OCTOBER 24, 2014
VOL. LXVI, NO. 22
The Second Best Thing About Payday

nih record

ABOVE • *The 2014 NIH Research Festival drew top IC scientists for a poster session. See story below.*

features

departments

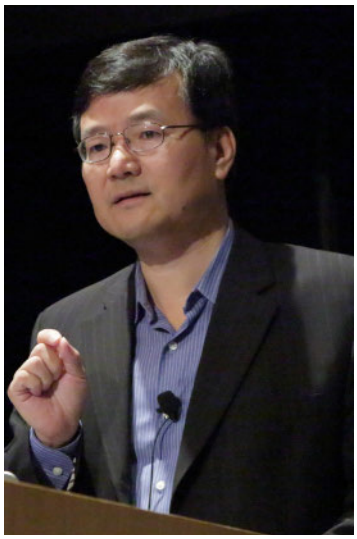
Imagination Takes Flight

He Describes Advances in Mapping Brain Dynamics

By Carla Garnett

Once his lab perfects its research on mind-flying a full-size helicopter, Dr. Bin He will be spending a lot less time in his car. That day may not come for a while, though, he said, despite his incredible advances in "motor imagination"—brain activity combined with computer and imaging technologies.

In a recent lecture "How to Map the Dynamics of Your Brain—From EEG to BCI," He described the system his lab designed in 2009 to move a helicopter image around a virtual 3-dimensional landscape using electroencephalography (EEG), in real time. EEG measures brain activity via electrical signals in the scalp. BCI, or brain computer interface, is direct communication between the mind and an external device—using the mind to control a wheelchair, surf the web or turn on the TV, for instance.



Dr. Bin He speaks at NIH.

Last year, He said his group advanced its BCI research past the video-game realm to ask, "Can we really control flying of an actual helicopter?

SEE **BRAIN MAPPING,** PAGE 6

NIDDK director Dr. Griffin Rodgers (l) learns from NIA director Dr. Richard Hodes at festival.

Brain-Oriented Research Festival Encourages Mingling

By Rich McManus

Somewhere in the unruly, uncharted depths of the brain lies the urge to communicate, share and, in the best-case scenario, shout "Eureka!"

It is in that spirit that NIH director Dr. Francis Collins launched the 2014 NIH Research Festival on Sept. 22. He encouraged free-form min-

SEE **FESTIVAL,** PAGE 8

Production Line Philosophy Can Reduce Medical Errors, Says Southwick

By Eric Bock

Anywhere from 200,000 to 400,000 people die each year each from preventable medical errors, according to recent estimates.

That makes preventable medical errors the third leading cause of death in the United States, said Dr. Frederick Southwick at a Contemporary Clinical Medicine Great Teachers Grand Rounds held in Lipsett Amphitheater recently.

"For every death, there are 10 serious, life altering injuries," said Southwick, professor of medicine at the University of Florida College of Medicine and quality projects manager for the senior vice president for health affairs, University of Florida Health. "There's somewhere between 1 million to 4 million life altering injuries per year. The human toll is incalculable. The monetary cost is somewhere near $29 billion."

Southwick knows firsthand the emotional and

SEE **SOUTHWICK,** PAGE 4

The **NIH Record** is published biweekly at Bethesda, MD by the Editorial Operations Branch, Office of Communications and Public Liaison, for the information of employees of the National Institutes of Health, Department of Health and Human Services. The content is reprintable without permission. Pictures may be available upon request. Use of funds for printing this periodical has been approved by the director of the Office of Management and Budget through September 30, 2015.

To receive alerts to our latest issue, send an email to listserv@list.nih.gov with the words "Subscribe NIHRECORD" in the message body.

NIH Record Office Bldg. 31, Rm. 5B41
Phone (301) 496-2125 **Fax** (301) 402-1485

Web address http://nihrecord.nih.gov/

Editor
Richard McManus
Rich.McManus@nih.gov

Associate Editor
Carla Garnett
Carla.Garnett@nih.gov

Staff Writers
Eric Bock
Eric.Bock@nih.gov

Dana Talesnik
Dana.Talesnik@nih.gov

Belle Waring
Belle.Waring@nih.gov

The **NIH Record** reserves the right to make corrections, changes or deletions in submitted copy in conformity with the policies of the paper and HHS.

NIH...Turning Discovery Into Health

nih record

briefs

Fulbright Visiting Scholar To Lecture, Nov. 4

Dr. Melanie Cheung, a Fulbright New Zealand scholar developing a brain resilience training program for Huntington's disease, will deliver a special lecture on Tuesday, Nov. 4 at 1 p.m. in the Porter Neuroscience Research Center, Rm. 620/630. The lecture is free and open to the public and sponsored by NIMHD, NINDS and FIC. For reasonable accommodation, call (301) 402-1366 or the Federal Relay at 1 (800) 877-8339.

'Safe to Sleep' Campaign Celebrates 20th Anniversary

The NICHD-led Safe to Sleep campaign celebrates its 20th anniversary this month, coinciding with National SIDS Awareness Month. The campaign's original guideline was to place babies to sleep on their backs to reduce the risk of SIDS. In recent years, the campaign expanded to include guidelines to reduce the risk of other sleep-related causes of infant death, such as accidental suffocation, by providing a safe environment for infant sleep.

Safe to Sleep seeks to inform all those who care for infants about how to provide a safe sleep environment. Key messages include placing a baby to sleep on the back for every sleep time, including naps; on a firm surface such as a mattress in a safety-approved crib, bassinet or play yard with no soft bedding, crib bumpers or toys; on a separate sleep surface in the same room next to where the parents sleep. The campaign reaches out to mothers and fathers, but also to grandparents, babysitters, other caregivers and health care providers. October anniversary events include:

- A Thunderclap, a tool that allows many social media users to send an important message at once, on Oct. 20
- An interactive tool on the Safe to Sleep web site (at www.nichd.nih.gov) that shows what a safe sleep environment looks like
- An article by Dr. Shavon Artis, Safe to Sleep campaign coordinator, in *Parents* magazine
- Conversations from the Oct. 7 Twitter chat.

Acting Surgeon General To Kick Off Seminar on Disease Prevention

Rear Admiral Boris Lushniak, acting surgeon general and chair of the National Prevention Council, will introduce the next Medicine: Mind the Gap seminar on Wednesday, Nov. 5 from 1 to 3 p.m. in Natcher Bldg., balcony B.


