

Intuition

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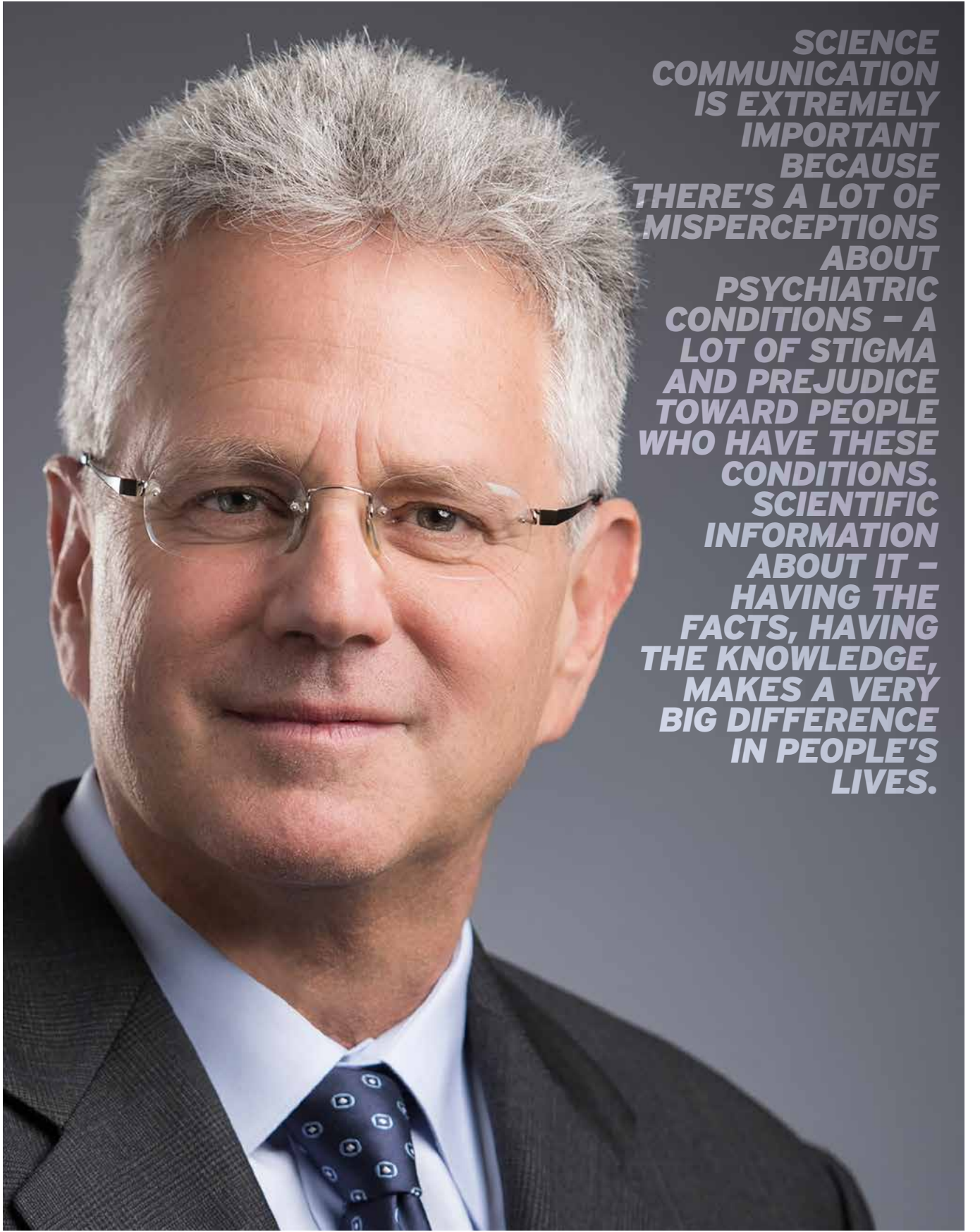
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HUMANITY'S NEW FRONTIER

