Steady Progress:
Collaboration Making Strides to Improve Fall Risk Assessments in the Clinic, pages 6 – 7
NeuroMatters, a publication of IHSI at Illinois, covers clinical and translational neuroscience topics relevant to University of Illinois at Urbana-Champaign investigators and the university’s clinical partners.

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Sanjiv Jain, MD, Carle physician in physical medicine and rehabilitation, and Jacob Sosnoff, PhD, associate professor in kinesiology and community health, with their device that will assess fall risk in older adults.

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I am pleased to welcome you to the inaugural issue of NeuroMatters, an Interdisciplinary Health Sciences Initiative (IHSI) publication designed to cover clinical and translational neuroscience topics relevant to University of Illinois at Urbana-Champaign faculty and our clinical partners. I have been a part of the Illinois neuroscience community ever since I arrived in Urbana-Champaign. During my time here, I have seen the lines of neuroscience research evolve and change, but one constant has certainly been the research community's vibrancy and diversity. From physical activity and the brain to the injured brain to the developing brain, there has never been a shortage of creativity and inspiration in the research you can find on our campus.

And now, in my role as director of the IHSI, I am pleased to work with our campus’s already thriving neuroscience community in efforts to strengthen and build our clinical and translational neuroscience connections. It is an exciting endeavor with the long-term benefit of providing better translation of work from research to practice.

To improve and facilitate this critical academic/clinical connection, IHSI is building a strong team of research development specialists. In clinical and translational neuroscience our research development specialist is Gillian Cooke (gcooke@illinois.edu). If you haven’t yet had the opportunity to meet her, I encourage you to reach out as soon as possible. She is an invaluable resource for helping make connections, initiating, guiding, and advising clinical studies; identifying grant funding applications and supporting submissions; and much more.

I hope you enjoy perusing this issue and learning more about “NeuroMatters” happening at Illinois.

Best Regards,

Neal Cohen
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Dr. Holscher’s lab contributes to several clinical studies at Illinois with neuroscience impact. These projects include PATH (Persea Americana for Total Health), EPOCH (Effects of Probiotics on Cognition and Health), and the Gut-Brain study. To differing degrees, these studies examine the relationship among lifestyle behaviors, gut function, microbiome response to probiotics and prebiotics, metabolism, stress, and cognitive function.

What specific aspects of doing research at Illinois particularly support and enhance your own neuroscience-related research?

Research in her laboratory, the Nutrition and Human Microbiome Laboratory, focuses on the clinical application of nutritional sciences in healthy and diseased populations across the lifespan with an overarching goal of improving human health through dietary modulation of the gastrointestinal microbiome. Over the last year, Holscher has been collaborating with neuroscience faculty to delineate the physiological functions of diet on the human gut-microbiota-brain axis. In her words, the neuroscience faculty and the intellectual resources of Illinois as an institution have not only supported her research, but have been integral to its success. Her neuroscience colleagues’ expertise and ability to develop tasks that tap into specific cognitive processes has allowed for collaboration to delineate the bi-directional signaling that occurs along the gut-microbiota-brain axis.

How do you see neuroscience-related research at Illinois advancing in the next five to ten years?

“I see Illinois being recognized as the premier institution for understanding the interplay of nutrition, microbiota, and the brain, and their impacts on adult health and disease. Currently, we are recognized for our expertise in both neuroscience and microbiota research. Over the next five to ten years, I envision continued interdisciplinary collaborations that will help propel this field forward,” says Holscher.
Dr. Sullivan’s work seeks to understand how designed landscapes impact human health and wellbeing. Sullivan and his students study the impact of urban design on a person’s ability to recover from stress, and how “green views” out a classroom window can influence students’ attentiveness and test performance. Sullivan’s protocols involve using technology and clinical measures of hormone levels, heart rates, brain waves, and more.

What specific aspects of doing research at Illinois particularly support and enhance your own neuroscience-related research?

Sullivan’s training is in landscape architecture, biology, and environment and behavior, but nothing specifically-related to the brain. However, his students are taking classes in psychology and are increasing his own interests in neurological implications, while teaching him things along the way, Sullivan says. He has had several interactions with Aron Barbey, associate professor of psychology, and sought Barbey’s advice on research study design issues. Having accessible experts who know the current literature and underlying theories of psychology and neuroscience is a hugely beneficial resource, according to Sullivan.

