientific Council Member and Chief of the NIMH Child Psychiatry Branch. “[But] there’s an important rule of thumb: there is no ‘disorder’ until a problem begins to significantly interfere with a child’s quality of life. When fear or sadness or an inability to concentrate takes over and starts to interfere with the child’s life, either at home or at school, that’s when you should take action.”

Dr. Rapoport said parents can turn to local psychiatrists, psychologists, psychiatric social workers and family physicians if they think their child has a mental illness, which could include attention-deficit hyperactivity disorder (ADHD), anxiety, depression, or schizophrenia, among other conditions. She noted that there are a growing number of behavioral and pharmaceutical treatments that should be tailored to each child. “However, parents should know that they are not locked in to any one approach,” Dr. Rapoport added. “If a few months after you begin a therapy it doesn’t seem that you are getting anywhere you should reconsider and be open to trying a different approach.”

Dr. Rapoport also sought to reassure parents on some of the more common fears about childhood mental illness, such as the possibility of addiction to ADHD medication, or the likelihood of developing childhood-onset schizophrenia. Studies show that the ADHD medicine Ritalin, for example, is not addictive in children with ADHD and does not lead to a tendency to abuse drugs later in life, she said. Similarly, she noted that childhood-onset schizophrenia and bipolar disorder are extremely rare.

Rapoport acknowledged that a child’s mental illness can affect the family as a whole. “Following a diagnosis, the first thing parents need to do is make sure that everyone in the family gets on the same page,” she said, adding that occasional meetings with a family therapist can help. And as the stigma of these illnesses lessens, parents are finding more support groups, school district officials and other community caretakers who can join them in helping children with psychological disorders.
Parents may worry about a stray remark about suicide or dangerous behavior among pre-pubescent children, but suicidal thoughts and completed suicides are very rare among young children, said David Shaffer, M.D., Chief of the Division of Child and Adolescent Psychiatry at Columbia University Medical Center. Instead, parents should consider the risk factors for suicide among adolescents, while avoiding some common misconceptions about suicide in this age group.

“…Here are things that you do worry about: risk factors that exist within the family—a family history of suicide; if the kid is drinking a lot, getting drunk—alcohol is a major stimulus of suicide; if there are available methods in the household—a gun collection for example; if there’s any evidence that the child has poor emotional control—if he loses his temper very frequently, or easily gets upset; further, if there are crises, or significant ‘challenges’—it could be an examination, or having to appear in court, or it could be a planned separation by the parents. Such looming events often serve as a marker for a planned suicide,” Dr. Shaffer explained.

There are widespread misconceptions that suicidality “is a permanent mood state,” or that people intending to commit suicide can’t be stopped, Dr. Shaffer said, noting that studies do not support either contention. There is some evidence that adolescents may be influenced to consider suicide in emulation of a famous person or someone in their peer group, he noted, but most people do not act on these feelings.

“But when you have a role model, a famous person who commits suicide, and the press coverage depicts it as a tragedy, and not a crime, it glamorizes the act,” Dr. Shaffer suggested. “I think the moral is, the less talk about suicide, the better. Rather than the reverse. I think most of our work on press coverage supports that.”

Dr. Shaffer said the most important thing parents can do when their child is talking about or threatening suicide “is not to immediately start a dialogue on life and death, but to try and get some understanding of the event that is either looming or has taken place, that is worrying the kid. And then try to work through some options and also to demonstrate support.”
Although there is “no convincing evidence” that rates of anxiety disorders among children and teens are on the rise, pediatricians and therapists have become increasingly better at identifying and treating the disorders, said Daniel S. Pine, M.D., Chief of the Section on Development and Affective Neuroscience at the NIMH Intramural Research Program.

