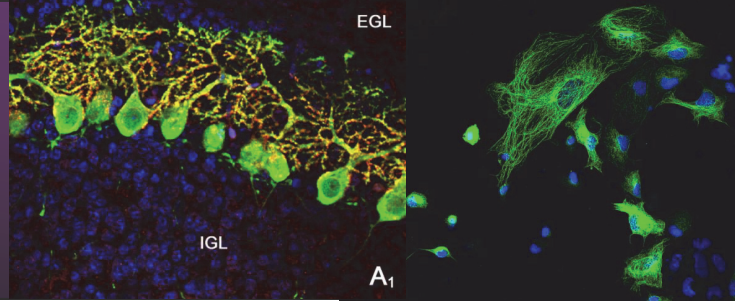


Brainstorm

Newsletter of the Program in Neuroscience
Harriot College of Arts & Sciences
East Carolina University



Greetings from the Editing Office!



Tuan D. Tran, Ph.D.
Executive Editor
Neuroscience Program Director
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Dear Friends,

It is my pleasure to present you our second installment of *Brainstorm*, the official newsletter of the Multidisciplinary Studies Program in Neuroscience. We were on hiatus the past academic year (2010-2011) due to significant amount of work that took priority in other program areas. Thankfully, we are back in full force and happy to bring you the latest about the program, our students, and their achievements.

Neuroscience is the study of how the brain organizes behavior and cognition, which can be examined at many different levels of analyses— from molecular, cellular, chemical, physiological, and to neural systems. The curriculum offers courses from such diverse fields as biology, chemistry, physics, and psychology. As a result of this interdisciplinary rigor, the program prepares students for advanced study in graduate school, medical school, physical therapy, and many other disciplines. Neuroscience is a relatively new field, but despite this, it has experienced tremendous growth in the past several decades and has spurred a vast amount of academic, scientific, clinical, and socio-political interest. The program has certainly grown since its humble beginnings in 2004, not only in the number of majors and minors, but also in its reach to faculty at the Brody School of Medicine, its interactions with the Psychology and Biology departments, and in student participation. This newsletter is a result of our students' hard work, and their intellectual and creative contributions. We hope you find it informative and enjoyable!

Best wishes, 

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Top banner images courtesy of Carl at immunportal.com

Left: Calbindin D and DAG-lipase in PD5 mouse cerebellum

Right: Beta III tubulin in mouse Cor1 cells

We're on the web!

<http://www.ecu.edu/neuroscience>



A Visit from Congressman Jones: TBI and PTSD



Photo 1: Dr. Tran greets Congressman Jones.



Photo 2: Dr. Clemens talks science with Rep. Jones.

students. The Congressman was thoroughly impressed with ECU's facilities and resources, the quality of the presentations, and the turnout by our faculty and students. Altogether, it was a wonderful event that allowed much needed discourse between government and academia in finding creative ways to help solve adverse human conditions through more funding for research, proper clinical treatment, and public awareness. ECCSFN and the Program in Neuroscience thanks the Congressman for the taking the time out of his busy schedule to hear what ECU has to offer and how it can assist. We also thank school administration, faculty, and students for their attendance and support. It was indeed a special night!

Congressman Walter Jones (3rd District, North Carolina) was invited by the Eastern Carolina Chapter of the Society for Neuroscience (www.ecu.edu/cs-dhs/neurochapter/index.cfm) to take a tour of our research facilities and to hear about the latest research on traumatic brain injury and post-traumatic stress disorder (PTSD). The latter is of particular significance to the Congressman, as he supports funding for the treatment of our military service men and women suffering from PTSD and strives to bring all military personnel back home from the ongoing campaigns in the middle east. The visit took place on November 9th, 2011 at the Brody School of Medicine. The event was a joint effort between ECCSFN and the Neuroscience Program, spearheaded by Dr. Tran (**Photo 1**).

Upon his visit, he was taken to Dr. Stefan Clemens' lab to see the cutting edge research being done to help promote repair from spinal cord injury (**Photo 2**). Afterwards, Dr. Marilyn Sheerer (Provost & Senior Vice Chancellor) welcomed the Congressman in front of school administration, faculty, and students, and provided opening remarks. The Congressman then took the podium to address the current military situation in the middle east, the seriousness of brain injury and PTSD, and the need for more federal funding to address their medical and psychiatric needs during their service and their return home. A series of presentations by selected faculty (**Photo 3**) representing the east and west campuses ensued. Presentations were given by Dr. Kori Brewer (Emergency Medicine), Dr. Erik Everhart (Psychology), Dr. Tuan Tran (Psychology, Neuroscience), and Dr. David Cistola (Associate Dean of Research, College of Allied Health). In attendance were Dean Alan White (College of Arts and Sciences), Dr. David Taylor (Chair, Pharmacology & Toxicology), Dr. Kathleen Row (Chair, Psychology), faculty, and



Photo 3: Dr. Brewer talks about spinal cord injury and chronic pain.



Baby, Were You Born This Way?

