Zackory Erickson

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Carnegie Mellon University
Robotics Institute
5000 Forbes Avenue
Pittsburgh, PA 15213

Current Positions

Assistant Professor, Carnegie Mellon University, Robotics Institute — Sept 2021–present
Courtesy appointment: Biomedical Engineering

Education

Ph.D., Robotics — 2016–2021
Georgia Institute of Technology
Advisor: Charles C. Kemp

M.S., Computer Science — 2020
Georgia Institute of Technology
Advisor: Charles C. Kemp

B.S., Computer Science, Mathematics (double major) — 2012–2016
University of Wisconsin–La Crosse

Honors and Awards

NVIDIA Academic Hardware Grant — 2022
"Adapting to Distribution Shift in Deformable Manipulation with Assistive Robots"

NVIDIA Fellowship Finalist — 2020

Best Student Paper Award, IEEE International Conference on Rehabilitation Robotics (ICORR) — 2019
"Multidimensional Capacitive Sensing for Robot-Assisted Dressing and Bathing"

Best Paper Award in Service Robotics Finalist, IEEE ICRA — 2019
"Classification of Household Materials via Spectroscopy"

President's Fellowship, Georgia Tech — 2016–2020

4th Heidelberg Laureate Forum — 2016

Honorable Mention, NSF GRFP — 2016

Strzelczyk Award — 2016
Awarded to the top graduating senior in the College of Science and Health
for academic achievement and service to the campus and community.

MIT CONVERGE — 2015
One of 18 prospective PhD students in the nation invited to tour MIT.

Berkeley Engineering Preview Days — 2015
One of 14 prospective PhD students nationwide invited to tour UC Berkeley.

Grace Olwell Memorial Endowment Fund Scholarship — 2015

Xcel Energy Scholarship — 2015

John and Lois Storlie Scholarship in Computer Science — 2014

Undergraduate Research Grant, UW–La Crosse 2013

Scottish Rite Abbott Scholarship 2013

Dean's List, UW–La Crosse 8 semesters

Mentoring

PhD Students

Kavya Puthuveetil, CMU, RI 2022–

Zulekha Karachiwalla, CMU, RI (co-advised with Henny Admoni) 2022–

Je-Han Yang, CMU, BME (co-advised with Douglas Weber) 2022–

Yufei Wang, CMU, RI (co-advised with David Held) 2021–

Akhil Padmanabha, CMU, RI (co-advised with Carmel Majidi) 2021–

M.S. Students

Abhishek Tandon, CMU, RI 2023–

Anujraaj Goyal, CMU, RI 2023–

Sankalp Chopkar, CMU, RI 2022–

Atharva Kusalkar, CMU, RI 2022–

Saurav Kambil, CMU, MechE 2022–

Zilin Zhang, CMU, RI 2022–

MRSD Project: Auxilio, CMU, RI 2022–
Students: Shaolin Kataria, Shivam Tripathy, Praveen Venkatesh, Abhinav Gupta, Atharva Pusalkar

Fukang Liu, CMU, MechE 2021–

Vaidehi Patil, CMU, RI 2021–2022

MRSD Project: TouRI, CMU, RI 2021–2022
Students: Shivani Sivakumar, Jashkumar Diyora, Shruti Gangopadhyay, Prakhar Pradeep, Jigarkumar Patel

Pratyusha Karnati, Georgia Tech, CS 2020–2021
Current: Google X Robotics

Yijun (Esther) Gu, Georgia Tech, CS 2019–2021
Current: PhD Student at Imperial College London

