

The Neurotransmitter



Newsletter of the Western North Carolina Chapter of the Society for Neuroscience

March, 2013 – Issue #14

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**SPECIAL
Brain
Awareness
Week
ISSUE!!**

National [Brain Awareness Week](#) is sponsored by SfN and the [Dana Alliance for Brain Initiatives](#). Your local Brain Awareness Council celebrates has many exciting local events lined up this year! See pages two and three for more information.

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President's Welcome

by David Riddle, Ph.D., President of WNCSfN

Greetings to the Western North Carolina neuroscience community! As we begin to look toward the spring, there are several items that I would like to bring to your attention.

Give us all your money! OK, not all of it, just a few dollars for your membership dues. As institutional resources become ever tighter, we are more dependent than ever on the support of individual members. Many students renewed at the time of the fall Neuroscience Day, but many faculty and other members still need to renew. If you know you haven't renewed your membership in the last year or more, please do so now. If you are unsure whether your membership is current, don't worry; you'll be hearing from us soon. And if you know someone that's new to the western North Carolina neuroscience community, send

them a copy of [The Neurotransmitter](#), fill them in on the chapter and its activities, and encourage them to join. Membership forms are available on our website at <http://www.wfubmc.edu/SfN/>.

Plans are beginning for a professional development event and spring symposium. Watch for dates and details in the near future.

It's time to elect new members of the chapter executive committee. Students and postdoctoral fellows who wish to be considered as councilors should let me know by email (driddle@wakehealth.edu). A call for nominations for other positions on the executive committee will be forthcoming soon. Please nominate your colleagues and encourage all students and faculty members to be involved.

Brookshire Wins Next Generation Award

by Dwayne Godwin, Ph.D., Neurobiology & Anatomy, Interim Dean

Former Brain Awareness Council member and Physiology and Pharmacology graduate student Bethany Brookshire, Ph.D., was presented with the Next Generation Award at the Society for Neuroscience Annual meeting in New Orleans. While at Wake Forest, Bethany was a very active member of BAC and a recurring contributor to *The Neurotransmitter*. Bethany's Ph.D. advisor was Dr. Sara Jones and she is currently a postdoctoral fellow at the University of Pennsylvania. We are all very proud of her accomplishment.

Bethany is a social media expert who has taken her passion for science beyond the lab to educate a broad audience about the brain and psychiatric illness. Bethany is a prolific blogger, who has published more than 1,000 blog posts to date. Her specialty is taking a scientific topic, often a paper, and breaking it down into digestible pieces suitable for public consumption,

often with a wry twist of humor. She blogs under a pseudonym for Scientific American, and is recognized as one of the best science bloggers on the web. It's even more impressive when you consider that she achieved all this while engaged in full time postdoctoral research.

Moses Chao, president of the Society for Neuroscience presented the award to Bethany, and said, "SfN believes strongly in the value of educating the public about insights gained through neuroscience research. It is an honor to recognize the winners of this year's awards for their work with the media, outreach efforts in their communities, and dedication to science communication."

Congratulations to Bethany Brookshire for winning this prestigious award!



WFU Brain Awareness Season 2013

By Jamie Rose, Neuroscience Graduate Student

The [Wake Forest University Brain Awareness Council](#) (WFU BAC) is a volunteer-driven organization whose goals include encouraging neuroscience and continuing education in our community, expanding public familiarity with basic science research and increasing public awareness and interest in human and animal brain function. **Brain Awareness Week** (BAW) is a combined effort from the BAC and the Western NC Chapter of the Society for Neuroscience to facilitate awareness about the progress and benefits of neuroscience and brain research. BAW was founded and is coordinated by the Dana Alliance for Brain Initiatives in 1996, and is supported by the Society for Neuroscience. The WFU BAC will be hosting and participating in a number of events in our local community. This year, BAW will extend from March 11-17. Welcome to another illuminating season of Brain Awareness events! **Please join the WNCsFN and WFU BAC in this brainy celebration!**

BRAIN AWARENESS DAY at SciWorks

Wednesday, March 13, 9 am – 2 pm; 400 Hanes Mill Rd, Winston-Salem, NC

The WFU Brain Awareness Council, in conjunction with efforts from the Western NC Chapter of the Society for Neuroscience, [SciWorks](#) and [Time Warner Cable's Connect a Million Minds](#) initiative are hosting **Brain Awareness Day at SciWorks** on **Wednesday, March 13th** from **9am-2pm**. Area schools have signed up to bring approximately 400 elementary, middle and high school students to the event. Our volunteers will organize stations throughout the museum focusing on various aspects of our favorite thing– the brain! This year's stations include: Human Brains, Comparative Brains, Hearing, Vision, Visual Plasticity, Visual Illusions, Build a Neuron, Two-point Discrimination, Multisensory Integration, and Careers in Science.