How do you see neuroscience-related research at Illinois advancing in the next five to ten years?

“My sense is that psychology is increasingly looking towards contextual factors as having implications for psychological health and wellbeing and general human function. Now we have the technology that allows us to very carefully and systematically measure exposure to varying types of landscape and contexts and the implications for neuro-function. Studies are moving away from single stimuli and the looking at larger context for answers,” says Sullivan.

Know an Illinois investigator doing neuro-related research?

Nominate them for the Innovative Investigator Spotlight section in our next issue of NeuroMatters. Email Gillian Cooke at gcooke@illinois.edu with your suggestion and details, and IHSI will be happy to follow up.
A new study of older adults finds an association between higher blood levels of phosphatidylcholine, a source of the dietary nutrient choline, and greater cognitive flexibility, the ability to regulate attention to manage competing tasks. The study also identified a brain structure within the prefrontal cortex, a region at the front of the brain, that appears to play a role in this association.

Phosphatidylcholine in the blood can originate from the diet, said University of Illinois graduate student Marta Zamroziewicz, who led the study with Aron Barbey, a professor of psychology and an affiliate of the Beckman Institute for Advanced Science and Technology at Illinois. Egg yolks, red meat and soybeans are rich sources of phosphatidylcholine, which also can be synthesized by the body, she said. Phosphatidylcholine is a key component of cell membranes.

“Accumulating evidence suggests that declining phosphatidylcholine levels are a robust marker of age-related neurodegeneration and cognitive deterioration,” Zamroziewicz said. “No studies have determined how phosphatidylcholine may prevent such decline, however,” she said.

The new analysis, reported in the journal *Frontiers in Aging Neuroscience*, measured blood levels of phosphatidylcholine and assessed brain structure in 72 healthy adults between the ages of 65 and 75. The researchers used magnetic resonance imaging to gauge the thickness of gray matter in the prefrontal cortex.

The researchers conducted statistical analyses to tease out the relationships between phosphatidylcholine levels, brain structure and performance on specific cognitive tests. They controlled for age, sex, education, income, depression status and body-mass index, and focused on specific regions within the prefrontal cortex.

“We hypothesized that higher blood plasma levels of phosphatidylcholine would be associated with better performance on tests of cognitive flexibility,” Zamroziewicz said. “And we found that higher blood levels of phosphatidylcholine are linked to better cognitive flexibility.”

The analyses also linked gray-matter thickness of the left inferior prefrontal cortex to better cognitive flexibility, and revealed that the beefiness of gray matter in this brain region played a role in the relationship between phosphatidylcholine levels and performance on tests of cognitive flexibility.

“Our findings add to a growing body of research suggesting that particular nutrients may slow or prevent age-related declines in cognition by influencing specific structures within the brain.”

–Aron Barbey

Barbey is an affiliate of the Carl R. Woese Institute for Genomic Biology at the U. of I. Abbott Nutrition supported this work through the Center for Nutrition, Learning, and Memory at the University of Illinois at Urbana-Champaign.
A systematic review of the scientific studies cited by brain-training companies as evidence that their products improve cognition in daily life finds no convincing evidence to support those claims. While people tend to improve on the specific tasks they practice, the researchers report, the conclusion that computerized brain-training programs yield broader cognitive benefits or improve real-world outcomes for their users is premature at best.

The analysis and an independent commentary on the findings appear in the journal *Psychological Science in the Public Interest.* "The idea behind ‘brain training’ is that if you practice a task that taps a core component of cognitive ability, like memory, the training will improve your ability to perform other tasks that also rely on memory, not just in the lab, but also in the world. That premise is known as ‘transfer-of-training,’” said University of Illinois psychology professor Daniel Simons, who led the analysis with U. of I. educational psychology professor Elizabeth Stine-Morrow and colleagues at Florida State University, Michigan State University, Union College, and the Medical Research Council in Cambridge, U.K.