Undergraduate Students

Janavi Gupta, CMU, CS 2023–

Sumayya Syeda, CMU, CIT 2023–

Preethi Krishnamoorthy, CMU, CS 2023–

Jessie Yuan, CMU, CS 2023–

Madeliene Brutin, CMU, CS 2023–

Kendra Givens, Middle Tennessee State University (NSF REU, RISS), CS 2023–

Alexandra Gillespie, Colby College (NSF REU, RISS), CS 2023–

Yikang (Bruce) Cheng, CMU, CS 2022–2023

Jacob Delgado-López, University of Puerto Rico (NSF REU, RISS), CS 2022

Wesley Lewis, University of Virginia (NSF REU, RISS), CS 2022–

Allen Zheng, CMU, CS 2022–

Qin (Alicia) Wang, CMU, CS 2022–2023

Daphne Han, CMU, CB 2022

Alexandra (Sasha) Wald, CMU, CS 2021–

Kavya Puthuveetil, Virginia Commonwealth University (NSF REU), BME 2021–2022

Samantha Mutiti, Georgia Tech, BME 2021

Holden Schaffer, Georgia Tech, CS 2020–2021

Siyan (Sylvia) Li, Georgia Tech, CS 2018–2019

Jiaqi (Julia) Chen, Georgia Tech, CS 2018
Current: PhD Student at ETH Zurich

Katelyn Sosnowski, University of Arizona (NSF REU), BME 2018
Current: BME PhD Student at University of Arizona

Mallak Taleb, University of Michigan (NSF REU), BME 2018

Bharat Srirangam, Georgia Tech, CS 2018–2020
Current: Woot, Inc.

Eliot Xing, Georgia Tech, CE 2017–2022

Vamsee Gangaram, Georgia Tech, CS 2017–2020
Current: Microsoft

Jong Hwa (Austin) Jang, Georgia Tech, CS 2017–2018

Maggie Collier, University of Alabama at Birmingham (NSF REU), BME 2017
Current: Robotics PhD student at CMU, NDSEG fellow

Nathan Luskey, Georgia Tech, BME 2017–2018
Current: MSCS student at CMU

Teaching

16-741: Mechanics of Manipulation, CMU Fall 2022–2023

16-887: Robotic Caregivers and Intelligent Physical Collaboration, CMU Spring 2022–2023

Robotic Caregivers (BMED 4833/8813), Co-instructor, Georgia Tech Spring 2021

Robotic Caregivers (BMED 4803/8813), Co-developer and instructor, Georgia Tech Spring 2020

Invited Talks

Robot Learning, Wearable Sensing, and Teleoperation in Pursuit of Robotic Caregivers
CMU RI Seminar 2023

My Journey to Professor
Robotics Institute Summer Scholars Seminar, CMU 2023

Robot Learning, Sensing, and Teleoperation in Pursuit of Robotic Caregivers
Northeastern University 2023
University of Utah 2023
University of Illinois Urbana-Champaign 2023

Robotics and Artificial Intelligence in Healthcare and Opportunities for Innovation
Clinical Impact Symposia, BrightSpring Health Services 2023

Capacitive Servoing and Spectroscopy for Physically Assistive Robotics
16-722: Sensing and Sensors, CMU 2022

Haptic Perspective-taking from Vision and Force
CMU RI Seminar 2022

Capacitive Proximity Servoing for Physically Assistive Robotics
Close Proximity Human-Robot Collaboration, RSS 2022

Robotic Caregiving and Human Interaction
24-675: Humanoid Robotics and Cognition, CMU 2022
16-311: Introduction to Robotics, CMU 2022
05-899: Special Topics in HCI: Accessibility, CMU 2021

Capacitive Servoing for Physically Assistive Robotics
4th Workshop on Proximity Perception in Robotics, IROS 2021

Robotic Caregivers—Sensing, Simulation, and Physical Human-Robot Interaction
Carnegie Mellon University 2021
University of Pennsylvania 2021

Physics-based Cloth Simulation and Learning Towards Robotic Caregiving
Workshop on Representing and Manipulating Deformable Objects, ICRA 2021

Robotic Caregivers—Recent Advances in Physics-based Simulation
Medical Robotics Club, Georgia Tech 2021

Robot-Assisted Dressing
Workshop on Smart and Robotic Homes, RESNA 2018

Multimodal Anomaly Detection
Mathematics Colloquium, UW–La Crosse 2015

Academic Service

Associate Editor — IEEE Robotics and Automation Letters (RA-L) 2023–
Manipulation and Grasping

Virtual Experience Chair — Conference on Robot Learning (CoRL) 2023

Seminar and Panel Organizer, Life as a Professor, CMU 2023–
Semesterly seminar where a panel of CMU faculty discuss their perspectives on becoming and being a professor for graduate students interested in the academic career path

Special Session Organizer — RO-MAN, Special Session on Human-Agent/Robot Interaction in Healthcare and Medicine 2023

