Matthew Strong

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Education

University of Colorado Boulder Boulder, CO

Bachelor of Science in Computer Science, Chinese Minor, 4.00 GPA *Aug. 2017 – May 2021*

Experience

Software Engineer - Customer Experience Platform (CXP) September 2021 – present

Microsoft *Bellevue, WA*

- Engineering AI-based solutions to improve the customer journey experience.
- Architecting ML pipelines to draw from RL models for predicting which messages to send to customers.
- Designed, developed, and deployed the consent for channel optimization feature for CXP.

Undergraduate Researcher - CU Boulder SBS Lab January 2018 – present

Sustainable Buildings and Systems Lab, Advised by Wangda Zuo *Boulder, CO*

- Developed an automatic energy building simulation pipeline for testing energy outputs of different building models in different climate zones.
- Devised multiple methods of building energy prediction with Generative Adversarial Networks.
- Core contributor of an open source release of 500+ EnergyPlus building models, supported by researchers at labs including NREL and Oak Ridge National Lab, as the culmination of a 4+ year research project.

Undergraduate Researcher - HIRO Group January 2020 – September 2021

HIRO (Human Interaction and RObotics Group) Group, Advised by Alessandro Roncone *Boulder, CO*

- Devised a novel kinematic calibration algorithm to estimate the pose of a novel sensor unit on a robot manipulator. Validated on a real robot control example.
- Proposed a framework for bridging the gap between avoidance and contact, informed by onboard sensors for collaborative robotics, funded by a university research grant.
- Constructed an effective method for probabilistic fusion of external depth data and onboard proximity data to reduce occlusions in a robot's nearby space.
- Theoretically motivated entropy in Hierarchical Reinforcement Learning, empirically demonstrating more efficient learning on simulated robotic locomotion tasks.

Software Engineer Intern - Journey Optimization using RL May 2020 – August 2020

Microsoft, Customer Experience Platform (CXP) *Remote - Broomfield, CO*

- Deployed a real-time analytics service for retrieving customer data.
- Designed and developed a feature from scratch called journey optimization, which intelligently guides a customer through the "customer journey", using reinforcement learning.

CTO and Co-Founder - Udana Systems February 2018 – May 2020

Udana Systems *Boulder, CO*

- Co-Founded company targeted towards drone delivery for small to medium sized businesses.
- Designed and developed robotics tech stack, using ROS, MavROS, Gazebo, PyTorch, and more.
- Developed machine learning pipeline for computer vision based models.

Software Engineer Intern - Global Search May 2019 – July 2019

Microsoft, Dynamics 365 for Talent *Redmond, WA*

- Designed and developed the Global Search feature for Microsoft Dynamics 365 for Talent.
- Worked with .NET, Angular, and XML in order to successfully deploy an end-to-end feature.

Awards

RSS Inclusion Fellow June 2021

- Accepted as an RSS (Robotics: Science and Systems) Inclusion Fellow, an expenses-paid program for upcoming robotics researchers attending RSS.

Chancellor's Recognition Award May 2021

- An award given to students that maintain a 4.0 GPA throughout all of college.

Active Learning Award April 2021

- Award given to outstanding students in service, professional, and research experiences.

College of Arts and Sciences: Class of 2021 Amazing Student April 2021

- For my minor in Chinese, I received an outstanding student award for the Class of 2021 in the College of Arts of Arts and Sciences (1 of 30 out of 4500+ students).

College of Engineering Research Award April 2021

- Only one other CS student from CU has received this award in its 20+ year history.

CRA Outstanding Undergraduate Researchers 2021 – Honorable Mention December 2020

- The most prestigious award for CS undergraduate researchers in North America.

UROP Research Grant: Null Space Control for Collaborative Robotics August 2020 – August 2021

- Received $1500 research grant from CU Boulder's Undergraduate Research Opportunities Program (UROP) to perform research on null space control.