“If you practice remembering playing cards, you’ll get really good at remembering playing cards,” Simons said. “But does that help you remember which medications to take, and when? Does it help you remember your friends’ names? Historically, there is not much evidence that practicing one task improves different tasks in other contexts, even if they seem to rely on the same ability.” The researchers closely examined 132 journal articles cited by a large group of brain-training proponents in support of their claims. The team supplemented that list with all of the published articles cited on the websites of leading brain-training companies that were identified by SharpBrains, an independent market-research firm that follows the industry. The review found numerous problems with the way many of the cited studies were designed and how the evidence was reported and interpreted.

The problems included small sample sizes and studies in which researchers reported only a handful of significant results from the many measures collected.

“Sometimes the effects of a single brain-training intervention are described in many separate papers without any acknowledgment that the results are from the same study,” Simons said. "That gives the misleading impression that there is more evidence than actually exists, and it makes it hard to evaluate whether the study provided any evidence at all.”

Some studies conducted with special groups (such as people diagnosed with schizophrenia, children with language delays, or older adults with dementia) were used as support for broad claims about the benefits of brain training for the general population. One of the most glaring problems in the cited research was the use of inadequate control groups as a baseline for measuring improvements. Ideally, participants in a control group do not engage in the intervention but are otherwise matched closely with those who do, the researchers said. Not only should the control group’s demographics (age, sex, race, income and education) match those of the intervention group as closely as possible, control-group participants also should be equally engaged, Simons said.

“A control group should experience everything the treatment group does, except for the critical ingredient of the treatment,” he said. “They should be equally engaged and should have similar expectations for improvement, so that if the treatment group improves more than the control group, the difference must be due to the treatment itself.” Some of the studies had no control group. Some had a passive control group, whose members took the same pre- and post-test as the intervention group, but were not engaged in any other way. Some studies had participants in a control group come into the lab and play crossword puzzles, watch educational DVDs or just socialize with the experimenters. Such control groups differ in many ways from the intervention group, so greater improvement in the treatment group might be due to those other differences, including differences in expected improvement, rather than to the brain-training intervention itself, the researchers said.

"Based on our comprehensive review of the evidence cited by brain-training proponents and companies, we found little evidence for broad transfer from brain-training tasks to other tasks,” Simons said. “We hope future studies will adopt more rigorous methods and better control groups to assess possible benefits of brain training, but there is little evidence to date of real-world benefits from brain training.”

The research team included Walter Boot and Neil Charness, of Florida State University; Susan Gathercole, of the Medical Research Council, Cambridge, U.K.; Christopher Chabris, of Union College and Geisinger Health System; and David Hambrick, of Michigan State University. Simons and Stine-Morrow are affiliates of the Beckman Institute for Advanced Science and Technology at Illinois.
Jacob Sosnoff, PhD, associate professor of kinesiology and community health at Illinois and founding director of the Illini Fall Prevention Clinic, and Sanjiv Jain, MD, physician in physical medicine and rehabilitation and director of the Bone Health and Osteoporosis Center at Carle Foundation Hospital, along with Dan Morrow, PhD, professor and chair of educational psychology, and Rama Ratnam, PhD, senior research scientist at Illinois’ Advanced Digital Sciences Center (ADSC), part of the College of Engineering, believe their interdisciplinary team’s work can transform fall assessment protocol and intervention standards in the clinic.

In April 2016, Sosnoff, Jain, Morrow, and Ratnam submitted a project proposal that was awarded $50K as part of the Carle Illinois Collaborative Research Seed Program, which seeks to foster collaboration between Carle clinicians and Illinois researchers. The seed funding program aims to support innovative approaches to the challenges facing clinical care, as well as promote opportunities to improve positive health outcomes. Their project, titled “Automated Fall Risk Assessment in High Risk Older Adults,” is now being implemented at Carle by a collaborative team of graduate students and clinicians.

“I’ve been at the University of Illinois for nearly 12 years, and have been trying the whole time to work with physicians at Carle to help answer some of my research questions. It wasn’t until IHSI and Carle came together that we actually got a collaborative project started. This seed program opportunity opened doors and got me talking to the right people,” said Sosnoff. His Carle co-PI agrees.