Workshop Organizer — ICRA, Emerging paradigms for assistive robotic manipulation: from research labs to the real world 2023

Chair — IROS 2022 session on Art and Entertainment and Manipulation 2022

Co-Chair — ICRA 2022 session on Physical HRI 2022

Area Chair — Conference on Robot Learning (CoRL) 2022–2023

Workshop Organizer — IROS, 5th Workshop on Proximity Perception - Towards Next-Generation Multi-Modal Sensing in Soft Structures 2022

Carnegie Mellon University
PhD Admissions Committee 2023–
Organized Seminar Series, Life as a Professor 2023–

Associate Editor
IEEE Conference on Robot and Human Interactive Communication (RO-MAN) 2021, 2022

Reviewer
T-RO, ICRA, IROS, RA-L, Humanoids, HRI, Sensors, RO-MAN, Science Robotics, RSS Pioneers

Workshop Organizer — ICRA, Learning for Caregiving Robots 2021

Seminar Organizer, Georgia Tech
Life as a Professor: Student Advising and Recruiting 2020
Life as a Professor: Funding 101 2019
Life as a Professor: Starting a Start-Up 2018

Panelist
Graduate Intro to Robotics Research, Georgia Tech 2018
Summer Undergraduate Research Experience (SURE) Program, Georgia Tech 2017–2019

RoboGrads (robotics graduate student organization), Georgia Tech
Vice President for Robotics PhD 2019–2020
President 2018–2019

Outreach

AI Scholars, Co-organizer, CMU 2023–
Each summer, AIS provides 30+ rising high school seniors who have historically been excluded from STEM fields the opportunity to explore artificial intelligence through 4 weeks of courses and hands-on projects with Carnegie Mellon faculty, staff, and researchers.

AI4ALL, Co-organizer, CMU 2022

RoboGrads, Vice President of Outreach, Georgia Tech 2017–2018
Organized K-12 outreach events for over 30 robotics labs at Georgia Tech

Biomedical Robotics Club, Mentor, Georgia Tech 2016–2019
Mentoring over 50 undergraduate students in how to research and build assistive devices and robots for people with impairments.

FIRST Lego League, Judge 2015–2021

CS Outreach & Diversity Club, UW–La Crosse 2015–2016
Organizing CS and robotics events for K-12 students.

FIRST Robotics, Mentor, Central High School and Holmen High School 2012–2016

Peer-Reviewed Publications (Conferences and Journals)

[1] **Quantifying Assistive Robustness Via the Natural-Adversarial Frontier**
Conference on Robot Learning (CoRL), 2023
Jerry Zhi-Yang He, Daniel S Brown, Zackory Erickson, Anca Dragan

[2] **A Multimodal Sensing Ring for Quantification of Scratch Intensity**
Nature Communications Medicine, 2023
Akhil Padmanabha, Sonal Choudhary, Carmel Majidi, Zackory Erickson

[3] **One Policy to Dress Them All: Learning to Dress People with Diverse Poses and Garments**
Robotics Science and Systems (RSS), 2023
Yufei Wang, Zhanyi Sun, Zackory Erickson*, David Held*

[4] **HAT: Head-Worn Assistive Teleoperation of Mobile Manipulators**
IEEE International Conference on Robotics and Automation (ICRA), 2023
Akhil Padmanabha*, Qin Wang*, Daphne Han, Jashkumar Diyora, Kriti Kacker, Hamza Khalid, Liang-Jung Chen, Carmel Majidi, Zackory Erickson

[5] **SLURP! Spectroscopy of Liquids Using Robot Pre-Touch Sensing**
IEEE International Conference on Robotics and Automation (ICRA), 2023
Nathaniel Hanson*, Wesley Lewis*, Kavya Puthuveetil, Donelle Furline Jr, Akhil Padmanabha, Taskin Padir, Zackory Erickson

[6] **EDO-Net: Learning Elastic Properties of Deformable Objects from Graph Dynamics**
IEEE International Conference on Robotics and Automation (ICRA), 2023
Alberta Longhini*, Marco Moletta*, Alfredo Reichlin, Michael C. Welle, David Held, Zackory Erickson, Danica Kragic