BRAIN POWER! Family fun with neuroscience at the Children's Museum

Those of us in the BAC believe that you can never be too young (or old!) to start learning about the brain. The WFU BAC, together with the Western NC Society for Neuroscience, is hosting **Brain Power! Family fun with Neuroscience at The Children's Museum of Winston Salem** on **Sunday, March 17th** from **1 – 4 p.m.** The volunteers of BAC will host age-appropriate, brain-themed stations for children and their parents to enjoy. You will have the opportunity to touch a *real* human brain, compare human and animal brains, build neurons and more! Faculty and students of WFU: **Don't miss this great opportunity if you have small children!** Museum admission is \$7 for adults and children over age 1, \$6 for seniors above age 62 and free for children under 1 year. For more information visit their [website](#) or call the Museum at (336) 723-9111.



What is the WFU **Brain Awareness Council (BAC)**? We are a group of graduate student and faculty volunteers from different science-related disciplines with a love for neuroscience and education. We visit local schools and other venues to teach K-12 students about their brains. During a typical visit, students are divided into groups and rotate through a variety of age-appropriate stations where they have the opportunity to participate in exciting, hands-on activities to learn about neuroscience. Volunteering is fun and easy! Our most popular stations include:

Human Brains
Comparative Brains
Drugs of Abuse
Build a Neuron
Hearing
Visual Adaptation
Visual Illusions
Careers in Science
Multisensory Integration

For more information, check out our website: <http://graduate.wfu.edu/bac/index.html>.





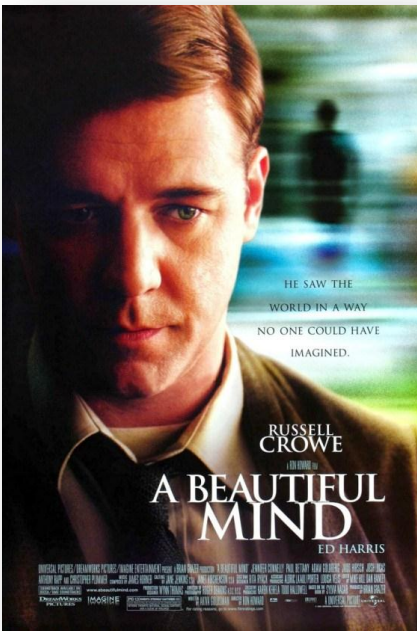
Neuroscience
2013

Mark your calendars!

Deadlines for the 43rd Annual Society for Neuroscience (SfN) Meeting are fast approaching. SfN 2013 will be held in **San Diego, CA November 9-13.**

- You must be an active SfN member in order to submit or sponsor an abstract. [Join or renew](#) your membership today!
- Keep your eyes open for the open abstract submission coming soon!

More information about registration, hotels, travel, and other important dates and deadlines are not yet available, but are coming soon!



Become a fan of the WNCsFN on Facebook!

Brain Awareness Season 2012, cont...

Brain Injury Association of NC (BIANC) Walk and Roll-a-thon for Brain Injury Prevention

Saturday April 13th, 9 am – 12 pm, High Point City Lake Park, Jamestown, NC

[The Brain Injury Association of North Carolina](#) (BIANC) is a non-profit organization whose mission is to provide help, hope and a voice to those with traumatic brain injuries and their families. The BIANC will be hosting their 7th annual Walk & Roll-a-thon at High Point City Lake Park in Jamestown, NC to raise money for the over 188,000 people in NC with a traumatic brain injury. Registration is \$20 if you sign up at least one week prior to the walk and \$25 if you sign up the day of the event. Registration includes a t-shirt and lunch. There will be music, food, display booths, raffles, speakers and activities – fun for the whole family!! Contact the Team Leader, Jamie Rose at jamrose@wakehealth.edu to join the BAC/WNCsFN team.



SCHEDULE:

- Registration: 9 am – 10 am
- Walk & Roll-a-thon: 10:30 am
- Vendors & Activities available: 9 am – 12 pm
- Lunch will be served at 11:30



“Walk for Thought”

Neuroflix

The next Neuroflix screening will be “A Beautiful Mind” at Fox and Hound Pub (Thruway Mall, 367 Lower Mall, Winston Salem, NC) – Date: Mid-March TBD

Neuroflix is a fun way to better understand brain disorders! The BAC hosts a current movie at a local restaurant while the audience eats dinner. Immediately after the movie, a panel of experts discusses the movie topic with the audience, answering any questions and clearing up any misconceptions about the disorder portrayed in the movie or in reality. **Keep your eyes open for announcements about the dates, times, and panel for “A Beautiful Mind”!**

