Caleb Escobedo

caleb.phd | cescobed@proton.me

Education

University of Colorado Boulder — Boulder, CO
PhD in Computer Science - Advised by Alessandro Roncone — *Aug. 2019 – July 2026*
Whole-Body Robot Skins for Near-Body Perception and Safe Interaction

Trinity University — San Antonio, TX
Bachelor of Science in Computer Science — *Jan. 2017 – May 2019*

University of Wisconsin — Madison, WI
Aug. 2013 – May 2016

Research Experience

Graduate Research Assistant, University of Colorado Boulder — August 2019 – July 2026
HIRO (Human Interaction and Robotics Group) — *Boulder, CO*

Research Scientist Intern — August 2022 – December 2023
Samsung Artificial Intelligence Center — *New York, NY*

Research Intern — December 2017 – June 2019
FlashScan3D — *San Antonio, TX*

Undergraduate Researcher, Trinity University — January 2018 – June 2019
Advised by Dr. Matthew Hibbs — *San Antonio, TX*

McNair Summer Research, Trinity University — May 2018 – July 2018
Advised by Dr. Albert Jiang — *San Antonio, TX*

Awards

Ralph J. Slutz Student Excellence Award Outstanding PhD Student — Fall 2023
NSF GRFP Honorable Mention — Spring 2020
Charles Babbage and Ada Lovelace Computing Award — Fall 2019
Ronald E. McNair Scholar Post-Baccalaureate Achievement Program — Spring 2018
Martin Lange Award in Theoretical Computer Science — Fall 2017

Publications

Design, Mapping, and Contact Anticipation with 3D-printed Whole-Body Tactile and Proximity Sensors

IEEE International Conference on Robotics and Automation 2026.

Carson Kohlbrenner, Anna Soukhovei, **Caleb Escobedo**, Nataliya Nechyporenko, Alessandro Roncone

Improving Sensing Coverage and Compliance of 3D-Printed Artificial Skins Through Multi-Modal Sensing and Soft Materials

ICRA 2026 Workshop on Towards Large-Area Tactile Sensing Skins.

Carson Kohlbrenner, **Caleb Escobedo**, Sayak Ray, Alexander Dickhans, Anna Soukhovei, Nickolaus Jackoski, Lyle Antieau, Alessandro Roncone

Design of a Robot-Assisted Chemical Dialysis System

ACM/IEEE International Conference on Human-Robot Interaction 2026 Late Breaking Reports.

Diane Jung, **Caleb Escobedo**, Noah Liska, Maitrey Gramopadhye, Daniel Szafir, Alessandro Roncone, Carson Bruns

Form-Fitting, Large-Area Sensor Mounting for Obstacle Detection

ConRich Workshop at Humanoids 2025.

Anna Soukhovei, Carson Kohlbrenner, **Caleb Escobedo**, Alexander Gholmieh, Alexander Dickhans, and Alessandro Roncone

***GenTact Toolbox*: A Computational Design Pipeline to Procedurally Generate Context-Driven 3D Printed Whole-Body Tactile Skins**

IEEE International Conference on Robotics and Automation 2025.

Carson Kohlbrenner, **Caleb Escobedo**, S. Sandra Bae, Alexander Dickhans, and Alessandro Roncone

A Machine Learning Approach to Contact Localization in Variable Density Three-Dimensional Tactile Artificial Skin

NeurIPS Workshop on Touch Processing: From Data to Knowledge 2024.

Carson Kohlbrenner, Mitchell Murray, Yutong Zhang, **Caleb Escobedo**, Thomas Dunnington, Nolan Stevenson, Nikolaus Correll, Alessandro Roncone

CAT-RRT: Motion Planning that Admits Contact One Link at a Time

IEEE/RSJ International Conference on Robotics and Systems 2023.

Nataliya Nechyporenko, **Caleb Escobedo**, Shreyas Kadekodi, Alessandro Roncone

AmbiSense: Acoustic Field Based Blindspot-Free Proximity Detection and Bearing Estimation

IEEE/RSJ International Conference on Robotics and Systems 2023.

Siddharth Rupavatharam, Xiaoran Fan, **Caleb Escobedo**, Daewon Lee, Larry Jackel, Richard Howard, Colin Prepscius, Daniel Lee, Volkan Isler

AcouSkin: Full Surface Contact Localization Using Acoustic Waves

IEEE/RSJ International Conference on Robotics and Systems 2023.

Adarsh Kumar Kosta, Alexis Burns, Siddharth Rupavatharam, **Caleb Escobedo**, Daewon Lee, Richard Howard, Larry Jackel, Volkan Isler.

SonicFinger: Pre-touch and Contact Detection Tactile Sensor for Reactive Pregrasping

IEEE International Conference on Robotics and Automation 2023

Siddharth Rupavatharam*, **Caleb Escobedo***, Daewon Lee, Colin Prepscius, Larry Jackel, Richard Howard, Volkan Isler

A Framework for the Systematic Evaluation of Obstacle Avoidance and Object-aware Controllers

IEEE/RSJ International Conference on Robotics and Systems 2022.

