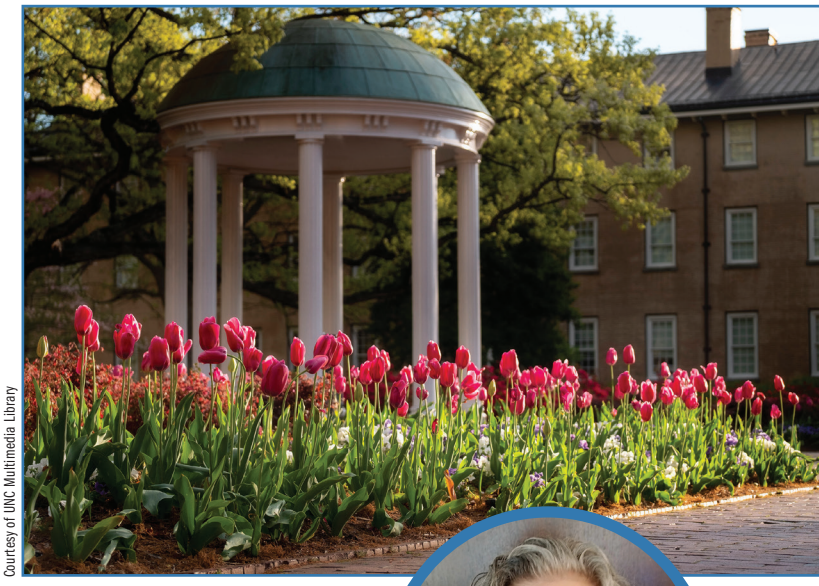
DEPARTMENT OF
PSYCHOLOGY & NEUROSCIENCE
2019 NEWSLETTER

TASK FORCE ADDRESSES MENTAL HEALTH ISSUES AT CAROLINA

Mental health concerns are on the rise in the United States, with a corresponding uptick in the demand for psychological services. National College Health Assessments by the American College Health Association measured U.S. undergraduates from 2011 to 2018 and found that self-reports of overwhelming anxiety and depression rose significantly, with percentage increases of 24% in anxiety and 34% in depression over a seven-year period. UNC Chapel Hill is experiencing a rise of mental health distress at rates similar to these national averages; as a result, Executive Vice Chancellor and Provost Bob Blouin and former Vice Chancellor for Student Affairs Winston Crisp convened a Mental Health Task Force in 2018 to assess the scope of mental health care needs, evaluate best practices, and provide evidence-based guidance and recommendations.

Dr. Erica Wise, Clinical Professor and Director of our Community Clinics, was charged with chairing the 25-person committee in this yearlong effort, culminating in a 46-page report and presentation to the Board of Trustees in May 2019. "We had some amazing people on the committee," says Dr. Wise. "Dean Crisp assembled a very deep bench of people, including faculty and staff from Advising, Housing, Campus Health, the Counseling Center, and emergency psychiatry services. We also had substantial student involvement, including the Student Body President, co-chairs of the Graduate and Professional Student Federation, and representatives from student activist groups." The Mental Health Task Force accomplished their mission of producing an extensive review of mental health and well-being on-campus through the work of four subcommittees, including Wellness and Prevention, Early Identification and Ongoing Support, Treatment, and University Policies and Procedures, with smaller working groups tasked with assessing areas of concern and exploring potential actions.

The Mental Health Task Force's report included nearly 60 recommendations across the campus community, with a particular focus on undergraduates, graduate and professional students, and post-doctoral fellows. Dr. Wise shares, "In addition to examining broad mental health trends, we wanted to hold up a mirror to ourselves to identify sources of stress that we were unnecessarily adding to the lives of our students." Matthew Clayton, a second-year Clinical Psychology graduate student, serves as Co-President of Stigma Free Carolina, a student organization that is devoted to the de-stigmatization of mental health and wellness. "The Mental Health Task Force and its report represent a step in the right direction for the university," Matthew says. "Only by critically looking inward at university policies can we begin to address the systemic underlying barriers to campus-wide mental health improvements."