Science Café hosted by SciWorks

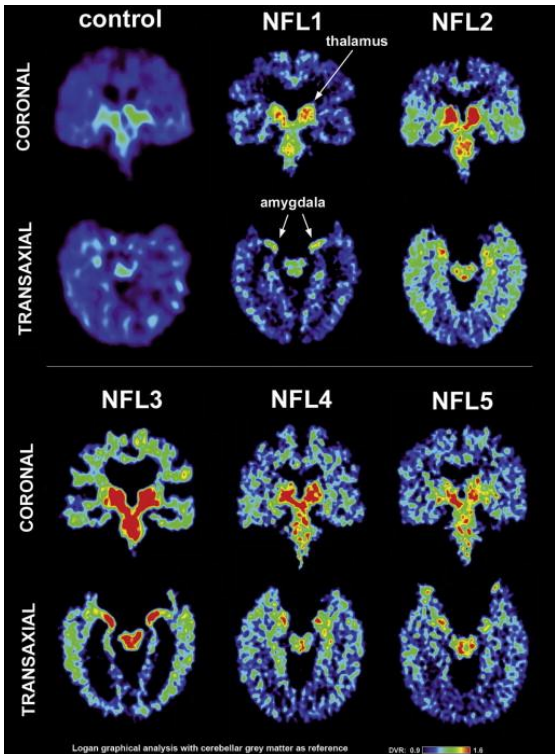
Tuesday March 19, 2013, Fox & Hound (Thruway Center)

Updates in Geriatrics: Tips for Successful Aging and Discussion of Current Controversies by Dr. Franklin Watkins, Assistant Professor of Internal Medicine, Wake Forest School of Medicine.

Don't forget to visit “Winston-Salem Science Café” on Facebook for more details on Science Café and other SciWorks Museum events!

PET Scanning Reveals Neurodegenerative Condition in Retired NFL Players

by Chris Schaich, Physiology & Pharmacology Graduate Student



Junior Seau was one of the most decorated and beloved players in the National Football League (NFL) over an iconic professional career that spanned twenty seasons. As a linebacker, a bruising defensive position tasked with tackling offensive ball carriers, Seau's honors included twelve Pro Bowl selections, the NFL's 1994 Man of the Year Award, and being named to the NFL 1990s All-Decade Team. He developed a reputation for his ferocious play and passionate on-field leadership, often playing through injury and performing a distinctive [fist-pumping dance after big plays](#). Most would agree that Seau was a wonderful representative of the NFL before retiring in January 2010.

On May 2, 2012, at the age of 43, Junior Seau committed suicide by a self-inflicted gunshot wound to the chest. His ex-wife reported that he had suffered from depression and insomnia in the [last years](#)

[of his life](#). Suspecting that brain damage related to his long playing career may have contributed to his suicide, Seau's family donated his brain tissue to the National Institute of Neurological Disorders and Stroke at the National Institutes of Health (NIH) for analysis. On January 10, 2013, Seau's family revealed that NIH neuroscientists had definitively concluded that Seau suffered from [chronic traumatic encephalopathy \(CTE\)](#), a degenerative neurological condition associated with concussion-related brain injury.

Seau's post-mortem CTE diagnosis is one of several high profile cases that have brought recent media attention to a disturbing trend among retired professional football players. Studies of former NFL players reveal a persistently higher rate of personality and mood disorders (e.g. major depression), mild cognitive impairment (MCI), and severe dementia compared to the general population. In fact, retired NFL players sustaining three or more concussions during their careers may be three times more likely to be diagnosed with depression and five times more likely to be diagnosed with MCI later in life [4, 5]. Dozens of similar cases in former athletes who had suffered repetitive brain injuries are linked to CTE after death [6, 7].

CTE manifests as a steady deterioration in mood, personality, motor function, and cognition. It is confirmed by a variety of findings at autopsy, particularly the widespread accumulation of phosphorylated tau protein tangles (similar to Alzheimer's disease), axon damage, inflammation, and other brain abnormalities, including neuronal loss [6, 7]. Clearly, CTE can be a devastating consequence of repeated traumatic brain injury, and it is quite alarming that so many people are at risk due to the popularity of contact sports [8]. That retired NFL players are disproportionately more at risk for CTE should be cause for further unease among current players and league officials. After all, American football is not merely a contact sport, according to legendary coach Vince Lombardi—it's a *collision* sport.

Despite the risk for CTE among former athletes, there is no established method for its early detection. All cases of CTE are currently diagnosed at autopsy. However, in a clinical research article from the February 2013 issue of *The American Journal of Geriatric...*

Continued on page 8



**Become a
Member of the
WNCSfN!**

The Western North Carolina Chapter of the Society for Neuroscience (WNCSfN), a division of SfN, is dedicated to promoting education in the Neurosciences, facilitating Neuroscience outreach in the western North Carolina area, and encouraging interaction among Neuroscience professionals within our research community. The WNCSfN sponsors numerous events including a fall poster session, an annual research symposium, and multiple Brain Awareness Council activities in the community. You can view all our current and past activities on our [website](#).