Sewall Scholar August 2017 – May 2021

- The top merit scholarship at CU Boulder.

Engineering Merit Scholarship August 2017 – May 2021

- Received based on high school academic performance.

BOLD Scholarship August 2017 – May 2021

- Received diversity scholarship based on high school achievement.

National Merit Scholar August 2017

- Selected to receive National Merit Scholarship on basis of outstanding high school achievement.
- Given to <1% of high school seniors in the US.

Publications

Evaluating Performance of Different Generative Adversarial Networks for Large-Scale Building Power Demand Prediction

Energy and Buildings. Accepted.

Yunyang Ye, **Matthew Strong**, Yingli Lou, Cary Faulkner, Wangda Zuo, Satish Upadhyaya.

Volumetric Data Fusion of External Depth and Onboard Proximity Data For Occluded Space Reduction

4th Workshop on Proximity Perception in Robotics at IROS 2021. Accepted.

Matthew Strong*, Caleb Escobedo*, Alessandro Roncone.

Contact Anticipation for Physical Human–Robot Interaction with Robotic Manipulators using Onboard Proximity Sensors

International Conference on Robotics and Systems 2021. Accepted.

Caleb Escobedo, **Matthew Strong**, Mary West, Ander Aramburu, Alessandro Roncone

Self-Contained Kinematic Calibration of a Novel Whole-Body Artificial Skin for Collaborative Robotics

International Conference on Robotics and Systems 2021. Accepted.

Kandai Watanabe, **Matthew Strong**, Mary West, Caleb Escobedo, Ander Aramburu, Krishna Chaitanya, Alessandro Roncone.

Enabling Close Proximity Human Robot Collaboration via Distributed, Self-Calibrating Robotic Skin

BS Thesis at CU Boulder. Committee: Alessandro Roncone, Bradley Hayes, Christoffer Heckman

Matthew Strong.

Development of New Baseline Models for U.S. Medium Office Buildings Based on Commercial Buildings Energy Consumption Survey Data

Science and Technology for the Built Environment Volume 26, 2020. Accepted.

Yunyang Ye, Yingli Lou, **Matthew Strong**, Satish Upadhyaya, Gang Wang, Wangda Zuo.

Service/Leadership

HackCU August 2018 – May 2021
- Led HackCU's tech team, organizing the largest hackathon in the Rocky Mountain region.
- Managed whole tech stack during 500+ person hackathon.
- Developed hacker sites and APIs accessed by thousands of people across the nation and globe.
- Handled 1000+ hacker applications.

Slingshot Mentor and Founding Member June 2020 – September 2021
- Served as a founding member for students from top high schools interested in CS at Slingshot, a **Techstars-backed startup** co-founded by students from top tech companies.
- Organized learning sessions about robotics, research, and machine learning for high school students.
- Onboarded startups out of Y-Combinator, Techstars, Berkeley, Stanford, and more.

Discrete Structures Tutor January 2019 – May 2019
- Mentored student in discrete structures.
- Set homework and test-prep deadlines, and prepared practice problems.

SASE (Society of Asian Scientists and Engineers) Leadership January 2018 – May 2018
- Served as Co-Marketing Director and managed social media pages.

Membership

Colorado Data Science Team August 2019 – December 2020
SHPE (Society of Hispanic Professional Engineers) August 2019 – May 2021
SASE (Society of Asian Scientists and Engineers) August 2017 – August 2019

Invited Talks

HackCU Workshop Invited Speaker: A Gentler Introduction to Robotics March 2022
- Invited to conduct a workshop on how to get started with algorithm robotics at HackCU.

Invited Speaker at the PhD Forum: 4th Workshop on Proximity Perception in Robotics August 2021
- Only undergraduate invited to speak at the forum.

Slingshot Interview Series: Getting Involved in Robotics August 2021
- Invited by Techstars-backed startup to be interviewed on my experience with robotics, how I improved, and what others can learn from me.

Reviewer

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022