Courtesy of UNC Multimedia Library

DR. ERICA WISE

Leveraging resources from across campus, the Mental Health Task Force utilized faculty expertise to provide crucial insight, including researchers in the Department of Psychology and Neuroscience. "For example, Dr. Anna Bardone-Cone provided us with a great resource that concluded that individuals who are in recovery from eating disorders are more likely to relapse if they're continuing to track their calorie and exercise intake," explains Dr. Wise. As part of the general education curriculum, UNC requires a Lifetime Fitness (LFIT) course that combines the practice of a sport or physical activity with broader instruction in lifelong health, and one requirement of the course has involved tracking food and exercise. "Some students

continued on page 2

CONTENTS

TASK FORCE, *continued from page 1*

were anecdotally reporting relapses of eating disorders," says Dr. Wise. "This is one example of our willingness to examine university policies and practices. There is already work underway to revamp some of our large-scale messaging." Dr. Wise also consulted with Dr. Mitch Prinstein for his expertise on suicidality and the task force utilized data from the 2015 High-Risk Alcohol and Substance Abuse Report, whose working group included Psychology and Neuroscience faculty members Drs. Charlotte Boettiger, Andrea Hussong, and Abigail Panter. "Colleagues assisted us with accessing and interpreting some of the large-scale studies, and this really brought a psychological science perspective into the process. Their input resulted in a higher quality and more meaningful report," says Dr. Wise.

The report by the task force is currently under review by the Provost and his team, but some recommendations are already being implemented. 24/7, a hotline for around-the-clock counseling and support, was launched in August, following a recommendation for after-hours student access to mental health services. "Previously, students could call Counseling and Psychological Services (CAPS) after-hours and be connected with the triage nurses at UNC Hospitals," says Dr. Wise. "Now, with CAPS 24/7, students can call the CAPS number after regular business hours and be connected to a qualified counselor. This provides immediate access and 24/7 was a direct result of our recommendations for CAPS to improve accessibility, ease, and navigability."

Recommendations in the report also included clarifying medical term withdrawal and readmission policies and processes for students, increasing access to care and cultivating supportive environments, promoting wellness and academic coaching, and conducting further assessments on our campus, among others. "What I hope will happen, and was one of our primary recommendations, is for there to be a permanent mental health committee created on-campus," shares Dr. Wise. "This committee should be staffed with the people who can best do the work of considering all of these recommendations and suggest strategies and steps for moving forward. A permanent committee would ensure that this work continues." Matthew agrees, "It is important that the work doesn't end with the Mental Health Task Force report. This will take concerted and consistent effort by administrators, staff, faculty, and students."

Reaction from the community, including the Board of Trustees, Provost, and Parents' Council, has been very positive according to Dr. Wise. "I was really pleased, because it was a major project. There's been a lot of real passion and commitment to this, because who has not been affected either personally or by a professional colleague, a friend, or a loved one with mental health issues? By serving on this project, it felt that I was able to give back to the University that I have loved throughout my career."

The Mental Health Task Force report is available online at http://mentalhealthtaskforce.web.unc.edu/files/2019/05/MHTF-Report-5.21.19.pdf.

ONLY BY CRITICALLY LOOKING INWARD AT UNIVERSITY POLICIES CAN WE BEGIN TO ADDRESS THE SYSTEMIC UNDERLYING BARRIERS TO CAMPUS-WIDE MENTAL HEALTH IMPROVEMENTS.
– MATTHEW CLAYTON

[FACULTY *Spotlight*]

BRIDGING LOVE AND DATA SCIENCE

Psychologists have produced extensive research showing the importance of relationships to our health and well-being. But how do they begin? What is it about our very first interactions that forge our best relationships?

Dr. Sara Algoe, Associate Professor of Social Psychology, directs the Emotions and Social Interactions in Relationships Laboratory (EASIR, pronounced "easier") where she studies what makes interactions between people easier and the implications for the long-term health of relationships. She has studied people in a wide variety of relationships, including friends, romantic partners, roommates, and sorority sisters.

Recently, Dr. Algoe studied strangers who witness other people's kindness. She and her team used experiments to show that people who witnessed one person express gratitude to another – even in just one line of text – were more helpful toward the grateful person. The witnesses were also more willing to help the person to whom gratitude was expressed and were interested in being friends with both people.


DR. SARA ALGOE

Dr. Algoe shares, "This has important implications for the impact of expressed emotion in our everyday lives, like within the workplace, in our families, or within our communities. It also shines a spotlight on the power of kindness to influence multiple members of a social group, simultaneously – someone does something kind that might elicit gratitude, thereby enhancing the relationship between the kind person and the grateful person, but we now know that witnesses who see that gratitude are also drawn to both the grateful person and the originally kind person, thereby setting the stage for better relationships among all group members, over time."

It was this type of powerful effect that made Dr. Algoe more interested in studying love itself – how we see love in everyday life and its impact. "I dug into the literature and thought there was a big opportunity to bring more data to questions like mine," she says. "When we study people in ongoing relationships, it's so expensive to collect the data, to bring them into lab, and it's really time-consuming. We collect as much data as we possibly can for that investment of time and money." The result is a large amount of data that are not all used in early publications. "There's millions of dollars' worth of data sitting in people's labs, and nobody knows it's there except the PIs and other members of their labs."