Like everyone else, children experience some anxiety as a normal part of life, but Dr. Pine said parents should look for three things to know whether their child’s anxiety has become abnormal. “The first and probably the most important thing we look at is whether there is impairment—anxiety that interferes with a person’s ability to function and leads to avoidance,” he said. After that, parents and physicians should look to whether the anxiety causes extreme stress or lasts for weeks or months. After that, parents and physicians should look to whether the anxiety causes extreme stress or lasts for weeks or months. There are “no firmly established mechanisms” linking substance abuse and anxiety, Dr. Pine added, but the two disorders may occur together in some teens.

Cognitive behavioral therapy (CBT) and selective serotonin reuptake inhibitor (SSRI) medications seem to be equally effective in treating childhood anxiety, Pine said. “The best study that compared them directly in kids found one is no better than the other, and that combining the two works better than using one or the other alone.” He cautioned, however, that CBT should be delivered by a trained therapist.

Encouraging parents are the key in helping children with anxiety disorders manage their condition, Pine said. “These are parents who can help their kids face the situations that make their children most afraid, and encourage their kids to not avoid the things they’re afraid of. They are parents who look for situations and circumstances and experiences where kids are going to have to deal with their anxiety,” he noted. “Those kids tend to do better with their anxiety compared to kids whose parents are doing absolutely everything they can to prevent their kids from ever getting anxious.”
DISCOVERY TO RECOVERY
STORIES OF
PRODUCTIVE LIVES

People living with mental illness often face numerous challenges in managing their day to day life. Inspired by their unique stories of grace and determination, we acknowledge these challenges and recognize the capacity for families and individuals to persevere and often live productive lives. With the help of both science and the unwavering support of family and friends voice is given to the often silent, closeted and misunderstood illnesses of the brain.
Battling the Dragon of Mental Illness

Instilling Hope in Others and in Themselves

Madelin Weiss and Cory Gould have devoted their careers to helping people with mental illness. The two women have never met; their backgrounds and home towns are very different. But both have walked in the shoes of the people they serve. Since childhood, Madelin and Cory have dealt with harrowing mental illnesses that threatened to destroy any hope of a fulfilling future for either.

From age 8, Madelin experienced paralyzing anxiety and depression. Panic attacks made her fearful of going out, “afraid she wouldn’t be able to get back home.” Diagnosed with bipolar disorder at age 11, Cory had completed high school by age 16, but “my smarts didn’t save me from depression,” she says.

Madelin was first misdiagnosed with schizophrenia and given medications that didn’t work. She barely made it through high school and failed twice to get through college. “I spent most of two years in bed,” she says, “getting up only to go to therapy.” She finally found a wonderful therapist and a psychiatrist who prescribed medications that helped her.

For Cory a serious suicide attempt at age 20 turned out to be a “life changer.” She swallowed three times the dose of phenobarbital that should have been lethal. But instead of dying, she woke up a couple of days later, itching all over and thinking how grossly incompetent she was; she couldn’t even kill herself. Then she concluded that there must be mysteries in the universe, and decided to live.

For Madelin and Cory, mental illness is a life-long challenge. Cory pictures her illness as “this ugly little dragon on a chain sleeping in a corner of her brain. Every once in a while, it pulls on the chain, and her vision clouds. I have to pay attention to the early warning signs. I’ve become expert at managing my illness.” As recently as two years ago, Madelin—who calls depression “an outside force from within”—suffered symptoms severe enough for her to have to stop work. But despite the setbacks and constant vigilance, both women are grateful for the advances in research that have made it possible for them to live productive lives.

Today, Madelin, 64, holds a master’s degree in social work. She is the Associate Executive Director of PIBLY Residential Programs, in the Bronx, New York, where she oversees rehabilitative and support services for several hundred people with mental illnesses. Cory, 58, has a master’s degree in psychology and psychotherapy. She is the go-to mental health professional at Gifford Medical Center in Randolph, Vermont, and a co-founder of the Vermont chapter of the American Foundation for Suicide Prevention.
A Downward Spiral Leads to Uplift

Former NFL Player Helps Others After Facing His Diagnosis

Dreams and reality were always at odds for Keith O’Neil. With a former NFL player for a father and an early love for the game, he always longed to play professional football. But severe anxiety clouded that vision. “I couldn’t sleep at night,” he recalls. “My mind would just keep going.” Around age 12, he began having suicidal thoughts. His parents knew he was moody, but because he would snap out of it, they never suspected an underlying illness. His symptoms receded in high school and resumed in college, while playing college football. Keith turned to alcohol to cope.