Membership dues make a significant and consistent contribution to our annual budget. We are therefore inviting all faculty, staff, graduate students, post-doctoral fellows, and medical residents with interest in the Neurosciences to join the Chapter. Please send us your name, title, department, and email address, along with your dues (cash or check made payable to WNCSfN) to Dr. David Riddle, Department of Neurobiology & Anatomy, Wake Forest School of Medicine, Medical Center Blvd, Winston-Salem, NC 27157.

Membership Dues:

	1 Year	3 Years
Regular	\$30	\$75
Postdoc	\$20	\$50
Student	\$15	\$35

TEDxWakeForestU

by Ashley Wagoner,
Neuroscience Graduate Student

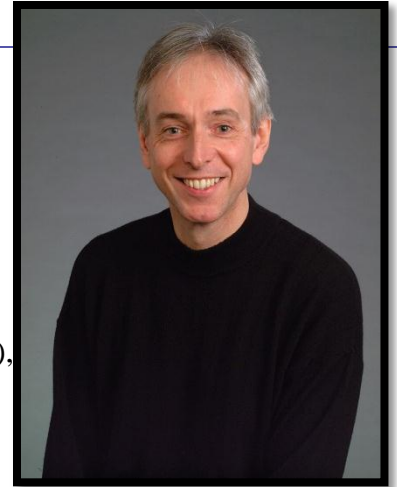
The second annual [TEDxWakeForestU](#) Talk was held on February 23rd at Wait Chapel. This was an exciting and creative conference based on technology, social impact and entrepreneurship. Wake School of Medicine professor [Michael Nader](#) represented the WNCsFN Chapter, speaking about his ideals behind the value of drug addiction research. He presented alongside 8 other speakers from the Wake Forest and Triad community who individually covered many diverse topics including the impact of social media, retail marketing, community reinvestment and plenty other [“Ideas Worth Spreading.”](#)



SfN Capital Hill Day

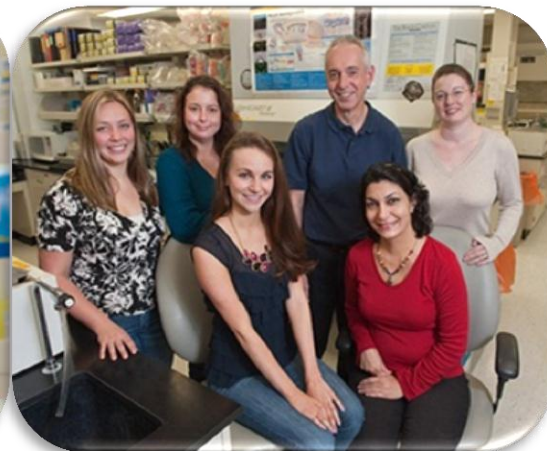
Help lawmakers make informed budgetary decisions and represent science! On March 20, SfN will host the 7th annual Capitol Hill Day in Washington, DC. At this event, SfN members will head to Capitol Hill to discuss with their congressional representatives the latest discoveries in neuroscience. To register and learn more, contact advocacy@sfn.org.

**Mike Robbins, Ph.D.
1954-2012**



Mike Robbins, 58, passed away on November 23, 2012 at Wake Forest Baptist Medical Center. He is survived by his wife Pam Scordas Robbins and his mother Liliane Robbins, brother Mark (Teresa), and sister Monique (Jim) of England. Mike was preceded in death by his first wife Lucy, father Bill, and sister Maryse. He was born in London, England and received his Bachelor’s Degree in 1976 and PhD in 1980 at Thames Polytechnic in Woolwich, London, England. Mike spent his career researching the effects of radiation on normal tissues and held positions in England and the University of Iowa. He was recruited to the Wake Forest School of Medicine in 2001 as a Professor in the Department of Radiation Oncology and Section Head of Radiation Biology. During his tenure at Wake Forest, Mike developed a world-class research program in the prevention and treatment of radiation-induced brain injury and was a senior leader in the Thomas K. Hearn Brain Tumor Center of Excellence. At the time of his death, Mike was principal investigator (PI), co-PI, or collaborator on 13 research grants from entities such as the National Cancer Institute, Department of Health and Human Services, and the Nuclear Regulatory Commission. Mike published 21 book chapters and over 120 research articles and mentored 20 graduate and post-doctoral students. His outstanding leadership and commitment to his colleagues in the laboratory created an atmosphere of genuine collaboration, which led to the success of his team nationally and inter-nationally. Mike lectured worldwide and was the recipient of numerous honors and awards. Mike, a beloved friend and colleague to many, will be greatly missed. He had a passion for racing/sport motorcycles, WWII history, traveling, and hiking with Pam and their three dogs Dash, Chase, and Stella. Everyone who knew Mike enjoyed his dry sense of humor. Donations in Mike’s honor can be sent to the Lucy Robbins Graduate Fellowship Fund, c/o Office of Development & Alumni Affairs, Wake Forest Baptist Medical Center, Medical Center Blvd., Winston-Salem, NC 27157.

