Saturday, April 13, 2019
High Point University
Congdon School of Health Sciences

Organizing Chairs:
Drs. Kristin Ackerman and Mike Grider

Sponsored by:
North Carolina Biotechnology Center
HPU Neuroscience Club and SGA
HPU URCW
HPU Cultural Affairs Grant: Dr. Veronica Segarra

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<td>Opening Welcome</td>
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<td>Neuro Art Collaborative</td>
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<td>Poster Session 1</td>
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<td>Noon - 1:00</td>
<td>Buffet Lunch / Faculty meeting</td>
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<td>1:15 - 2:15</td>
<td>Keynote Address: Dr. Matthew Rasband</td>
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<td>3:30 - 4:30</td>
<td>Poster Session 2</td>
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<td>Closing</td>
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Congdon Hall of Health Sciences

**FOURTH FLOOR**
1. Anatomy Lab
2. Dept. of Physical Therapy Administration
3. Medicinal and Pharmaceutical Chemistry Research Lab
4. Pharmacology Research Lab
5. Fred Wilson School of Pharmacy Faculty Offices

**THIRD FLOOR**
1. Dept. of Physician Assistant Studies Administration
2. Simulation Labs
3. Clinical Skills Lab
4. History and Physical Exam Lab
5. Ballroom
6. Standardized Client Suite
7. Infectious Disease Lab
8. Fred Wilson School of Pharmacy Administration

**SECOND FLOOR**
1. Lobby
2. Physical Therapy Neuroscience Lab
3. Virtual Reality and Gait Analysis Lab
4. Pharmacy Skills Laboratory Suite
5. Callcott Auditorium

**FIRST FLOOR**
1. Human Biomechanics and Physiology Lab
2. Willed Body Program
3. Pharmacy Collaboration Spaces and Classrooms
4. Musculoskeletal Lab

**EQUIPMENT LOCATIONS**
- Ballroom
- 3027
- 2047
- Callicutt Auditorium
- 2062
Dr. Rasband is a Professor and the Vivian L. Smith Endowed Chair in Neuroscience at Baylor College of Medicine. He is also the Director of the Neuroscience graduate program, in which he contributes to the teaching of several courses. Dr. Rasband’s research focuses on the mechanisms of formation and maintenance of nodes of Ranvier. His lab has identified the roles of key structural proteins involved in the assembly of nodes and has elucidated the function of these proteins in neuroglial interactions, demyelinating neuropathies, and following injury.

Julia Buntaine, a New York-based artist and editor of SciArt Magazine, has training in both neuroscience and the studio arts. Her work can be found in the permanent collections of New York University and Johns Hopkins University, and her international exhibits include shows in New York City, Amherst, Princeton, London, Toronto, Knokke, Sofia, and elsewhere. She states, “Beginning with biological form or data, my work departs into the world of aesthetics as I manipulate the idea through the use of scale, metaphor, material and form. Unlike articles and raw data, scientific ideas in the form of art inherently demand subjective judgment and interpretation, and my goal as a science-based artist is to provide my viewer an alternative way to understand the wonders of biology we have discovered in ourselves.”
Synaptic Plasticity in the crossed temporodentate pathway in female rats.