Post college his NFL dream came true when he joined the Dallas Cowboys and an old reality resurfaced—constant anxiety. When the Indianapolis Colts picked him up in 2005, Keith realized another dream: playing under revered coach Tony Dungy. But his anxiety worsened. He couldn't stop thinking about the playbook, yet kept forgetting plays. He worried about days ahead and days past. Keith spoke to Coach Dungy not only about his present mental state but also his lifelong anxiety. Dungy rallied his staff to help. Keith began taking anti-anxiety medication and played on the 2006 Colts Championship Super Bowl team.

His new reality soon came crashing down. In 2010 his wife’s miscarriage triggered a severe manic episode. Following a few days of euphoria, he became paranoid and delusional. Friends and family urged him to seek psychiatric help. Within a week, he was diagnosed with bipolar 1 disorder and began medication. He still faced an uphill battle. Coping with the reality of his illness and medication side effects, Keith sank into an 18-month-long depression that persisted even after the birth of his son in 2012. That summer, Keith met Dr. Steven Dubovsky, a psychiatrist at the University of Buffalo. Dr. Dubovsky prescribed lithium, oxcarbepazine (Trileptal) and aripiprazole (Abilify), which “really made all the difference in the world,” says Keith. “I still deal with my moods but I’m as healthy as I can get.”

In October 2013, he founded 4th And Forever, a nonprofit organization dedicated to raising awareness, providing education, and funding research for mental illness. Through 4th And Forever, Keith is realizing a new dream—easing the way for others and reducing the stigma surrounding mental illness. “I want to do something to help, to say ‘I went through this and it is okay to talk about it.’”
DONORS

We are truly grateful for the generosity of caring individuals, foundations, and members of the community that make our work possible.
Research Partners Program

Our Research Partners Program enables donors to select and support a scientist’s project from amongst the most promising, cutting-edge proposals in mental illness research. Sponsoring one year of support for a Young Investigator is $35,000; an Independent Investigator, $50,000; and a Distinguished Investigator, $100,000.

We are deeply grateful to all Research Partners for their vision and leadership.

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<td>Jessica A. Bernard, Ph.D.</td>
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<td>Alessandro Bertolino, M.D., Ph.D.</td>
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<td>Anthony Charles Ruocco, Ph.D.</td>
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<td>Kate Eleanor Anne Saunders, B.M., B.Ch., M.A.</td>
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<td>Chun Hay Alex Kwan, Ph.D.</td>
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<td>Shinichi Kano, M.D., Ph.D.</td>
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<td>June Gruber, Ph.D.</td>
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<td>Mariana Pereira, Ph.D.</td>
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NAMI Michigan Investigator

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<td>Bonnie L. Firestein, Ph.D.</td>
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<td>Hagai Sharon, M.D.</td>
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<td>Yingwei Mao, Ph.D.</td>
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<th><strong>William Risser Charitable Trust Investigators</strong></th>
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<td>Katie Lynn Nugent, Ph.D.</td>
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<td>Jack &amp; Dorothy Kupferberg Family Foundation</td>
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<td>The Jesse &amp; Joan Kupferberg Family Foundation</td>
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<td>Mr. and Mrs. J. Wesley Kussmaul</td>
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Jonathan E. Dixon
Matthew Dodge
Valerie Domitrovic
Christopher Donovan
Lance Dorfman
August E. Doskey
Mike Downing
Rachel L. Drabensott
Gerald A. Drake, M.D.
Sandra G. Dreyfuss
Harriet Dublow
Kyle DuBose
Michael Ducate
David M. Duda
Edna Duffy
Christopher R. Dugan
Alan Dutka
Duane A. Duvall
Benjamin S. Easton
Ethan Edelman
Brian P. Edwards
John J. Egan, Jr.
Community Partners

