Matthew B. Luebbers

PhD Student / Research Assistant
University of Colorado Boulder
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Education

University of Colorado Boulder; Boulder, CO   Aug 2018 – Present
Doctor of Philosophy, Computer Science
      Advisor: Prof. Bradley Hayes
      Collaborative AI and Robotics Lab (CAIRO)

Cornell University; Ithaca, NY   Aug 2014 – May 2018
Bachelor of Arts, Computer Science
      Internal Concentration: Artificial Intelligence & Robotics
      External Concentration: Psychology

Professional Experience

NASA Jet Propulsion Laboratory; Pasadena, CA   Jun 2020 – Aug 2020
Research Technologist Intern, Robotics (347)
      Worked on the composite terrain generation pipeline for a Monte-Carlo simulation tool to enable statistical analysis of plans generated by the Perseverance rover's ENav system for autonomous navigation.

NASA Jet Propulsion Laboratory; Pasadena, CA   Jun 2019 – Aug 2019
Robotic Systems Engineering Intern, Robotics (347)
      Designed a prototype virtual reality application for stereo image viewing and 3D plan overlay for the Rover Sequencing & Visualization Program (RSVP). Intended for use in rover driving activities for the Mars rovers Curiosity & Perseverance. Also participated in tactical rover driving sessions of Curiosity, learning to sequence and operate the vehicle.

NASA Jet Propulsion Laboratory; Pasadena, CA   Jun 2018 – Aug 2018
Software Systems Engineering Intern, Instrument Data Systems (398)
      Continued work on the Common Workflow Service (CWS), including creation of a web-based BPMN process modeler to contain all CWS functionality within a single webapp.

NASA Jet Propulsion Laboratory; Pasadena, CA   Jun 2017 – Aug 2017
Software Systems Engineering Intern, Instrument Data Systems (398)
      Continued work on the Common Workflow Service (CWS), including adaptation work for the Instrument Data Systems pipelines of the Mars 2020 mission.

NASA Jet Propulsion Laboratory; Pasadena, CA   Jun 2016 – Aug 2016
Software Systems Engineering Intern, Instrument Data Systems (398)
      Worked on the Common Workflow Service (CWS), a cloud-based workflow-management system for NASA's Advanced Multi-Mission Operations System (AMMOS).

Teaching & Research Assistantships

Army Research Lab STRONG Program   Aug 2020 – Present
University of Colorado Boulder; Boulder, CO
Research Assistant, Prof. Bradley Hayes

CSCI 5722 (Computer Vision)   Jan 2020 – May 2020
University of Colorado Boulder; Boulder, CO
Teaching Assistant, Prof. Ioana Fleming

CSCI 1300 (Introduction to Computer Science)   Aug 2019 – Dec 2019
University of Colorado Boulder; Boulder, CO
Teaching Assistant, Prof. Ioana Fleming

Dean's Graduate Fellowship   Aug 2018 – May 2019
University of Colorado Boulder; Boulder, CO
Research Assistant, Prof. Bradley Hayes

CS 4700 (Foundations of Artificial Intelligence)   Aug 2017 – Dec 2017
Cornell University; Ithaca, NY
Teaching Assistant, Prof. Bart Selman

CS 3410 (Computer System Organization & Programming)   Aug 2016 – May 2017
Cornell University; Ithaca, NY
Teaching Assistant, Prof. Anne Bracy

CS 2110 (Object-Oriented Programming & Data Structures)   Aug 2015 – May 2016
Cornell University; Ithaca, NY
Course Consultant, Profs. David Gries, Nate Foster, & Ross Tate

Publications

Journal Papers

J1. Aaquib Tabrez, Matthew B. Luebbers, and Bradley Hayes. (2020). **A Survey of Mental Modeling Techniques in Human-Robot Teaming**. In Current Robotics Reports. Springer-Nature.

Workshops, Symposia, & Posters

W1. Aaquib Tabrez, Matthew B. Luebbers, and Bradley Hayes. (2020). **Automated Failure-Mode Clustering and Labeling for Informed Car-To-Driver Handover in Autonomous Vehicles**. In Proceedings of the Workshop on Assessing, Explaining, and Conveying Robot Proficiency for Human-Robot Teaming. Cambridge, UK.

W2. Matthew B. Luebbers, Connor Brooks, Minjae John Kim, Daniel Szafir, and Bradley Hayes. (2019). **Augmented Reality Interface for Constrained Learning from Demonstration**. In Proceedings of the Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (VAM-HRI 2019). Daegu, South Korea.

W3. Matthew B. Luebbers, Ramchandran Muthukumar, Madeleine Udell, and Ross A. Knepper. (2017). **Planning Aerial Survey Missions using Low Rank Approximation**. Presented: Northeast Robotics Colloquium (NERC 2017). Boston, Massachusetts, USA.

Further Experience

Conference & Journal Review

- Robotics and Automation Letters (RA-L)
- IEEE/RSJ International Conference on Intelligent Robotics and Systems (IROS)
- ACM/IEEE International Conference on Human-Robot Interaction (HRI)
- Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (VAM-HRI)

Additional Projects of Interest

Self-Driving RC Car   Aug 2019 – Dec 2019
Designed and built a self-driving RC car capable of racing around indoor tracks. Created in a team of five as a semester-long project for CSCI 5302 – Advanced Robotics.

Multiple Asteroid Flyby Mission Formulation   Jan 2019 – May 2019

Formulated a NASA Discovery-class mission concept for a robotic spacecraft to perform multispectral remote sensing of three main-belt asteroids to gain valuable understanding of planetary migration and solar system formation. Delivered a formal, cost-constrained proposal, and presented a PDR (Preliminary Design Review). Created in a team of ten as a semester-long project for ASEN 5148 – Spacecraft Design. I was responsible for the CDH (Command & Data Handling), and FSW (Flight Software) subsystems.

Autonomous Solar-Powered Airship   Sep 2016 – May 2018

Group project within Cornell's Robotic Personal Assistants Lab (RPAL) to design and build an airship capable of flying autonomously. A lightweight solar power system and robust autonomy extend the range of the airship, enabling it to perform long-duration aerial survey missions for ecological monitoring.