Alan Papalia

Curriculum Vitae

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Education

2019-2024 Massachusetts Institute of Technology / Woods Hole Oceanographic Institution
PhD Ocean Engineering, *Focus: Robotics*
Advisor: John Leonard

2015-2019 University of Illinois at Urbana-Champaign
BS Mechanical Engineering, *Focus: Computer Science*

Research Direction

I aim to improve and expand human exploration and science by developing multi-robot systems which efficiently explore, perceive, and communicate to collaboratively build task-specific representations of the environment. I work to achieve this through theoretically grounded algorithms which consider probabilistic uncertainty and system robustness. More specifically, I seek to combine optimization and probability to construct representative models and theoretical guarantees on robotic tasks while using graph-theoretic representations of multi-robot systems to obtain insights into system structure and leverage this structure to improve task efficiency.

Publications

[1] **Alan Papalia** and John Leonard. "Network Localization Based Planning for Autonomous Underwater Vehicles with Inter-Vehicle Ranging". In: *IEEE/OES Autonomous Underwater Vehicle Symposium*. 2020.

[2] Lillian Clark, **Alan Papalia**, Jonata Carvalho, Luca Mastrostefano, and Bhaskar Krishnamachari. "Algorithms for Inter-Mobile-Device Distance Estimation using Network Localization". In: *Connected Health: Applications, Systems and Engineering Technologies*. 2020.

Employment History

Sep 2019 - Present **Massachusetts Institute of Technology**
Graduate Student
Advisor: John Leonard

- Developed localization-centered priority-based multi-agent planner for robot swarms *(paper accepted)*
- Implemented multi-robot localization for COVID-19 contact tracing via Bluetooth *(paper accepted)*

Jun 2018 - Sep 2018 **Oregon State University**
Undergraduate Research Assistant
Advisors: Cindy Grimm and Ravi Balasubramanian

- Implemented and tested object pose-tracking systems for robotic grasping experiments
- Designed library for automated and synchronized RGB-D camera data collection

Sep 2016 - Sep 2018 **University of Illinois at Urbana-Champaign**
Undergraduate Research Assistant
Advisors: Placid Ferreira and Jorge Correa

- Developed cloud-based web applications for distributed cloud manufacturing network
- Presented cloud manufacturing application to DoD, DMDII, and Fortune 100 sponsors

Jun 2017 - Aug 2017 **Seurat Technologies**
Mechanical Engineering Intern
Advisor: James Demuth

- Designed and assembled cooling systems for industrial 3D printer prototype
- Performed thermal-fluid analyses to ensure system cooling parameters were met

Awards

Best Poster *(2020 ACM SIGCOMM N2Women)*
Woods Hole Next Wave Fellow *(2019) 1 year full tuition & stipend*
GM/Philip W. Leistra Jr. Society of Automative Engineers Award *(2019)*
Illinois Engineering Achievement Scholar *(2018)*
UIUC Dean's List
Eagle Scout

Professional Activities

Mentorship

- Undergraduate Research, Sophia Franklin; *Low-cost Swarm Robot for Collaborative Mapping* (2020)
- Undergraduate Research, Hunter Celio; *3-DOF Robot Arm for Mobile Manipulation* (2020)
- Project Team Mentor, UIUC - ME270, Design for Manufacturing (2017-2018)

Service

- Executive Board Member, MIT MakerWorks (2020-Present)
- Volunteer, MIT-WHOI Applicant Support & Knowledgebase (2019-Present)
- Robotics Outreach Volunteer, Takeoff Space (2019-Present)
- Volunteer, Orpheum Children's Science Museum Robot Day (2018)
- Assistant Curriculum Designer, UIUC - ME270, Design for Manufacturing (2018)

Skills

Software Languages: C++, Python, MATLAB
Software Libraries: ROS, OpenCV, Point Cloud Library, NumPy, SciPy, Pandas
Fabrication: Welding, Machining, Soldering
Mechanical Design: CAD, Finite Element Analysis, Design of Experiments

Extracurricular

Aug 2018 - Jun 2019 **UIUC Formula SAE**
Team Captain

- Led internal operations and system architecture for top 5 team in USA
- Oversaw team of 40+ engineering students in full-stack design of $100,000+ Formula SAE vehicle

Jun 2016 - Jun 2019 **UIUC Formula SAE**
Technical Lead

- Performed redesign of composite monocoque chassis with result of 4.6 lb savings on 40 lb design
- Applied classical laminate theory in structural properties prediction tool, resulting in under 7% error
- Applied structural finite element analysis to validate wear cycle performance of suspension components