Dr. Algoe recently received a grant from the John Templeton Foundation to develop a data science initiative, the Love Consortium (https://www.theloveconsortium.org). Working with the Odum Institute, she has launched a customized version of UNC Dataverse – which is a platform for archiving data – where people who study relationships can describe data they've collected and find collaborators. "By doing that, we should be able to move faster on research questions," she shares.

By making other researchers aware of previously unknown datasets, Dr. Algoe anticipates innovation and rapid scientific advances in psychology and neuroscience. "But it's also more rigorous because you have the opportunity to have replication across many data sets," she adds. The Love Consortium will be a resource for researchers to test their hypotheses and to broaden the conversation. "The ask is to get people to simply describe datasets in a standardized way – there is no requirement for the researcher to upload any files, like materials, code books, or data. They can if they want to, but the description itself is what opens doors."

[GRADUATE STUDENT *Spotlight*]

PROMOTING ACADEMIC SUCCESS THROUGH EARLY CHILDHOOD PROGRAMS

Ensuring all children start school with the cognitive, academic, and school skills needed to succeed has been a priority for policymakers, teachers, parents, and researchers for several decades, yet there are still many unanswered questions that have important policy implications. Early care and education (ECE) programs are designed to promote school readiness skills in children from birth to 5 years old, before entry to formal school, yet often the effects from these programs fade once children enter elementary school. Researchers, including Kylie Bezdek, a fourth-year Developmental Psychology graduate student, are investigating whether preschool programs are targeting the skills that promote long-term learning and which aspects of preschool classroom quality are associated with the skills that are most important for lasting success.

Using a large longitudinal study with over 1,200 children, the Family Life Project at UNC's Frank Porter Graham Child Development Institute followed children from birth through elementary school to examine the development of children growing up in rural areas. Kylie explains, "Few studies have taken this approach of examining trajectories rather than an outcome at a single timepoint, but it is an important methodological step, because it allowed us to ask which school readiness skills predicted subsequent learning – not just higher levels of skill at a specific time." Kylie, who is involved in secondary analyses of the project, shares that they found that academic skills, like reading and mathematics, were the best predictor of respective skills in those domains at the start of elementary school. However, foundational cognitive skills, like language and executive function were the best predictors of gains in almost all areas of school readiness. "The development of language and executive function are both found to be highly dependent on one's environment," she says. "For language development, children need to be exposed to rich language inputs from their caregivers – labeling objects in the environment, asking a lot of questions, book reading, and talking often with a child are some of the ways in which a parent or caregiver can promote language development. Executive function is a set of complex cognitive processes that are found to be promoted by warm, sensitive caregiving." These findings suggest that these skills may be more broadly targeted in ECE programs to promote long-term success in learning, and Kylie hopes to continue to understand how these early childhood skills are related to inform how interventions can promote growth in other domains.

Kylie is also involved in another project at Frank Porter Graham called "Early Education in Rural North Carolina," which is funded through the Institute of Education Sciences to reduce achievement gaps by understanding the classroom practices that lead to desired gains in skills. North Carolina is one of six states that is conducting this work, and UNC's team is following a group of children who attended state-funded pre-kindergarten (pre-K) programs and a matched sample of children who did not attend pre-K, until they reach the third grade. "Through this study, we hope to identify the school and classroom practices that are associated with better learning outcomes so that future children may have the best chance to thrive academically and socially in school," shares Kylie.

Kylie was recently awarded a prestigious State Policy Fellowship by the Society for Research in Child Development due to her strong background and innovative research in early care and education programs. Fellows are placed in state executive branch offices that work on pre-K programs to gain insight into how research can be used to inform policymaking and policy implementation, and to bridge the gap between research and policy. As Kylie's goal is to produce policy-relevant research, she feels fortunate to be placed at the North Carolina Department of Health and Human Services' Division of Child Development and Early Education (DCDEE). "Although I have just begun my work at DCDEE, I can already see that this will be an invaluable experience that will help me to address research questions that are important to policymakers and practitioners in the future," says Kylie. "The skills that children may need for school develop most rapidly in the infant and toddler years, so I was excited to work with DCDEE because they have several new initiatives centered on improving the care and education of North Carolina's infants and toddlers. My hope is that my fellowship will provide me with a roadmap for how to disseminate my research in a way that is most impactful for improving the future of our children."

