

CARL LOUIS MUELLER

CS PhD Student / Roboticist / Entrepreneur

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SUMMARY

- PhD student at the University of Colorado Boulder in the Collaborative Artificial Intelligence and Robotics Laboratory (CAIRO) under the advisement of Professor Bradley Hayes.
 - Published researcher with expertise in machine learning, AI, robotics, and software engineering.
 - Former Director of Portfolio at the Deming Center Venture Fund, a student-run venture capital fund.
 - Co-founded a small tech company that cultivated a variety of consulting and contracting experiences.
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EDUCATION

<i>University of Colorado - Boulder</i>	9/2017 – Present
<ul style="list-style-type: none">• PhD Computer Science	
<i>Santa Barbara City College</i>	9/2012 – 12/2015
<ul style="list-style-type: none">• Post-Baccalaureate coursework	
<i>University of California, Santa Barbara</i>	Graduated 4/2011
<ul style="list-style-type: none">• B.S. Biopsychology	

RESEARCH FOCI

Robot Learning from Demonstration

- Develop algorithms and systems that enable robotic systems to learn from human counterparts during collaborative tasks in order to create generalized plans for future autonomous behavior.

Constrained Robotic Learning Systems

- Use abstract constraints to enhance the learning capacity of robotics systems and to provide guarantees of safe behavior through the development of constrained motion planning & LfD algorithms.

Human-Robot Interfaces for Learning from Demonstration

- Design and evaluate interfaces that best enable human operators to effectively and intuitively communicate important information about tasks demonstrated to a robotic learning system.
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PUBLICATIONS

Graduate Publications:

- Mueller, C.L., Tabrez, A, Hayes, B. Robot Behavior Counterfactuals for Interactive Constrained Learning from Demonstrations. *Robotics Sciences and Systems - WARP-WOF*. 2021
- Luebbers, M. B., Brooks, C., Mueller, C. L., Szafir, D., & Hayes, B. ARC-LfD: Using Augmented Reality for Interactive Long-Term Robot Skill Maintenance via Constrained Learning from Demonstration. *IEEE/RJS International Conference on Robotics and Automation (ICRA)*, 2021

- Mueller, C.L., and Hayes, B.. "Safe and Robust Robot Learning from Demonstration through Conceptual Constraints." *Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction*. 2020.
 - Mueller, C.L., "Abstract Constraints for Safe and Robust Robot Learning from Demonstration," *Proceedings of the AAAI Conference on Artificial Intelligence - Doctoral Consortium*, New York City, New York, 2020
 - Mueller, C.L., Venicx, J., and Hayes, B. "Robust robot learning from demonstration and skill repair using conceptual constraints," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.
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CONSORTIUMS, PRESENTATIONS & TALKS

- WARP-WOF Workshop RSS 2021
 - Talking Robotics Seminar Series 2021
 - Twenty-Fifth AAAI/SIGAI Doctoral Consortium, 2020, New York City, New York
 - 2019 CU Boulder Aerospace Ventures Research Blitz Speaker
 - 2018 TedX Mile High Adventure Interactive Presentation
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AWARDS & HONORS

- 2018/2019 Outstanding PhD Researcher Department Award
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ACADEMIC SERVICE, MEMBERSHIP, & OUTREACH

Conference and Journal Review

- THRI
- HRI
- ICRA
- IROS

Professional Membership

- IEEE
- ACM
- Deming Center Venture Fund

Community Outreach

- 2018 TedX Mile High Adventure
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ACADEMIC ADVISEMENT

Graduate

- Ashwin Sankaralingam, M.S. 9/1/2018 – 12/15/2018

Undergraduate

- Micah Zhang, B.S. 2/1/2019 – 12/12/2019
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EMPLOYMENT HISTORY

Circadence Corporation
Software Contracting / Consulting

Boulder, Colorado
6/2019 – 11/2019

Lightning in a Bot, Inc.
Co-Founder / CTO

Los Angeles, California
8/2015 - 9/2017

Independent Employment
Software Contracting / Consulting

Santa Barbara, California
4/2017 – 9/2017

QualTek Molecular Laboratories
Research Scientist / Project Manager

Santa Barbara, California
1/2013 – 7/2014

Research Assistant / Sample Manager

4/2011 – 1/2013

TECHNICAL SKILLS

Software Engineering

- Professional in software design, coding principles, and documentation best practices.
- Developed CAIRO lab LfD, motion planning, and simulation software stacks.
- Designed a large-scale PostgreSQL backend to support on-demand analytics.
- Built Django, Flask, and Node.js web backends to support a custom in-house NLP engine.

Platforms and Frameworks

- Experience with a variety of cloud platforms such as MongoDB, PostgreSQL, Heroku, Amazon EC2, S3, RDS, Elastic Beanstalk, & Lambda.
- Production-level implementation of machine learning platforms such as Scikit-Learn.
- Built robot learning from demonstration and motion planning software package for CAIRO lab.

Robotics

- Well-versed in ROS and MoveIt! frameworks.
- Published researcher in robotic Learning from Demonstration with expertise in trajectory modeling, motion planning optimization, task planning, and human-robot interfaces.
- Knowledgeable in human-centered design as well as conducting human-computer interaction studies.

Machine Learning / Data Analytics

- Performed statistical analysis and data exploration for research applications and industrial reporting.
 - Domain expert in machine learning and AI including classification, clustering, probabilistic modeling, graphical models, deep learning, decision making under uncertainty, planning, and modern NLP.
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EXTRACURRICULARS

Deming Center Venture Fund - Portfolio Manager

- Accredited venture capital firm run by graduate students within the CU Boulder business school.

Racer X Cycling / Colorado Bike Law Team Member

- Amateur mountain bike and cyclocross racer.
- Volunteer at local events in the greater Denver area