THE FUTURE

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COLLECTIVE
INTELLIGENCE:
A Q&A
WITH
MARIANO
SIGMAN



**SCIENCE
COMMUNICATION
IS EXTREMELY
IMPORTANT
BECAUSE
THERE'S A LOT OF
MISPERCEPTIONS
ABOUT
PSYCHIATRIC
CONDITIONS – A
LOT OF STIGMA
AND PREJUDICE
TOWARD PEOPLE
WHO HAVE THESE
CONDITIONS.
SCIENTIFIC
INFORMATION
ABOUT IT –
HAVING THE
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THE KNOWLEDGE,
MAKES A VERY
BIG DIFFERENCE
IN PEOPLE'S
LIVES.**

GETTING THE WORD OUT TO PEOPLE IS EXTREMELY IMPORTANT SO THAT PEOPLE UNDERSTAND THAT THESE ILLNESSES ARE THE RESULT OF BIOLOGY, NOT THE RESULT OF CHARACTER WEAKNESS OR MORAL WEAKNESS. THESE ARE PHYSICAL ILLNESSES THAT AFFECT THE BRAIN. THESE ILLNESSES ARE TREATABLE AND PEOPLE SHOULD NOT SUFFER IN SILENCE.

Brain World: How did you become interested in neuroscience?

Jeffrey Borenstein: I became interested in neuroscience in medical school when I decided to become a psychiatrist. It was having the opportunity to see people who had various psychiatric conditions such as depression, bipolar disorder, and schizophrenia and wanting to understand what may cause those conditions and how to best help people with those conditions.

BW: Why is science communication important?

JB: I think science communication is extremely important because there's a lot of misperceptions about psychiatric conditions — a lot of stigma and prejudice toward people who have these conditions. Scientific information about it — having the facts, having the knowledge, makes a very big difference in people's lives. I think that understanding psychiatric illness such as depression or schizophrenia is an illness like any other illness — that it's based on the biology of the human brain, just like pneumonia is based on the biology of the human lungs and that there are treatments available to help people, and that people shouldn't suffer in silence — that they should seek and accept help.

BW: What is the Brain & Behavior Research Foundation?

JB: The Brain & Behavior Research Foundation is the largest private funder of brain and behavior psychiatric research grants in the world, and we fund scientists around the world who are doing innovative and cutting-edge research about the brain. Our major focus is supporting young scientists who are just beginning their career in brain research. Unfortunately it's very very hard to begin a career in brain research — in any area of medical research. We are able to give support so that people can begin to develop initial pilot data so that they could then go on and receive subsequent funding from the government and other sources.

BW: Why would you say that it's harder? Would you say it is harder now than when the foundation began?

JB: Yes, it's become more difficult over the last few years — the amount of funding available and real dollars hasn't kept pace. It's very challenging and difficult for — especially young researchers to get that kind of funding to begin a career and to continue a career. We really don't put enough dollars into research despite the large number of people who have these illnesses and the significant number of people affected by these illnesses: whether it be themselves or a family member. We don't put enough into research and development for understanding these conditions, and we need to.

I think there are many issues in society related to mental illness. Certainly, and foremost, people who have a variety of illnesses would benefit from improved methods of treatment and potentially methods of prevention for these conditions. In medicine now, by treating things like high blood pressure and cholesterol, we are able to have methods of prevention for heart disease. We need to similarly develop these kinds of methods for treating depression and bipolar disorder, obsessive-compulsive disorder, all the psychiatric conditions. We need to look at: "Are there ways to prevent these illnesses?" "Once they occur, are there better ways to treat them?" "More effective ways to treat them?"

And then there are issues like the issue of suicide prevention and the increasing rates of suicide that's happening now and sometimes gets attention in the press when a well-known person dies of suicide, but day in and day out people are dying as a result of suicide. More people die because of suicide than because of homicide in our country. So that's an important issue. Our returning service members who have post-traumatic stress and depression are at risk of suicide — that's a particular area that needs more attention as well. The issue of people that are homeless and have psychiatric illnesses and are not receiving appropriate treatment and appropriate support is a very important one. So I think there are a variety of issues that are very important from a societal standpoint where improved treatment would have a tremendous impact.

BW: So how can we improve treatment? Or how can it improve?