KYLIE BEZDEK

THROUGH THIS STUDY, WE HOPE TO IDENTIFY THE SCHOOL AND CLASSROOM PRACTICES THAT ARE ASSOCIATED WITH BETTER LEARNING OUTCOMES SO THAT FUTURE CHILDREN MAY HAVE THE BEST CHANCE TO THRIVE ACADEMICALLY AND SOCIALLY IN SCHOOL. – KYLIE BEZDEK

[AWARD *Spotlight*]

RECOGNIZING SERVICE LEADERS AT CAROLINA

The Donald T. Lysle Service Award in Psychology and Neuroscience was introduced this past academic year as our first-ever student service award. This newly created award recognizes an undergraduate student majoring in psychology or neuroscience who has made exemplary service contributions and honors Dr. Donald Lysle, who has served as Department Chair since 2007. Alyssa Aihui Guo '19 was selected as the inaugural recipient and received the Lysle Award at the Chancellor's Awards Ceremony on April 16, 2019.

"I think that it is extremely fitting that a service award is what represents our department," says Dr. Jeannie Loeb, Director of Undergraduate Studies, who led a committee in the creation of this award and its inclusion into the Chancellor's Awards Ceremony, the only campus-wide awards ceremony at Carolina. "We want to make sure that we excel not only in the academic arena, but that we are contributing to the greater community – whether it is within UNC or the surrounding areas. We felt there was a need for an award that recognizes those that consistently contribute to the community."

With over 1,000 service hours on UNC's campus and hospitals, Alyssa was clearly dedicated to serving the community, but it was her commitment to founding new initiatives to meet unaddressed needs that made her the top choice by the selection committee. "Alyssa took on a lot of leadership roles over her years here, which is above and beyond simply contributing to the community," says Dr. Loeb. "It takes so much work to be the main coordinator and motivator behind these kinds of efforts. The fact that she kept it up for so many years was quite impressive to us."

Alyssa created two major organizations at Carolina, including the Undergraduate Research Society (URS) and the Student Health Action Coalition's (SHAC) Mandarin Interpreting Service. The mission of URS is to raise undergraduate awareness of research on-campus and to promote research accessibility by connecting undergraduates with graduate students and faculty members. Alyssa explains, "Starting the Undergraduate Research Society was meant to bridge the scientific language barriers among students and researchers." During meetings, students present research articles that are geared towards undergraduates. URS prepares and provides members with background information to help students of any level to understand the papers and edits presentations for overall ease of comprehension. Faculty researchers are invited to URS meetings where, following student presentations, they offer their expertise and facilitate further discussion, with the goals of building vocabulary, understanding research methods, and learning about advances in various fields. Importantly, Alyssa shares, "URS is a safe place for inquiry."

During the first year of URS, Alyssa hosted five journal clubs and three social events with over a hundred student attendees, with themes ranging from cancer biology to chemistry. She says, "The variety of topics covered in journal clubs is instrumental in exposing students to different fields that they may not encounter in the classroom. Learning a wide-range of topics is especially important as we nudged them a little closer to finding their passion in the most unexpected places."

In addition to building an interactive research society, Alyssa co-founded SHAC's Mandarin Interpreting Service to break down language barriers for families in a healthcare setting. "SHAC was especially meaningful for me because it allowed me to reflect on my own experiences," shares Alyssa. "When I first moved to the U.S., I remember being in doctors' offices only watching their body language because I didn't speak English. I felt small and hopeless. Helping others who struggle with the same problems I experienced adds to the perspective of finally being in a place where I'm able to pay it forward and address the issues I've encountered."

Alyssa received the Donald T. Lysle Award from Interim Chancellor Kevin Guskiewicz in April and is now a first-year medical student at the University of South Carolina's School of Medicine. "I was really grateful and honored to have received the Donald T. Lysle Award," she says. "Knowing that my efforts have made a difference for others has cemented my passion for service, an indispensable component of my character that I will cherish and bring with me as I enter the medical profession."