(by David Riddle, Ph.D., Neurobiology & Anatomy)



Wake Forest Neuroscience in the News!

By Amie Severino, Neuroscience
Program Graduate Student

Dr. Osvaldo Delbono and graduate student Alex Birbirar at Wake Forest have been featured in an [article](#) on the online science news site, ScienceDaily.com for their research. They were able to isolate neural precursor cells from adult skeletal muscles that survived in the brain and normally migrate to the origin of neural stem cells. These cells could be isolated from a patient's own muscle tissue with a biopsy to be used for their own treatment for various neurological disorders. For instance, they may be able to be used as drug-delivery vehicles, for brain tumors, spinal cord or brain injury, and neurodegenerative disease. The full scientific article can be found [here](#).

Dr. James Eisenach, editor in chief of the Journal Anesthesiology and director of the Pain Mechanisms Lab at Wake Forest was featured in a US News Health article for his [clinical](#) and [laboratory](#) research on postpartum pain in women. His lab research suggests that the hormone oxytocin becomes elevated in the brain and spinal cord of rat mothers and contributes to the mechanism that protects them from injury after birth. These studies are in an effort to provide a mechanism that explains how only a small percent of women who had pain when they delivered developed chronic pain issues. The lab is conducting studies to examine if oxytocin hormone signalling is a therapeutic target for chronic pain relief.

Grad Student Tool Box

The "Grad Student Tool Box" is a new feature of *The Neurotransmitter* the newsletter staff is trying to implement for future issues. We are striving to provide helpful resources geared towards graduate students in order for us all to fill our "tool boxes" with the skills and knowledge needed to survive graduate school and succeed in our future careers. This can include comical blog posts to tips on communicating effectively, and how to find a job. If you have any ideas or resources you would like to share please email Ashley Wagoner at aswagone@wakehealth.edu.

How to communicate (better) with your advisor:

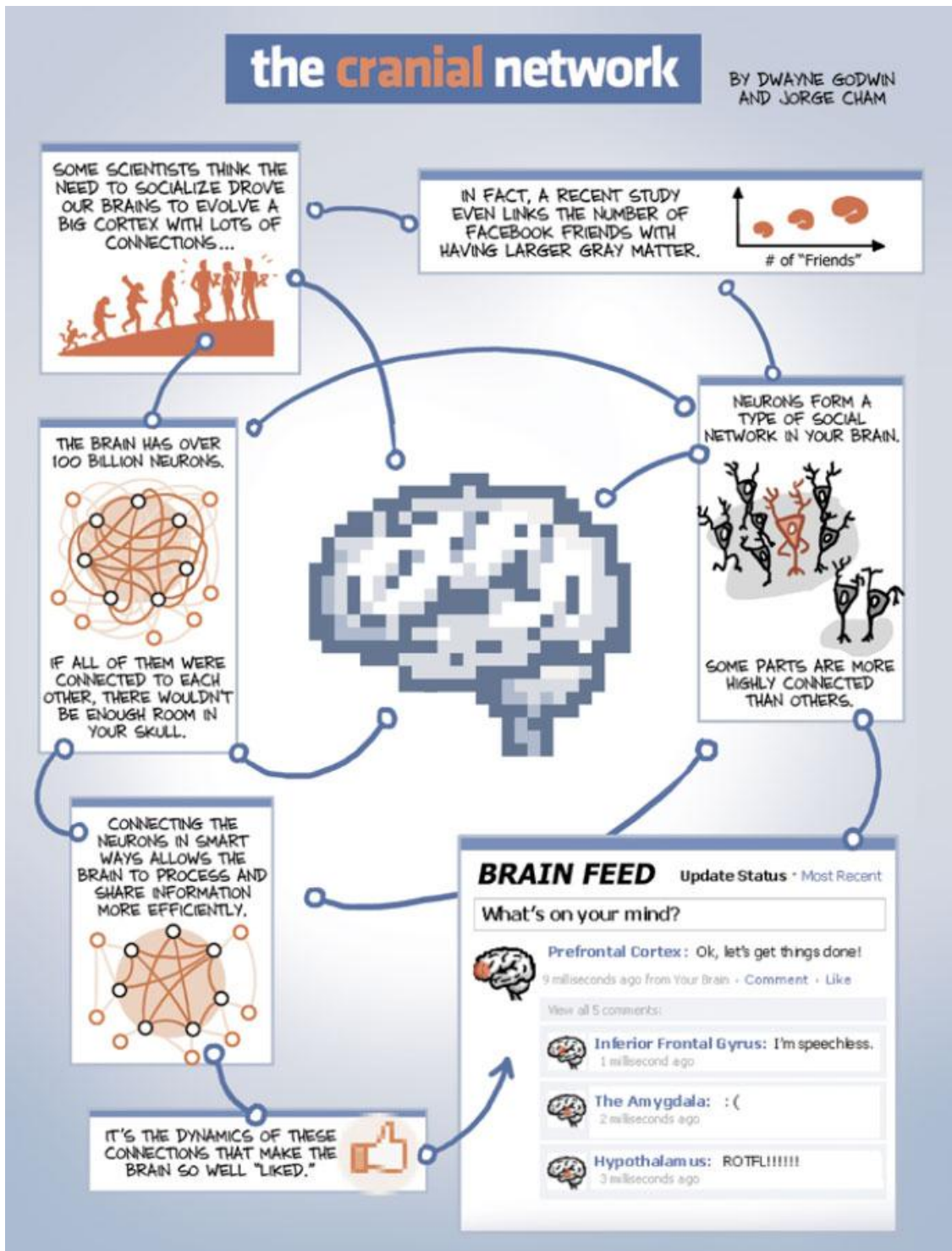
By Stacey Robinson, Neuroscience Graduate Student