“The seed funding has been the energy behind being able to do this project. Trying to get projects going, meeting, finding time to even discuss the project can be difficult, let alone doing the work. By having gotten funding, we can actually do the work,” said Jain.

The investigators believe that fall risk can be better assessed, and even prevented, with automated assessments that generate targeted interventions. Current screening methods either rely on clinician judgment, which is subjective, or patient self-reporting. According to Sosnoff, the lack of easily-administered, cost-effective, objective tests of fall risk impedes optimal care of individuals at risk for falls. For instance, currently only a small portion of patients at the Bone Health and Osteoporosis Center at Carle Foundation Hospital (who are, by definition, at high risk for fall-related fractures) are referred to physical therapy for balance and mobility issues. This is due in part to the inability to objectively quantify balance and mobility impairment in these patients. Consequently, without getting a customized treatment plan that could be implemented, these patients remain at elevated risk for fall-related fractures.

Technology to automate and produce quantifiable, actionable data is where Rama Ratnam comes in. Ratnam’s group of engineers have developed a new software system that makes it easier for a doctor or therapist to monitor a patient’s movement and progress. The technology employs Kinect cameras, which capture 3D motion data, and then adds a mathematical layer that eliminates noise and produces a smooth motion, giving health care providers an accurate picture of how a patient is performing an exercise.
According to Ratnam, the mathematical layer is what makes the system unique. Kinect cameras excel at capturing motion in 3D, but do not have a holistic concept of the human body. They only see a series of points in space. The algorithms developed by Ratnam’s team imposes constraints on the data that rules out movements that humans are physically incapable of doing.

A major advantage of the system is that data is stored in the form of a stick-figure, representing major joints and body segments, and not as a detailed video that reveals the identity of the patient participant. This reduces data bandwidth, while ensuring privacy. The system, called SALUS (after the Roman goddess of wellness), was initially developed by ADSC engineer and colleague of Ratnam’s, Alex Khromenkov. Other advantages SALUS provides include:

- Camera-based, wireless operation that doesn’t require participants to wear body sensors
- Quantifies fall risk, objectively
- Clinicians can download video from the cloud, to assess whenever and wherever convenient
- Eventually, patients will use SALUS remotely to generate video for clinicians to monitor and assess progress, as part of an interactive at-home rehab program

The goal of this innovative clinical and translational project is to determine if automated fall risk assessment is feasible in clinical settings. Specifically, the team must determine if the system is capable of operating in a typical exam room, while accurately identifying individuals at risk for falls. The clinical study is being implementing with these parameters:

- Sixty or more adult patient participants from the Carle Bone Health and Osteoporosis Center who are ambulatory (with or without prosthetic aid) and living in the Champaign-Urbana community
- Participants will all complete the same assessment at Carle, taking approximately 30 minutes
- Participants will then be provided a “falls diary” to take home, in which to record falls during a four-month period.

“We’re going to have such a volume of potential participants that we’ll have no trouble meeting study parameters,” said Jain.

Their research comes at a time when health care costs are causing therapy patients to reduce time spent doing in-patient rehab care, driving many to return home before regaining full function. In addition, as people continue to live longer, there may not be enough providers to care for patients in traditional settings in the future.

“The ultimate goal is to have an assessment and intervention system that essentially is run by itself. An avatar will walk a patient right through the exercises,” Sosnoff said. The team’s immediate next steps will focus on refinement of the software technology and bridging the gap between risk assessment and intervention.
The Mayo Clinic’s Summer Undergraduate Research Fellowship (SURF) program is a 10-week summer research internship that exposes students to biomedical research in a clinical setting, with mentoring from top-notch physicians and Mayo Clinic graduate students. Thanks to an existing research alliance between the Mayo Clinic and the University of Illinois at Urbana-Champaign, two spots were reserved in this highly-competitive 2016 program for Illinois students interested specifically in neuro-focused research. The first summer of sending Illinois SURF students to the Mayo Clinic Hospital in Jacksonville, Florida, proved to be an excellent experience. Here, we highlight the two undergraduate students selected for the program.