WHEN I FIRST MOVED TO THE U.S., I REMEMBER BEING IN DOCTORS' OFFICES ONLY WATCHING THEIR BODY LANGUAGE BECAUSE I DIDN'T SPEAK ENGLISH. I FELT SMALL AND HOPELESS. HELPING OTHERS WHO STRUGGLE WITH THE SAME PROBLEMS I EXPERIENCED ADDS TO THE PERSPECTIVE OF FINALLY BEING IN A PLACE WHERE I'M ABLE TO PAY IT FORWARD AND ADDRESS THE ISSUES I'VE ENCOUNTERED. – ALYSSA GUO

ALYSSA AIHUI GUO '19 WITH INTERIM CHANCELLOR KEVIN GUSKIEWICZ

Courtesy of UNC Chancellor's Awards Committee

[UNDERGRADUATE *Spotlight*]

REZNICK GRANT EVOLVES TO ENGAGE UNDERGRADUATES IN RESEARCH

The J. Steven Reznick Diversity and Psychological Research Grant, created in memory of Dr. Reznick, a close friend and colleague in the Department, is entering its third year of supporting undergraduate students in research. The Reznick grant honors Dr. Reznick's championing of efforts to enrich diversity in research and supports students from underrepresented backgrounds or those who are interested in conducting research applicable to traditionally underrepresented populations in psychological research. Carrington Merritt '18 was the inaugural recipient of a $4,000 Reznick grant in Spring 2018 and her mentor, Dr. Keely Muscatell, shares, "Carrington was a superstar who had been pretty heavily involved in research already. The Reznick grant gave her funding to just fully focus on research."

In its second year, the Reznick grant was separated into two awards of $2,000 each. Donna Kaye, who created the fund with her late husband Dr. Reznick, explains, "When we reviewed the applications during the first year of the Reznick grant, we noticed that those students who were already experienced in working in a research lab were able to submit much more extensive applications than those who had little or no research experience." To make the process fairer for these two groups of students, the Reznick grant launched a pilot in Spring 2019 to award two grants – one for an undergraduate with research experience and another for an undergraduate with little to no research experience. Dr. Muscatell, who now chairs the selection committee, says, "One grant goes to support someone like Carrington, who was already involved in research and on an amazing trajectory, but another goes to someone who is really interested in getting involved in research, but not already connected or embedded in a lab. I really like this approach a lot, because we know that there exist disparities in who even knows about what research is or how to get involved and approach a faculty member."

Two Reznick grants were awarded in Spring 2019 to juniors Dillon Rubalcava and Desman Wilson. Dillon had been working for two years in Dr. Kristen Lindquist's laboratory, and Desman was a new lab member in Dr. Kurt Gray's Mind Perception and Morality (MPM) Lab. During his Reznick semester, the grant supported Desman as he examined the perceptions of morality in discrimination in artificial intelligence. "Obviously, I'm a college student, and there are a lot of expenses, like books, that the grant helped me pay for. The Reznick grant took a lot of stress off," says Desman. "But more importantly, it helped me in other ways – when you are awarded something that other people think is really good, then they want you and it starts a snowball effect. The Reznick grant was a good start to the snowball."

DESMAN WILSON

Desman's involvement in research has clearly expanded since his Reznick semester. As a senior this year, he continues to work in the MPM Lab with Dr. Gray and has also joined the Social Neuroscience and Health Lab with Dr. Muscatell, where he is administering Trier Social Stress Tests. Over the summer, Desman had the opportunity to work in Dr. Maria Gendron's Affective Science and Culture Lab at Yale University, where he helped create a dictionary for LIWC, a text analysis tool. He also credits the Reznick grant with helping him secure a spot in our competitive Karen M. Gil Internship Program. This semester, he's gaining valuable experience as a Gil Intern at the UNC Center for Health Equity Research and is working on his honors thesis in the MPM Lab. After graduation, Desman plans to pursue a Ph.D. in Social Psychology.

The Reznick grant selection committee considers the pilot of two separate grant awards to be a resounding success and plans to continue this model in Spring 2020. Donna recently attended the department's information session on the Reznick grant for applicants to ask questions and learn more about how to apply. "Much to my delight, 70% of the attendees were students who were new to research – many of them first-year students – with the majority of students from diverse backgrounds," enthuses Donna. "I could almost feel how excited Steve would have been to have this level of interest in research from first-year students from such diverse backgrounds."

Dr. Muscatell agrees, "There's a lot of interesting research indicating that getting involved in research as an undergraduate is actually predictive of continuing in a STEM field, even after graduation. Carolina is a great place for research, and I think that having this specific award for an undergraduate who hasn't been involved in research is really critical, because it brings someone new into the fold." As a Reznick scholar, Desman is continuing to serve as an ambassador for the grant and sharing his research experiences with peers. "I think it's important that the department has this grant, because it highlights the really impressive work that undergraduates are doing," says Desman. "It's also really reinforcing for students if they get the award or even an honorable mention – it makes you feel like you're on the right path. It gives you guidance and reassurance that you're doing something right."

