WINSTON HURST

Email: wdurhamh@gmail.com; Phone: (214)-476-0770; Evanston, IL
Webpage: https://wdurhamh.github.io/winston.hurst.io

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

EDUCATION

Ph.D., Electrical Engineering - UC Santa Barbara 2021 - 2025 (Expected)
Research: Controls, mmWave Sensing/Tracking, and Communications

M.S., Electrical Engineering - UC Santa Barbara 2019 - 2021
GPA: 3.96; Controls emphasis, minor in Communications

B.S., Computer Science - Brigham Young University 2010 - 2016
GPA: 3.99; 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 mmWave radar sensing pipelines
- Mitigated communication dead zones with auction-based protocol for relay coordination
- Published 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 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

Software Team Lead - Epic Systems Madison, WI; 2017-2019

- Led team of 8 developers integrating Epic software with national health systems in European countries, coordinating across stakeholders and meeting strict timelines
- Eliminated project budget overruns through the design and rollout of a standardized estimation process
- Coached underperforming team member through weekly goal setting and evaluation

Software Engineer - Epic Systems Madison, WI; 2016-2017

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

SKILLS & COURSEWORK

Coding Languages: Python, C++, SQL, MongoDB Matlab, Java, JavaScript, VB, MUMPS, C#
Scientific Computing Tools: SciPy, PyTorch, CVXPY, CLARABEL, CGAL, CPLEX
Coding Tools & Concepts:, git, Linux, MVC, OOP, Agile, Microservices Architecture
Optimization, Control, & Planning: Dynamic Programming, Optimal Control, Deep Reinforcement Learning, Control Barrier Functions, Mathematical Programming, Mixed-Integer programming
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

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.

SELECTED 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.

RF Field Programming and Sensing

- A. Pallaprolu, **W. Hurst**, and Y. Mostofi, "Embracing Diffraction: A Paradigm Shift in Wireless Sensing and Communication," Submitted to IEEE Journal of Selected Topics in Electromagnetics, Antennas and Propagation, 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.
- 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.