Taylor Heilman

• **Neuroscience Minor**

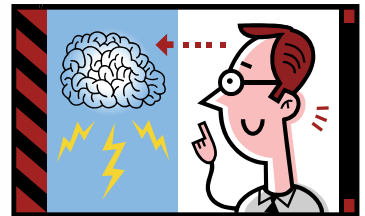
that drive proponents on either side of the dividing line to great lengths in presenting "truth" and ethics in their own eyes. Take for example, the upcoming national elections where many government positions are at stake, including the president's. The media is often used as a large source of knowledge by which the public and politicians securely latch onto with a firm grip at the cost of understanding truth from more credible sources (including outside one's own biases) and using that truth in socially fair and useful ways. One of the most emotionally charged issues that we're seeing is homosexuality and the rights that homosexuals hold. Is the set of rights the same set that is endowed to everyone not gay, and if so, why isn't this exercised in reality? Or is it just a partial subset of those rights, and justifies government (local, state, national) in making provision-

ary laws for a particular segment of society? Whatever one's opinion may be, that opinion may be better guided with proper understanding of our biological and biochemical being. The most salient question people are asking the gay community is, "Were you born this way and if not, then is it a matter of personal choice?", and indeed it is a question that homosexuals have internalized with a fair amount of existentialism and metaphysics. Although the debate continues for both sides pushing for changes and enforcement of rights legislation, it is often good to step back and try to understand that aforementioned question from a scientific viewpoint in order to have an open discussion of the topic matter. A group of Swedish scientists set out to elucidate that exact question.

In their paper, Ivanka Savic and Per Lindstrom¹ focused on the symmetry of the two hemispheres of the brain, as well as the connections that are made by the amygdala, the part of the brain that helps process emotional signals and emotional content in our memories. A total of 90 participants were recruited for the study, with the pool comprised of 20 gay males (HoM), 20 gay females (HoW), 25 straight males (HeM), and 25 straight females (HeW). Each person underwent a magnetic resonance imaging (MRI) scan to help identify morphological differences in various structures within the brain, including the amygdala. The other structures included the cerebral cortex (higher order thought, memory storage, decision-making, planning) and the cerebellum (motor functions, balance, timing of motor skills). A large number of them also received positron emission tomography (PET) scans to measure changes in cerebral blood flow, in order to determine differences in functional connections between each amygdala. Based on prior research, the researchers hypothesized that sexual dimorphism would differ in participants of the same sex with contrasting sexual orientations.

Differences in both the symmetry and the synaptic connections made were found:

- Cerebral volume was symmetrical in HoM and HeW.
- There were no cerebellar asymmetries.
- Homosexuals showed atypical amygdala connections within each gender.
 - HoM and HeW: Connections were more widespread from the left amygdala.
 - HoW and HeM: Connections were more widespread from the right amygdala.



Although this is just one study highlighting neuroanatomical differences between homosexuals and heterosexuals, it shouldn't be taken as definitive evidence for biological differences. It does however, shed light on the idea that the brain of a gay male resembles that of a straight female in some aspects more than that of a straight male, and vice versa. Homosexuality has existed for thousands of years², as found in the writings of early Greek philosophers such as Plato³, and Savic and Lindstrom's findings give us new evidence to consider before we point fingers in the eyes of a homosexual person, challenging him/her with the question, "Were you born this way?", so as not to make an indictment of another human being.

References

1. Savic, I. & Lindstrom, P. PET and MRI show differences in cerebral asymmetry and functional connectivity between homo- and hetero sexual subjects. *Proc. Natl. Acad. Sci. U.S.A.* **105**, 9403-9408 (2008).
2. Pickett, B. Homosexuality in *The Stanford Encyclopedia of Philosophy* (ed. E.N. Zalta) (<http://plato.stanford.edu/archives/spr2011/entries/homosexuality>, 2011).
3. Plato (c. 385–380 BC). Phaedrus in the symposium.



Parkinson's Disease: Finding Biomarkers

Andrew Norris

- **Biology/Chemistry Double Major, Class of 2012**
- **Brody School of Medicine 2012**

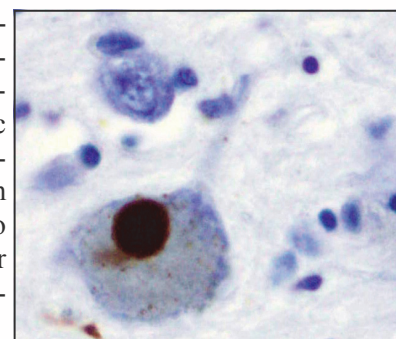
Parkinson's disease (PD) is a debilitating neurodegenerative disorder characterized by the selective deterioration of dopamine-producing neurons of the substantia nigra. The most common motor symptoms of PD include rigidity, tremors, and bradykinesia while individuals with late stage PD may exhibit difficulty speaking, severe cognitive decline, as well as learning and behavioral deficits. A vast amount of literature is devoted to the anatomical and histological features of Parkinsonism. Such research provides investigators crucial information and insight, enabling a better understanding and proper diagnosis of the disorder. Selective death of these dopaminergic neurons is accompanied by the buildup of abnormal aggregates of α -synuclein protein, also known as Lewy bodies (figure), in a process that is still not certain.

The loss of dopaminergic neurons in the substantia nigra results in decreased striatal dopamine levels, which can be visualized using positron emission tomography (PET) scanning. To date, much data has been collected from PET imaging studies, but magnetic resonance imaging (MRI) studies are lacking in both number and scope. MRI technology gives greater resolution in detailing the structures that may undergo pathology in PD. In this report, I highlight a recent study by Anthony Vernon and colleagues¹ who used MRI technology in a rodent model of PD, which allows scientists to gain better insight on basic neurodegenerative mechanisms, that in turn may help guide the development of targeted treatments for humans afflicted with this disease.

Vernon and colleagues examined whether alterations occurred between morphological and T_2 water proton relaxivity rates and then described how the two factors relate to both behavioral and histological outcomes in the rodents. The significance of T_2 water proton relaxivity is that when rates decrease, they do so more significantly in PD patients, particularly in the nigrostriatal pathway (a brain system that involves connections between the substantia nigra and the striatum)². According to the authors, alterations in T_2 relaxivity may be one of many biomarkers for PD progression.