[7] **Elastic Context: Encoding Elasticity for Data-driven Models of Textiles**
IEEE International Conference on Robotics and Automation (ICRA), 2023
Alberta Longhini, Marco Moletta, Alfredo Reichlin, Michael C. Welle, Alexander Kravberg, Yufei Wang, David Held, Zackory Erickson, Danica Kragic

[8] **A Study of Causal Confusion in Preference-Based Reward Learning**
International Conference on Learning Representations (ICLR), 2023
Jeremy Tien, Jerry Zhi-Yang He, Zackory Erickson, Anca D. Dragan, Daniel S. Brown

[9] **ToolFlowNet: Robotic Manipulation with Tools via Predicting Tool Flow from Point Clouds**
Conference on Robot Learning (CoRL), 2022
Daniel Seita, Yufei Wang, Edward Yao Li, Sarthak J Shetty, Zackory Erickson, and David Held

[10] **Learning Representations that Enable Generalization in Assistive Tasks**
Conference on Robot Learning (CoRL), 2022
Jerry Zhi-Yang He, Zackory Erickson, Daniel S. Brown, Aditi Raghunathan, and Anca Dragan

[11] **Characterization of a Meso-Scale Wearable Robot for Bathing Assistance**
IEEE International Conference on Robotics and Biomimetics (ROBIO), 2022
Fukang Liu, Vaidehi Patil, Zackory Erickson, and Zeynep Temel

[12] **Visual Haptic Reasoning: Estimating Contact Forces by Observing Deformable Object Interactions**
IEEE Robotics and Automation Letters (RA-L), 2022
Yufei Wang, David Held, and Zackory Erickson

[13] **CapSense: A Real-Time Capacitive Sensor Simulation Framework for Physical Human-Robot Interaction**
IEEE Robotics and Automation Letters (RA-L), 2022
Christian Schöffmann, Zackory Erickson, and Hubert Zangl

[14] **Bodies Uncovered: Learning to Manipulate Real Blankets Around People via Physics Simulations**
IEEE Robotics and Automation Letters (RA-L), 2022
Kavya Puthuveetil, Charles C. Kemp, and Zackory Erickson

[15] **Characterizing Multidimensional Capacitive Servoing for Physical Human-Robot Interaction**
IEEE Transactions on Robotics (T-RO), 2022
Zackory Erickson, Henry M. Clever, Vamsee Gangaram, Eliot Xing, Greg Turk, C. Karen Liu, and Charles C. Kemp

[16] **Assistive VR Gym: Interactions with Real People to Improve Virtual Assistive Robots**
IEEE Conference on Robot and Human Interactive Communication (RO-MAN), 2020
Zackory Erickson*, Yijun Gu*, and Charles C. Kemp

[17] **Multimodal Material Classification for Robots using Spectroscopy and High Resolution Texture Imaging**
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020
Zackory Erickson, Eliot Xing, Bharat Srirangam, Sonia Chernova, and Charles C. Kemp

[18] **Bodies at Rest: 3D Human Pose and Shape Estimation from a Pressure Image using Synthetic Data**
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020 **(Oral)**
Henry M. Clever, Zackory Erickson, Ariel Kapusta, Greg Turk, C. Karen Liu, and Charles C. Kemp

[19] **Assistive Gym: A Physics Simulation Framework for Assistive Robotics**
IEEE International Conference on Robotics and Automation (ICRA), 2020
Zackory Erickson, Vamsee Gangaram, Ariel Kapusta, C. Karen Liu, and Charles C. Kemp

[20] **Learning to Collaborate from Simulation for Robot-Assisted Dressing**
IEEE Robotics and Automation Letters (RA-L), 2020
Alexander Clegg, Zackory Erickson, Patrick Grady, Greg Turk, Charles C. Kemp, and C. Karen Liu

[21] **Active Robot-Assisted Feeding with a General-Purpose Mobile Manipulator: Design, Evaluation, and Lessons Learned**
Robotics and Autonomous Systems, 2020
Daehyung Park, Yuuna Hoshi, Harshal P. Mahajan, Ho Keun Kim, Zackory Erickson, Wendy A. Rogers, Charles C. Kemp