Maria Mihailescu
Molecular and Cellular Biology, Class of 2017

Maria became curious about neurodegenerative diseases when volunteering at the Champaign County Nursing Home. She developed bonds with several residents, and wanted to extend her knowledge about these progressive brain diseases by becoming involved as an investigator. Maria hoped the SURF experience would eventually help her make an impact for the families that suffer with these heartbreaking hardships. Maria worked in the lab of Dr. Pamela McLean, who studies Parkinson’s disease. She spent the summer optimizing an assay, the Proximity Ligation Assay (PLA), for Dr. McLean’s lab to study and visualize oligomeric species of alpha-synuclein (a protein that misfolds and aggregates in brain regions critically involved in dementia and Parkinson’s). Existing techniques are largely limited to the detection of later lesions such as Lewy bodies and Lewy neurites. While these species are widely characteristic of the disease, emerging evidence is pointing to the early oligomeric forms as the neurotoxic species. The PLA will help scientists further develop a larger understanding of the disease biology and target these forms as early as possible.

One of Maria’s favorite parts of the SURF program was the weekly lecture series, delivered by scientists from all over the nation. After each presentation, SURF students were invited to a luncheon with the speaker to further discuss the research topic.

Now back in Urbana-Champaign, Maria works in the lab of Dr. Joanna Shisler, studying viral immune evasion pathways involved in sarcomas and poxviral infections. Her advice for future participants in the SURF program? “I now understand that science is all about learning from your errors and staying persistent in the face of obstacles. I would advise all future participants to stay persistent and to continue learning. Keep pushing forward; success will be that much sweeter,” says Maria.

Shreya Santhanam
Bioengineering, Class of 2018

An engineering student at Illinois, Shreya is used to being involved in research activities and keeping a busy schedule. But she says it’s always been a dream of hers to work at the Mayo Clinic. Shreya spent her summer in Dr. Owen Ross’s lab at the Mayo Clinic Florida campus, studying the genetics of Parkinson’s disease through sequencing. Her mentor was researcher Ronald Walton, and Shreya specifically looked into novel genetic factors implicated in late onset familial Parkinson’s disease.

Being a SURF in Jacksonville allowed Shreya to witness clinical research not readily available in other hospitals. The Department of Neuroscience Research at Mayo Clinic in Florida runs a brain bank, housing over 5,000 brain tissue specimens for researching neurodegenerative disorders.

“One of my favorite things from the summer was seeing the brain cutting by (neuropathologist) Dr. Dickson on Fridays,” says Shreya. The brain bank has allowed investigators to improve the scientific community’s understanding of the neuropathology, genetics, biochemistry, cell biology and modeling of neurodegenerative disorders.

Continuing her focus on neuroscience-based research, Shreya is now an undergraduate research assistant for the Opto Neuro Technology Laboratory at the Beckman Institute. She advises other students applying to the SURF program to “take advantage of all the opportunities at Mayo Clinic, and go to as many talks as possible.”
Considering it is widely thought to be the most complex object in the known universe, there are still, obviously, innumerable questions to be answered about the human brain.

And who better to find solutions than fresh, young minds? This was the thinking of IHSI clinical and translational neuroscience colleagues Gillian Cooke and Tracey Wszalek as they became familiar with the International Brain Bee, a competition for secondary students.

“There are incredible neuroscience resources in the Champaign-Urbana community, but even so, we saw a gap in opportunities for high school students to deepen any interest in neuroscience,” says Cooke. “One of the aims of IHSI at Illinois is to engage communities in health sciences, so organizing a fun, rewarding, educational event for youth focused on neuroscience really makes sense. We’re very excited to see it come together.”

What is the Brain Bee?
The Brain Bee is a live question and answer competition that tests high school students’ knowledge of neuroscience. Its purpose is to motivate young people to learn about the human brain, and to inspire them to enter careers in the basic and clinical brain sciences. Humankind needs future clinicians and researchers able to treat and find cures for the more than 1,000 diagnosed neurological and psychological disorders on the planet.