The rodent model consisted of nigrostriatal lesions induced by unilateral injection of a proteasome inhibitor (lactacystin) into the substantia nigra of male rats. Sham-lesioned groups underwent the same procedure, but received injections of saline rather than the lactacystin. Animals were then subjected to a wide variety of behavioral testing methods, such as grip strength and circling, MRI brain volume analyses, and postmortem histological examination. The group discovered that there was certainly a pattern of morphological changes in the brains of rodents bearing the lesion, as well as alterations in the T_2 water proton relaxivity. Their primary finding was that morphological, not T_2 relaxivity changes, were statistically significant in their association with behavioral and histological outcomes. The research also revealed widespread iron accumulation and Lewy body formation in the ventral midbrains of lactacystin-lesioned animals, corresponding to human cases of Parkinsonism.

It may be concluded from the work of Vernon and colleagues that certain morphological features serve as surrogate markers for nigrostriatal degeneration *in vivo*. The data also suggests that the MRI signal changes in this model are not completely specific to the degeneration of the nigrostriatal pathway; thus, the usefulness of such markers may be limited in their diagnosis and study of PD. The researchers also conclude that this model may be extremely useful in studying dopaminergic neural degeneration, abnormal α -synuclein accumulation, and proteasome inhibition *in vivo*. It appears that an important future course of action in studies of PD is in determining what triggers α -synuclein accumulation, as this abnormality is seen robustly in patients and in animal models of PD.



Immunohistochemistry for alpha-synuclein showing positive staining (brown) of an intraneural Lewy body in the substantia nigra. Courtesy: Marvin_101 (Wikipedia)

References

1. Vernon, A.C., Johansson, S.M. & Mado, M.M. Non-invasive evaluation of nigrostriatal neuropathology in a proteasome inhibitor rodent model of Parkinson's disease. *BMC Neurosci.* **11**, 1 (2010).
2. Antonini, A., et al. T_2 relaxation time in patients with Parkinson's disease. *Neurology.* **43**, 697-700 (1993).

Student Research Presentations

The following students are recognized for their hard work and dedication to scientific research. They presented their findings in either poster format or through oral presentation at various research conferences within and outside of North Carolina! Those noted with "*" won a monetary award for best presentation at the indicated conference.

ECU Neuroscience Symposium

Heart Institute, Greenville, NC

November 1st, 2011

- Iola Conchar (Poster)
- Dorothy Dobbins (Poster)
- Latoya Perry (Poster)*
- Dioval Remonde (Poster)

ECU Research & Creative Achievement Week

Mendenhall Student Center

March 26 -30, 2012

- Stefania Blevins (Poster)
- Vanessa Buonopane (Poster)
- Iola Conchar (Oral)
- Suzanne Frisbee (Oral)*
- Joshua Hauserman (Poster)
- Danielle Martin (Poster)
- Lily Medina (Poster)
- Dioval A. Remonde (Poster)
- Alvin M. Tsang (Poster)



Comedian's Corner

How do parents teach their baby brains to greet one another?

Answer: Brainwaves

A father neuron was reunited with his daughter after being separated at birth during the great migration to the brain stem. When asked by reporters what he had named the little neurite, he replied, "But of course, my-e-len-cephalon."

Spotlight

Suzanne Frisbee



Profile

- ✓ BS, Neuroscience 2012
- ✓ Magna cum laude
- ✓ ECCSFN Council Representative 2010-2012

Awards:

- ✓ 2012: Best undergraduate oral presentation in the Social Science category at RCAW 2012 (\$50).
- ✓ 2011-2012: Undergraduate Research & Creative Activity award recipient (\$1500).
- ✓ 2011: ECU Summer Program for Future Doctors (\$2300).
- ✓ 2010: Duke University Summer Neuroscience Research Program (\$5000).

Thesis work: Conducted a one-year senior thesis project under Dr. Christyn Dolbier (Psychology). The thesis was titled, "*The Psychological and Neurological Mechanisms of Mindfulness Meditation Practice.*" It was presented at Senior Thesis Presentation Day in the Department of Psychology, May 3rd, 2012.

Career goals:

To earn an MD in Neurosurgery or Doctor of Optometry.



Journal Café

Photo: Courtesy of Wikipedia

The Journal Café was started in 2005 by Dr. Tran as a means for his lab assistants to interact and explore current topics in neuroscience. It has grown from being a lab-centered meeting to a bi-monthly vehicle for intellectual discussion that engages students across different disciplines including neuroscience, psychology, and biology. Students select a research article and make a 30-40 minute PowerPoint presentation. They lead the discussion by identifying the hypotheses in the paper, research methods/results, and elaborate on the conclusions. In turn, members in the audience ask challenging questions or present points of discussion, and the paper may be critically assessed for its strong and weak points. For some, the Café may simply be a mechanism for learning more about a topic and getting socially involved. The Café is open to all students that are interested in having intellectual discussions about neuroscience. Please inquire with Dr. Tran about meeting dates and location. Past presentations are shown below:

10.07.11 - Iola Conchar: Fortin et al. (2002). Critical role of the hippocampus in memory for sequences of events. *Nature Neuroscience*, 5(5), 458–462.

10.14.11 - Lily Medina: Chapman et al. (2011). Women have farther to fall: Gender differences between normal elderly and Alzheimer's disease in verbal memory engender better detection of Alzheimer's disease in women. *Journal of the International Neuropsychological Society*, 17, 654–662.