BY THE NUMBERS

Your generous donations through the College of Arts and Sciences Foundation provided the following support last year:

6 Graduate Fellowships

26 Graduate Students with Research Support

12 Faculty Members with Research Support

41 Graduate Students with Travel Support

24 Undergraduate Student Interns

26 Undergraduate Students with Research Support

Your generosity allowed us to reach our educational and research objectives – which we couldn't have done without you!

Thank you!

To make a gift, please visit: http://psychology.unc.edu/make-a-gift.

[GRADUATE STUDENT *Spotlight*]

NOVEL TECHNOLOGY MAY LEAD TO ADVANCES IN ALZHEIMER'S DISEASE

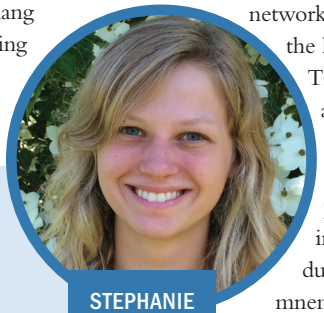
The hippocampus, a medial temporal lobe brain structure, is considered to be a convergence area in the brain – in which integration between cortical regions and the hippocampus is critical for the successful encoding and retrieval of episodic memory. Several subfields within the hippocampus play a distinct role in memory, with each mediating its own mnemonic function, such as match detection (discerning whether features or pairs of items were previously encountered together) or discrimination (distinguishing between highly similar items). Abnormalities in hippocampal subfields are associated with many illnesses, including Alzheimer's disease, schizophrenia, and depression; however, there are significant gaps in our understanding of hippocampal functional connectivity with cortical regions.

Technology has limited researchers' ability to learn more about subfields in the hippocampus and how they interact with cortical regions. Standard functional magnetic resonance imaging (fMRI) has a spatial resolution of about 3mm, which allows for isolation of the hippocampus from other brain structures, but cannot separate the hippocampal subfields. High-resolution fMRI, with 1.5mm resolution, allows for fairly detailed segmentation of the hippocampus, but the field of view is limited to the hippocampus and surrounding medial temporal lobe structures. "We know that brain regions do not act in isolation," says Stephanie Langella, a fourth-year graduate student in Cognitive Psychology. "This small field of view precludes one's ability to examine connectivity between the subfields and other brain regions."

Due to these technical limitations, prior fMRI studies have been severely limited to either the hippocampus or immediate surrounding structures, or to cortical connections with the hippocampus as a unified structure, thereby preventing concurrent examination of hippocampal subfield-cortical interactions. Research has shown that the hippocampus and surrounding medial temporal lobe is a densely connected circuit, with specific subfields differentially supporting mnemonic processes. In Alzheimer's disease, individual subfields degenerate faster than others, and examining mnemonic functions supported by those subfields may provide an avenue to identify individuals early in the disease progression. Whole-brain function networks, which support mnemonic encoding and retrieval, are also disrupted in Alzheimer's disease. "Neurons are in constant communication with one another, so if one region starts to degenerate, that can have an immense impact on areas across the brain," explains Stephanie. "The hippocampus is a convergence area – simply focusing on the hippocampus is disregarding a wealth of information." The current field of cognitive neuroscience has yet to combine these levels of analysis and uncover how these millimeter-sized subfields within the hippocampus relate to the rest of the brain, including memory networks.

Stephanie's research aims to bridge these levels of analysis with a study involving a sample of healthy young adults in collaboration with Dr. Wei-Tang Chang of UNC's Biomedical Research Imaging Center. Dr. Chang developed a novel imaging sequence combining whole-brain field of view with 1mm resolution on a 7T scanner, which allows for even finer grained distinction of the hippocampal subfields without sacrificing the utility of whole-brain imaging. Her project combines Dr. Chang's imaging sequence with a memory task that involves two different subfields in the activity of discrimination and match detection. This important work is producing the first results that document hippocampal-subfield cortical interactions.

Analysis from the study will assess hippocampal subfield contributions to episodic memory-relevant networks, such as the posterior medial (PM) and anterior temporal (AT) networks. "These networks are both important for episodic memory, and both show dysfunction in Alzheimer's disease," says Stephanie. "The PM network is related to the context of an event, things like where and when, while the AT network is related to the objects in the event, recognizing the items and associations between them. The information carried by these networks converges in the hippocampus."



STEPHANIE LANGELLA

The study will also directly compare hippocampal subfield involvement during specific mnemonic processes. Data collection is still ongoing, but preliminary results are encouraging. Stephanie shares, "The high-resolution scanner and imaging sequence are resulting in cleaner and more detailed images than we are used to getting, and we're reliably separating hippocampal subfields that have previously had to be combined due to lower spatial resolution."