Team Up For Mental Health

$50,000+
9th Annual Chrissy's Wish Memorial Golf Outing
Linda & Mario Rossi
Manorville, NY

Hike for Mental Health
Leo Walker & Tom Kennedy
Appalachian Trail & Nationwide

$25,000+
5th Annual Let The Sun Shine Run/Walk
Kathy & Curt Robbins
Cold Spring, MN

$10,000+
Wedding of Julie & Guneet Kochar
Overland, KS

$5,000+
Horizon Group Properties Mall Fundraising
Gary Skoien & Connie Dyer
Rosemont, IL

Team Daniel: Running for Recovery from Mental Illness
Drs. Ann & Robert Laitman
Orlando, FL & Amnon, NY

$1,000+
A Day At The Beach
Arlene O'Rourke
Hampton Bays, NY

Remember Johnny Charity Event
Summer Reid
Orange, CA

NAMI Eastside Support Group
Dr. Tom B. Coles
Harper Woods, MI

Gaming Against Mental Illness
David O'Keefe
Trenton, NJ

Cynthia Crawford Birthday Party
Newport News, VA

Running for Research
Jennifer Spangler
Midlothian, VA

Fair Lawn High School 1st Annual “Live to Laugh” Fundraiser
Jed Downey
Fair Lawn, NJ

Wedding of Mary Hofert & Anna Flaherty
Honolulu, HI

Power Planetrees
Jee Ramos
Fresno, CA

“REVOLVE: The Lost Something” Film
Chase Iacofano
Denver, CO

Chefwich
Lauren Bohlig
Portland, OR

Taking Strides Against Mental Illness
Harryet, Rebecca, and Stuart Ehrlich
Wayne, NJ

Dave Green Memorial Golf Classic
John Hagerty
Glenn Dale, MD

Ribbons for Research
Linda & Frank Kilpatrick
Manhattan Beach, CA

$500+
Next to Normal: A Benefit Concert
Zachary Wobensmith
New York, NY

Kettlebell Swings for Kasia
Rory Pollack
Robbinsville, NJ

Texas A&M University Flash Zombie 5K
Alyssa Tigner
College Station, TX

BadNewsBaron Twitch
Matthew Anderson
Allen, TX

Stop the Stigma Dine & Donate/Ribbon Sale
Sydney Edelson
Fort Washington, PA
With the support of family, friends and your community, you can make a difference in the fight against mental illness and the stigma it bears. When you raise money to support the Brain & Behavior Research Foundation, you not only fund the most progressive and promising brain and behavior research, but you help chip away at the crippling effect that stigma has on these illnesses. The Foundation relies on the generosity of the community to help fund leading brain and behavior research.

In 2015, local community fundraising events raised $216,000 to support brain and behavior research.
Ninth Annual Chrissy’s Wish Memorial Golf Outing
MANORVILLE, NY

Chrissy’s Wish was established in memory of Christina Rossi and to honor the millions of people who continue to live with mental illnesses. All proceeds are donated to the Brain & Behavior Research Foundation. As a result of the fundraisers of the past seven years, together with matched funds, Chrissy’s Wish has raised more than $480,000 for the Foundation.

“Chrissy’s greatest wish was to find peace of mind. Let’s bring this wish to life. By supporting Chrissy’s Wish you can help bring an end to the devastating mental disorders that strike so many our friends and family members.”

LINDA AND MARIO ROSSI, CHRISSEY’S PARENTS

HIKE for Mental Health
APPALACHIAN TRAIL AND NATIONALLY ACROSS THE U.S.

Share the joy of hiking. Bring hope to those battling mental illness.

HIKE for Mental Health was born of a single vision: a world in which everyone, including those who suffer from mental illness, can find the simple joy of living. It’s mission is to increase public awareness of the challenges and suffering faced by those afflicted by mental illness and their families; increase public appreciation for and responsible use of wilderness trails; and to raise funds to prevent and alleviate the pain caused by mental illness while maintaining and preserving wilderness trails.