Rear Adm. Boris Lushniak

He will highlight the National Prevention Strategy, the need to create and maintain healthy and safe communities and the role the built environment plays in promoting physical and mental well-being. The built environment refers to the human-made surroundings of a community such as parks, sidewalks, buildings, neighborhoods and transportation systems.

Three speakers will discuss examples of organizations and communities working to promote health and prevent disease through changes in the built environment: Dr. Allen Glicksman, director of research and evaluation at the Philadelphia Corporation for Aging; Rachel MacCleery, senior vice president of the Urban Land Institute; and Gwen Wright, planning director of the Montgomery County planning department.

Registration is not required; seating is on a first-come, first-served basis. Sign language interpreters will be provided. Those who require reasonable accommodation to participate should contact Christine Jones, Christine.Jones2@nih.gov, (301) 496-4819.

The seminar will also be available through videocast and archived at http://videocast.nih.gov/.

The Medicine: Mind the Gap, Translating from Clinic to Curbside Series explores the science of prevention in community-based settings. This event, the first seminar in this series, is sponsored by the NIH Office of Disease Prevention and the Office of the Surgeon General. For information, visit https://prevention.nih.gov/programs-events/medicine-mind-the-gap.

Veterans Day Celebration, Nov. 5

The 2014 NIH Veterans Day Celebration will be held on Wednesday, Nov. 5 in Masur Auditorium, Bldg. 10 from 10 to 11 a.m. followed by exhibits and refreshments in the South Lobby until 12:30 p.m. NIH director Dr. Francis Collins will recognize veterans' contributions and introduce guest speaker Commander Everett Alvarez Jr., (USN ret.), who was the first American pilot to be shot down and held as a prisoner of war in North Vietnam.

Stanford's Dr. William E. Moerner, Nobel laureate
PHOTO: STANFORD UNIVERSITY

Grantee Shares 2014 Chemistry Nobel

NIH grantee Dr. William E. Moerner of Stanford University shares the 2014 Nobel Prize in chemistry for his work on optical microscopy that has opened the understanding of molecules by allowing researchers to see how the molecules work close up.

Moerner won the award jointly with Eric Betzig from Howard Hughes Medical Institute and Stefan W. Hell of the Max Planck Institute for Biophysical Chemistry in Germany. NIH was also instrumental in the development of the first working model of Betzig's microscope.

The Royal Swedish Academy of Sciences, which selected the laureates, said that, because of the achievements of these researchers in overcoming the limitations of the traditional light microscope, "the optical microscope can now peer into the nanoworld."

"Because of this revolutionary work, scientists can now visualize the pathways of individual molecules inside living cells," said NIH director Dr. Francis Collins. "Researchers can see how molecules create synapses between nerve cells in the brain and they can track proteins involved in Parkinson's, Alzheimer's and Huntington's diseases. NIH is proud to have supported this work, which is now used worldwide."

Since 2003, Moerner has received more than $10 million in support from the National Institute of General Medical Sciences and the National Human Genome Research Institute. He was among the first to receive grants from NIH cellular imaging initiatives that encouraged the application of physical science tools and approaches to biological studies.

"These achievements were truly pioneering," said Dr. Catherine Lewis, director of the Division of Cell Biology and Biophysics at NIGMS. "The scientists accomplished something that was thought to be impossible—seeing single molecules in living cells in real time. This has opened a window into the cell and paved the way for an explosion of research on the role of individual molecules in health and disease."

The first working model of Betzig's microscope was built in a laboratory at the National Institute of Child Health and Human Development at a time when Betzig was between jobs and working out of a cottage in rural Michigan.

Dr. Jennifer Lippincott-Schwartz, who heads the NICHD section on organelle biology, was captivated by Betzig's concept for an optical microscope that could beat the so-called diffraction limit of 0.2 micrometers, the theoretical maximum resolution of traditional optical microscopy.

Betzig had developed the theoretical basis, but he had neither access to the green fluorescent proteins needed for the experiment nor a laboratory in which to build a microscope.

Lippincott-Schwartz hosted Betzig and his colleague, Dr. Harald Hess, in her NIH lab, where together they constructed a working prototype of the microscope as a proof of concept. The result was photo-activated localization microscopy (PALM), which scientists now use to study dynamic protein interactions within cells in real time and space.

"We didn't imagine at the time how quickly the point localization imaging would become such an amazing enabling technology," said Lippincott-Schwartz. "But it caught on like wildfire, expanding throughout many fields of biology."

NCI Scientists Win National Medal of Technology and Innovation

President Obama has announced that two NCI scientists will be recipients of the National Medal of Technology and Innovation, the nation's highest honor for technological achievement. The honorees, Dr. John Schiller of the Laboratory of Cellular Oncology and NCI deputy director Dr. Douglas Lowy, also from the same lab, will receive their medals at a White House ceremony later this year.

Drs. Douglas Lowy (l) and John Schiller

Awarded annually, the National Medal of Technology and Innovation recognizes individuals who have made outstanding contributions to science and engineering. Lowy and Schiller have been honored numerous times, for example in 2011 with the Albert B. Sabin Gold Medal Award. Their discoveries enabled the development of HPV vaccines. As a direct result of Lowy's and Schiller's research, vaccines now exist that safely protect against infection with the HPV types that cause most cervical cancers in women and anal and oral cancers in both sexes, as well as HPV types that cause genital warts in both sexes.

The National Medal of Technology and Innovation was created by statute in 1980 and is administered for the White House by the Department of Commerce's Patent and Trademark Office. The medal recognizes those who have made lasting contributions to America's competitiveness and quality of life and helped strengthen the nation's technological workforce.

SOUTHWICK

CONTINUED FROM PAGE 1

physical trauma of preventable medical error. In 1995, he had surgery on his left Achilles tendon. During the procedure, his surgeon placed a tourniquet above his knee to block the flow of blood. The tourniquet was left on for too long and injured his arteries. Over time, the damaged arteries scarred and calcified, hindering blood flow to the leg. As a result, Southwick's leg had to be amputated.

"The total cost of this error was $194,915 and I lost 6 months of work. The emotional and physical trauma for me and my family is inestimable," he said.

Before his injury, Southwick had been studying how to prevent medical errors. Then he learned about the Toyota Production System, a management practice focused on producing vehicles as rapidly, safely and efficiently as possible.

Dr. Frederick Southwick of the University of Florida put an athletic department spin on car-building principles to improve patient safety at his school.

PHOTOS: BILL BRANSON

He believed he could apply the philosophy to patient care.