Caleb Escobedo, Nataliya Nechyporenko, Shreyas Kadekodi, Alessandro Roncone.

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

IEEE/RSJ International Conference on Robotics and Systems 2021.

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

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

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

Matthew Strong*, **Caleb Escobedo***, Alessandro Roncone.

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

IEEE/RSJ International Conference on Robotics and Systems 2021.

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

Musical Style Transfer in a Symbolic Domain

BS Thesis at Trinity University 2019.

Caleb Escobedo.

Patents

Sonicfinger: Low-cost, Compact, Proximity and Contact Sensor for Reactive Positioning

Samsung Electronics Co Ltd, US Patent 12,496,723 B2, 2025.

Siddharth Rupavatharam, Richard Howard, Daewon Lee, Lawrence Jackel, **Caleb Escobedo**, Ibrahim Volkan Isler.

Ultrasonic Piezoelectric Transceiver Sensor for Full Surface Contact Localization

Samsung Electronics Co Ltd, US Patent 12,619,250 B2, 2026.

Adarsh K. Kosta, Alexis M. Burns, **Caleb Escobedo**, Siddharth Rupavatharam, Richard E. Howard, Lawrence Jackel, Daewon Lee, Ibrahim Volkan Isler.

Mentorship, Service, and Teaching

Mentored Students

1. Anna Soukhovei [BS]
2. Nick Jackoski [MS]
3. Sayak Ray [MS]
4. Klara Nitsche [MS]
5. Jay Vakil [PhD]
6. Ekshan Raj Verma [MS]
7. Carson Kohlbrenner [BS and MS] now at University of Colorado Boulder [PhD]
8. Mitchell Murray [PhD]
9. Noah Liska [BS]
10. Alex Dickhans [HS]
11. Anujay Sharma [MS]
12. Caleb Kumar [BS]

13. Zoya Khan [HS]
14. Shreyas Kadekodi [BS and MS] now at University of California San Diego [PhD]
15. Matthew Strong [BS] now at Stanford University [PhD]
16. Joseph David Galloway II [BS]
17. Ander Aramburu Fernandez [MS]
18. Mitchell D Scott [BS]
19. Abhilash Jahagirdar [MS]
20. Garrett Pierson [BS]
21. Eleanor Sarder [BS]
22. William Wang [BS]

Reviewer

- IEEE International Conference on Robotics and Automation (ICRA 2021, 2022, 2023, 2025, 2026)
- IEEE/RSJ International Conference on Robotics and Systems (IROS 2021, 2022, 2023, 2024, 2025)
- Robotics Science and Systems (RSS 2022)
- Human-Robot Interaction (HRI 2026)
- The International Journal of Robotics Research (IJRR 2025)

Workshop Organization

- RSS 2025: Navigating Contact Dynamics in Robotics $1,500 Prize
- RSS 2022: Close-Proximity Human-Robot Collaboration: Challenges and Opportunities

Treasurer of Computer Science Grad Student Association, University of Colorado Fall 2020
Introduction to Artificial Intelligence TA, University of Colorado Spring 2022
Algorithms TA, University of Colorado Fall 2021
Algorithms Instructor, University of Colorado Summer 2020
Algorithms TA, Trinity University Fall 2018
Data Abstraction TA, Trinity University Fall 2018
Biochemistry TA, University of Wisconsin Fall 2016
Food Sustainability Instructor, University of Wisconsin Fall 2015

Presentations

Intuitive Computing Laboratory at Johns Hopkins University Summer 2024
- Dynamic Robot Arm Movement and Close–Proximity Sensing Systems.

IEEE at University of Denver Spring 2024
- Dynamic Robot Arm Movement and Close–Proximity Sensing Systems.

Trinity University Computer Science Colloquium November 2021
- Title: Physical Human-robot Interaction Through Control, Perception, and AI.

International Conference on Robotics and Systems August 2021
- Talk Title: Contact Anticipation for Physical Human-Robot Interaction with Robotic Manipulators using Onboard Proximity Sensors.

4th Workshop on Proximity Perception in Robotics PhD Forum at IROS August 2021
- Talk Title: Volumetric Data Fusion of External Depth and Onboard Proximity Data For Occluded Space Reduction

Robotics Summer Student Seminar - University of Colorado June 2021
- Talk Title: Contact Anticipation for Physical Human-Robot Interaction with Robotic Manipulators using Onboard Proximity Sensors.

Trinity University Undergraduate Research Conference March 2019
- Poster Title: Musical Style Transfer in a Symbolic Domain.

University of New Mexico McNair Scholars Research Conference October 2018
- Poster Title: Cycle-Consistent Adversarial Networks with Optimistic Adam.