



The BRAINet SYNAPSE

BRAINet is a friends group of the OHSU Brain Institute (OBI) that helps build community awareness, interest, and support for neuroscience research at OHSU.

BRAINet Synapse Newsletter

April 2016

President's Column

Spring in Portland is a variable time. One minute the sun is out, next minute the rain is coming down in sheets. It has always seemed to me that my mind wanders more during this season than at any other time of the year. Now comes a Belgian study attempting to find out if and how the brain differs from season to season. One finding is that on a memory task, study participants performance "hit a low in the spring." Does that support my feeling of a seasonally-related wandering mind? I'm not sure. But perhaps we might be able to replace occasional comments about 'senior moments' with 'ah, it's because it's spring.' In any event, enjoy the warming weather!

Warmest wishes,

Helen Richardson, President



April Lecture Luncheon

Join us on Monday, April 18 at 11:30 a.m. at the Multnomah Athletic Club for a lecture luncheon with Kim Nixon Hutchison, M.D. Dr. Hutchison will present a lecture on **"Sleep and Dreams."**

Dr. Hutchison is a neurologist with a special focus on sleep medicine.

11:30-11:45 Registration and Social Time

11:45 Lunch Served

12:00 – 1:00 Luncheon and Lecture

Cost

\$25 Members

\$25 Guests of Members

\$30 Non-Members



To register and pre-pay to secure your reservation, please visit:

<https://goo.gl/ffYsmV>

Registration will close at midnight on Wednesday, April 13.

This month we will be served nicoise salad with chicken breast. Please note there is only one option for all vegetarian/ vegan/ gluten free requests.

March Lecture Luncheon

By Julie Branford, Past President

"Mind-reading with Functional Brain Imaging"

Octavio Choi, M.D., Ph.D., presented an absolutely fascinating lecture that ties together what can be seen in functional magnetic resonance imaging (fMRI) when the brain is working (listening, visualizing, problem-solving, etc.) and how that potentially is connected to neurolaw: can a brain scan be used in court to prove or disprove what you are saying?



Neurolaw has three areas of inquiry: criminal responsibility (was s/he "sane" at the time the act was committed or restricted in the ability to be responsible due to mental illness, brain damage, autism, etc.), mind-reading (lie detection, pain measurement, bias?), and then predictions (the potential for future violence as a gauge of rehabilitation).

Neuro-ethics is the area of study of neuro interventions: deep brain stimulation, transcranial analysis, etc.

Very strong magnets in the fMRI machines can create 3-D images of the brain and can measure increased oxygen, brought in by increases in blood flow to working segments of the brain. The portion of the brain that is working has more blood, therefore more oxygen. The flow of water molecules in the brain can also be measured to show what parts of the brain are engaged in a certain task. "Brain activity becomes mind-reading."

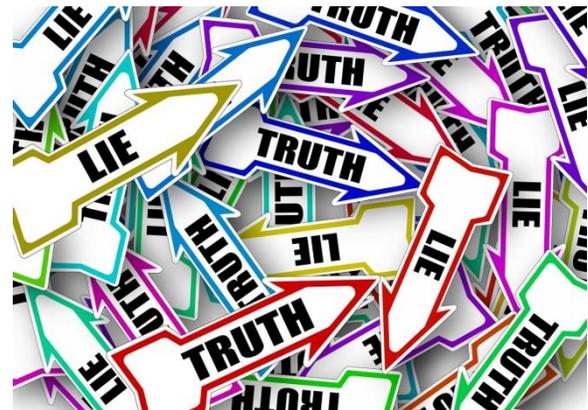
Dr. Choi's focus for our luncheon lecture was on "mind-reading." He noted that psychopaths have very low neuro substrate (where "conscience" seems to dwell).

One story Dr. Choi told was of a young woman who had been in a severe car crash and was in a coma for a long period of time. Physicians began to wonder if any parts of her brain were still working. They put her in an fMRI machine

and told her to visualize walking around her house; portions of her brain lit up! They then told her to visualize playing tennis; different parts of her brain lit up. A few months later she came out of the coma. What a valuable tool to use when someone appears to be brain-dead and people need to know whether or not to "pull the plug."

Dr. Choi said that if we want to explore what regions of the brain are working for specific tasks, we can go to www.gallantlab.org/brainviewer/huthetal2012. You can touch the brain on the screen and see what that part of the brain is responsible for.