Southwick said that the Toyota Production System is based on three rules: First, every worker must know his or her role within the system. This is called a protocol. Southwick noted that there must be no ambiguity regarding a worker's role. Next, the supply line between two workers must be as simple and direct as possible. Finally, every employee must offer suggestions to increase quality and efficiency.

If these principles are implemented in health care on a large scale, Southwick estimated that costs could be reduced by 30 to 40 percent without impairing quality.

Southwick tried to apply the Toyota principles to multidisciplinary inpatient work rounds at the University of Florida College of Medicine. He met resistance. Many physicians noted that patients weren't cars.

"So I took Toyota Production System principles and turned them into athletic principles," Southwick said.

Southwick called it "Gatorounds," because the University of Florida's mascot is an alligator.

"The primary goals of Gatorounds are to have timely, efficient, error-free patient-centered care with nurse involvement and to maximize teaching opportunities," said Southwick.

Just as each player on a football team has responsibilities for specific plays, each medical provider participating in rounds has responsibilities for managing complex cases.

Muniyappa Wins 2014 Distinguished Clinical Teacher Award

Just before Dr. Frederick Southwick's Great Teachers Grand Rounds got under way, future greatness was predicted by presentation of the annual Distinguished Clinical Teacher Award. Dr. Ranganath Muniyappa received the 2014 DCTA, given by the NIH clinical fellows committee. Muniyappa is a staff clinician in the clinical endocrinology section of NIDDK's Diabetes, Endocrinology and Obesity Branch.

Established in 1985, the DCTA recognizes excellence in mentoring health care professionals, teaching about issues related to patient care and outstanding contributions to clinical research.

"The Distinguished Clinical Teacher Award is the highest honor bestowed on an NIH investigator, staff clinician or tenure-track investigator. By my standards, it's really one of the most special awards someone can receive here," said CC director Dr. John Gallin, who presented the honor.

On hand at the presentation of the 2014 Distinguished Clinical Teacher Award are (from l) CC director Dr. John Gallin, 2014 DCTA recipient Dr. Ranganath Muniyappa, and co-chairs of the DCTA Dr. Syed Abbas Ali of NCI and Dr. Ricardo R. Correa of NICHD.

In a typical Gatorounds, the team forms a huddle around the patient.

"When everyone is in a circle, everyone hears the same thing at the same time. It creates a shared mental model, it flattens the hierarchy and allows everyone to share information," said Southwick.

He also noted that when an unexpected problem arises, the team works together to understand and solve that problem.

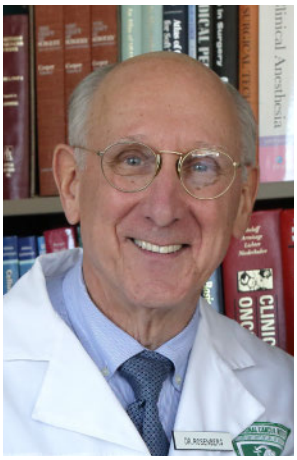
After every Gatorounds, Southwick reviews the team's performance and suggests strategies for improvement and for preventing mistakes in the future.

Southwick surveyed those who participated in Gatorounds. Attendants, residents, medical students and nurses all thought the system was much more efficient. He also found the length of hospital stays decreased by 18 percent and readmission to the hospital decreased by 30 percent.

He cautioned that change isn't easy. He recommends that those who wish to adopt changes in health care move slowly and listen to those resistant to change.

"Without change, preventable patient deaths and injuries will continue," Southwick concluded. "We must change. Our patients are counting on us."

NCI's Rosenberg Wins Two Awards



NCI Surgery Branch chief Dr. Steve Rosenberg has been selected to receive the 2015 American Cancer Society Medal of Honor and will share the 2014 Massry Prize with two other scientists. The ACS award is the highest honor bestowed by the society and is given for outstanding contributions to cancer control in four categories: clinical research, basic research, cancer control and philanthropy. Rosenberg won the Basic Research Award, to be presented next summer in New York City. The Massry Prize consists of a 10 oz. gold medal, a certificate and $66,000 for each of the three honorees. It includes a proclamation from the City of Beverly Hills and requires three talks, to be given in Los Angeles in October.

Dr. Ron Vale of UCSF

Cell Biologist Vale To Discuss Motor Proteins in Stetten Lecture

The interior of our cells teems with purposeful motion akin to the flow of traffic in a major metropolis. Powering this movement are dozens of molecular motors—biological internal combustion engines found in all eukaryotic cells.

This year's DeWitt Stetten Jr. lecturer, Dr. Ron Vale of the University of California, San Francisco, has long been a leader in devising and integrating biochemical, structural and microscopy-based methods to reveal the inner workings of the motors that drive intracellular movement. He will discuss his innovative research in a talk titled "The Mechanisms of Cytoskeletal Motor Proteins." Part of the NIH Director's Wednesday Afternoon Lecture Series and sponsored by NIGMS, the lecture will be held on Wednesday, Oct. 29 at 3 p.m. in Masur Auditorium, Bldg. 10.

Cytoskeletal motor proteins use chemical energy stored in adenosine triphosphate (ATP) to power unidirectional motion along tracks made of actin filaments or microtubules. The proteins perform tasks such as transporting membrane-enclosed organelles to their proper locations in the cell and ensuring the equal partitioning of genetic material during cell division. Vale's focus is on understanding and manipulating the motor proteins that move along microtubules, which are the heavy lifters of the cytoskeleton.

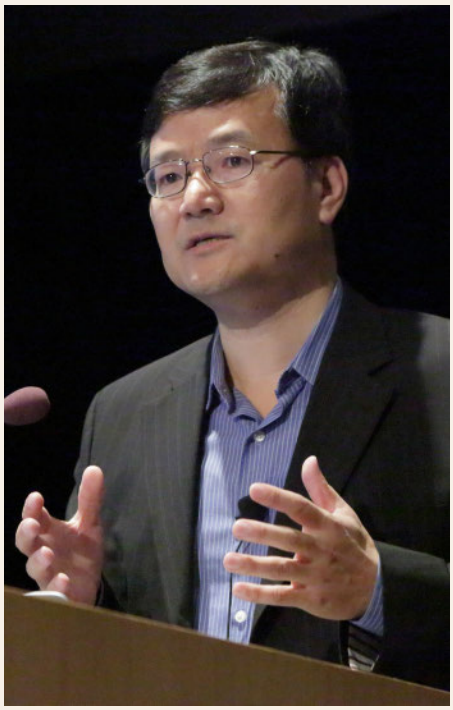
Research by Vale and others has shown that each cytoskeletal motor protein consists of a region called the motor domain, which catalyzes the breakdown of ATP and moves the protein along its track, and a tail domain that docks the motor onto a particular cargo in the cell.

