Elissa Aminoff, Daniel Leeds: ***Representing Human Relevant Context in Convolutional Neural Networks***

Abstract:

In recent years, the intersection between human vision and artificial vision has reached a scientific pivotal point. At one end, with the development of convolutional neural networks (CNNs) computer vision has been able to score remarkable success rates in identifying and categorizing images. At the other end, research in the cognitive neuroscience realm has progressed greatly in understanding the way human vision is represented in the brain, from low-level feature integration to high-level categorization of visual information. This vast progress has led scientists in both fields to begin and apply tools, methods and insights from one realm to the other. For example, in human perceptual neuroscience, we apply computational models of vision to learn more about the potential features that the brain is using to yield the fast and rich understanding of our environment. In computer vision, inspiration from human perceptual neuroscience is used to create potential shortcuts and more efficient processing streams. The separate advances in each field and the emerging exchange of knowledge between the fields make interdisciplinary research that combines computer vision and human vision one of great potential. One area not tapped into yet is the role of contextual associations perceiving the visual world. The goal of the proposal is integrating computer science and human cognitive neuroscience to better explicate the role and representations of contextual associations in vision to reveal the mechanisms underlying human vision as well as to build better and more efficient artificial vision systems.

Marija Kundakovic, Heining Cham: ***Sex-specific effects of early-life stress on cocaine addiction vulnerability***

Abstract:

Cocaine use disorder remains an important public health problem in the USA, with nearly million Americans over age 12 struggling with the disorder in 2017. Women are more sensitive to the effects of cocaine; they transition to addiction faster, have more difficulty remaining abstinent, and experience more adverse consequences of cocaine use. While there is evidence that factors such as biological sex and early life trauma increase the risk for cocaine addiction, the underlying biological mechanisms remain poorly understood and there is still no FDA-approved drug to treat cocaine use disorder. Here we propose a well-designed, multifactorial animal study which will test the effects of early-life stress, biological sex, and estrogen status in females on cocaine addiction vulnerability. We will also look into the expression of relevant genes in the key brain reward area in order to provide a mechanistic insight into sex-specific effects of stress on cocaine addiction. The study combines the expertise of two faculty members: Dr. Marija Kundakovic (Biological Sciences), with strong experience in molecular biology and modelling of stress and behavior in animal models; and Dr. Heining Cham (Psychology) with strong expertise in multifactorial data analysis. The proposal builds on our previously published findings and represents an ideal opportunity to test whether and how early life stress may be contributing to the sexual dimorphism in cocaine addiction vulnerability. Our study may reveal new molecular candidates and novel approaches to treat cocaine addiction in males and females.

Ipsita Banerjee, Amy Roy, Lindsay Hoyt, Tiffany Yip: ***A Multimethod Assessment of Stress in College Students***

Abstract:

Stress is an integral aspect of the college experience. Addressing the prevalence and detrimental impacts of stress in college students is crucial. A recent study of nearly 100,000 college students from over 100 colleges nationwide shows that nearly one in four report being diagnosed with, or treated for, a mental health disorder in the past year, with stress found to be the greatest predictor of a mental health diagnosis, suicidality, and self-injury (Liu et al., 2019). Identifying both chronic and acute stress levels in students can help inform the development of interventions to mitigate their adverse effects.

The current study draws on methodological and substantive expertise in the Chemistry and Psychology Departments to collect data from 50 pre-med students at Fordham University to investigate the physiological and self-reported stress before and after an acute stressor, the Organic Chemistry I final exam. Because the long-term goal of this research is to inform interventions to ameliorate the physical and mental health impact of stress, the study will also investigate individual differences in how students respond to acute stress, as conditioned by their chronic stress levels.

The proposal will help to institutionalize a Chemistry-Psychology collaboration to support faculty research, student research training, external NIH and NSF grant submissions and contribute to a growing science of college student health and adjustment. The proposal's interdisciplinary focus is well aligned with NSF's focus on basic mechanisms of social functioning and development as well as NIH's mission to advance optimal health outcomes.

Sudip Vhaduri, Tiffany Yip: ***Uninterrupted Sensing and Automatic Detection of Spatio-Temporal Factors Towards a Better Reporting of Sleep Quality***

Abstract:

As the economy progresses and new technologies emerge, more people are struggling with sleep-related difficulties. According to the National Institutes of Health, about 50 to 70 million Americans have sleep disorders, and 1 in 3 adults do not regularly get the recommended amount of uninterrupted sleep they need to protect their health. Poor sleep quality adversely affects people's health and well-being, productivity, academic success, and cognitive capability. These impairments can also affect traffic and industrial safety, and national economic developments. To better tackle these problems, it is important to accurately understand people's sleep quality. The objective of this research to develop an approach to utilize sensor data from wearables and smartphones and machine learning techniques to automatically detect different nocturnal events, such as snoring and coughing, in multi-person noisy environments in order to objectively report parts of the self-reported sleep quality and respiratory diseases assessment tests, which are widely used by researchers, physicians, and healthcare providers. To further automate the sleep quality assessment, we plan to develop generalized and personalized sleep duration estimation

models considering various spatio-temporal factors detectable from smartphones and wearables. Our findings will provide a foundation for future sleep research using wearables and smartphones. This has the potential to inform the individuals about their estimated sleep duration and quality to foster the design and delivery of adaptive mobile health interventions to empower people to lead healthier lives.

Robb Hernandez, Stephen Sohn, Matthew Chin: ***Transnational AAxL (Asian American by Latinx Digital Cultural Studies) through the Caribbean/ New York Nexus***

Abstract:

Our proposal, "Transnational AAxL (Asian American by Latinx Digital Cultural Studies) through the Caribbean/ New York Nexus," specifically seeks to address the alignments and interrelationalities between Asian/Americans and Latinx communities in New York City and the Caribbean. To that end, our projects work in synergy to explore the transnational dynamics that link Asian American and Latinx populations from New York City with Caribbean cultures and contexts. According to Basil Wilson, "The non-Hispanic Caribbean foreign-born population amounts to 5.3 percent of the United States population, according to data from the 2000 Census. When those macro-data are disaggregated and New York City is isolated, the Caribbean foreign-born compose 20.8 percent of that population. That figure supersedes the figure of European foreign-born, at 19.4 percent" (34). Given the unique historical and social configuration of the Caribbean, the so-called "foreign born" hail from various racial backgrounds, including many of whom identify as Latinx and/or Asian. Our project seeks to address such intriguing cultural convergences and peculiarities, especially through the unique archives produced out of the transnational bridges between New York City and the Caribbean. We anticipate AAxL emerging as a regional and national leader in comparative ethnic digital studies by fostering the long needed public archives, original scholarship, and teaching toolkits to combat the longstanding ethnic silos severing comparative dialogues. In this sense, Fordham, with its demographics and location, is uniquely poised to bring this particular stage of AAxL into being.