Although Stephanie's project is currently examining healthy young adults, she plans to extend these innovative methods to aging populations, both healthy and those at an increased risk for Alzheimer's disease. "We're combining multiple sensitive methods: a cognitive task sensitive to memory declines in Alzheimer's, examination of subfield-level activity, and connectivity analyses. Our hope is by combining them into a single study, we can produce greater ability to differentiate healthy aging from pre-clinical Alzheimer's disease. We want to identify individuals before they develop a clinical diagnosis," she says. "My primary research interest is to identify cognitive and biological markers of pre-clinical decline due to Alzheimer's disease, and I believe this study is an important first step in doing so."

WE'RE COMBINING MULTIPLE SENSITIVE METHODS: A COGNITIVE TASK SENSITIVE TO MEMORY DECLINES IN ALZHEIMER'S, EXAMINATION OF SUBFIELD-LEVEL ACTIVITY, AND CONNECTIVITY ANALYSES. OUR HOPE IS BY COMBINING THEM INTO A SINGLE STUDY, WE CAN PRODUCE GREATER ABILITY TO DIFFERENTIATE HEALTHY AGING FROM PRE-CLINICAL ALZHEIMER'S DISEASE. WE WANT TO IDENTIFY INDIVIDUALS BEFORE THEY DEVELOP A CLINICAL DIAGNOSIS. — STEPHANIE LANGELLA

[GRADUATE STUDENT *Spotlight*]

EXPLORING THE LINKS BETWEEN OXIDATIVE STRESS AND DRUG SEEKING BEHAVIORS

To date, no FDA-approved pharmacological treatments exist for psychostimulant use disorders, which involve addiction to psychostimulants like cocaine, amphetamine, and methamphetamine. Accordingly, development of effective interventions that can countermand the cellular adaptations that drive relapse remains a priority. "Drugs of abuse disrupt the biological functioning of our natural reward systems," explains Emily Witt, a fourth-year graduate student in Behavioral and Integrative Neuroscience. "This makes it extremely difficult for those with a substance use disorder to inhibit use – despite their desire to reduce consumption." Studies show that 85% of people who attend treatment clinics relapse to regular use within the first year after discharge, and – among cocaine users – about 50% of individuals relapse by day 50.

Existing evidence indicates that cocaine-use leads to elevated markers of oxidative stress, a disruption in the balance of production of reactive oxygen species and the body's antioxidant defenses. Reactive oxygen species have unpaired electrons, which can lead to cellular damage when inadequately kept in check by antioxidants. These elevated markers of oxidative stress may contribute to drug-seeking behaviors. Emily is studying how nicotinamide (NAM), a form of vitamin B3 that can inhibit or reverse markers of oxidative stress, may influence cocaine-seeking behaviors in a pre-clinical study. Using a self-administration and reinstatement model of addiction, rats are trained to press a lever for cocaine. Every day for 12 days, each successful lever press results in the delivery of cocaine along with the presentation of drug-paired cues, including light and tone. Following self-administration, an 'extinction period' begins for the animals, where they can press the lever, but no longer receive cocaine or any drug-paired cues. "Over a period of days, the lever pressing declines to close to zero," Emily says. "For two and a half weeks during the cessation of self-administration, rats receive daily treatment of NAM or, in the control group, saline." Following treatment, the rats' desire for cocaine is measured through tests of reinstatement, with 5-second presentations of light and tone drug-paired cues, in which rats may make subsequent presses on the lever.

Reinstatement tests in rodent models provide a measure of drug-seeking associated with relapse in humans. Relapse can be precipitated by the availability of drug-paired cues, by stressors, or by re-exposure to the drug itself. Interestingly, Emily found that daily treatment with NAM reduced lever pressing during reinstatement in response to the re-introduction of drug-paired cues, but not in response to the re-introduction of cocaine itself. "This result suggests that NAM somehow specifically reduces the salience of drug-paired cues that can trigger relapse," explains Emily. "Different brain areas are involved in different aspects of drug-seeking. The fact that NAM only reduces cue-primed, but not drug-primed seeking may suggest that NAM's effects are most beneficial in one brain area." Another remarkable finding was that the effect of NAM on cocaine-seeking was specific to male rats. NAM had no effect on cue-driven reinstatement in female rats, which supports a growing body of literature indicating that the neurobiology of substance use disorders and drug relapse may differ between males and females.

