

STEM BYTES SEMINARS

Summer 2024 | 9:00 - 10:00 am PT | Zoom | Open to the USC community

Monday, June 17



Shao-Hung Chan

Flex Distribution for Bounded-Suboptimal Multi-Agent Path Finding

Abstract: Multi-Agent Path Finding (MAPF) is a problem of finding collision-free paths for a set of agents moving in a shared environment. In this talk, I will introduce our new way to speed up solving MAPF bounded-suboptimally via so-called flex distribution.

Bio: Shao-Hung Chan is a Ph.D. candidate at the University of Southern California, advised by Professor Sven Koenig. His research interests are based on multi-agent system, especially in developing heuristic search algorithms that solve Multi-Agent Path Finding (MAPF) in the large-scale environment such as automated warehouses.



Brandy Weathers

Serotonin Deficiency from Constitutive SKN-1 Activation Drives Pathogen Apathy

Abstract: My research focuses on how the immune system responds to a dangerous pathogenic infection caused by *Pseudomonas aeruginosa* (PA14) using a model organism, the roundworm, *Caenorhabditis elegans*, as it contains similar immune responses to humans and responds to a lethal pathogenic infection caused by PA14. By studying a genetic variant of *C. elegans* with a constantly active immune defense mechanism, known as SKN-1, I intend to discover how the immune system communicates during pathogenic stress, and reveal new targets of SKN-1 in order to enhance our understanding of host-pathogen interactions and improve immune responses.

Bio: Brandy is a PhD student in molecular biology with a research focus on cellular stress response mechanisms and pathways that differentially promote survival. Her research uncovers novel connections between immune and neuronal pathways in organismal health and aging and in the context of pathogen defenses. She has been recognized for her leadership in STEM mentorship programs that have cultivated an environment of growth and individuality amongst students.

Monday, July 1



Ecrin Yagiz

Heart in Motion: Real-time Cardiac MRI at 0.55T

Abstract: This presentation will be divided into two parts. In the first part, I will delve into the broader field of medical imaging, with a specific focus on Magnetic Resonance Imaging (MRI). In the second part, I will discuss Cardiac MRI and its real-time applications, allowing for the visualization of the heart's movement in real-time. Additionally, I will share results from my involvement in research conducted at DISC (Dynamic Imaging Science Center) at the USC UPC campus.

Bio: I am currently pursuing a Ph.D. in the Department of Electrical and Computer Engineering at USC, working with Dr. Krishna Nayak. My research focuses on dynamic imaging of the human body, particularly the heart, using Magnetic Resonance Imaging (MRI). Prior to joining USC, I received my Ms.c. and Bs.c. in Electrical and Electronics Engineering from Bilkent University, Ankara, Turkey. There, I worked with Dr. Emine Ulku Saritas on Magnetic Particle Imaging (MPI). My interests span across signal and image processing, mathematical optimization, and computational imaging.



Diamond Mangrum

Modeling the Cue Signal Response Competition in Tumor Cells

Abstract: Extracellular stimuli are processed by biological signaling networks to regulate critical cell decisions like proliferation-differentiation, growth-quiescence, and death-survival. In my work, I aim to understand how these signaling networks transmit signals through a cell by activating cell surface receptors and then recruiting intracellular signaling proteins in a series to evoke specific responses from the cell.

Bio: Diamond graduated with a dual degree from North Carolina Agricultural and Technical State University in 2020, where she served as Miss North Carolina A&T State University. Beyond her academic pursuits, she aspires to reach the stars as an astronaut and has already made strides toward this goal through impactful internships at NASA's Kennedy Space Center and NASA's Langley Research Center. In her relentless pursuit of breaking barriers, Diamond created a platform for underrepresented voices in academia called "melanated.phd" on Instagram, to inspire the next generation of diverse scholars.

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Monday, July 15



Qinyuan Ye

Cross-Task Generalization Abilities of Large Language Models

Abstract: Humans can learn a new language task efficiently with only few examples, by leveraging their knowledge and experience obtained when learning prior tasks. In this talk, I will present my work on (1) benchmarking cross-task generalization abilities with diverse NLP tasks; (2) developing model architectures for improving cross-task generalization abilities; (3) analyzing and predicting the generalization landscape of current state-of-the-art large language models.

Bio: Qinyuan Ye is a fifth-year PhD student at USC Department of Computer Science, advised by Professor Xiang Ren. Her primary area of study revolves around natural language processing (NLP) and artificial intelligence (AI). Her research seeks to enable human-level learning abilities in NLP systems. Towards this goal, she explores novel forms of supervision (explanations and instructions) and learning paradigm (meta-learning).



James Flemings

Privacy in the Era of Large Language Models

Abstract: In this talk, I will motivate why privacy is needed for large language models, then I will discuss the challenges of providing privacy, the existing solutions, and future directions.

Bio: James Flemings is a second-year PhD student at the University of Southern California, advised by Murali Annavaram in the REAL@USC-Meta Center. He is a recipient of the NSF Graduate Research Fellowship and is currently interning as a research scientist at TikTok in the Privacy Innovation Lab. His research broadly spans privacy in large language models.

Monday, July 29



Tooraj Helmi

Exploring General Purpose LLM Limitations in Performing Professional Tasks

Abstract: This exploration will discuss why general-purpose large language models (LLMs) cannot independently perform professional tasks, focusing on their limitations in handling complex, context-sensitive tasks, the constraints of their training data, and the ethical challenges they face in professional environments.

Bio: I am a fourth-year returning PhD student in the Computer Science department, focusing on the impact of Large Language Models on software engineering, with a particular emphasis on software architecture and development. I resumed my PhD studies in 2020 after a decade-long career in the software industry, during which I held various roles, most recently as the Head of Product and Engineering at builder.ai. Returning to academia during such a pivotal time in computer science has been incredibly rewarding, and I cherish the opportunity to reconnect with the campus that holds so many fond memories for me.



Elizabeth Ondula

Navigating Safe Campus Operations During Epidemics with Reinforcement Learning

Abstract: SafeCampus incorporates a custom RL environment, leveraging a stochastic epidemic model, to realistically represent university campus dynamics during epidemics. Our results also illustrates the inherent trade-off in characterized by the dilemma between stricter measures, which may effectively reduce infections but impose less educational benefit (more in-person interactions), and more lenient policies, which could lead to higher infection rates.

Bio: Elizabeth is a sixth-year PhD student at the University of Southern California, advised by Bhaskar Krishnamachari. She completed her Bachelor of Engineering in Electrical and Electronics Engineering from Technical University of Kenya and her research focus is on Applied Reinforcement Learning.