The Brain Bee was founded in 1998 by neuroscientist Dr. Norbert Myslinski at the University of Maryland, according to the university’s website, and is now a world-wide competition for high school students. Currently, the closest Brain Bee chapters to Champaign-Urbana are located at the Indiana University-Purdue University, Indianapolis campus and St. Louis Area (Washington University). The Brain Bee has grown to include more than 160 chapters in over 40 countries. The first international competition was held in 1999 in Toronto, Canada, and for 2017 will be held in Washington, D.C.

How does the Brain Bee work?
For U.S. students, there are three levels of Brain Bee events: Local, Regional (National), and International.

First, students must connect with a local Brain Bee chapter to register. All participants are provided with a digital or printed copy of Brain Facts or Neuroscience, the Science of the Brain (both published by the Society for Neuroscience) as standard study guides. At the Brain Bee, students are quizzed about the brain as it relates to intelligence, memory, emotion, sensation, movement, stress, aging, sleep, technology and imaging, and clinical neurological conditions and disorders. Participants work their way through several rounds of competition until there is an eventual local chapter winner.

Local winners in the United States can choose to compete at the National Brain Bee, typically held each year at the University of Maryland in Baltimore. The winners of each national (or regional) Brain Bee (from around the world) then have the opportunity to travel to the International Brain Bee event. This location varies each year.

Are there more details about the University of Illinois Brain Bee and chapter?
Over the past few months, Cooke has reached out to local high school science teachers and representatives who handle high school academic competitions, informing them about the new chapter and asking for help in promoting the Brain Bee event.

The Interdisciplinary Health Sciences Initiative (IHSI) at the University of Illinois at Urbana-Champaign is excited to launch the local Brain Bee chapter and eagerly anticipates hosting the east central Illinois area’s first-ever competition on Saturday, February 4, 2017.

Students ages 14 to 18 (during academic year 2016-2017), from secondary schools within a 25-mile radius of Champaign-Urbana, are eligible to participate.

Neuroscientists from the university will serve as judges for the event, with graduate student volunteers assisting. The winner of our local competition may compete in the U.S. National Brain Bee, to be held in March 2017 in Baltimore, MD, and, if successful, may also go on to compete in the International Brain Bee later in the year in Washington, D.C.

It is free of cost for students to register for the local Brain Bee, but spots are limited. Registration opens in early December 2016. For a link to registration, and more Brain Bee information, visit www.healthinitiative.illinois.edu and look under Program Areas and Clinical & Translational Neuroscience.

We look forward to sharing photos and results from the 2017 Brain Bee in the next issue of NeuroMatters. In the meantime, please email Gillian Cooke at gcooke@illinois.edu with any questions.
If you give a mouse a seizure, he’ll want some serotonin to go with it.

At least according to Gordon Buchanan, who presented some of his research on sudden unexplained death in people with epilepsy (SUDEP) at the 2016 Clinical and Translational Neuroscience workshop in April. Similar to sudden infant death syndrome (SIDS), SUDEP occurs when someone experiences a seizure and then dies in their sleep without diagnosable cause.

His research in mice has uncovered the idea that serotonin may be protective against SUDEP in some capacity. The assistant professor of neurology at the University of Iowa shared his work at the workshop, held in the Pollard Auditorium at the Forum at Carle Foundation Hospital.

Hosted by the Interdisciplinary Health Sciences Initiative (ISHI) at Illinois and Carle Foundation Hospital, this is the first year the workshop has been held. ISHI research development specialist in clinical and translational neuroscience Gillian Cooke headed the event in an effort to bring the community together.

“We’ve had smaller things throughout the year, we have a monthly newsletter, but this is our first meet and greet and face time for parties in this community,” Cooke said. The workshop was split into three themes: neuroengineering, aging and dementia, and brain injury. Faculty from the university and staff at Carle, as well as researchers from around the country, were in attendance at the event.

Cooke has high hopes for the future of the workshop. “Eventually, what we’d like to do is build it into a larger event, where we’re maybe bringing in not just attendees from our local community, but also from the wider neuroscience community. We’ll probably also try to build out the research areas we focused on today,” Cooke said. “But what we’re hoping is that we’ll get a sense of the other topics people are interested in hearing about and try to target some of our future workshops to those interests.”