Communication is the foundation of human relationships, with the interaction between graduate student and principle investigator being no exception to this rule. A failure in communication can lead to feelings of frustration or even abandonment in the student and possible disappointment or doubt on the behalf of the PI, none of which is conducive to a thriving and exciting research environment. While every situation is unique and each person must find the communication style which suits them best, there are a few common pieces of advice to help the development of a successful relationship.

- 1. Establish expectations.** While the general idea of a mentor/mentee relationship may seem simple, the nitty-gritty of what each person expects both to bring and receive from this interaction can vary wildly. Stanford University offers a handy (and free) Student-Advisor Expectations [work sheet](#) to help facilitate conversations regarding these expectations.
- 2. Structure, structure, structure.** Informal chats whenever (if ever) your advisor happens to stop by the lab are useful, but setting a schedule is a far more consistent means of receiving updates and feedback. Try to set a standing appointment, whether weekly, bi-weekly, or monthly, with your advisor. Schedule meetings and follow up to confirm them rather than waiting for the advisor to ask one or assume that the one you scheduled a month ago hasn't been forgotten. Have an agenda for each meeting when they happen. Being able to summarize what you wanted to talk about and why in five minutes or less is widely recommended. Take good notes, and at the end of the meeting summarize what has been covered and what needs to be done on both ends before the next meeting. The University of Michigan offers a helpful online [book](#) which includes chapters on successful meetings structures.
- 3. A Work in Progress.** While there's no substitute for face to face meetings, if conflicting schedules prevent one don't let that stop your updates. A quick email at the end of each week to keep a PI up to date on what is happening in the lab can save a half hour of catch up when the next face to face meeting actually occurs. Items like keeping a [Monthly Progress Meter](#) and keeping your PI aware of your timeline might help in at least keeping communication flowing.



Is it about time to start looking for post-grad job? Whether you're looking for a post doctorate, job in industry or academia, check out the [Wake Forest Portal](#) to BioCareers for help in your search!

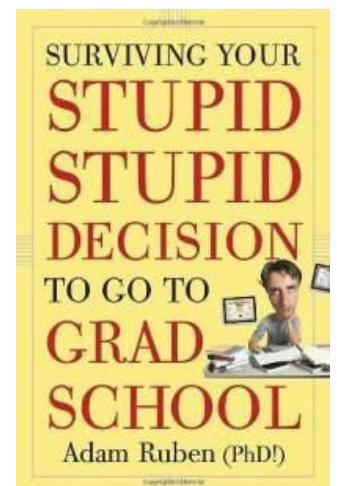


Grad Student Tool Box

The Audacity of Graduate School

By Ashley Wagoner, Neuroscience Graduate Program

Adam Ruben spent 7 years earning his Ph.D. in molecular biology at Johns Hopkins. Instead of the traditional post-grad route, his degree led him to writing the book [Surviving Your Stupid, Stupid, Stupid Decision to Go to Graduate School](#) and blogging for Science Careers. Adam visited Wake Forest last spring and gave an hour long talk on his experiences as a student and what brought him to write his book. As entertaining as honest, Adam is able to reflect on the deeper meaning behind graduate school and the reasons we all know why we are here. Below is an excerpt and check out the full article and more posts [here](#).



“The trade-off for a pitiable existence is that you get to research the subject you love, alongside others who feel the same way, and often that’s enough. You complain, “Ugh, I spent 15 hours in the lab yesterday,” but part of your brain says, “Yes, I spent 15 hours in the lab yesterday!” You complain that no one understands what you’re working on, but inside, you gleefully think, “No one understands what I’m working on!”

–[The Audacity of Graduate School](#), Adam Ruben, Ph.D.

