Zackory Erickson

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Research Interests

My research broadly explores physical human-robot interaction, with an emphasis on physical robotic caregiving. I am especially interested in how robots can leverage physics-based simulation and learning to more efficiently and safely assist people with physical disabilities to perform activities of daily living. My work spans the fields of physically assistive robotics, haptic perception, learning, physics simulation, and human-robot interaction towards robotic caregivers that intelligently interact with and assist people.

Education

Georgia Institute of Technology 2016–
Ph.D. in Robotics
Advisor: Charles C. Kemp

Georgia Institute of Technology 2020
Masters in Computer Science
Advisor: Charles C. Kemp

University of Wisconsin–La Crosse 2012–2016
B.S. in Computer Science, Mathematics (double major) · GPA: 3.93

Publications

Journal

[21] A. Clegg, **Z. Erickson**, P. Grady, G. Turk, C. C. Kemp, and C. K. Liu, "Learning to Collaborate from Simulation for Robot-Assisted Dressing," *IEEE Robotics and Automation Letters (RA-L)*, 2020.

[20] D. Park, Y. Hoshi, H. P. Mahajan, H. K. Kim, **Z. Erickson**, W. A. Rogers, C. C. Kemp, "Active Robot-Assisted Feeding with a General-Purpose Mobile Manipulator: Design, Evaluation, and Lessons Learned," *Robotics and Autonomous Systems*, 2020.

[19] **Z. Erickson**, N. Luskey, S. Chernova, and C. C. Kemp, "Classification of Household Materials via Spectroscopy," *IEEE Robotics and Automation Letters (RA-L)*, 2019. (**Best Paper Award in Service Robotics finalist** at IEEE Conference on Robotics and Automation (ICRA 2019))

[18] A. Kapusta, **Z. Erickson**, H. M. Clever, W. Yu, C. K. Liu, G. Turk, and C. C. Kemp, "Personalized Collaborative Plans for Robot-Assisted Dressing via Optimization and Simulation," *Autonomous*

Robots (AURO), 2019.

[17] **Z. Erickson**, M. Collier, A. Kapusta, and C. C. Kemp, "Tracking Human Pose During Robot-Assisted Dressing using Single-Axis Capacitive Proximity Sensing," *IEEE Robotics and Automation Letters (RA-L)*, 2018.

Conference

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

[15] **Z. Erickson**, E. Xing, B. Srirangam, S. Chernova, and C. C. Kemp, "Multimodal Material Classification for Robots using Spectroscopy and High Resolution Texture Imaging", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020.

[14] H. M. Clever, **Z. Erickson**, A. Kapusta, G. Turk, C. K. Liu, and C. C. Kemp, "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. (**Accepted for Oral Presentation**)

[13] **Z. Erickson**, V. Gangaram, A. Kapusta, C. K. Liu, and C. C. Kemp, "Assistive Gym: A Physics Simulation Framework for Assistive Robotics," *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

[12] **Z. Erickson**, H. M. Clever, V. Gangaram, G. Turk, C. K. Liu, and C. C. Kemp, "Multidimensional Capacitive Sensing for Robot-Assisted Dressing and Bathing," *IEEE/RAS-EMBS International Conference on Rehabilitation Robotics (ICORR)*, 2019. (**Best Student Paper Award**)

[11] L. Nair, N. Srikanth, **Z. Erickson**, S. Chernova, "Autonomous Tool Construction Using Part Shape and Attachment Prediction," *Robotics: Science and Systems (RSS)*, 2019.

[10] H. M. Clever, A. Kapusta, D. Park, **Z. Erickson**, Y. Chitalia, C. C. Kemp, "Estimating 3D Human Pose on a Configurable Bed from a Single Pressure Image," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.

[9] **Z. Erickson**, H. M. Clever, G. Turk, C. K. Liu, and C. C. Kemp, "Deep Haptic Model Predictive Control for Robot-Assisted Dressing," *IEEE International Conference on Robotics and Automation (ICRA)*, 2018.

[8] **Z. Erickson**, S. Chernova, and C. C. Kemp, "Semi-Supervised Haptic Material Recognition for Robots using Generative Adversarial Networks," *1st Annual Conference on Robot Learning (CoRL)*, 2017.

[7] **Z. Erickson**, A. Clegg, W. Yu, G. Turk, C. K. Liu, and C. C. Kemp, "What Does the Person Feel? Learning to Infer Applied Forces During Robot-Assisted Dressing," *IEEE International Conference on Robotics and Automation (ICRA)*, 2017.

[6] A Clegg, W. Yu, **Z. Erickson**, C. K. Liu, and G. Turk, "Learning to Navigate Cloth using Haptics," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2017.