10.21.11 - Joshua Hauserman: Raine et al. (2010). Neurodevelopmental marker for limbic maldevelopment in antisocial personality disorder and psychopathy. *British Journal of Psychiatry*, 197, 186–192.

11.11.11 - Vanessa Buonopane: Boggiano et al. (2009). The Pavlovian power of palatable food: Lessons for weight-loss adherence from a new rodent model of cue-induced overeating. *International Journal of Obesity*, 33, 693–701.

11.18.11 - Joshua Hauserman: Hayes et al. (2011). Reduced hippocampal and amygdala activity predicts memory distortions for trauma reminders in combat-related PTSD. *Journal of Psychiatric Research*, 45, 660–669.

12.02.11 - Tiffany Phasukkan: Feinstein et al. (1999). Pathological laughing and crying in multiple sclerosis: A preliminary report suggesting a role for the prefrontal cortex. *Multiple Sclerosis*, 5, 69–73.

01.20.12 - Jeremy Edwards: Cruciani et al. (2011). Positive and negative emotional arousal increases duration of memory traces: Common and independent mechanisms. *Frontiers in Behavioral Neuroscience*, 5(86), 1–8.

02.03.12 - Amanda Huffman: Gadotti et al. (2012). Depressive-like behaviour of mice lacking cellular prion protein. *Behavioural Brain Research*, 227, 319–323.

02.17.12 - Elizabeth McGovern: De Ciantis et al. (2008). A functional MRI study of language disturbances in subjects with migraine headache during treatment with topiramate. *Neurological Sciences*, 29, S141–S143.

03.16.12 - Taylor Heilman: Johnson et al. (2012). Expression and resilience of a cocaine-conditioned locomotor response after brief and extended drug-free periods. *Behavioural Brain Research*, 230, 69–77.

03.30.12 - Sebastian Gil: Chen et al. (2012). Early fear as a predictor of avoidance in a rat model of post-traumatic stress disorder. *Behavioural Brain Research*, 226, 112–117.

Spotlight

Vanessa Buonopane



Profile

- ✓ BS, Neuroscience 2012
- ✓ BA, Psychology 2012

Current Research:

“Areas of Executive Functioning that May Impact Weight Loss in Obese Treatment-Seeking Adolescents” (RCAW 2012). This work was mentored by Dr. Lesley Lutes (Psychology) and was presented at Senior Thesis Presentation Day in the Department of Psychology, May 3rd, 2012.

Goals and Aspirations: To earn a master's degree before pursuing my doctoral degree in Clinical Psychology. My main interest is Health Psychology and the effects of cognition on those seeking weight loss treatments.

Achievements: My biggest achievement would definitely have to be graduating with two degrees in three years (Neuroscience and Psychology), but I am also taking with me a wealth of knowledge, research experience, and social connections that I can use in my future.

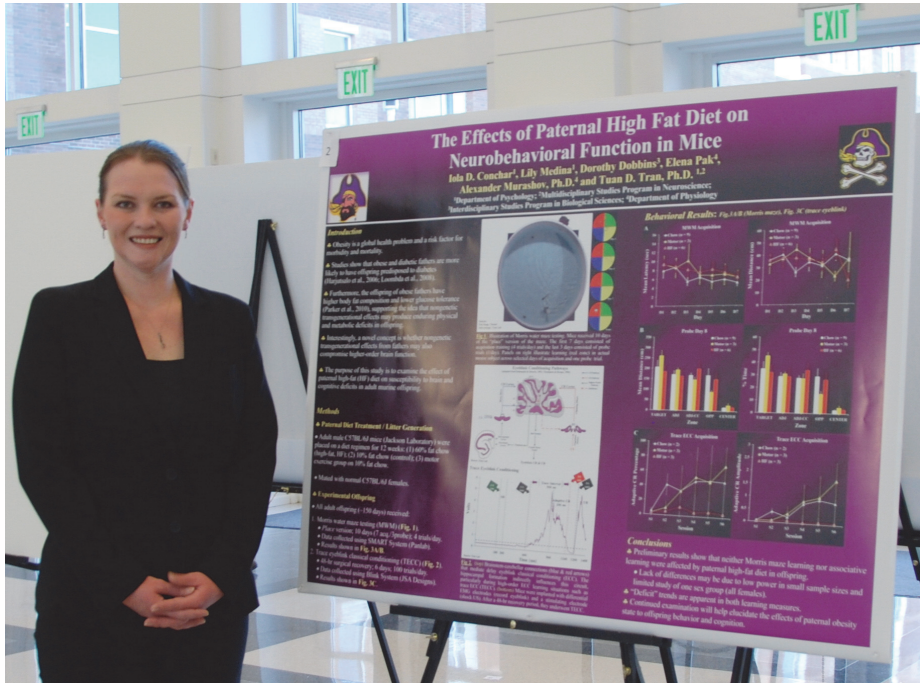


Comedian's Corner

With all of the hype over the TV show *G.L.E.E.*, the nerd-rons decided to form their own *G.L.I.A* Club.

