

# Matthew Strong

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## EDUCATION

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### University of Colorado Boulder

*Bachelor of Science in Computer Science, Chinese Minor, 4.00 GPA*

Boulder, CO

Aug. 2017 – May 2021

## EXPERIENCE

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### Software Engineer - Customer Experience Platform

*Microsoft*

September 2021 – present

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.

### Undergraduate Researcher - CU Boulder SBS Lab

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

January 2018 – present

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

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

January 2020 – September 2021

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

*Microsoft, Customer Experience Platform (CXP)*

May 2020 – August 2020

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

*Udana Systems*

February 2018 – May 2020

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

*Microsoft, Dynamics 365 for Talent*

May 2019 – July 2019

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

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- 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 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

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### **Evaluating Performance of Different Generative Adversarial Networks for Building Power Demand Prediction at a Large Scale**

*Applied Energy. Submitted.*

Yunyang Ye, **Matthew Strong**, Yingli Lou, Wangda Zuo.

### **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

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**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

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**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

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**Invited Speaker at the PhD Forum: 4th Workshop on Proximity Perception in Robotics** August 2021

- Only undergraduate invited to speak at the forum.