*Doyle, H, Ghosh, A, Soden, G, Barlis, K, Ramirez, JJ*

Department of Psychology, Neuroscience Program, Davidson College

Alzheimer’s disease (AD) is a debilitating neurodegenerative disorder characterized by memory loss. One of the principal early targets of AD is the entorhinal cortex (EC), a primary cortical input to the hippocampal formation. When the hippocampus is deafferented because of EC degeneration resulting from AD, several remaining afferents to the hippocampus undergo axonal sprouting. An established model to explore this concept in rats involves making a unilateral lesion of the EC, which elicits a sprouting response in fibers from the intact EC to the denervated contralateral dentate gyrus (DG) of the hippocampus, the so-called crossed temporodentate (CTD) pathway. Greater synaptic efficacy of lesion-induced, CTD sprouting has been found to occur as early as 6 days postlesion. To date, this model has been used almost exclusively in male rats, so it remains unclear whether the female brain evidences a similar kind of plasticity. The present study explored the nature of synaptic plasticity in the CTD in female rats 12 days postlesion. Male and female Sprague-Dawley rats received either unilateral entorhinal cortex lesions or sham operations, a craniotomy over the EC. A stimulating electrode was placed in the contralateral intact EC 12 days after a lesion or sham operation, and evoked field excitatory postsynaptic potentials (fEPSPs) were recorded in the DG ipsilateral to the lesioned EC. The paired pulse paradigm involved one pulse to the EC, known as the “conditioning pulse,” followed by a second “test” pulse at a range of interpulse intervals (IPIs; 10 to 500 ms). Additionally, estrus cycles of female rats were recorded by lavages on both operation days. Acetylcholinesterase Naik stain helped determine extent of sprouting in the septodentate pathway (SD), a hippocampal afferent that also projects to the denervated DG. Electrophysiological data show a lesion effect in the female CTD (p = 0.001) and in the males (p = 0.009). Interestingly, histological data show a significant synaptic response at ventral (p = 0.007) but not dorsal levels (p = 0.519), for both sexes, and females demonstrated higher levels of plasticity than males at dorsal level (p = 0.012). The electrophysiological findings of a lesion effect on synaptic efficacy in both sexes and the histological results that suggest females exhibit a more robust sprouting response dorsally at 12 days postlesion than males do prompt further investigation into the nature of synaptic plasticity in female rats.

Forced Abstinence from Cocaine Self-Administration in Rats Alters Prelimbic Cortical Astrocyte-Neuron Interactions.

*Hooker KN, Siemsen BM, Scofield MD*

Department of Biology and Program in Neuroscience, College of Charleston; Departments of Neuroscience and Anesthesiology and Perioperative Medicine, Medical University of South Carolina

Chronic cocaine users represent a significant portion of the population diagnosed with substance abuse disorder, characterized by high relapse rates even after prolonged abstinence. Preclinical models of self-administration (SA) have provided a method for studying the neuroanatomy implicated in addiction. Specifically, rodent models of cocaine SA have established a role for the prelimbic cortex (PLC) projection to the nucleus accumbens core (NAcore) in that dysregulated cortical glutamatergic transmission facilitates cue-induced craving, promoting relapse after abstinence. Excitatory synapses are found in subcellular structures referred to as dendritic spines, and synaptic plasticity is shaped by the interaction of the nonneuronal cells, astrocytes, with pre and post-synaptic compartments. Recent studies have shown that cocaine SA and abstinence increases dendritic spine diameter in PLC-NAcore neurons, while a period of extinction decreases astrocyte morphological features and association with synaptic markers in the NAcore, but not the PLC. In this study, we examined the effects of cocaine SA and abstinence on spine morphology and the extent to which the spines in the PLC-NAcore colocalize with synapses and astrocytes. In male rats, viral techniques were used to selectively label PLC-NAcore neurons and astrocytes prior to undergoing cocaine SA or receiving yoked-saline infusion followed by seven days of forced home cage abstinence. Animals were then transcardially perfused and immunohistochemistry performed on coronal sections of PLC. Confocal microscopy and 3D reconstruction were used to visualize morphology and colocalization with Synapsin I (non-specific synapse marker) and PLC-NAcore dendrites and spines. We observed that while cocaine SA followed by one week of abstinence decreased the astrocyte association with Synapsin I, the same conditions increased PLC-NAcore dendritic spine head volume as well as the degree to which astrocytes associate with these spines. Thus, astrocyte association with PLC-NAcore neurons is enhanced after abstinence from cocaine SA, whereas the association with non-specific synapses is decreased. While an improved understanding of the modifications occurring after drug administration and abstinence may provide a more focused target for reducing the likelihood of drug-seeking behaviors and relapse, future studies will examine in more detail potential modifications in related pathways. NIH R00DA040004, T32DA007288, F31DA041021
Effects of Sublethal Imidacloprid on House Cricket (Acheta domesticus) Neuron Firing Activity and Chirping Behavior.

