JACK KOLB

Email: kolb@gatech.edu
Website: https://jackkolb.com

EDUCATION

Ph.D. *Robotics — in progress* *Aug 2020 - present*
Advisor: Sonia Chernova
Georgia Institute of Technology (Georgia Tech)
Dissertation Topic: Considering heterogeneous agent capabilities in multi-human multi-robot teaming.

B.S. *Mechanical Engineering (cum laude)* *Sep 2016 - Jun 2020*
University of California at Riverside (UC Riverside)
Capstone Title: "An Autonomous Robot Capable of Scaling a Self-Built Structure."

RESEARCH EXPERIENCE

Robot Autonomy and Interactive Learning Lab, Georgia Tech
Graduate Research Assistant *Sep 2020 - present*
Improving human-robot teaming by leveraging user cognitive states.
- Applied human cognitive states in role assignment to improve multi-human multi-robot teaming.
- Published and presented at international research conferences.
- Contributed to quarterly progress reports and regularly presented to sponsors (Army Research Lab).

Sundararajan Venkatadriagaram Research Group, UC Riverside
Undergraduate Research Assistant *Mar 2018 - Jun 2020*
Predicting electric motor failure by analyzing motor vibrations.
- Developed an intelligent sensor network to record and analyze the vibrations of electric motors to identify motor damages and predict mechanical failure.
- Worked with UCR's administration to trial the system on campus ventilation and water pump motors, and commercialize the system.

PUBLICATIONS

Jack Kolb, Harish Ravichandar, Sonia Chernova. "Leveraging Cognitive States in Human-Robot Teaming." *IEEE Int. Conference on Robot & Human Interactive Communication*, 2022. **[Best Student Paper finalist!]**

Jack Kolb, Mayank Kishore, Kenneth Shaw, Harish Ravichandar, and Sonia Chernova. "Predicting Individual Human Performance in Human-Robot Teaming." *IEEE Int. Conference on Robot & Human Interactive Communication*, 2021.

Abhineet Jain, **Jack Kolb**, and Harish Ravichandar. "Safe Dexterous Manipulation Using Geometric Boundary Constraints" *Safe Reinforcement Learning Workshop at IJCAI '22,* 2022.

Abhineet Jain*****, **Jack Kolb***, J.M. Abbess IV*, and Harish Ravichandar. "Evaluating the Effectiveness of Corrective Demonstrations and a Low-Cost Sensor for Dexterous Manipulation." *MLHRC Workshop at ACM/IEEE HRI '22,* 2022.

TECHNICAL SKILLS

Programming Languages: Python, C++, JavaScript, C#, Golang, HTML/CSS
Frameworks & Tools: ROS1, ROS2, PyTorch, OpenCV, Flask, WeBots, Gazebo, Azure, Heroku, Firebase/GCP, CAD, Unity3D, Git, MATLAB/Simulink
Coursework: Intelligent Control, Human-Robot Interaction, Reinforcement Learning, Natural Language Processing, Human Factors, Machine Learning, Interactive Robot Learning, Robot Kinematics and Planning, Computer Vision

WORK EXPERIENCE

Gatik AI

Robotics Engineer (intern) *May 2022 - Aug 2022*

Autonomous vehicle platform for short-haul middle mile deliveries.

- Conducted a literature review on the state of research in surrounding vehicle trajectory prediction.
- Developed and presented design recommendations for improving the company's surrounding vehicle trajectory prediction module.

NextGen Assistive Technology

Software Engineer (intern) *Jun 2020 - Sep 2020*

Sensor-driven remote caregiving to support communities with developmental disabilities.

- Developed sensor-based smart home remote caregiving system, now deployed in over 100 homes.
- Integrated video conferencing and event resolution, enabling each caregiver to support 10+ clients.
- Leveraged Microsoft Azure's Event Grid, Power Apps, and IOT Hub platforms for IOT capabilities.

UC Riverside Autonomous Underwater Vehicles (UCR RoboSub)

Project Lead ('18-'20), *Mechanical Team Lead* ('17-'18), *Mechanical Team* ('16-'17) *Sep 2016 - Aug 2020*

Marine robots to autonomously complete aquatic naval tasks in international competitions.

- Led 25+ members in the development of two autonomous marine robot platforms for RoboSub '18-'20.
- Researched and implemented systems for navigation, vision, mission control, object interaction.
- Awarded "Best [Large-Scale Student] Project" (2019) by UC Riverside's College of Engineering.

EXTRACURRICULARS

RoboGrads, Georgia Tech

President ('22-'23), *Treasurer* ('21-'22) *May 2021 - present*

Professional and community development for Georgia Tech's robotics graduate students.

- Supported graduate students by hosting student-led research seminars, mock qualifying exams, academia and industry panels, new student orientations, Q/A panels, and community socials.
- Developed industry partnerships to support Georgia Tech's robotics research and facilitate access to the robotics student talent pool.
- Represented graduate students to the robotics institute's administration and faculty.

Hackathons *Sep 2016 - present*

Project sprints focused on product development using machine learning, computer vision, IOT, etc.

- Winner (**3**): HackGT '21 *RoboVR*, CutieHack '19 *Schedul.io*, CitrusHack '18 *Blindsight*
- Judge (**3**): RoseHack '22, RoseHack '21, Prototypical '22
- Mentor (**5**): RoseHack '20-'22, CitrusHack '19, CutieHack '18
- Participant (**16**): VandyHacks '21, ShellHacks '21, HackGT '20-'21, CutieHack '17-'19, HackUCI '19, HackSC '19, BioHack '19, HackTech '18, HackIOT '18, CitrusHack '16-'18, Enguinity '17
- For a curated project list visit jackkolb.com.

IEEE Student Chapter, UC Riverside

Projects Chair ('19-'20), *RoboSub Project Lead* ('18-'20) *Jun 2020 - Sep 2020*

Technical development and community outreach to Southern California's inland empire region.

- Hosted technical workshops for students: Python, Linux/Raspberry Pi, Arduino, Soldering, SolidWorks, 3D Printing, IOT, Circuit Design, ROS, Flask, Product Pitching.
- Led large-scale community outreach events for 1,000+ community members: Boy Scout Merit Badge Day, Electrical and Computer Engineering Day, Hackathons.