[22] **Multidimensional Capacitive Sensing for Robot-Assisted Dressing and Bathing**
IEEE International Conference on Rehabilitation Robotics (ICORR), 2019 **(Best Student Paper)**
Zackory Erickson, Henry M. Clever, Vamsee Gangaram, Greg Turk, C. Karen Liu, and Charles C. Kemp

[23] **Classification of Household Materials via Spectroscopy**
IEEE Robotics and Automation Letters (RA-L), 2019 **(Best Paper Award in Service Robotics Finalist at ICRA 2019)**
Zackory Erickson, Nathan Luskey, Sonia Chernova, and Charles C. Kemp

[24] **Personalized Collaborative Plans for Robot-Assisted Dressing via Optimization and Simulation**
Autonomous Robots, 2019
Ariel Kapusta, Zackory Erickson, Henry M. Clever, Wenhao Yu, C. Karen Liu, Greg Turk, and Charles C. Kemp

[25] **Autonomous Tool Construction Using Part Shape and Attachment Prediction**
Robotics: Science and Systems (RSS), 2019
Lakshmi Nair, Nithin Srikanth, Zackory Erickson, Sonia Chernova

[26] **Deep Haptic Model Predictive Control for Robot-Assisted Dressing**
IEEE International Conference on Robotics and Automation (ICRA), 2018
Zackory Erickson, Henry M. Clever, Greg Turk, C. Karen Liu, and Charles C. Kemp

[27] **Tracking Human Pose During Robot-Assisted Dressing using Single-Axis Capacitive Proximity Sensing**

IEEE Robotics and Automation Letters (RA-L), 2018
Zackory Erickson, Maggie Collier, Ariel Kapusta, and Charles C. Kemp

[28] **3D Human Pose Estimation on a Configurable Bed from a Pressure Image**
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018
Henry M. Clever, Ariel Kapusta, Daehyung Park, Zackory Erickson, Yash Chitalia, Charles C. Kemp

[29] **Semi-Supervised Haptic Material Recognition for Robots using Generative Adversarial Networks**
Conference on Robot Learning (CoRL), 2017
Zackory Erickson, Sonia Chernova, and Charles C. Kemp

[30] **What Does the Person Feel? Learning to Infer Applied Forces During Robot-Assisted Dressing**
IEEE International Conference on Robotics and Automation (ICRA), 2017
Zackory Erickson, Alexander Clegg, Wenhao Yu, Greg Turk, C. Karen Liu, and Charles C. Kemp

[31] **Learning to Navigate Cloth using Haptics**
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2017
Alexander Clegg, Wenhao Yu, Zackory Erickson, C. Karen Liu, and Greg Turk

[32] **A Multimodal Execution Monitor with Anomaly Classification for Robot-Assisted Feeding**
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2017
Daehyung Park, Hokeun Kim, Yuuna Hoshi, Zackory Erickson, Ariel Kapusta, and Charles C. Kemp

[33] **Multimodal Execution Monitoring for Anomaly Detection During Robot Manipulation**
IEEE International Conference on Robotics and Automation (ICRA), 2016
Daehyung Park, Zackory Erickson, Tapomayukh Bhattacharjee, and Charles C. Kemp

Workshop Papers

[1] **Elastic Context: Encoding Elasticity for Data-driven Models of Textiles**
ICRA 2023: Embracing contacts. Making robots physically interact with our world, 2023
Alberta Longhini, Marco Moletta, Alfredo Reichlin, Michael C. Welle, Alexander Kravberg, Yufei Wang, David Held, Zackory Erickson, Danica Kragic

[2] **HAT: Head-Worn Assistive Teleoperation of Mobile Manipulators**
ICRA 2023: Emerging paradigms for assistive robotic manipulation: from research labs to the real world, 2023
Akhil Padmanabha*, Qin Wang*, Daphne Han, Jashkumar Diyora, Kriti Kacker, Hamza Khalid, Liang-Jung Chen, Carmel Majidi, Zackory Erickson

[3] **A Study of Causal Confusion in Preference-Based Reward Learning**
ICML 2022: Workshop on Spurious Correlations, Invariance and Stability, 2022
Jeremy Tien, Jerry Zhi-Yang He, Zackory Erickson, Anca Dragan, Daniel S. Brown