Jenna Joyner, Jennifer Mozolic, Langdon Martin, David Coffey
Warren Wilson College

The use of pesticides to enhance crop yield is becoming increasingly prevalent as the human population continues to rise. Imidacloprid, a pesticide within a class of insect neurotoxins known as neonicotinoids, is the prevailing pesticide for treating common crop pests such as aphids and whiteflies. Neonicotinoids are designed to chemically mimic nicotine and bind to the same nicotinic acetylcholine receptors (nAChRs) within an insect’s nervous system that nicotine would bind to. Lethal doses of the toxin can result in apparent intoxication, tremors, paralysis, and death of an insect, but sublethal doses have been shown to have unusual and unintended effects on non-target organisms. Honey bees, for example, have been shown to have a reduced ability to navigate to their hives after being exposed to sublethal amounts of the pesticide. Crickets, another example of a potential non-target organism, may be susceptible to undesirable effects as well. Due to the observed partial paralysis causing effects of the neonicotinoid, it was theorized that sublethal doses of imidacloprid could affect important aspects of a male cricket’s chirping behavior, a characteristic vital for the reproductive success of the species. In this study, sublethal doses of imidacloprid were administered to crickets to investigate potential effects on chirp quality, for example, changes in the intra-chirp intervals which have been shown in previous studies to affect a female’s recognition of the mating call. Changes in neuron firing activity were also directly observed to assess the extent to which neuronal activity was being impaired by the neurotoxin. Preliminary findings from this study suggest that imidacloprid both affects neuronal response to a stimulus and duration of chirping.

Stress and College Students: The Impact of Nature and Tree Climbing.

Willibnganz SB
Department of Psychology, Warren Wilson College

Shinrin-yoku, the concept of spending time in a wooded area or green space, or ‘forest bathing’, promotes overall well-being and decreased stress (Park et al., 2010). Driven by an interest in mitigating college students’ stress due to its negative impact academic success and physical and mental health, this study investigated whether recreational tree climbing, as modified forest bathing, could similarly reduce stress in a college demographic. Twenty participants engaged in two climbing conditions for prescribed periods of time, with recreational tree climbing as the intervention and wooden tower climbing as the control. Participants’ stress was measured pre- and post-climbing for both conditions by completion of a self-reported survey to measure perceived acute stress, and physiologically via measuring heart rate, electrodermal activity, salivary cortisol concentration, and alpha brainwave activity levels. Results were significant for reductions in stress levels of college students post recreational tree climbing as measured by perceived acute stress, heart rate, and electrodermal activity. Additionally, alpha brainwave activity, a measure of stress absence, was significantly lower in the tree climbing group compared to the tower climbing group. Further study will provide additional insight into the potential of recreational tree climbing to provide a low-cost, accessible way for college students to manage stress.

Concurrent Session I:

You have the option to attend:

Julia Buntaine’s STEAM Neuro Art Collaborative
Room 3027

Student Elevator Pitch Talk
Callicutt Auditorium
1 Effect of In-Vivo Nicotine Treatment on Adult Zebrafish Brain
Allgood CS*, McCauley MK*, Mans KA
Georgia Southern University, Armstrong Campus

3 Autonomic Nervous System Dysregulation and Vagal Activity in Postpartum Depression and Anxiety
Ataei S, Kimmel MC, Rackers HS
Department of Psychiatry, UNC Chapel Hill

5 ISRIB as a Potential Therapeutic Drug for Neuronal Injury
Benz, Ian and Grider MH
Department of Biology and Program in Neuroscience, High Point University

7 Associations Between Lifetime Use of Classic Psychedelics, LSD, and Psychological Distress
Caudill, CV, Crawford, MS, Thorne, CB, Hendricks, PS
Department of Psychology, University of Alabama in Birmingham

9 The Effect of Semaphorin 3A on Chick Embryo Retinal Growth Cones
Cisse FN, Reed A, Birgbauer E
Department of Biology, Winthrop University

11 Studying pain neural circuits with viral vector rAAV2-retro in rat brains
Cunnane KA, Alvarado-Vazquez PA, Gwak Y, Peters C, Romero-Sandoval EA, Martin J, Eisenach J
Wake Forest School of Medicine Department of Anesthesiology

13 Synaptic Plasticity in the crossed temporodentate pathway in female rats
Department of Psychology, Neuroscience Program, Davidson College

15 Effects of C-terminal Mutations in Fused in Sarcoma on the Structure, Function, and Viability of Motor Neurons.
Garris RL, Henken HJ, Kaur A
Department of Neuroscience, University of North Carolina at Asheville