In 1985, by observing the movement of organelles along microtubule filaments in the squid giant axon (nerve fiber), Vale discovered kinesin, the smallest known molecular motor. In 1996, in collaboration with Robert Fletterick's UCSF lab, Vale and his colleagues determined the structure of the kinesin motor domain at atomic-resolution detail and discovered, quite unexpectedly, that it is similar to myosin, the actin-based, prototypical molecular motor.

More recently, Vale has shifted his attention to understanding the mechanisms by which motor proteins in the dynein family—the largest known molecular motors—power the beating of hairlike cilia and flagella, transport molecular cargoes and help form the mitotic spindle. As part of this effort, in 2011, he and colleagues obtained the crystal structure of the dynein motor domain, a major technical achievement.

Vale is a professor and vice-chair of the department of cellular and molecular pharmacology at UCSF, where he has been on the faculty since 1987. He is also a Howard Hughes Medical Institute investigator and holds an adjunct senior scientist appointment with the Marine Biological Laboratory in Woods Hole, Mass. Vale earned a B.A. in biology and chemistry from the University of California, Santa Barbara, in 1980 and a Ph.D. in neuroscience from Stanford University in 1985.

Among Vale's many honors are the Wiley Prize in Biomedical Sciences and the Albert Lasker Basic Medical Research Award. He was elected to the National Academy of Sciences in 2001 and to the American Academy of Arts and Sciences in 2002.—**Elia Ben-Ari**



BRAIN MAPPING

CONTINUED FROM PAGE 1

***Above**:*
At left, a graduate student—outfitted with an EEG cap and a laptop—uses his thoughts alone to pilot a model helicopter around an obstacle course set up in a gymnasium.

Director of the Institute for Engineering in Medicine at the University of Minnesota, He explains the flight demonstration at a recent NCCAM lecture. He is a grantee of NIBIB and NEI.

LECTURE PHOTOS: ERNIE BRANSON, FLIGHT DEMO PHOTOS: UNIVERSITY OF MINNESOTA

Certainly not a big helicopter, but a small one… otherwise I can commute every day and not have to pay gas bills."

He captivated the Lipsett Amphitheater audience with a 2013 video clip: Outfitted with an EEG cap and a laptop, a graduate student used his thoughts alone to pilot a model helicopter around an obstacle course set up in a gymnasium.

Distinguished McKnight University professor of biomedical engineering, director of the Institute for Engineering in Medicine at the University of Minnesota, and an NIBIB and NEI grantee, He had earlier in his lecture laid the foundation for the video. He outlined the numerous complexities involved in mapping the mind and the capabilities—and limitations—of the field's latest neuroimaging technologies.

"Our brain activity is not just distributed over the three spatial dimensions," he explained, "so we need high-spatial resolution imaging. But it also is really a dynamic process…What we really want is to map the information-processing process, not just say where the neuron is located."

Current clinical practice requires invasive methods in order to localize a seizure as it is occurring. In a surgical procedure, doctors must insert probes or sensors through the skull into specific brain regions.

The top two noninvasive tools, however—functional magnetic resonance imaging (fMRI) and EEG—have their own drawbacks as well. "fMRI is very precise in spatial domain, however it is limited by its slow response in the time domain," He pointed out. "EEG is very fast in time, but relatively low in spatial resolution."

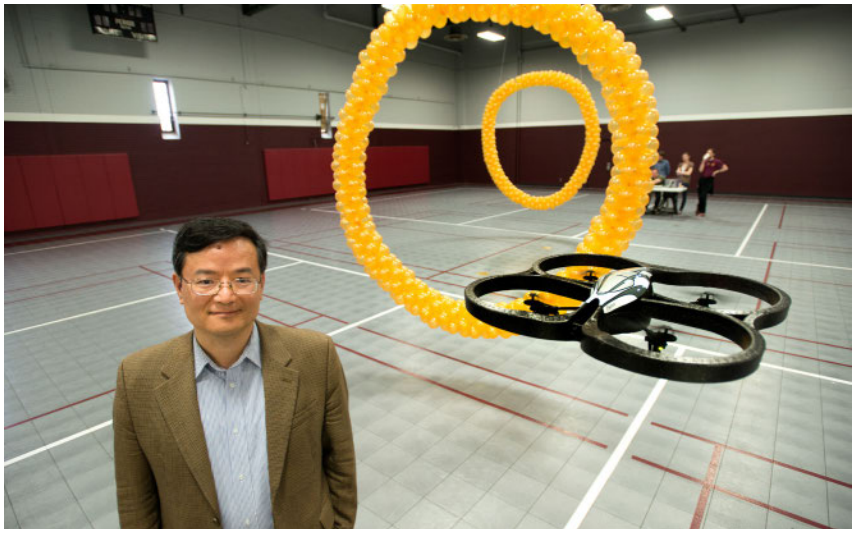
What if we could somehow combine measurements from two or more methods? That's "multimodal neuroimaging" and it's what He's group and others have been working on for the past decade or so.

"There's a lot of work that has been done to try to improve the EEG spatial resolution by solving for something called electrical source imaging—ESI—and integrating EEG with functional MRI," He said, describing how his group mapped brain dynamics using EEG recordings, then added fMRI data.

Billions of neurons work in the brain, he explained. "To map or measure a single neuronal response, an EEG is definitely not your choice. There is [currently] no noninvasive neuroimaging technology to accomplish that goal."

He explained that an EEG recording of the dynamic action of neurons delivers what's known as a "synchronized neural network response." By recording EEG as a "filter" to responses produced by all the neurons, however, scientists are able to isolate the neural network responses that encode the brain function. With even more sophisticated math, He reported, researchers can now map the 3D whole human brain function using electrical source imaging.

"There is a need for engineering innovation to solve such a [source-imaging] problem," He admitted, "but the good news is that we have done a lot in the past to accomplish a much more reasonable spatial resolution from the EEG."



***Above**:*
He, with the mind-maneuvered model 'copter navigating through rings suspended in a gym

Before the lecture, NCCAM's deputy director Dr. David Shurtleff (l) and director Dr. Josephine Briggs welcome He.