Spotlight

Iola Conchar



Profile

- ✓ BS, Neuroscience 2011
- ✓ BA, Psychology 2011
- ✓ Cum laude
- ✓ MA Program in Research Psychology
- ✓ Associate Editor of *Brainstorm*
- ✓ Council Member, ECCSFN

Iola Conchar was a Psychology and Neuroscience double major. She contributed the following thoughts about her research experience and undergraduate career:

"In the spring of 2009, I took 'Introduction to Neuroscience,' a course taught by Dr. Tran, and it instantly captured my interest in explaining how the brain works in organizing behavior and complex mental processes such as attention, learning, memory, and motivation. It was this course that spurred my motivation to pursue neuroscience as a career, and thus I directed all my efforts in being more of a complete student. I was fortunate enough to become a research assistant for Dr. Tran later in the fall of 2009. Since joining his lab, I have gained a wealth of knowledge about the research process, proper scientific methodology, animal models of neurodevelopmental disorders, surgical procedures, and overall, how to be a better student."

She is currently a graduate student in the MA Program in Research Psychology at ECU and continues her studies under the mentorship of Dr. Tran. Her thesis work involves examining the neurobehavioral changes in a triple transgenic mouse model of Alzheimer's disease, which is funded by the Wooten Laboratory for Neurodegenerative and Alzheimer's Research. She has also been Associate Editor of *Brainstorm* since 2010, is co-author on three research posters, and presented one research paper. The paper was recently presented at ECU Research and Creative Achievement Week 2012, titled "*Examination of Neurobehavioral Impairments in a Triple-Transgenic Mouse Model of Alzheimer's Disease Across Development.*" She presented one of her posters at the 13th Annual Neuroscience Symposium in November, 2011, titled "*The Effects of Paternal High Fat Diet on Neurobehavioral Function in Mice,*" as a side project that involves collaborative efforts between Dr. Alex Murashov (Physiology) and Dr. Tran. Iola aspires to earn a Ph.D. in Psychology or Neuroscience and pursue an academic career in higher education.

Spotlight

Eden Rouse

Profile

- ✓ BS, Neuroscience 2011
- ✓ Summa cum laude
- ✓ Medical student, BSOM 2012
- ✓ Thesis mentor: Dr. Tamara Warner



Eden Rouse was a neuroscience major who conducted research under the mentorship of Dr. Tamara Warner in the Department of Psychology from 2010-2011. She completed a senior thesis project titled, *“Computer-Based Cognitive Rehabilitation in Pediatric Cancer Patients and Survivors.”* She contributed the following thoughts about her research:

“Recent advances in cancer treatment have significantly increased the 5-year survival rate for all childhood cancer patients in the U.S. since the late 1970s. As the survivors of childhood cancer become adults, new problems caused primarily by the cancer treatment (chemotherapy and radiation therapy), have emerged. These “late effects” can be found many years after the end of treatment. Cognitive late effects may include deficits in intellectual functioning, memory, attention, processing speed, and academic achievement. My work with Dr. Warner involves testing the feasibility and efficacy of a computer-based cognitive rehabilitation program to improve attention and working memory in pediatric cancer patients and survivors. If effective, computer-based cognitive rehabilitation could be a relatively cost-effective solution to help the thousands of pediatric cancer patients and survivors who struggle with thinking problems caused by their cancer treatment.”

Along with the research she conducted, Eden had a number of accolades including being the recipient of a Spring 2011 Undergraduate Research and Creative Activity (URCA) award for this project, being nominated for the 2010-2011 Outstanding Senior Award sponsored by the ECU Chapter of Phi Kappa Phi, and maintaining a 4.0 GPA in her first three years at ECU. She graduated from East Carolina University with a Bachelor of Science degree with Honors in Neuroscience and is a medical student at Brody School of Medicine. About her time as an undergraduate, Eden remarked, *“I know that the research I conducted with Dr. Warner and the time I spent working on this project will remain one of my fondest and most meaningful memories from ECU. I’m so grateful to all those teachers and faculty members who helped me along the way, because I could not have succeeded without their help.”*



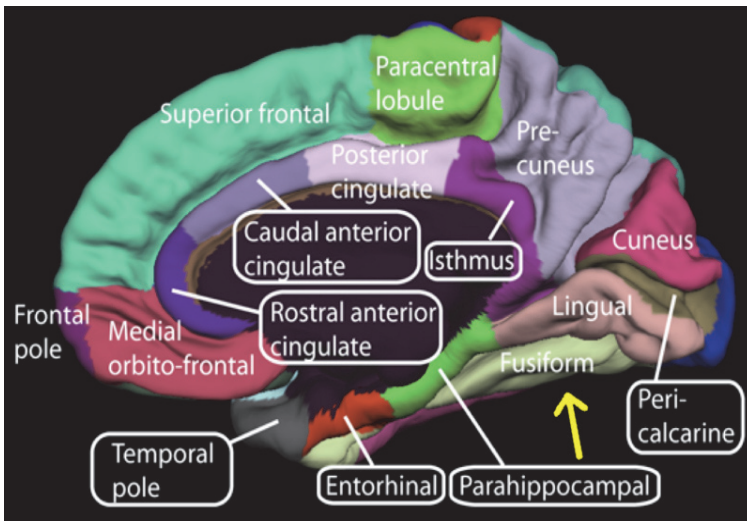
My FFA isn't Yours!

Elizabeth McGovern

• Neuroscience Major

(FFA, see figure) and damage may result in impaired ability to recognize faces, a condition known as prosopagnosia. The FFA was first discovered by Justine Sergent and colleagues¹ using positron emission tomography in human participants. It is quite a misnomer, as the FFA was later discovered to be important for recognizing familiar objects as well by Gauthier and colleagues². Whether the FFA is exclusively important for allowing us to recognize faces or familiar objects is still a matter of debate.