17 Adolescent Δ9-tetrahydrocannabinol (THC) and stress exposure predicts alcohol dependence in adulthood
Gilman HK, Smiley, L, Gass JT
Department of Biology and Program in Neuroscience, College of Charleston; Department of Neurosciences, Medical University of South Carolina

19 Characterizing the Interaction between Annexin Family Members and α-Synuclein, a Parkinson’s Disease Associated Protein
Hendrick SC*, Glidden EA*, Cantor AG*, Banks SML
Florida Southern College

21 Forced Abstinence from Cocaine Self-Administration in Rats Alters Prelimbic Cortical Astrocyte-Neuron Interactions
Hooker KN, Siemsen BM, Scofield MD
Department of Biology and Program in Neuroscience, College of Charleston; Departments of Neuroscience and Anesthesiology and Perioperative Medicine, Medical University of South Carolina

23 Analysis of CLARITY and Tert-Butanol Optical Clearing Methods on Fluorescence Preservation in the Chicken Visual System
Jeffrey Parham, Dr. Birgbuer
Winthrop University

25 Interleukin-1 receptor type 1 exercises a critical role in neurodegeneration following magnetic nanoparticle-induced focal cerebral ischemia
Katta A
Neuroscience Undergraduate Program, The Ohio State University
27 Heart Activity and Anti-Saccade Performance in Women with the Broad Autism Phenotype
Lateef AU
Department of Communication Science and Disorders

29 Probing Cognitive Control Neurocircuits: A Concurrent TMS-fMRI Investigation of State Dependence
Lopez JW, Mithoefer OJ, Dowdle LT, Badran BW, Summers PM, George MS, McTeague LM
Department of Psychology and Program in Neuroscience, College of Charleston; Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina

31 Nicotine as a gateway drug: Enhanced sign-tracking by nicotine leads to greater cocaine demand in rats
Majors CT, Harryman DC, Smith AL, Day TC, Pham M, Kosky MM, Stillwell E, Palmatier MI
Department of Psychology, East Tennessee State University

33 The Effects of p75NTR Signaling on Oxidative Stress-induced Dopaminergic Neurodegeneration
Department of Biological Sciences, Eastern Kentucky University

35 Cholinergic stimulation of the adult Zebrafish brain induces phosphorylation of GSK3-beta and ERK in the telencephalon of adult zebrafish
Powers GE, Hinton KD, Payne CH, Scheuermann NL, Saint-Jean M, Mans RA
Department of Biology, Georgia Southern University - Armstrong Campus

37 Impact of Nodal Perturbation on the Distribution of Nuclear Transport Proteins in Sea Urchin Neurogenesis
Shams R, Byrum CA
Department of Biology and Program in Neuroscience, College of Charleston

39 Impacts of Glucagon-Like Peptide-1 (9-36) on de novo protein synthesis-associated signaling pathways in a mouse model of Down syndrome
Stern JE, Wang X, Day SM, Ma T
Department of Neuroscience, Wake Forest University

43 Comparative study of flicker fusion frequency in three cockroach species
Vaughan DT, Triblehorn JD
Department of Biology and Program in Neuroscience, College of Charleston

45 The Effect of Valence Priming Labels on Ratings and Neural Processing of Ambiguous Sounds
Willingham K, Zeitlen D, Barrera M, Neelon M
Department of Psychology, University of North Carolina Asheville

Concurrent Session II:
You have the option to attend:

Julia Buntaine’s STEAM Neuro Art Collaborative Room 3027
Student Elevator Pitch Talk Callicutt Auditorium
2 Volunteering, Major Depressive Disorder, and the Default Mode 3 Network
Anderson GE, Ballard PJ
Department of Family and Community Medicine, Wake Forest School of Medicine

4 Identifying the molecular components of cold nociception in Drophila melanogaster
Department of Biology, James Madison University

6 Gut Microbiome Effects on Cocaine Seeking Behavior in Adolescent and Adult Male Rats
Brock N, Anthony B, Kasiah J, Suess G.J, Williams B.F, Chassaing B, Frantz K.J.
Department of Neuroscience, Georgia State University