To test a clinical application of the method, He, who also serves as a consultant on NIH's BRAIN Initiative, examined how pain can be noninvasively quantified and imaged in a thermal stimulation study. Researchers established a temperature, asked subjects to provide a pain rating and then recorded an EEG.

"We tried to see if we could derive quantitative and objective biomarkers to quantify the pain level and try to image the neural network involved with pain," He said. Results were encouraging.

Noninvasive epilepsy localization presents another potential clinical use for He's work. About 30 percent of people with epilepsy do not respond to anti-seizure medication. Patients in that group who experience severe seizures often need surgery to remove the seizure-causing region of their brain. To find out precisely where in the brain the seizures occur, doctors perform open-skull monitoring—also a surgical procedure.

Other problems exist with the monitoring, too: seizures can't be predicted and the procedure is expensive, offers limited cortical coverage and requires a stay in intensive care. What if a noninvasive imaging technology could pinpoint the seizure region just as well? He's group tested its method in collaboration with physicians at Mayo Clinic; accuracy compared favorably with the surgical monitoring.

He devoted the last third of his lecture to a topic dear to the hearts (and minds) of folks at the National Center for Complementary and Alternative Medicine, whose integrative medicine research series sponsored He's visit.

"From the EEG, from the neurophysiology and the hemodynamic responses, one thing we can do is to understand the brain," he noted. "But there is one more step. By understanding the brain, we want to aid diagnosis and treatment of disorders. But can we help the patient accomplish something more? That is really the scientific goal of the brain computer interface field."

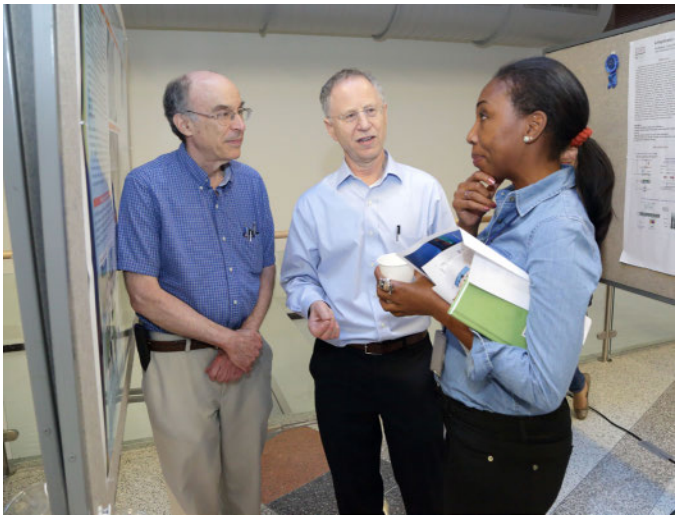
He's lab used electric source imaging to investigate where in the brain a signal comes from when you imagine a motion. For example, when a person who is paralyzed thinks about moving a limb—but can't move it—where does that thought originate? By determining what's called the "event-related desynchronization," or ERD signal, and where it's located, scientists can understand how such a cue is generated and how to design a better system.

Mapping and decoding motor imagination eventually led He and colleagues to develop the technology that allows users to fly toy choppers using thoughts only.

In an interesting sidenote, He and colleagues just by chance discovered that people with previous mind-body awareness training—like yoga or meditation—perform better on BCI tasks. A research paper on that finding recently was accepted for publication.

"We learned from this EEG mapping work to optimize our system and to demonstrate for the first time in the world that noninvasive brain computer interface is able to control a real physical device for sophisticated tasks in 3D physical space," He concluded. "Of course my ideal case is to control a robotic arm helping a patient with prosthetics, but we have to test on healthy subjects first."

He's full lecture is available online at http://videocast.nih.gov/summary.asp?Live=14515&bhcp=1.



FESTIVAL

CONTINUED FROM PAGE 1

***Above, from l**:*
Dr. Kandice Tanner, Earl Stadtman tenure-track investigator and head, tissue morphodynamics unit, Laboratory of Cell Biology, NCI, chats with NIBIB scientific director Dr. Richard Leapman (c) and NIBIB deputy scientific director Dr. Henry Eden.

NCI director Dr. Harold Varmus (l) explains his poster to a festival attendee.

PHOTOS: ERNIE BRANSON, ERIC BOCK

gling and conversation: "Oftentimes, that's how new ideas develop," he told a Masur Auditorium audience assembled for the festival's opening plenary session.

Clearly endorsing what the Intramural Research Program likes to call "3 days of peace, love and science," Collins offered four "snapshots of exceptional opportunities in biomedical research in the era of the brain."

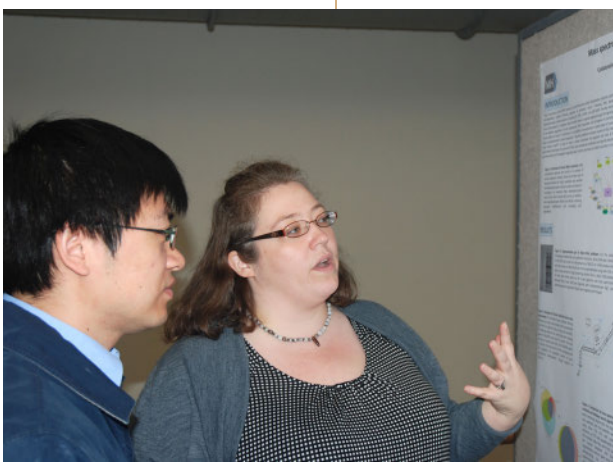
He began with NIH's strong suit—unraveling mysteries through basic research. "That's been NIH's strength over many decades," he said. Collins announced that NIH would soon be revealing the first $46 million in BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative grants. The 12-year program will focus on 7 priority areas in an effort to understand the most complex part of the human body.

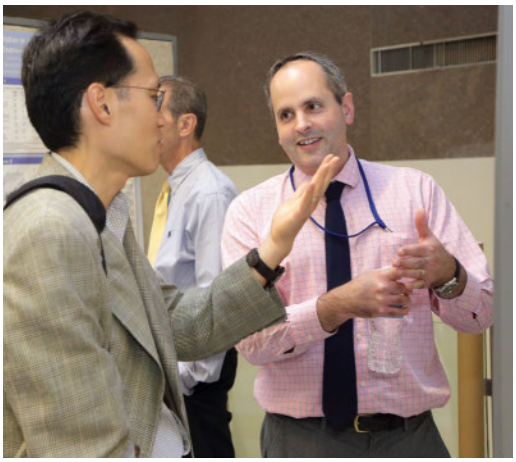
Second, he emphasized the need to harness massive amounts of data in the service of better health: the BD2K, or Big Data to Knowledge initiative. This is a 6-year effort to wring public health advances from a burgeoning technical field. NIH announced a national network of centers of excellence just days later.