One interesting question is if two people are indeed using their FFAs to identify a friend, are they actually using the same location within their FFAs? Contrary to what is commonly taught to students in introductory level neuroscience



The fusiform face area is located on the fusiform gyrus (yellow arrow) at the base of the brain, and is adjacent to visual sensory areas (posterior) and areas involved with learning and memory (anterior). Courtesy: Hagmann et al. (2009), Wikipedia.

blood) than other areas of the brain that are relatively inactive. The researchers then measured how well the “landmarks” and functional areas corresponded within participants.

The results showed that the FEF, which are responsible for voluntary eye movements, had almost no variability in location throughout the subjects. This suggests that this functional area of the brain is in roughly the same location for everyone. The FFA, on the other hand, did not show the same relationship. The FFA has much more spatial variability between subjects, tending to be in different locations across different people. This type of spatial variation for a brain region is not limited to the FFA, as Frost and Goebel also found that the location of language areas were also likely to vary from participant to participant (e.g., Broca’s Area, which is responsible for producing speech) compared to areas that were not language related. What do these findings suggest? One speculation is that some specialized functional areas of the brain have different spatial locations stemming from how well utilized they are for each individual. Indeed, more research in the field of neural macro-anatomy will hopefully provide better insight as to why spatial variability exists across people.

References

1. Sergent, J., Ohta, S. & MacDonald, B. Functional neuroanatomy of face and object processing. A positron emission tomography study. *Brain* **115** Pt 1, 15-36 (1992).
2. Gauthier, I., Skudlarski, P., Gore, J.C. & Anderson, A.W. Expertise for cars and birds recruits brain areas involved in face recognition. *Nat. Neurosci.* **3**, 191-197 (2000).
3. Frost, M.A. & Goebel, R. Measuring structural-functional correspondence: spatial variability of specialised brain regions after macro-anatomical alignment. *NeuroImage* **59**, 1369-1381 (2012).

Did you know that we have areas in the brain devoted to recognition of faces? Apparently we do...two of them, one on each hemisphere. This neural region is known as the *fusiform face area* (FFA, see figure) and damage may result in impaired ability to recognize faces, a condition known as prosopagnosia. The FFA was first discovered by Justine Sergent and colleagues¹ using positron emission tomography in human participants. It is quite a misnomer, as the FFA was later discovered to be important for recognizing familiar objects as well by Gauthier and colleagues². Whether the FFA is exclusively important for allowing us to recognize faces or familiar objects is still a matter of debate.

One interesting question is if two people are indeed using their FFAs to identify a friend, are they actually using the same location within their FFAs? Contrary to what is commonly taught to students in introductory level neuroscience classes, functional areas of the brain are not as uniform in location as they were once believed to be. Or to put it this way, “My FFA doesn’t exactly have the same coordinates as your FFA.” Martin Frost and Rainer Goebel recently conducted a research study to help elucidate this idea³.

In their study, the relationship among 26 structural “landmarks” and 13 functional regions of the brain in 10 human participants was examined. The researchers used structural areas, such as sulci, as landmarks. Sulci are prominent grooves on the surface of the brain. They were able to almost perfectly align all of the major sulci in their participants, and therefore could use them as landmarks. Frost and Goebel then identified several functional areas on the participants’ brains. They then measured thirteen functional areas, including the FFA and frontal eye fields (FEF) using functional magnetic resonance imaging (fMRI). An fMRI machine measures brain activity by the amount of blood flow carried to an area of the brain. If an area of the brain is being used to process information, it requires more oxygen (carried by

Consolidation: Thanks for the Memories!



Ellen Sheffer (Psychology Major) and Dr. Tran at ECU Open House, April 2011. This is a bi-annual event for incoming freshmen and their parents to learn about various degree programs, such as Neuroscience!

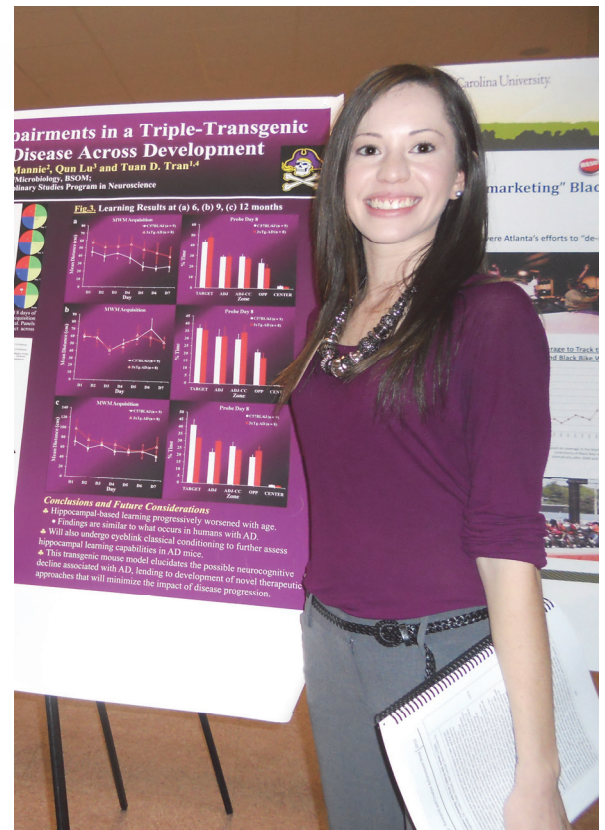


Dr. Tran and students from Ms. Dawn Peele's Anatomy and Physiology class at Rose High School. He presented a talk about current research efforts in better understanding Alzheimer's disease, as part of Brain Awareness Week on behalf of the Eastern Carolina Chapter of the Society for Neuroscience.



