WINSTON HURST

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Curious and impact-driven problem solver with a strong foundation in optimization, control, and software engineering. Proven success in algorithm design, ML, systems design, and technical leadership, backed by hands-on experience.

EDUCATION

Ph.D., Electrical Engineering - UC Santa Barbara 2019 - 2025 (Expected)
Graduating PhD student; Advisor: Dr. Yasamin Mostofi; GPA: 3.96

B.S., Computer Science - Brigham Young University Graduated 2016
GPA: 3.99/4.00; Magna Cum Laude with Honors; Full tuition academic scholarship all years

RESEARCH EXPERIENCE

Graduate Student Researcher - UC Santa Barbara Santa Barbara, CA; 2019 - Present

Novel Algorithms for Trajectory Design, mmWave Signal Processing, and Relay Selection
- Minimized communication delays by optimizing robotic relay trajectory using novel DRL algorithm implemented in PyTorch with CGAL and IBM CPLEX
- Enabled advanced crowd analytics with novel mmWave radar sensing pipelines
- Mitigated communication dead zones with novel auction-based protocol for relay coordinationPublished comprehensive survey on planning for autonomous vehicles in 6G communication networks

Software Implementation for Scientific Simulation and Integration
- Accelerated iterative design process with custom Python script server for high-end EM simulator
- Architected and implemented modular mmWave radar data processing pipeline with dataflow paradigm
- Developed object-oriented Python library for scientific wireless communication channel simulation
- Improved code management practices by introducing and teaching Git to lab members

Hands-On Hardware Experience
- Designed and constructed cutting-edge electromagnetic metasurface capable of beamforming in 4 directions simultaneously
- Tracked large-scale crowd dynamics using TI AWR2243BOOST mmWave radar board

INDUSTRY EXPERIENCE

Team Lead/Software Engineer - Epic Systems Madison, WI; 2016-2019

Leadership and Communication
- Led team of 8 developers to deliver 6 enterprise-grade international software projects (> $1M total budget), coordinating across stakeholders and meeting strict timelines
- Coached underperforming team member through weekly goal setting and evaluation
- Eliminated project budget overruns through the design and rollout of a standardized estimation process, enabling improved forecasting and resource planning
- Ensured sufficient staffing by projecting future workloads and advocating for 2 additional developers

Software Development
- Implemented full-stack features using OOP and MVC architecture in VB and C#
- Streamlined patient rooming experience with physician voice assistant prototype for mobile devices
- Reduced physician administrative burden with NLP application for parsing clinical notes

COURSEWORK & SKILLS

Relevant Coursework: Machine Learning, Theoretical Machine Learning, Data Structures, Advanced Programming Concepts, Computational and Probabilistic Models, Algorithm Design and Analysis, Software Design and Testing, Internet Programming, Computer Security
Coding Languages: Python, C++, Matlab, Java, JavaScript, VB, MUMPS, C#
Scientific Computing Tools: SciPy, PyTorch, CVXPY, CLARABEL, CGAL, CPLEX
Coding Tools & Concepts: git, Linux, APIs, MVC, OOP, FSM
Optimization, Control, & Planning: Dynamic Programming, Optimal Control, MPC, Deep Reinforcement Learning, Control Barrier Functions, Mathematical Programming, Mixed-Integer programming
RF Sensing: TI AWR2243BOOST mmWave radar board, FMCW radar, Geometric Theory of Diffraction

PATENT

Y. Mostofi, A. Pallaprolu, B. Korany, and **W. Hurst**, "Exploiting diffraction for sensing with RF signals and/or for RF field programming," US Patent App. 18/904812, 2025.

PUBLICATIONS

Communication-Aware Robotics for Next Generation Communication Systems

- **W. Hurst**, S. Evmorfos, A. Petropulu, and Y. Mostofi, "Uncrewed Vehicles in 6G Networks: A Unifying Treatment of Problems, Formulations, and Tools," Proceedings of the IEEE, special issue on 6G, March 2025. **[Impact Factor: 23.2]**
- **W. Hurst** and Y. Mostofi, "Minimizing Wait Time and Age of Information in Mobility-Enabled Communication Systems," IEEE International Conference on Communications (ICC), June 2024.
- **W. Hurst** and Y. Mostofi, "Optimal Dynamic Trajectories for UAVs in Mobility-Enabled Relay Systems," IEEE Conference on Decision and Control (CDC), Dec. 2023.
- **W. Hurst** and Y. Mostofi, "Optimization of Mobile Robotic Relay Operation for Minimal Average Wait Time," IEEE Transactions on Wireless Communications, vol. 22, number 6, June 2023.
- **W. Hurst**, H. Cai, and Y. Mostofi, "Communication-Aware RRT*: Path Planning for Robotic Communication Operation in Obstacle Environments," IEEE International Conference on Communications (ICC) , June 2021.

Crowd Analytics with mmWave Radar

- A. Pallaprolu, A.P. Kattekola, **W. Hurst**, U. Madhow, A. Sabharwal, and Y. Mostofi, "Crowd Size Estimation for Non-Uniform Spatial Distributions with mmWave Radar," Submitted to ASILOMAR, 2025.
- A. Pallaprolu, P. Peng, S. Sandhu, **W. Hurst**, and Y. Mostofi, "Crowd Analytics with a Single mmWave Radar," 30th International Conference on Mobile Computing and Networking (MobiCom), November 2024.

RF Field Programming and Sensing

- A. Pallaprolu, **W. Hurst**, and Y. Mostofi, "Embracing Diffraction: A Paradigm Shift in Wireless Sensing and Communication," *S*ubmitted to IEEE Journal of Selected Topics in Electromagnetics, Antennas and Propagation, 2025.
- A. Pallaprolu, **W. Hurst**, S. Paul, and Y. Mostofi, "I Beg to Diffract: RF Field Programming With Edges," 29th Annual International Conference on Mobile Computing and Networking (MobiCom), October 2023.

Decentralized Control for Energy-Efficient mmWave Relay

- **W. Hurst** and Y. Mostofi, "Relay Incentive Mechanisms Using Wireless Power Transfer in Non-Cooperative Networks, " Transactions on Wireless Communications, 2025.
- **W. Hurst** and Y. Mostofi, "Multi-Attribute Auctions for Efficient Operation of Non-Cooperative Relaying Systems," accepted, American Control Conference (ACC), 2025.
- **W. Hurst**, A. Pallaprolu, and Y. Mostofi, "Emergent Cooperation for Energy-efficient Connectivity via Wireless Power Transfer," IEEE GLOBECOM, 2024.