Another frontier where technology is currently far ahead of therapy is in the detection of the molecular bases of disease, which Collins said is proceeding "at a prodigious rate." More than 5,000 disorders so far have been characterized at the molecular level, but only about 500 have a corresponding therapy, he reported.

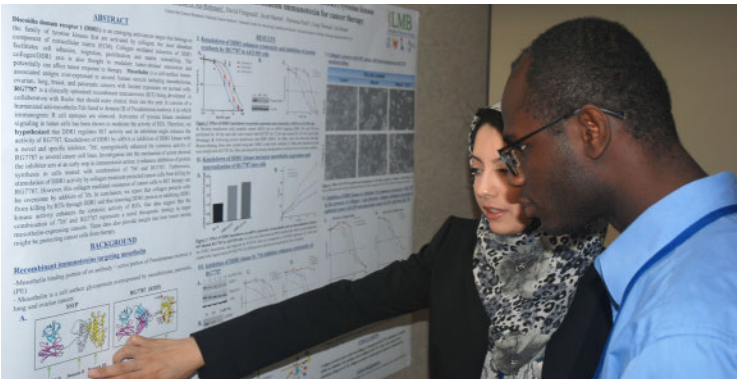
He said NIH's Accelerating Medicines Partnership with industry is ahead of its time schedule in tackling Alzheimer's disease, type 2 diabetes, lupus and rheumatoid arthritis. "Over the next 5 years, we expect major contributions on where we ought to go," he said. "We also want to add schizophrenia—that would be a wonderful direction to go in." AMP is funded at more than $230 million over 5 years, he added.

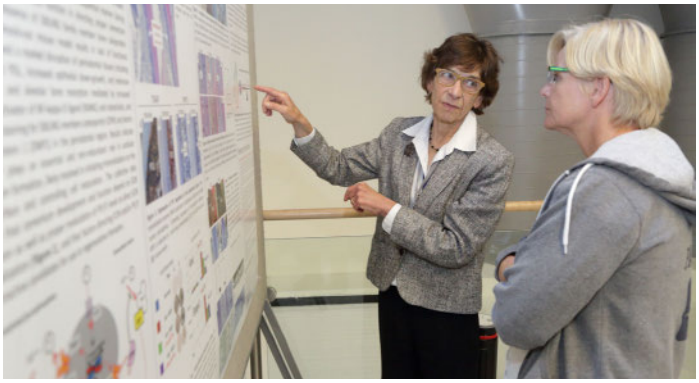
The week prior to Research Festival, the White House announced new strategies in the battle against anti-microbial resistance, Collins reported. A national strategy for combatting antibiotic resistance was unveiled, targeting





At left, Dr. Lisa Jenkins, mass spectrometry facility manager, Laboratory of Cell Biology, NCI, and NCATS biologist Dr. Wei Sun discuss Jenkins' poster. At center, NIGMS director Dr. Jon Lorsch (r) enjoys a lively discussion with a visitor. At right, NIH deputy director for intramural research Dr. Michael Gottesman lauds the IRP's "enormous productivity," which he said is due in large part to the work of research fellows.





At one of several poster sessions, Dr. Fatima Ali-Rahmani (l), postdoctoral fellow at NCI, shows her poster to Kingsley Asiedu. At right, NIDCR director Dr. Martha Somerman (l) describes her poster to a visitor.

such common infections as *Clostridium difficile* and MRSA, which tend to occur in clusters. Collins said NIH is also cosponsoring a $20 million prize for development of a rapid diagnostic test (3-4 hours) "so you would not lose a couple of days using an antibiotic that won't work."

Collins' last, but not least, emphasis was the need to prepare a diverse and talented biomedical research workforce for the future. "At a time when resources are unusually stressed, we need to encourage the early stage especially," he said.

"We hope to gain some traction after 10 years of declining budgets," he noted. Collins mentioned that he has met with some 300 members of Congress to educate them about NIH's mission. He is concerned that "our workforce does not look like our nation—we need to do a better job."

Collins listed three recent accomplishments in achieving diversity: hiring Dr. Hannah Valantine to become NIH's first chief officer for scientific workforce diversity, with the IRP as her first area of focus; a renewed commitment to ensuring fairness in peer review; and major new grants to be announced soon in three programs—BUILD (Building Infrastructure Leading to Diversity) Consortium, NRMN (National Research Mentor Network) and CEC (Coordination and Evaluation Center, to monitor BUILD and NRMN progress).

The director also promised to unveil, at December's meeting of the advisory committee to the NIH director, a working group's vision for the next 10 years of the IRP, with the Clinical Center lying at the heart of the program.

The plenary session also included recognition of more than 200 winners of the 2015 FARE (Fellows Award for Research Excellence). "It's a poorly kept secret around here that the enormous productivity of the Intramural Research Program is due in large measure to the work of the fellows," said Dr. Michael Gottesman, NIH deputy director for intramural research.

This is the 20th year of the FARE competition, which drew 923 abstracts from a pool of some 4,000 postdocs and clinical fellows, said NICHD's Sudhir Rai, cochair of the FARE 2015 subcommittee.

Lorsch's cookies tied for first place in the festival bake-off with biscotti prepared by NIA scientific director Dr. Luigi Ferrucci.

NIDA scientific director Dr. Anto Bonci (l) leads off the opening plenary session's scientific talks with a discussion of optogenetics as potential therapy for substance abuse. Kicking off the festival, NIH director Dr. Francis Collins (r) discusses the research equivalent of Woodstock—"3 days of peace, love and science."

NIDDK's Dr. Jay Hoofnagle

Astute Clinician Lecture to Address Hepatitis C

Dr. Jay Hoofnagle will give the Astute Clinician Lecture as part of the NIH Director's Wednesday Afternoon Lecture Series on Nov. 12 at 3 p.m. in Masur Auditorium, Bldg. 10. He will present "Past and Future Therapy for Hepatitis C."

Hoofnagle is director of NIDDK's Liver Disease Research Branch and is responsible for the administration and award of research grants on liver and biliary diseases. He also is a senior investigator in the Liver Diseases Branch of NIDDK's intramural program and conducts clinical research at the Clinical Center on liver diseases, including viral hepatitis, nonalcoholic steatohepatitis (fatty liver disease), drug-induced liver injury and autoimmune liver diseases. Hoofnagle is a graduate of the University of Virginia and earned his M.D. degree at Yale Medical School.