[5] D. Park, H. Kim, Y. Hoshi, **Z. Erickson**, A. Kapusta, and C. C. Kemp, "A Multimodal Execution Monitor with Anomaly Classification for Robot-Assisted Feeding," *IEEE/RSJ International Conference*

on Intelligent Robots and Systems (IROS), 2017.

[4] D. Park, **Z. Erickson**, T. Bhattacharjee, and C. C. Kemp, "Multimodal Execution Monitoring for Anomaly Detection During Robot Manipulation," *IEEE International Conference on Robotics and Automation (ICRA)*, 2016.

[3] **Z. Erickson** and S. Foley, "On Ramp to Parallel Computing," in *Midwest Instruction and Computing Symposium (MICS)*, 2014.

Peer-Reviewed Workshops

[2] **Z. Erickson**, M. Collier, A. Kapusta, and C. C. Kemp, "Investigating Capacitive Proximity Sensing for Tracking Human Pose During Robot-Assisted Dressing," *IROS 2017 workshop on Assistance and Service Robotics in a Human Environment*, 2017.

[1] D. Park, Y. Kim, **Z. Erickson**, and C. C. Kemp, "Towards Assistive Feeding with a General-Purpose Mobile Manipulator," *ICRA 2016 workshop on Human-Robot Interfaces for Enhanced Physical Interactions*, 2016.

Teaching

BMED 8813 - Robotic Caregivers, Co-instructor — Georgia Tech, Spring 2021

BMED 8813 - Robotic Caregivers, Co-developer and instructor — Georgia Tech, Spring 2020

Mentoring

Master's Students

Pratyusha Karnati, Georgia Tech, CS Master's — 2020–

Esther (Yijun) Gu, Georgia Tech, CS Master's — 2019–
Publications: [16]

Undergraduate Students

Holden Schaffer, Georgia Tech, CS — 2019–2020

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, BME — 2018
Current: BME PhD Student at University of Arizona

Mallak Taleb, University of Michigan, BME — 2018

Bharat Srirangam, Georgia Tech, CS — 2018–2020
Current: Woot, Inc.
Publications: [15]

Eliot Xing, Georgia Tech, CE — 2017–

Publications: [15]

Vamsee Gangaram, Georgia Tech, CS 2017–2020
Current: Microsoft
Publications: [12], [13]

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

Maggie Collier, University of Alabama at Birmingham, BME 2017
Current: Robotics PhD student at CMU, NDSEG fellow.
Publications: [2], [17]

Nathan Luskey, Georgia Tech, BME 2017–2018
Publications: [19]

Invited Talks

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

Multimodal Anomaly Detection, Mathematics Colloquium, UW–La Crosse 2015

Honors and Awards

NVIDIA Fellowship Finalist 2020

Best Student Paper Award at ICORR 2019

Best Paper Award in Service Robotics finalist at ICRA 2019

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 graduate students in the nation invited to tour MIT.

Berkeley Engineering Preview Days 2015
One of 14 prospective graduate 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

Academic Service

Refereeing: Conferences and Journals

T-RO, ICRA, IROS, RA-L, HRI, Sensors

Organizing

ICRA 2021 Workshop – Learning for Caregiving Robots 2021
`https://sites.gatech.edu/learning-caregiving-icra2021/`

Seminar Organizer, Life as a Professor: Student Advising and Recruiting 2020

Seminar Organizer, Life as a Professor: Funding 101 2019

Seminar Organizer, Life as a Professor: Starting a Start-Up 2018

Other Service

RoboGrads, Vice President for Robotics PhD 2019–2020
Facilitating communication between robotics PhD students and faculty at Georgia Tech. Attending IRIM faculty meetings.

RoboGrads, President 2018–2019
Lead the executive board for RoboGrads, a graduate student organization for robotics researchers at Georgia Tech.

Panelist, Graduate Intro to Robotics Research 2018

Panelist, Summer Undergraduate Research Experience (SURE) Program 2017–2019

Outreach

RoboGrads, Vice President of Outreach 2017–2018
Coordinated tours and outreach events for over 30 robotics labs at Georgia Tech. Organized outreach events and robotics demos at schools, libraries, and museums in the greater Atlanta area.

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

Judge, FIRST Lego League 2015–

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

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

Experience

Computer Science Tutor, UW–La Crosse 2016

SURE Robotics Program, Georgia Tech 2015
Summer NSF REU, advised by Professor Charlie Kemp.

TRUST REU Program, UC Berkeley 2014
Summer NSF REU, advised by Professor Dawn Song.

Software Developer Intern, Watlow 2013

Software Developer, Office of Residence Life, UW–La Crosse 2012–2013

Selected Media Coverage

Robot Able to Instantly Identify Household Materials Without Touching Objects 2019
Tech Unbound Podcast

Robot Teaches Itself How to Dress People 2018
Georgia Tech News, BBC News, CNET, ACM TechNews, ASME