

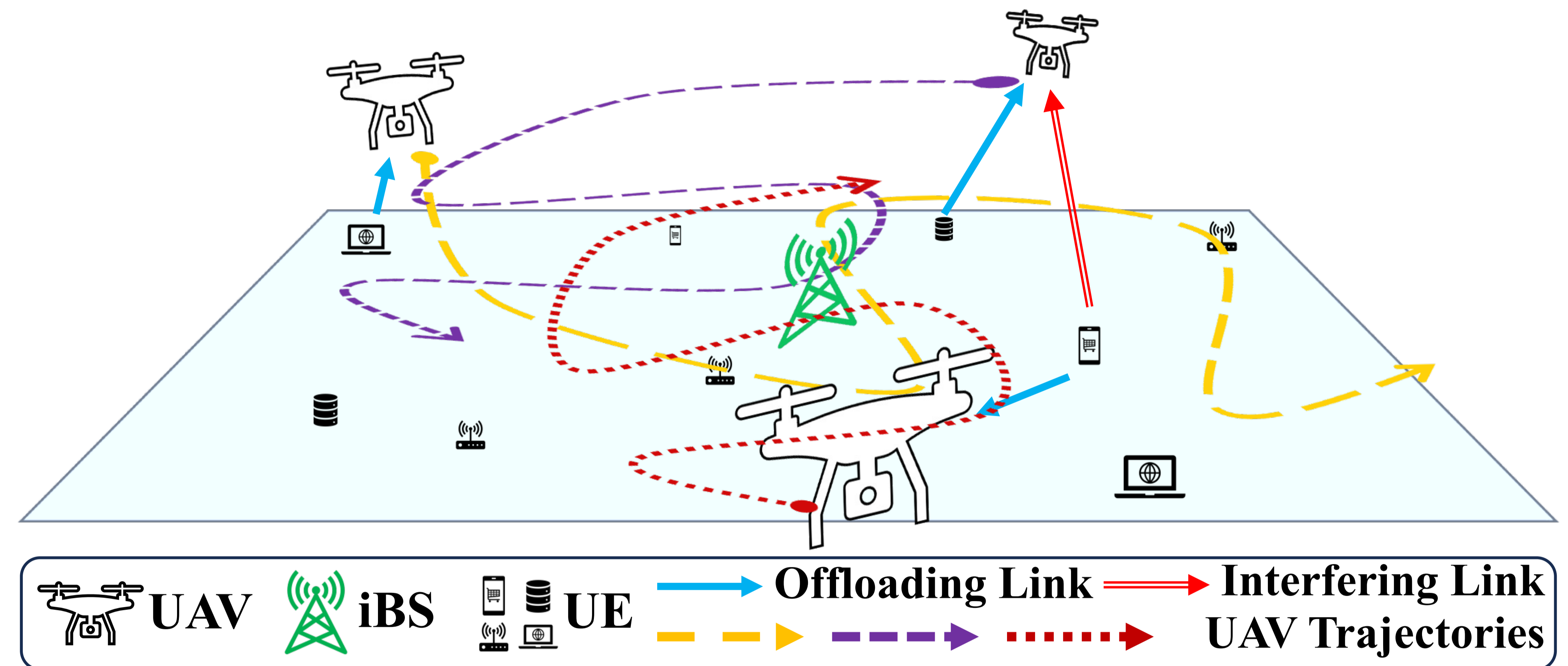
Two Zoomed-In Research Topics and Brief Introductions

- 1. Mang-Agent Deep Reinforcement Learning (MADRL)-Aided Resource Coordination for Multi-Access Edge Computing Systems:** This work focuses on developing MADRL-driven strategies to optimize key performance metrics, such as energy efficiency, in multi-access edge computing systems. Multiple unmanned aerial vehicles (UAVs) are deployed to provide energy-limited computation-scarce terrestrial user equipments (UEs) with accessible task offloading services. The optimization process jointly considers communication and computation resources, including UAVs' trajectories, UEs' local central processing unit (CPU) clock speeds, UAV-UE associations, time slot slicing, and UEs' offloading powers, after mapping the original problem into a stochastic (Markov) game.
- 2. Machine Learning (ML)-Enabled Channel Estimation for Terahertz (THz) Ultra-Massive Multi-Input-Multi-Output (UM-MIMO) Communications:** To facilitate efficient THz communications, UM-MIMO systems that provide substantial beamforming gains are essential. However, tailored channel estimation solutions are necessary to fully leverage UM-MIMO for THz transmissions. This involves practical modeling of the near-field propagation characteristics, molecular absorption, and scatter reflection effects. To address challenges such as angular-domain energy spread and the beam split effect, a dictionary learning framework that creates an adaptive sparsifying matrix from the THz channel dataset is proposed. Furthermore, a model-driven deep learning approach is introduced, which unrolls iterative algorithms into a finite-length, layer-wise deep neural network designed to learn the sparse representation of the THz channel from the THz channel dataset and received pilot signals.

Research Interests and Expertises

- Artificial Intelligence (AI)-Native Sixth-Generation (6G) Wireless Systems
- Internet of Intelligent Things (IoT)
- Non-Terrestrial Communications (e.g., Drone-Aided Networks)
- AI-Enabled Joint Computing and Communication Resource Coordination for Edge Intelligence
- (Scalable/Multi-Agent) Deep Reinforcement Learning (DRL)
- Compressive Sensing (CS)- and Machine Learning (ML)-Aided THz UM-MIMO Channel Estimation
- (Quantum) Machine Learning for Next-Generation Wireless Networks
- Secure and Covert Communications

A Many Unmanned Aerial Vehicle (UAV)-Aided Multi-Access Edge Computing Case in Internet-of-Things (IoT) Scenario with Impaired Terrestrial Base Station and Multiple Computation-Scarce User Equipments (UEs)



An Exemplary System Model for Terahertz Ultra-Massive Multi-Input-Multi-Output (UM-MIMO) Channel Estimation, where Array of Sub-Array (AoSA) Architecture and Partially Connected Hybrid Beamforming stand