The annual Astute Clinician Lecture was established in 1998 through a gift from the late Dr. Robert W. Miller and his wife, Haruko. It honors U.S. scientists who have observed unusual clinical occurrences and, by investigating them, have opened an important new avenue of research.

Sign language interpretation can be provided. For information or accommodation, contact Jacqueline Roberts at (301) 594-6747 or robertsjm@mail.nih.gov, or call the Federal Relay Service at 1-800-877-8339.

NIDA Director Featured At TEDMED 2014

Dr. Nora Volkow, director of the National Institute on Drug Abuse, was a speaker at the TEDMED 2014 conference held at the Kennedy Center in Washington, D.C. TEDMED is an annual multi-disciplinary gathering where leaders from all sectors of society come together to explore the promise of technology and potential of human achievement in health and medicine. This year's theme was "Unlocking Imagination in Service of Health and Medicine." Volkow, who spoke on Sept. 11, was one of 11 experts in the session "Stealing Smart," where speakers shared inspiring stories and ideas about how to adapt solutions from other industries and fields to solve the most intractable problems in health and medicine. She addressed the neuroscience of obesity and parallels between compulsive overeating and drug addiction.

PHOTO: TEDMED

volunteers

Overweight Volunteers Needed

Doctors at NIH seek volunteers ages 18 and older who are overweight to participate in a research study. Doctors are studying the role of the anti-inflammatory drug colchicine in overweight, non-diabetic adults. The results of this research study may help doctors understand more about how to prevent and treat the complications of obesity. This study will involve 4 visits lasting 5-6 hours each over a 3-month span. All study-related tests and medications are provided at no cost. Participants will be compensated. For more information, call 1-866-444-2214 (TTY 1-866-411-1010) and refer to study 14-CH-0119.

Normal Weight Men Needed

NIDDK seeks healthy normal weight men, ages 18-35 years old, to participate in a research study. Doctors want to learn how the body burns energy at different temperatures. Participants will have a 17-day inpatient stay in the metabolic clinical research unit of the Clinical Center with weekends off. Compensation is provided. For more information call 1-866-444-2214 (TTY 1-866-411-1010) or visit clinicaltrials.gov. Refer to study 13-DK-0200.

NIDDK Seeks Healthy Females

NIDDK seeks healthy females, ages 18-40 years old, to join a study. Researchers want to better understand vitamin E requirements in women.You will participate in at least one 4-night inpatient admission, with follow-up outpatient testing for 1 month. Study-related tests and procedures are provided at no cost. Compensation will be provided. For more information, call 1-866-444-2214 (TTY 1-866-411-1010) and refer to 09-DK-0097.

Next Protocol Navigation Lecture, Nov. 3

The IRP Protocol Navigation Training Program Seminar Series continues on Monday, Nov. 3 from 2 to 3 p.m. in Bldg. 50, Conf. Rm. 1227/1328. Dr. Laura Lyman Rodriguez of NHGRI will present "NIH Genetic Data Sharing Policy and Protecting the Privacy of Genomic Information." For details, contact Beverly Barham, (301) 594-2494, bbarham@mail.nih.gov or Marcia Vital, (301) 451-9437, vitalm@mail.nih.gov.

feedback

Want to know about some aspect of working at NIH? You can post anonymous questions at www.nih.gov/nihrecord/index.htm (click on the Feedback icon) and we'll try to provide answers.

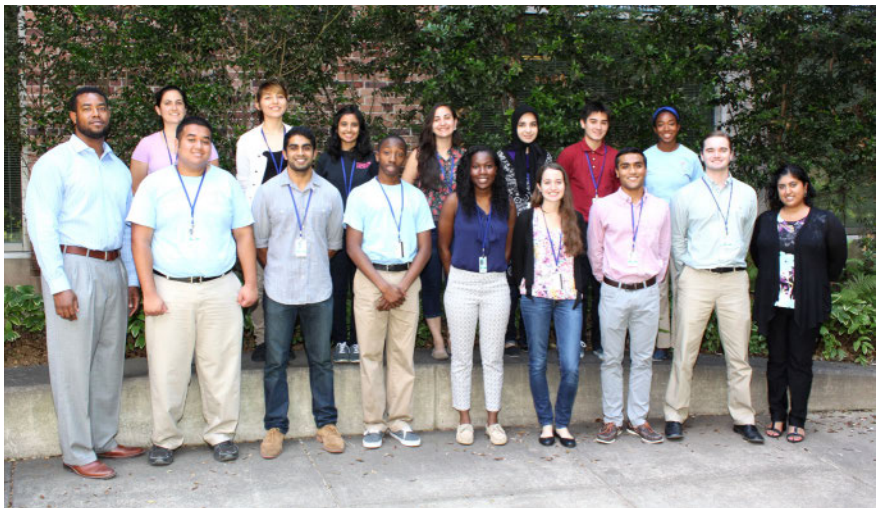
Feedback: I have frequently noticed cars parked in front of Bldg. 31 for the entire day in the short-term metered parking spots (some of which are supposed to be for NIH Credit Union customers). The meters are typically expired. Is anybody monitoring these meters? If you have a handicap placard in your car are you allowed to park in these spots for the entire day?

Response from the Office of Research Services: The NIH Police operate traffic units on campus, enforcing such violations as expired meters. Since the police can't catch every violation, if you witness a vehicle illegally parked, contact our non-emergency line at (301) 496-5685 and include the location, make and model of the vehicle in question. A police officer will be dispatched as soon as possible.

In regards to vehicles with handicap placards, any person properly displaying a valid state-issued handicap hangtag or license plate or an NIH-issued handicap placard is allowed to park in a metered visitor parking space free of charge for the entire day. This policy is covered in NIH Policy Manual Issuance 1410: Parking Policy under Section F. Procedures, 4. c. Disabled Employees.

Feedback: What's going on with the new child care center? In the Apr. 25, 2014 *NIH Record* there was an article talking about the groundbreaking and construction for the new center with it opening in the summer of 2015. It's now September and I drive by the construction site every workday and I have yet to see any construction. So the question is: Is there or is there not going to be a new child care center? At this rate, my children will outgrow the need for child care before more child care spaces are created. Not exactly supporting a "family-friendly" workplace.