He then moved to the question: how can we tell if someone is lying? He commented that our brains are adapted to "read" faces and body language, especially of those 150 people closest to us; we needed this early on as the new humans needed to determine friend or foe. An fMRI perhaps can detect neural correlates of deception. Researchers put people in fMRI equipment and asked them to lie, to see what areas of the brain lit up, thus creating a brain map for lying. Pathological liars have different brain structures involving white matter, and



thus have different maps than those of us who struggle with lying. A 2005 study showed that one could get about 76.5% accuracy by looking at the brain map of someone to determine truth/lie. When all of the data points from all of the studied individuals were put into a computer to give composite brain maps, the computer was 99% accurate! We humans function at about 55% accuracy in determining if someone is lying. The question then becomes: do we really want a machine to be able to determine if you are lying? What happens in

court if the jury comes to a different conclusion about the truth factor of witnesses in determining innocence or guilt? There are privacy concerns, with the mind potentially becoming a “search source” – thus impinging on 4th Amendment rights. “Can your brain scan be used to testify against you?” – which may impinge on 5th Amendment rights.

Dr. Choi shared with us that technology is being developed that can be used to inhibit lying, by placing the device on the person’s head and interfering with the segments of the brain that are active when lying. This is a non-invasive procedure, so no physical damage is permanently done to the person being interrogated. One can think of many international situations where that kind of technology could be of great value, but also leads to questions about its ethical/legal use.

If you would like to learn more, Dr. Choi said we could contact him at choio@ohsu.edu.

Lecture/luncheon attendees uniformly said that they want to have Dr. Choi return and talk about some of the other mind-reading research and technologies that are being developed – “and, that’s the truth!”

Brain in the News

*By George Ivan Smith,
BRAINet Member*

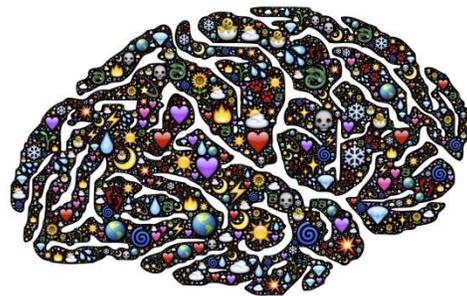
A recent study implied that creativity can be trained. According to Carl Sherman (2-22-16, www.dana.org/News) it is well understood that relentless hours of hard work hone the technical skills of a creative person to reach a high skill level. Researchers used an MRI scanner to approximate a natural performance involving jazz improvisation.



Researchers at Karolinska Institutet, Sweden, surveyed 39 professional jazz and classical pianists’ estimate of their lifetime hours of

practice and playing, and their estimate of hours improvising. fMRI testing showed no relationship between brain activity and total hours of practice, but strong correlation involving improvisation experience. “It seems to imply that the most experienced improvisers use much less executive control during this task,” said Fredrik Ullén, senior author of the paper.

“In a nutshell [with more training], you need less explicit control but the entire system seems more functionally connected,” Ullén says.



“More efficient communication between brain regions that represent motor aspects of musical performance and higher levels of cognitive organization could [help] finding musically interesting things,” Ullén said.

The pattern of brain activity seen in highly experienced improvisers show that the deactivations of cognitive control areas could contribute to a feeling of less mental effort and self-awareness. Charles Limb (UCSF, pioneering researcher in improvisation) said, “It’s a mistake to think that artists are ‘born that way.’” Rather, some people may have creative tendencies, interests, and aptitudes that are “sculpted over time.” The expert’s brain is like a machine finely tuned to generate new ideas. Just as it learns anything else, the brain has to learn how to ‘do’ creativity.

Other researchers offer their experience and conclusions; read the whole fascinating article, including the role of emotion and dynamic flow rather than just ‘on-or-off’ creativity.



Are you an OHSU Alumnus or Alumna?

We want to hear from you! The OHSU Alumni Magazine would like to profile our BRAINet members who are also alumni. Why is BRAINet important to you? What do you enjoy most? How else do you support your alma mater?

If you are interested in being interviewed for the magazine, please contact Kate Stout (503-494-0885, stoutk@ohsu.edu).



BRAIN
Institute

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