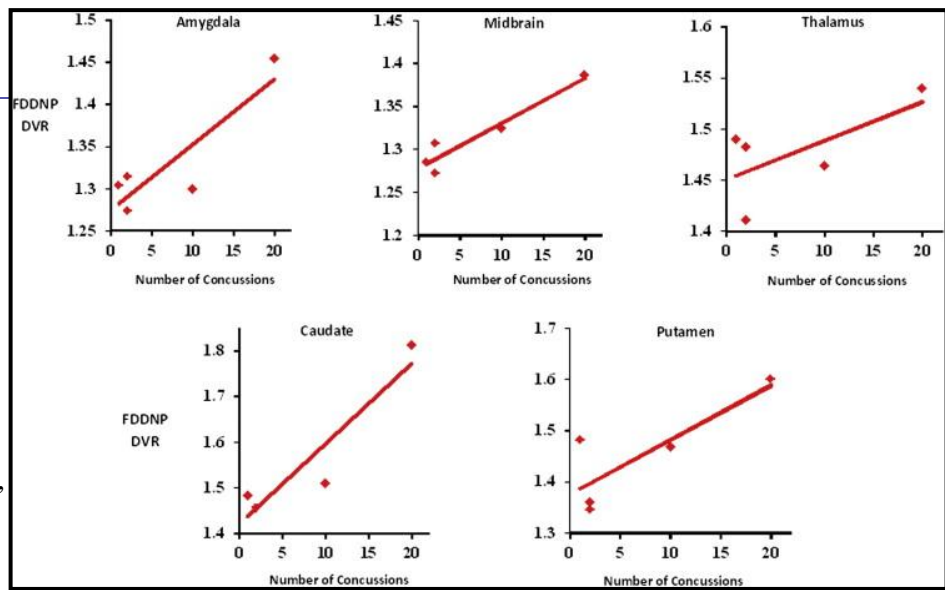
CTE in NFL Players continued...

Psychiatry, Dr. Gary W. Small and his UCLA colleagues describe a promising method for the non-invasive early detection of CTE and similar brain pathologies [9].

Dr. Small’s group previously invented a new tracer ligand for use in positron emission tomography (PET) that is capable of detecting tau tangle deposits in living brains, and can track and predict cognitive decline in people without dementia [10, 11]. In their latest study, Dr. Small’s research team applied this PET imaging technique to the brains of five living, retired NFL players with a history of cognitive or mood symptoms. The former players, ranging in age from 45 to 73 and having sustained between one and twenty concussions during their playing careers, completed a battery of neuropsychological tests prior to PET scanning. The tests revealed that the players indeed have significantly higher depression scores than control subjects, as well as a trend toward lower global cognitive ability. These results closely reflect the players’ clinical presentation, as three were diagnosed with MCI, and another with dementia. All exhibited symptoms of major depression.

More distressing, however, are the PET scans of the players’ brains: all had very high tracer signal intensity compared to controls that was especially concentrated in the thalamus, midbrain, and amygdala, indicating large tau deposits in these regions (see Figure 1, page 4). These binding patterns are consistent with the tau build-up observed in autopsy studies of CTE [6]. Perhaps the most striking feature of the study is the illustration of a relationship between PET signal intensity and the number of concussions each player sustained throughout his career (Figure 2, top right). Although none of the correlations reached statistical significance due to the small sample size of players tested, the plots show a clear trend toward an increase in tracer binding with more concussions suffered.

This study may have a considerable impact in medicine and sports. The PET tracer developed by Dr. Small’s team could facilitate the early detection of trauma-related brain diseases like CTE. As the authors note, the early detection of this condition is a crucial first step toward the development of medical interventions that may hinder the onset or progression of symptoms. No such early detection method is currently in practice. This study should also help raise further awareness of the substantial long-term consequences of traumatic brain injuries in many at-risk athletes. The NFL is now placing a much greater emphasis on player safety [12], having recently adopted new playing rules, medical guidelines and equipment standards to reduce the health risks of the game. Researchers at Wake Forest University and Virginia Tech are currently pioneering research on football helmets to reduce the number of concussions suffered [13]. The effectiveness of these measures remains to be seen, but the goal remains that at the end of their careers, players can truly leave all of the game on the field.



CONSCIOUSNESS
CONFESSIONS OF A ROMANTIC REDUCTIONIST



CHRISTOF KOCH

Popular Science Book Review:

“Consciousness: Confessions of a Romantic Reductionist” by Christof Koch

By Chris Schaich, Physiology & Pharmacology Graduate Student

The nature of the mind is a philosophical topic as old as philosophy itself. Plato, Aristotle, Descartes, Kant, and other historical thinkers shared ideas about the mind that remain influential today. Many of these ideas laid the foundation of modern neuroscience, as scientists established that the mind is a product of the brain. To understand the mind we must therefore understand the brain, and this has proven to be one of the greatest challenges science has ever encountered.