Response from the Office of Research Facilities: Yes. There will be a new Northwest Child Care Center built on the Bethesda campus. The Office of Research Facilities experienced a delay in the final stages of the design process due to unexpected developments related to the contract. All divisions within ORF are working collaboratively to assist in the design completion and move the project forward. While the design process nears completion, the project is concurrently awaiting approval from the Maryland Department of the Environment to break ground. The ORF project team is working closely with the contractor and will be releasing the new date for the project completion in the near future.



NIAMS Summer Program Trains Young People

This past summer, 14 interns with diverse backgrounds and scientific interests spent 8 weeks in the NIAMS Summer Research Program. They received career mentoring from senior researchers, attended lectures, engaged in basic and clinical research and gained credentials that will help them pursue career goals. Many had participated in the program before and returned to expand their skills. "My experience at the NIH was by far one of the best I've ever had, due largely to the wonderful team of scientists I got to work with," said one. "I am very grateful for their time and investment in my scientific career and to NIAMS for giving me this great opportunity." The NIAMS Summer Research Program provides opportunities for high school, undergraduate, graduate and medical students contemplating a career in biomedical research or academic medicine. Students can apply online at www.training.nih.gov/programs/sip from Nov. 15 to Mar. 1. Flanking this summer's cadre (above) are Dr. Robert Walker (l) chief, NIAMS Career Development and Outreach Branch, and program assistant Annamma Kimbrough (r).

NIH, FDA Win 'Deals of Distinction' Award

NIH and the Food and Drug Administration received a top national award for the year's most outstanding intellectual property licensing deal, for technology transfer of a pioneering, low-cost meningitis vaccine launched in sub-Saharan Africa. The 2014 Deals of Distinction Award (r) was presented to the two agencies and their collaborators by the Licensing Executives Society at its 50th annual meeting, Oct. 5-8 in San Francisco. NIH and FDA teamed with PATH, a Seattle-based non-profit leader in global health innovation, and the Serum Institute of India to develop MenAfriVac. The vaccine has a low production cost and does not require constant refrigeration, making it ideal for use in remote locations. A critical part of the manufacturing process for the vaccine is based on a patent license granted from the NIH Office of Technology Transfer to PATH. The vaccine targets the most common form of bacterial meningitis found in sub-Saharan Africa. "We are quite pleased about this inspired work in vaccine research as well as being able to transfer the intellectual property in a way to have such a spectacular impact on public health in this region of Africa," said NIH director Dr. Francis Collins.

Teachers Rate NIEHS Summer Institute An A+

By Kelly Lenox

For 2 weeks this past summer, 11 North Carolina high school teachers turned the tables and became students, as part of the expanded NIEHS Science, Teachers and Research Summer (STaRS) Institute. The teachers' evaluations have been compiled and NIEHS earned excellent marks. "STaRS represents the future of science education," said one educator.

Based on teachers' interests and curriculum needs, the syllabus was developed by collaborators from a cross-section of NIEHS, including the Office of Science Education and Diversity (OSED), the Protein Expression Core Facility and several laboratories. Participants learned basic biomedical research techniques, toured the labs and clinical research unit, received an overview on environmental health from NIEHS and NTP director Dr. Linda Birnbaum and heard lectures from postdocs on everything from epigenetics to bioinformatics.

Each of the program elements garnered praise. "The lab activities, the lectures and the facility tours helped me to understand the complexity of the research and all the parts that make a good study," said a participant.

Offered in collaboration with North Carolina New Schools, the program evolved from an earlier externship to the present STaRS Institute in order to enable more teachers to participate. According to Dr. Ericka Reid, director of OSED, a 2-week design best combined depth of the experience with ability of teachers to participate. "We wanted an extended experience for as many teachers as possible," she said.

The program aims to broaden teachers' understanding of basic biomedical research and thereby strengthen the biomedical research community. STaRS Institute participants will be able to go back to their schools with the knowledge they've gained, helping build student knowledge of, and enthusiasm for, environmental health sciences, including up-to-date laboratory technology and diverse career possibilities.

"Like a lot of us, I'm really turned on by epigenetics and how far the field has gotten. It's exciting and adds a lot to biology," said Thomas Venetta of Vance County Early College High School. "We've had some discussion of great ways to introduce epigenetics in the classroom."

PHOTOS: STEVE MCCAW

"This experience helps us find more ways to hook [students] in and interest them in the sciences," said Yolanda Blakeney (c) of Cabarrus-Kannapolis Early College High School.

At right, Dr. Amy Jessup of East Surry High School and the other teachers learned a variety of basic biomedical research techniques in lab sessions during the first week.

In the hallway outside the NIEHS confocal microscopy lab, Huei-Chen Lao, a biologist in OSED and one of the organizers, observed, "Teachers are some of the most creative people I know." Sula Teachey of the Wayne School of Engineering at Goldsboro High School validated Lao's observation. The classroom session on toxicology that Teachey developed called for students to set up a dose-response experiment. "I'd ask the teacher who runs the community garden if we could have some seedlings, which would make the experiment go a lot faster [than starting from seeds]," she said.

Enthusiasm reigned even as the program drew to an end. "You all were so dedicated," said Lao, at the closing session, in which the teachers presented the classroom projects they'd created. A teacher summed it up by saying, "It's been a priceless experience for all of us."

Szolovits Gives Talk in NLM Series

The National Library of Medicine Informatics Lecture Series will feature Dr. Peter Szolovits speaking on "How to Learn in 'The Learning Health Care System'" on Nov. 5 from 2 to 3 p.m. in Natcher Bldg., balcony C.

The Institute of Medicine has argued for more than 20 years that we should view every patient interaction as an (uncontrolled) experiment and learn from its outcome. Szolovits has been a participant in numerous collaborative projects, trying to apply this method to data about a broad range of patients suffering from conditions such as arthritis, cardiovascular disease, diabetes, inflammatory bowel disease, autism and depression. In this lecture, he will review some of the methodological challenges he has encountered and the hard-won lessons he has learned.

Szolovits is professor of computer science and engineering in MIT's department of electrical engineering and computer science, professor of health sciences and technology in the Harvard/MIT division of health sciences and technology and head of the clinical decision-making group within the MIT Computer Science and Artificial Intelligence Laboratory.

The talk will be broadcast live and archived at http://videocast.nih.gov/. Sign language interpreters will be provided. Individuals who need reasonable accommodation to participate should contact Ebony Hughes, (301) 451-8038, Ebony.Hughes@nih.gov or the Federal Relay (1-800-877-8339).