JB: Well, over the years, treatment has improved. So that somebody who has any of these conditions in 2018, it's a better time to have it because we have better treatments than we

did in the past, but we really need to build upon that. Research into better understanding the mechanisms in the brain that can cause these conditions is extremely important so that we can better develop new approaches to treatment that have an impact. So it really is a combination of basic research about how the brain works to clinical research about what types of treatments: whether it be medication, whether it be forms of talk therapy, whether it be other types of interventions — that can better treat these conditions.

BW: *So how has neuroscience contributed to our understanding of mental illness?*

JB: Neuroscience is a key to understanding mental illness. Neuroscience is studying the brain and a better understanding of how the brain works and what can go wrong in terms of how it works helps provide important information about the cause of mental illness and potential treatments for it. So neuroscience is extremely important in our understanding of the brain.

BW: *What would you say the most impactful breakthrough in neuroscience has been?*

JB: I think there's a number of important breakthroughs. First of all, when I went to medical school in the 1980s, I was taught that old brains do not grow new cells, and that "old" was after the age of 2 or 3. We now know that's not true — that adult brains, even older adult brains are able to grow new cells and have brain cells make new connections through a process called "neurogenesis." This is an extremely important finding, because it shows that the brain can adapt — can change — so that's a very important finding.

I think that our tools to understand the brain have significantly improved: whether it be through

neuroimaging studies, using MRIs, or other forms of imaging; whether it be through genetic studies where we're able to look at large numbers of people who have a particular condition and compare them to people who don't and look for certain areas of genetics that may have some relationship to that illness. Our ability to use new technologies such as "optogenetics" to study the brain is extremely important. So I think that there's been a number of breakthroughs in the course of my career that have had an impact on neuroscience.

BW: *What would you say is the proudest accomplishment of BBRF?*

JB: I think that the proudest accomplishment of BBRF is the impact that the foundation has on the careers of young scientists. So the foundation has been providing research grants now for over 30 years and some of the young scientists that we supported initially are now senior people in the field who continue to have an extraordinary impact in terms of their research, in terms of their mentoring other scientists, in terms of clinical care. So I think the most important accomplishment of BBRF has been support of scientists and the support of their ability to develop innovative approaches to research.

BW: *What would you say has been their most ambitious undertaking?*

JB: Well, I think that there's been a number of research projects that we supported that really are very ambitious. So one of them is support for work by Dr. Robert Freedman of the University of Colorado in Denver, looking at giving dietary supple-

mentation during pregnancy to decrease the risk of the child ultimately developing schizophrenia or other psychiatric conditions. Dr. Freedman's done work stemming from very basic research to clinical studies to look at the possibility that giving choline supplementation to pregnant women can reduce the risk of developing these illnesses. We also were early supporters of Dr. Karl Deisseroth and colleagues in the development of optogenetics, which is an important new tool now used by thousands of scientists around the world to study the brain.

BW: *How does that work — optogenetics?*

JB: Basically, it's used to study the brain in laboratory animals and they're able to genetically engineer brain cells so that they respond to light. They turn on as a result of being stimulated by light, and then they surgically put in a wire that can provide laser light to instantaneously turn on and off a particular brain cell or group of brain cells, and then see changes in behavior — see the connections of those brain cells to better understand the brain. We were also early supporters in the work of Dr. Mark George and his development of transcranial magnetic stimulation, and other conditions, where electromagnetic stimulation from an electrical coil placed on the scalp, target specific areas of the brain. Today, it's an important method of treatment, which is now widely used for depression.

BW: *What do you hope BBRF will achieve in the near future?*

JB: We are hoping to accelerate the support for brain research so that we can really have in hand, improved treatments, cures, and methods of prevention for these illnesses. My hope is that in doing so, we can have a positive impact on the lives of so many people who have been affected by these conditions, so that they can live full and healthy and happy lives.

BW: *What can we do to help — in terms of helping with research and destigmatizing mental illness?*

JB: I think that getting the word out to people is extremely important so that people understand that these illnesses are the result of biology, not the result of character weakness or moral weakness. These are physical illnesses that affect the brain.

These illnesses are treatable and people should not suffer in silence. They should seek help. One of the ways that I've done that — is through the "Healthy Minds" public television series, which is broadcast on public television stations around the country, but is also available on demand online, where in each episode, I interview an expert in a particular area or for a particular illness and/or a person who has lived with a particular illness to share their experience. ³