8 Adolescent nicotine exposure has long-term effects on dopamine release in the nucleus accumbens in rodents
Christensen BA, Pitts EG, Ferris MJ
Department of Physiology & Pharmacology, Wake Forest School of Medicine

10 The Effect of a Stand-Alone Mindfulness Exercise on Anxiety
Clark AM, Gill V, Sivakumar A, Blumenthal, TD
Department of Psychology, Wake Forest University

12 Nicotine Differentially Effects the Expression of nAChR in the Developing Zebrafish
Dew J and Ackerman KM
Department of Biology and Program in Neuroscience, High Point University

14 In an in-vitro model of hypoxia, Cannabidiol (CBD) has not demonstrated neuroprotective effects in neuronal cells
Dunn JM and Grider MH
Department of Biology and Program in Neuroscience, High Point University

16 The Effects of Cholinergic Degeneration in the Septodentate Pathway on LTP Induction in the Perforant Path of Rats
Davidson College

18 The effects of ethanol on Periplaneta americana (American cockroach) general locomotor behavior
Gurba JD, Triblehorn JD
Departments of Psychology and Biology and Program in Neuroscience, College of Charleston

20 Resting-state functional connectivity abnormalities in patients with amnestic mild cognitive impairment and the role of the posterior cingulate cortex
Hohmeister MR, Benitez AM, Joseph JE
Department of Biology and Program in Neuroscience; Departments of Neuroscience and Neurology, Medical University of South Carolina

22 Activation of norepinephrine neurons in nucleus tractus solitarius in response to acute morphine exposure
I.M. Bravo, K.T. Schmidt, E.S. Cogen, Z.A. McElligott
Department of Psychiatry - Bowles Center for Alcohol Studies, UNC Chapel Hill

24 Effects of Sublethal Imidacloprid on House Cricket (Acheta domesticus) Neuron Firing Activity and Chirping Behavior
Jenna Joyner, Jennifer Mozolic, Langdon Martin, David Coffey
Warren Wilson College

26 Structural and Biophysical Characterization of the Human Neuropeptide Galanin
Kraichely KN, Hendy CM, Clinkscales S, Giuliano MW
Department of Chemistry and Biochemistry and Program in Neuroscience, College of Charleston
28 The Role for Complement in Optic Nerve Regeneration
Leung, K. S., Benowitz, L. I., and Peterson, S. L.
Department of Neurosurgery, Boston Children’s Hospital, Harvard Medical School

30 The neuroprotective potential of Cannabidiol in an in vitro model of peroxidase injury
Lyons S and Grider MH
Department of Biology and Program in Neuroscience, High Point University

32 Dark Adaptation is not Necessary to Drive Light-Induced Retinal Regeneration in Adult Zebrafish
Muhr J and Ackerman KM
Department of Biology and Program in Neuroscience, High Point University

34 Use of 3D Printed Capacitive Touch Objects for Object Recognition Tasks
Potts K., Strauss J., Drye G., Stevanovic K., Cushman J.D.
Neurobehavioral Core, Neurobiology Laboratory, NIEHS

36 A Quantitative Comparison of Hippocampal and Cortical Cultures Within Microfluidic Devices
Rogers J, Tharkika N, Taylor A
Biomedical Engineering, UNC Chapel Hill

38 The Accessory Stimulus Effect is enhanced by a prepulse preceding an intense startle-eliciting acoustic stimulus
Sivakumar AP, Snipes LB, Blumenthal TD
Wake Forest University

40 Design and implementation of a custom-made device to measure two-bottle choice of fluid consumption in mice
Tanas JK, Schmidt KT, McElligott ZA
Bowles Center for Alcohol Studies, UNC Chapel Hill

42 Meeting young neuroscientists at their individual starting points
Tucker H, LaFratta B, Franssen RA, Hennings M, Franssen CL
Longwood University

44 Stress and College Students: The Impact of Nature and Tree Climbing
Willihnganz SB
Department of Psychology, Warren Wilson College

46 Reducing scrimmages may significantly reduce concussion rate in high school football
Zimmerman B, Kelley M, Contillo N, Flood W, Urban J, Stitzel J.
Wake Forest School of Medicine, Department of Biomedical Engineering