Let the Sun Shine Run/Walk to Benefit the Brain & Behavior Research Foundation
COLD SPRING, MN

This event was created to honor the memory of Jonathon James Robbins. Jonathon was diagnosed with schizophrenia and depression and committed suicide on April 28, 2010 at the age of 22.

“This world WILL be a better place because of Jonathon’s death; not for us who loved him, but for all those other families out there who still have hope that a cure or better faster-acting medicine can help their loved ones.”

KATHY ROBBINS, JONATHON’S MOM
2015
FINANCIAL SUMMARY
2015 Financial Summary

We are pleased to report on the financial position and results of the Brain & Behavior Research Foundation for 2015. We are appreciative and thankful for the commitment of Foundation leadership, dedicated staff, volunteers and our strong donor support base that allows the Foundation to perform its vital work. We remain indebted to the Foundation Scientific Council, our distinguished research leaders covering virtually every major discipline within brain and behavior science, who volunteer their expertise to select and recommend the most promising grant projects to fund.

In 2015, contributions continued to increase and bequests continued to provide major support for which we are deeply grateful to all of our supporters for their generosity. We again acknowledge the extraordinary bequest from the late Oliver D. Colvin, Jr. that continues to support our efforts at the Foundation. Together, all these donations further the Foundation’s mission to alleviate the suffering caused by mental illness by awarding grants that will lead to advances and breakthroughs in scientific research.

With another strong year of results, we continue to move forward with our focus of accelerating research accomplishments to help those living with mental illness to live full and productive lives. During 2015, the Foundation awarded additional NARSAD Grants to bring the total investment in mental health research to more than $342 million since inception.

We acknowledge, with great thanks and appreciation, the generosity of the two family foundations who have underwritten, once again, the Foundation’s operating expenses. This allows for contributions targeted for research to go directly to funding NARSAD Grants. The financial report shown herein has been summarized from our 2015 audited financial statements. The Foundation’s complete audited financial statements and our most recent IRS Form 990 are available online at bbrfoundation.org or contact our office at 800.829.8289 for copies of the material.
# Combined Statement of Financial Position

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2015</th>
<th>December 31, 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSETS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$14,408,546</td>
<td>$22,350,676</td>
</tr>
<tr>
<td>Investments, at fair value</td>
<td>20,664,680</td>
<td>11,164,075</td>
</tr>
<tr>
<td>Contributions receivable</td>
<td>–</td>
<td>1,436,500</td>
</tr>
<tr>
<td>Other receivables</td>
<td>17,038</td>
<td>12,009</td>
</tr>
<tr>
<td>Pledges receivable, net</td>
<td>505,583</td>
<td>780,440</td>
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<tr>
<td>Prepaid expenses and other assets</td>
<td>28,612</td>
<td>21,415</td>
</tr>
<tr>
<td>Assets held in charitable remainder trusts</td>
<td>1,363,469</td>
<td>1,460,182</td>
</tr>
<tr>
<td>Fixed assets, net</td>
<td>48,577</td>
<td>81,617</td>
</tr>
<tr>
<td>Security deposits</td>
<td>77,110</td>
<td>77,110</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>$37,113,615</td>
<td>$37,384,024</td>
</tr>
</tbody>
</table>

| **LIABILITIES AND NET ASSETS** |                   |                   |
| **Liabilities**              |                   |                   |
| Accounts payable and accrued expenses | $198,788         | $209,211          |
| Grants payable               | 22,943,344        | 20,093,716        |
| Accrued compensation         | 61,919            | 50,295            |
| Annuities payable            | 791,216           | 871,832           |
| Charitable gift annuities payable | 301,807       | 317,912           |
| **Total Liabilities**        | $24,297,074       | $21,542,966       |

| **Net Assets**              |                   |                   |
| Unrestricted                | (3,606,221)       | (1,081,384)       |
| Unrestricted – board designated endowment | 11,509,262     | 11,509,262       |
| **Total Unrestricted**      | $7,903,041         | $10,427,878       |
| Temporarily restricted      | -                 | 499,680           |
| Permanently restricted      | 4,913,500         | 4,913,500         |
| **Total Net Assets**        | $12,816,541        | $15,841,058       |
|                            | $37,113,615        | $37,384,024       |
## Combined Statement of Activities