Comedian's Corner

A male brainstem and a female brainstem met up on a date. The female asked if he would like some cake and the male accepted. As the female turned to grab the cake, the male noticed a rather prominent feature on her and said, "Oh my!" Alarmed, the female dropped her plate and asked, "What's wrong?" Slightly embarrassed and blushed, the male politely replied, "Oh nothing, you have terrific pons!"



Lily Medina (Psychology BA, 2012) striking a good pose. She presented her work on a triple-transgenic mouse model of Alzheimer's disease at RCAW 2012.

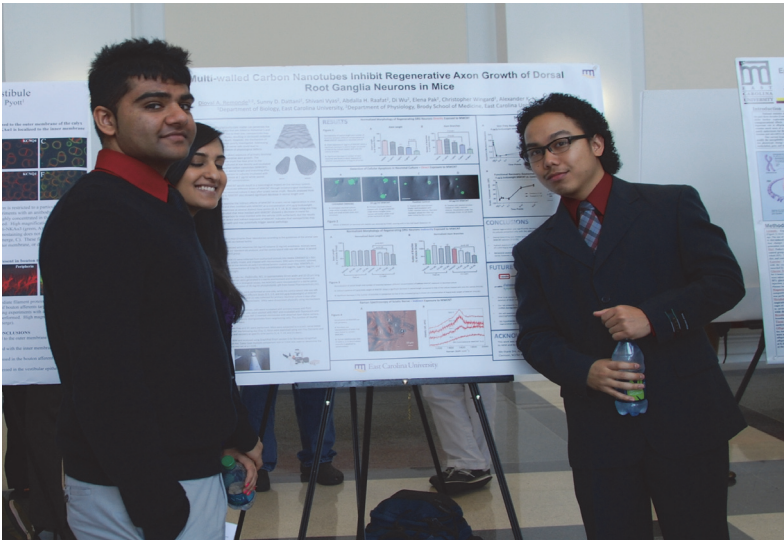


Joshua Hauserman (Psychology Major) looking cool and throwin' the pirate hook. He presented his work on the effects of paternal obesity on behavior and cognition in mice at RCAW 2012.

13th Annual Neuroscience Symposium



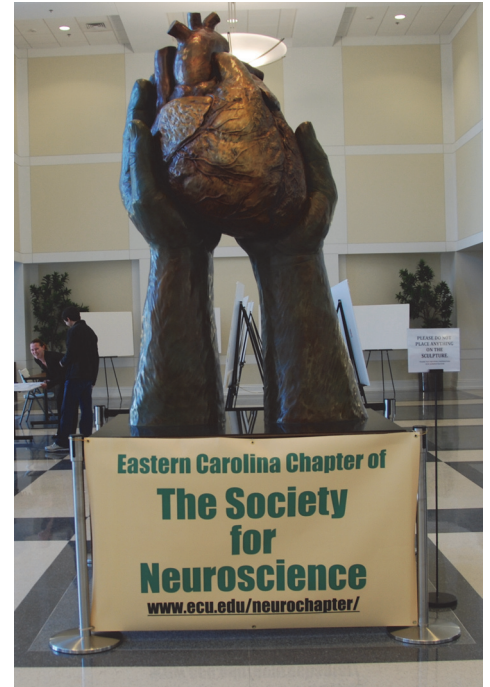
Latoya Perry (BS, 2012) explains her poster to Dr. Stefan Clemens.



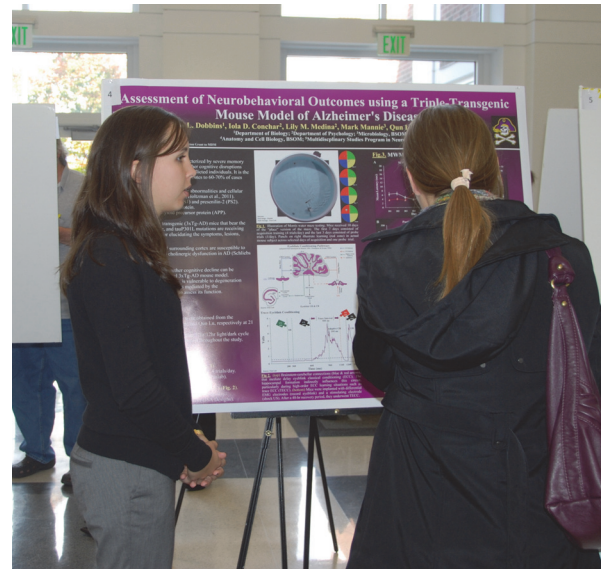
Sunny Dattani (left), Shivani Vyas (center), and Dioval Remonde (right) looking good for their group poster; Dr. Alex Murashov (mentor).



Dr. Kori Brewer (left) poses with winners of poster awards (Dr. Ben Keeler, Jeremy Braude from UNC-Wilmington, and Rebecca Howell from UNC-Pembroke).



The 13th Annual Neuroscience Symposium was held at the ECU Heart Institute on November 1st, 2011. This event allows faculty, clinicians, postdoctoral scientists, and students to present their research findings concerning all matters neuroscience and to promote collaborative efforts. It is a regional event that also attracts students and faculty from sister schools such as UNC-P and UNC-W.



Dorothy Dobbins (Neuroscience BS, 2011) talks about her poster; Dr. Tuan Tran (mentor).

Dr. Kori Brewer (left) poses with winners of poster awards (Dr. Ben Keeler, Jeremy Braude from UNC-Wilmington, and Rebecca Howell from UNC-Pembroke).