Associate professor of kinesiology and community health Jacob Sosnoff spoke at the workshop about the underlying neuroscience of falling, especially in the aging population. In addition to discussing his findings on how aging affects the risk of a fall and how falls cause both physical and psychological damage, he also stressed the importance of preventive measures to take action before a fall.

To Sosnoff, events like this help the research community gain perspective from clinicians.

“I think it’s really important for researchers to talk to clinicians, because often, we’re on campus doing our research in a lab and we don’t understand how to make our research more applicable,” Sosnoff said. “The whole reason we’re doing research, especially in a land grant university, is for the good of the people in the state or the people in the country. That’s why being able to interact with clinicians is going to help people say, ‘that’s a wonderful idea,’ or ‘this would never work clinically.’”
On August 19, 2016, the Carle Neuroscience Institute (CNI) and Beckman Institute for Advanced Science and Technology hosted “Synapse: A Collaborative Neuroscience Conference,” at the Beckman Institute—the first event for CNI held on the University of Illinois at Urbana-Champaign campus. The conference provided an educational forum through which neuroscientists—physicians, faculty, students, postdocs, researchers, and ancillary providers—were recognized for collaboration and utilized a platform where research and patient care synthesize.

A highlight of the day was the panel of experts discussing the impact of head injury in sports. Aron Barbey, associate professor in psychology, served as the moderator of questions for panelists including former Illinois football players Kevin Jackson, Timothy Simpson, and Dana Howard. The panel also featured Randy Ballard, associate athletics director at Illinois, and Illini women’s soccer head coach Janet Rayfield. Dr. Tara Riddle, Carle clinical neuropsychologist, rounded out the panel.

Responses from panelists sparked much discussion throughout the day. In particular, the need to educate youth sports coaches (those training children within our local communities) about head injury, concussion, and returning to play protocols. Dana Howard also brought a touching and human perspective to the effects of head injury on athletes, discussing the cognitive difficulties he experiences on a regular basis, although only in his 40s.

Synapse covered not only traumatic brain injury, but also sleep medicine, back care, and epilepsy, as the events involved a merger of the Carle Neuroscience Institute Update and the Carle Back Care Forum. This gave attendees a chance to listen to a range of talks from professionals within spine and non-spine related fields. The conference also gave university and industry exhibitors an opportunity to talk to attendees about their products and services. A team from IHSI at Illinois was on hand to discuss the role that IHSI plays in bringing together faculty and clinicians interested in clinical and translational neuroscience.

Rounding out the day’s events was a poster session where University of Illinois graduate students and postdocs had the opportunity to present their research and promote their labs, giving them a rare occasion to engage with clinicians and research staff alike.

Various panelists from the Champaign-Urbana community discuss the impact of head injury in sports.
The INSIGHT ("An integrative system for enhancing fluid intelligence (Gf) through human cognitive activity, fitness, high-definition transcranial direct-current brain stimulation, and nutritional intervention") project, led by Aron Barbey, associate professor of psychology and full-time faculty member of the Beckman Institute, will receive nearly a million dollars in funding as part of the Office of the Director of National Intelligence, Intelligence Advanced Research Projects Activity (IARPA) SHARP program.

This is the third and final year of the INSIGHT project, which aims to develop evidence-based tools and methods that can improve the quality of human judgment and reasoning in complex, real-world environments.

“We are pleased to contribute to the program for another year,” said Barbey. “We will direct our efforts toward analyzing and publishing data from the INSIGHT project, which now represents the largest and most comprehensive study investigating the combined beneficial effects of cognitive training, physical fitness training, and mindfulness meditation on the cognitive and neural mechanisms of human intelligence.”

In the first year, INSIGHT focused on how fitness, cognitive training, and non-invasive neural stimulation-based interventions affected cognitive function. In the second year, INSIGHT researchers continued to examine fitness and cognitive training, but substituted mindfulness meditation for neural stimulation in the intervention protocol.

For this third and final year of INSIGHT, Barbey’s team will focus on analyzing the data gathered from the previous years and integrate it with data gathered by the other IARPA SHARP teams, which consist of collaborators at other industry and academic organizations.