"These tests in animals are the first step in a long process to help develop treatments that may reduce relapse vulnerability in humans," shares Emily. "Sometimes I think of research as a relay race and that we're just one part of the team, handing off the baton to the next member. Many others before me have shown the qualities and function of NAM in cells; many more have shown what types of deficits are caused by cocaine. Combining those two pathways of knowledge led me to test the effects of NAM on drug-seeking in an animal model. Perhaps in the future, clinical trials can be used to assess efficacy as an anti-relapse treatment in humans."

Based on Emily's preliminary findings, NAM shows promise as a compound that could successfully reduce cue-primed cocaine-seeking, but her next step is learning how NAM reduces this desire and why it seems to be only effective for males. This task is complicated by the fact that NAM has multiple effects on cells. "In order to develop effective treatments for psychostimulant use disorder, it's essential to understand how drugs of abuse alter cellular activity," says Emily. "Discovering how NAM is able to specifically reduce cue-prime seeking in males will greatly inform knowledge regarding drug-induced alterations in the brain. This research is exciting to me because it provides another piece of knowledge to a larger puzzle – eventually, I hope this research provides the information needed to develop a treatment to help those with substance use disorders."

EMILY WITT

Psychology & Neuroscience | UNC COLLEGE OF ARTS & SCIENCES

DEPARTMENT OF PSYCHOLOGY & NEUROSCIENCE
The University of North Carolina at Chapel Hill
235 East Cameron Avenue
Chapel Hill, NC 27599-3270

ADMINISTRATION

DONALD T. LYSLE
Chair

REGINA CARELLI
Co-Associate Chair

SHAUNA COOPER
Director, Diversity Initiatives

KAREN GIL
Co-Associate Chair

KELLY GIOVANELLO
Director, Neuroscience Curricula

DEBORAH JONES
Director, Research Services

JEANNIE LOEB
Director, Undergraduate Studies

KEITH PAYNE
Director, Graduate Studies

MAKE A GIFT ONLINE!

Visit us at
psychology.unc.edu/make-a-gift

[GREETINGS *from the* CHAIR]

DEAR ALUMNI AND FRIENDS,

DR. DONALD LYSLE

I hope our newsletter finds you well! Every year, we put together a small sampling of the excellent research conducted by our faculty and students in psychology and neuroscience and I am glad to share some of their successes with you.

This year has been another exciting one at Carolina! We launched our new Neuroscience major this Fall, and have been astonished to see over 500 undergraduate students have already declared as Neuroscience majors! To provide these students with research-intensive experiences, several of our faculty members, including Drs. Kelly Giovanello, Rachel Penton, and Sabrina Robertson, have been working hard to develop NeuroMethods laboratory courses, which will engage students in the practice of neuroscience research in a working wet lab. We are in process of renovating a laboratory space that will allow undergraduates to train in microscopy, electrophysiology, and on a cryostat. Dr. Robertson will teach the first course on brain imaging and fluorescent microscopy in Spring 2020, and we are looking forward to sharing more about these new neuroscience research methods courses in our next issue.

Our faculty members and students have won many impressive honors over the past year, and I am pleased to share a few here with you. Shannon Blakey, a graduate student in Clinical Psychology, received the American Psychological Association (APA)'s Outstanding VA Trainee Award, which recognized Shannon as the top psychology trainee in the entire Veteran Affairs System. Dr. Peter Ornstein, Professor Emeritus, was honored with the APA's Mentor Award in Developmental Psychology for his dedication to excellent mentorship and training of our next generation of research leaders. Two of our faculty were elected Presidents of national psychology organizations, including Dr. Barbara Fredrickson in the Society for Affective Science and Dr. Eric Youngstrom in APA Division 5. Dr. Beth Kurtz-Costes was awarded a university teaching award, the William C. Friday/Class of 1986 award, for her distinguished teaching and mentoring of underrepresented undergraduate students. Dr. Todd Thiele received a prestigious MERIT Award from the National Institute on Alcohol Abuse and Alcoholism to guarantee his laboratory funding for at least another five years to explore the role of neuropeptide Y in binge alcohol drinking. Our students and faculty members are clearly leaders in the field, and we feel very fortunate to have them here in our department.

So much of what we do depends on the generous support we receive from alumni and friends of the department. We are appreciative of any gift, large or small. If you have already made a gift to us this year, we thank you for your generous support and for helping us maintain our academic excellence for current and future students.

I hope you enjoy hearing news from us in this issue. When you visit Carolina, I invite you to visit us on-campus! Our first floor lobby has recently been renovated with new places to sit, talk, and perhaps catch-up on the readings for class. We would love for alumni and friends to visit our new spaces in Davie Hall.

Sincerely,

Donald T. Lysle

Donald T. Lysle, Ph.D.