<table>
<thead>
<tr>
<th>SUPPORT AND REVENUE</th>
<th>YEAR ENDED</th>
<th>YEAR ENDED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DECEMBER 31, 2015</td>
<td>DECEMBER 31, 2014</td>
</tr>
<tr>
<td>Contributions</td>
<td>$11,608,273</td>
<td>$7,816,588</td>
</tr>
<tr>
<td>Special Events, net</td>
<td>509,498</td>
<td>584,805</td>
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<tr>
<td>Contribution of services</td>
<td>1,807,051</td>
<td>1,389,537</td>
</tr>
<tr>
<td>Bequests</td>
<td>8,847,835</td>
<td>21,683,838</td>
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<tr>
<td>Net realized and unrealized (losses) gains on investments</td>
<td>(405,214)</td>
<td>1,184,440</td>
</tr>
<tr>
<td>Net (depreciation) appreciation of assets held in charitable remainder trusts</td>
<td>(96,713)</td>
<td>55,885</td>
</tr>
<tr>
<td>Dividend and interest income</td>
<td>423,681</td>
<td>322,676</td>
</tr>
<tr>
<td><strong>Total Support and Revenue</strong></td>
<td><strong>$22,694,411</strong></td>
<td><strong>$33,037,769</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPENSES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research grants and awards</td>
<td>18,441,870</td>
<td>22,681,953</td>
</tr>
<tr>
<td>Scientific advancement</td>
<td>2,293,164</td>
<td>1,747,843</td>
</tr>
<tr>
<td>Program support</td>
<td>2,544,177</td>
<td>2,101,977</td>
</tr>
<tr>
<td><strong>Total Program Services</strong></td>
<td><strong>$23,279,211</strong></td>
<td><strong>$26,531,773</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supporting Services</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundraising*</td>
<td>903,798</td>
<td>793,219</td>
</tr>
<tr>
<td>Administration*</td>
<td>1,535,919</td>
<td>1,346,579</td>
</tr>
<tr>
<td><strong>Total Supporting Services</strong></td>
<td><strong>$2,439,717</strong></td>
<td><strong>$2,139,798</strong></td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td><strong>$25,718,928</strong></td>
<td><strong>$28,671,571</strong></td>
</tr>
</tbody>
</table>

| Change in Net Assets                                      | (3,024,517)         | 4,366,198           |
| Net Assets, beginning of year                             | 15,841,058          | 11,474,860          |
| **End of Year Net Assets**                                | **$12,816,541**     | **$15,841,058**     |

*All fundraising and administration expenses are funded by specially designated grants.
Investing in Breakthroughs To Find a Cure

100% of donor contributions for research are invested in our grants leading to advances and breakthroughs in brain and behavior research. This is made possible by the generous support of two family foundations which cover all of the Foundation’s operating expenses.

OUR 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.

HOW WE DO IT:
The Foundation funds the most innovative ideas in neuroscience and psychiatry to better understand the causes and develop new ways to treat brain and behavior disorders. These disorders include depression, bipolar disorder, schizophrenia, autism, attention-deficit hyperactivity disorder, anxiety, borderline personality disorder, chemical dependency, obsessive-compulsive disorder and post-traumatic stress disorders.

OUR CREDENTIALS:
Since 1987, we have awarded more than $342 million to fund more than 5,000 grants to more than 4,000 scientists around the world.

OUR VISION:
To bring the joy of living to those affected by mental illness—those who are ill and their loved ones.

SIGN UP FOR ENEWS: bbrfoundation.org/signup
FIND BBRFOUNDATION ON

BRAIN & BEHAVIOR RESEARCH FOUNDATION