Recent Neuroscience Program Alumni

Class of Spring 2011

- *Iola Conchar* (BS)
 - Accepted into Psychology Research MA Program, ECU, Fall 2011
- *Dorothy Dobbins* (BS)
 - Accepted into Interdisciplinary Program in Biological Sciences, ECU, Fall 2011
 - Best undergraduate poster at the 12th Annual Neuroscience Symposium, 2010
 - Best undergraduate oral presentation in Biomedical Science category at RCAW 2011
- *Heather Evans* (Neuroscience Minor)
- *Michael Galobardi* (BS)
- *Robert Hazard* (BS)
 - Accepted into MS Program in Biological Sciences, ECU, Fall 2011
 - Undergraduate Research & Creativity Award recipient, 2011
- *Tiffany Lee* (BS)
 - Accepted into Brody School of Medicine, ECU, Fall 2011
 - Undergraduate Research & Creativity Award recipient, 2010
- *Andrew McGowan* (BS)
- *Sophie Nthiga* (BS)
- *Stephanie Page* (BS)
- *Eden Rouse* (BS)
 - Accepted into Brody School of Medicine, ECU, Fall 2011
 - Undergraduate Research & Creativity Award recipient, 2011



Comic Relief

A young cranial nerve got lost on the way to make contact with his assigned neurons. He encountered an elder nerve and asked what the current location is? The elder asked, "What's your name kid?" The young nerve responded, "Nevada." Without hesitation the elder replied, "Oh that's easy, VAGUS baby!"

Class of Spring 2012

- *Stefania Blevins* (BA)
- *Vanessa Buonopane* (BS)
- *Suzanne Frisbee* (BS)
 - Best undergraduate oral presentation in Social Science category at RCAW 2012
 - Undergraduate Research & Creativity Award recipient, 2012
- *Kyle Fulk* (BS)
- *Latoya Perry* (BS)
 - Best undergraduate poster at the 13th Annual Neuroscience Symposium 2011
- *Alvin Tsang* (Neuroscience Minor)

Past Neuroscience Program Alumni Recognitions

Congratulations to our past alumni who were recently accepted into these advanced programs:

- *Kara Burns* (2010) - Accepted into Virginia College of Osteopathic Medicine, Fall 2011
- *Michael Koury* (2009) - Accepted into MS Program in Biological Sciences, ECU, Fall 2011

Brainstorm

Please consider making a contribution to the Neuroscience Program. Your donation helps offset program expenses and fund student travel to scientific conferences. Checks can be sent to:

Neuroscience Program Foundation
c/o Exie Anderson, Bate 1002
Thomas Harriot College of Arts and Sciences
East Carolina University
Greenville, NC 27858

Dr. Tran is President-Elect of the Eastern Carolina Chapter of the *Society for Neuroscience* (<http://www.sfn.org>). The aims of this chapter are (1) to promote collaborative work amongst scientists from different disciplines across the ECU main campus and at Brody School of Medicine, (2) to provide advanced training for undergraduates, graduates, and postdoctoral fellows through research experience and seminars, (3) educate communities and schools about the nature of science and its findings, (4) inform lawmakers about scientific knowledge and its implications, and (5) to provide a forum for the exchange of ideas and information and ideas between East Carolina-area neuroscientists.

SOCIETY FOR NEUROSCIENCE



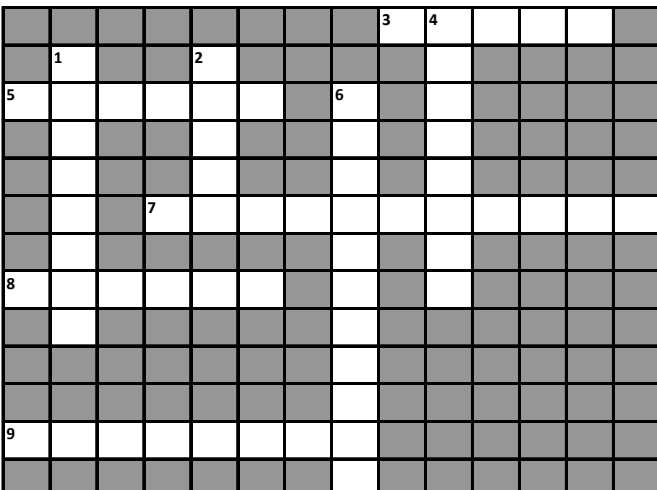
One for the road:

Two dendrites are sitting in a restaurant. One of the dendrites asks a waitress what the house special was for the day? She replies, "PKA, MAPK, and CaMKII." Within milliseconds, the dendrite asks her to repeat what she just said. She labors through reciting the house special and then he thanks her. But before she leaves, he abruptly asks her to repeat the special once again. Puzzled by his friend's apparent rudeness and lack of memory, the second dendrite says, "Dude, are you spineless?"

(Hint: Spine growth and plasticity...c'mon!)

Students, do you have any comments or want to contribute to the newsletter?

Please contact Dr. Tran (trant@ecu.edu) about how to get involved. We are looking for writers and editing contributors for the Spring, 2013 issue.



Mind Your Crossing

Are you up to the challenge?

Across

3. Father of modern neuroscience.
5. A brain cell.
7. A brain area that mediates learning and memory.
8. A female gametocyte.
9. A chemical transmitter that is lacking in Parkinson's disease.

Down

1. A type of protein that controls an ion channel.
2. Well known for his cell staining method.
4. A brain area that mediates emotional memory.
6. A brain area that executes motor behavior.