The National Institutes of Health (NIH) announced $2.9 million in new funding to the University of Illinois and the University of California, San Francisco (UCSF) for studies to determine how maternal exposure to stress and to hormone-disrupting chemicals during pregnancy affect birth outcomes and child brain development.

The support will allow the researchers, who already are engaged in separate studies, to combine their efforts and expand the pool of subjects they follow. Their work will be part of a national, seven-year initiative involving approximately 50,000 children from existing studies. The NIH has committed $157 million this fiscal year to the larger initiative, which is called Environmental Influences on Child Health Outcomes.

“We are really excited that our IKIDS study will be part of a nationwide effort to study environmental influences on child health outcomes,” Schantz said. The UCSF team has been studying how maternal stress affects child health.

In the new research, both teams will study the effects of chemical exposures and maternal stress on child brain development and health, expanding their pool of research subjects to about 1,400 children and their families.
In response to the needs of investigators, IHSI is now offering high-quality biostatistical consulting and analysis services in support of biomedical, clinical, and health research. Our biostatisticians focus on applications in clinical trials, clinical studies, and translational research studies. They work with researchers on a wide range of projects, including:

- Study design
- Power/sample size calculation
- Development of data specifications
- Execution of data specifications requiring data manipulation and preparation of analysis datasets
- Development of a statistical analysis plan for a grant application
- Analysis of existing data
- Interpretation of statistical results
- Assistance with manuscript development and/or critical review

The team is comprised of experienced, PhD-level biostatisticians who provide clinicians and investigators with services that are specifically tailored to their needs.

The fee for services is: $100 per hour for Illinois faculty and $180 per hour for external partners. However, biostatistician time for grant preparation is an IHSI provided service for Illinois faculty, with the understanding that the biostatistician will be written into the grant. If the grant is awarded, the biostatistician’s time will be paid by the specified percentage in the grant, and not charged as a fee for service.

To start a project, email healthinitiative@illinois.edu or complete the form at healthinitiative.illinois.edu under Resources & Training and Biostatistical Services.

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The University Library offers many resources—often unknown or untapped—for neuroscience research.

Margaret (Peg) Burnette is biomedical sciences librarian and assistant professor at the University Library. Burnette has created a LibGuide (library guide) online, providing an access point for library resources and services for research and scholarship in the area of neurosciences. It is intended for use by students and faculty, and is a compilation of information and links to the most useful resources for research in the neurosciences.

The LibGuide in Neurosciences Research and Scholarship is truly a one-stop portal for links to information on:

- Doing research, including: literature review, managing research data, links to library services and data management services, and more
- Article databases
- Books, journals, and other publications
- Statistics, data sets, and data repositories for neuroscience
- Grants and funding opportunities
- Neuroscience organizations and societies

You can find the LibGuide online at: http://guides.library.illinois.edu/neurosciences.

Burnette also makes herself available over email and in person for Illinois students, faculty, and staff researchers who have specific neuroscience or interdisciplinary research or information requests. Check out the LibGuide to take the next step in your research, or contact Burnette at (217) 300-5942 or phburn@illinois.edu.
The Interdisciplinary Health Sciences Initiative (IHSI) at Illinois exists to catalyze, connect, support, and engage health sciences research across the University of Illinois at Urbana-Champaign campus. To that end, we unite researchers around health program areas, one of which is Clinical and Translational Neuroscience.

IHSI research development specialist Gillian Cooke works to grow the clinical and translational neuroscience program area and its collaborations and partnerships. She works directly with sub-committee members and manages the day-to-day activities of the program area.

If you would like more information about research, education, or engagement opportunities the clinical and translational neuroscience program area offers, contact Gillian today.

Gillian Cooke
gcooke@illinois.edu
(217) 300-6709

IHSI Fosters Clinical & Translational Neuroscience

About IHSI

As the uniting initiative for health sciences and technology on the Illinois campus, IHSI is rooted in research and grounded in tech. IHSI supports faculty-driven research at Illinois by organizing our campus around health challenges, team-building, coordinating projects, and managing grant efforts. IHSI makes a point to fuse technological advances with health science research.

Common research interests merge; resources and teams coalesce.

Collaborations happen; studies are coordinated.

Findings communicated broadly; scientific and medical communities are informed.