There was intense debate late into the twentieth century about whether it was even possible to study the physical relationship between the mind and the brain. Out of this debate emerged a new problem dealing with consciousness: what must happen in the brain for our awareness of the world to arise? And more importantly, *why* do these internal brain events cause us to experience the world around us? This so-called Hard Problem of Consciousness attracted scientists from the burgeoning field of cognitive neuroscience in the 1980s and 90s, with [Christof Koch](#) of the California Institute of Technology among them. While working closely with his friend and mentor [Francis Crick](#)—the co-discoverer of the double helical structure of DNA—Koch became one of the pioneering neuroscientists in the study of consciousness during a time when most considered it a fringe subject. In his book [Consciousness: Confessions of a Romantic Reductionist](#), Koch offers a personal account of his life’s work and his goal of (continued page 9)

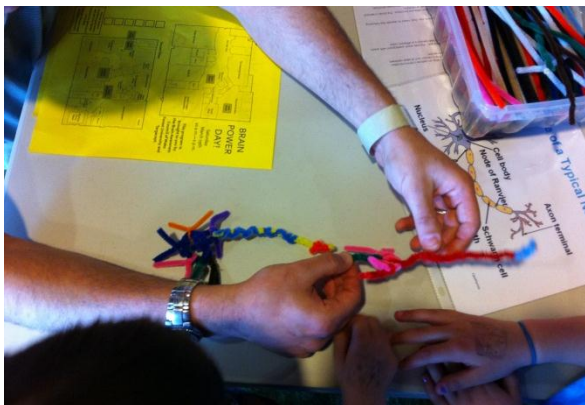
“Consciousness” Review continued...

understanding the origins of the mind.

The opening chapters of *Consciousness* relay some anecdotes that helped shape Koch’s scientific quest. Here he manages to portray himself as someone many in science can relate to: an earnest, romantic nerd. The content of some passages may border on the mundane, but the tone of Koch’s writing is kept refreshingly personal, reminding readers he is a flesh-and-blood creature with real motives and desires. These chapters are indeed a large reason for the book’s subtitle *Confessions of a Romantic Reductionist*. Koch’s “confession” is that he was drawn to the study of consciousness by his desire to justify his instinctual belief that life is meaningful. A pervasive theme of the book is Koch’s view that there must be something grander in the laws of the universe that science has not yet fully illuminated.

The central argument Koch makes in *Consciousness* is that modern neuroscience now possesses the tools to investigate consciousness, therefore elevating its status from fringe or pseudoscience into a legitimate scientific field of inquiry. Koch’s and Crick’s own research focus is in what they termed the “neural correlates of consciousness”—the minimum neuronal activity sufficient to generate a specific conscious percept—and they probed the primary visual pathway in search of these. He makes it clear, however, that they are far from the only scientists at work. Much attention is given to Naotsugu Tsuchiya’s work with fMRI and the technique of continuous flash suppression. Later chapters describe case studies by neurologists on peculiar perceptual defects like prosopagnosia (face-blindness) and akinetopsia (motion-blindness), as well as the work of [Benjamin Libet](#) and David Wegner with neuronal readiness potentials—the brain’s subconscious “zombie agents” that control much of our lives from beyond our awareness. The discussion of consciousness progresses from practical to the theoretical when Koch introduces neuroscientist [Giulio Tononi](#) and his Integrated Information Theory, praising it as the most promising fundamental theory of consciousness yet.

Koch’s discussions of the science mostly tie into the theme that small chunks of gray and white matter are responsible for encoding very specific pieces of conscious content. One shortcoming of the book, however, is that it often seems as though his perspectives are non-committal or incipient, but this may simply be his inner scientist revealing itself to readers. Embarking on a quest to understand the nature of consciousness, once considered off-limits to formal scientific discourse, certainly requires a degree of bravery. On this topic, Koch is perfectly clear: thanks to the tools of modern neuroscience, we are much further along in the study of consciousness than Plato, Descartes, Kant. Overall, *Consciousness: Confessions of a Romantic Reductionist* is an engaging, succinct introduction to the study of the mind by someone who should be easily relatable to many young scientists and students of neuroscience.



Pictures from Brain Awareness Week 2012: Dr. Jeff Weiner helping children at the Children’s Museum “Build-A-Neuron” (top left) and graduate student Mary Jane Skelly demonstrating how visual plasticity occurs in the brain!



The Neurotransmitter Staff:

Co-editors:

- Ashley Wagoner,
Graduate Student
Neuroscience Program
- Dwayne Godwin, Ph.D.
Neurobiology & Anatomy

Contributors:

- David Riddle, Ph.D.
WNCSfN President
Neurobiology & Anatomy
- Jamie Rose,
Graduate Student
Neuroscience Program
- Amie Severino,
Graduate Student
Neuroscience Program
- Chris Schaich,
Graduate Student
Integrative Physiology &
Pharmacology Program
- Stacey Robinson,
Graduate Student
Neuroscience Program
- Lindsey Pattison,
Graduate Student,
Neuroscience Program

Interested in contributing to *The Neurotransmitter*? Please contact Ashley Wagoner at: aswagone@wakehealth.edu