

Thomas R Groechel

CONTACT INFORMATION

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RESEARCH INTERESTS

Socially Assistive Robot (SAR) Tutors, Virtual and Augmented Reality Robotics

EDUCATION

University of Southern California, Los Angeles, CA *July 2018 - Present*
– Ph.D. Computer Science
– Research Advisor: Professor Maja J. Matarić

University of Michigan, Ann Arbor, MI *Sep 2014 - May 2018*
– B.S.E. Computer Science
– Undergraduate Research Advisor: Professor Odest C. Jenkins

EXPERIENCE

Ph.D. Researcher, USC Interaction Lab, Los Angeles, CA *July 2018 - Present*
– Created mixed reality robot tutor aiming to teach K-12 students coding via kinesthetic learning
– Developed and deployed telepresence robots in schools for home-bound students
– Supported month-long in-home deployments of robot tutor for students with Autism Spectrum Disorder

UG Researcher, UofM 4Progress Lab, Ann Arbor, MI *May 2016 - May 2018*
– Developed 2D SLAM algorithm using Iterative Closest Point visualization
– Implemented Stochastic Gradient Descent for loop closure based on *Fast Iterative Alignment of Pose Graphs with Poor Initial Estimates* (Olson et al.) using the Fetch

Staff Development Czar and TA, UofM, Ann Arbor, MI *Sep 2016 - May 2018*
– Created Staff Development program for teaching staff of 30 graduate and undergraduate TAs to improve teaching skills of new and returning staff members
– Structured 35-student lab session to review and teach concepts in a specialized alternative to traditional lecture, tailoring for active learning
– Produced class-specific help and tip videos to give students an extra resource to common issues in a newer format

Robotics Software Intern at TRAC Labs, Houston, TX *Summer 2017*
– Adapted local mapping and navigation to move TRACBot, a mobile-manipulator, to maneuver dynamically through obstacles such as doors and people in order to reach/use items in Affordance Template library
– Refitted and rebuilt action server nodes into custom system to perform dynamic re-planning based on real time observations

STUDENT RESEARCH MENTORING

Current Students

– Chloe Kuo	Merit Research Fellow, USC Computer Science
– Julia Cordero	Merit Research Fellow, USC Computer Science
– Roddur Dasgupta	USC Computer Science
– Haemin Lee	USC Computer Science
– Kartik Mahajan	Merit Research Fellow, USC Computer Science
– Radhika Agrawal	Merit Research Fellow, USC Computer Science
– Nisha Chatwani	Merit Research Fellow, USC Computer Science
– Adam Wathieu	Georgetown University Computer Science
– Annika Modi	USC SHINE Program, High School Student
– Jacob Zhi	USC SHINE Program, High School Student

	Previous Students <ul style="list-style-type: none"> – Roxanna Pakkar Merit Research Fellow, USC Electrical Engineering – Zhonghao Shi USC Computer Science – İpek Göktan USC SHINE Program, High School Student – Mena Hassan USC SHINE Program, High School Student – Adnan Karim SURE Student, University of Calgary Computer Science – Ryan Stevenson USC Computer Science Games – Ashley Perez USC SHINE Program, High School Student – Bryan Pyo USC SHINE Program, High School Student
CONTRIBUTIONS TO GRANT PROPOSALS	NSF NRI 2.0 - Communicate, Share, Adapt: A Mixed Reality Framework for Facilitating Robot Integration and Customization <ul style="list-style-type: none"> – Contributed significant ideas and content to proposal based upon ongoing Ph.D. work in Mixed Reality SAR – Research grant awarded in fall 2019
K-12 EDUCATIONAL OUTREACH	Microsoft TEALS Teaching Volunteer Los Angeles Center for Enriched Studies, Los Angeles, CA <i>July 2019 - Jan 2020</i> USC Robotics Academy Judge University of Southern California, Los Angeles, CA <i>Dec 2018/19, Apr 2019</i> Robotics Family Night Monterey Hills Elementary, Los Angeles, CA <i>May 2019, Nov 2019</i> The Help Group STEM³ Academy Visit STEM ³ Academy, Los Angeles, CA <i>June 2019</i> VEX Robotics Team Leader Clifford Street Elementary, Los Angeles, CA <i>Oct 2018 - Feb 2019</i>
HONORS AND AWARDS	USC CSCI Best Research Assistant <i>May 2020</i> USC Viterbi Undergraduate Research Mentoring Award <i>May 2020</i> USC Robotics George Bekey Service Award <i>May 2019</i>
PUBLICATIONS UNDER REVIEW	[1] Kartik Mahajan, Thomas R. Groechel , Roxanna Pakkar, Julia Cordero, Haemin Lee, Maja J. Matarić “Adapting Usability Metrics for a Socially Assistive, Kinesthetic, Mixed Reality Robot Tutoring Environment”, <i>International Conference on Social Robotics (ICSR)</i> , 2015. Under review (submitted 7/13/2020) [2] Thomas R. Groechel , Roxanna Pakkar, Roddur Dasgupta, Chloe Kuo, Haemin Lee, Julia Cordero, Kartik Mahajan, and Maja J. Matarić “Kinesthetic Curiosity: Towards Personalized Embodied Learning with a Robot Tutor Teaching Programming in Mixed Reality”, <i>International Symposium on Experimental Robotics (ISER)</i> , 2020. Under review (submitted 6/30/2020)
PEER-REVIEWED PUBLICATIONS	[3] Naomi T. Fitter, Luke M. Rush, Elizabeth Cha, Thomas R. Groechel , Maja J. Matarić, and Leila Takayama “Closeness is Key over Long Distances: Effects of Interpersonal Closeness on Telepresence Experience”, In <i>Proceedings of 2020 ACM/IEEE International Conference on Human Robot Interaction (HRI '20)</i> , Cambridge, UK, Mar 2020. [4] Tom Williams, Daniel Szafir, Tathagata Chakraborti, Ong Soh Khim, Eric Rosen, Serena Booth, Thomas R. Groechel , “Virtual, Augmented, and Mixed Reality for Human-Robot Interaction (VAM-HRI)”, In <i>Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI '20)</i> , Cambridge, UK, Mar 2020.

- [5] Matthew Rueben, **Thomas R. Groechel**, Yulun Zhang, Gisele Ragusa, Maja J. Matarić “Increasing Telepresence Robot Operator Awareness of Speaking Volume Appropriateness: Initial Model Development”, In *Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI '20)*, Cambridge, UK, Mar 2020.
- [6] **Thomas R. Groechel**, Zhonghao Shi, Roxanna Pakkar, and Maja J. Matarić “Using Socially Expressive Mixed Reality Arms for Enhancing Low-Expressivity Robots”, In *2019 IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN '19)*, New Delhi, India, Oct 2019.
Robotics Society of Japan and Korean Robotics Society Distinguished Interdisciplinary Research Award Finalist (3 nominated out of 206)

TALKS, DEMOS,
AND
PRESENTATIONS

Planning A Successful Summer Research Experience
 USC Summer Research Program Talks via Zoom *1 June 2020*

Live Mixed Reality Demo and How it Applies to Socially Assistive Robotics
 USC Remote Robotics Open House via Zoom *19 May 2020*

Communicate, Share, Adapt: A Mixed Reality Framework for Facilitation
Robot Integration and Customization Poster Presentation
 NSF NRI 2.0 PI Meeting, Arlington, VA *27 Feb 2020*

Human-Robot Interaction & Socially Assistive Robots
 Laguna Woods Village, Laguna Woods, CA *19 Feb 2020*

USC Robotics Visions & Voices: Emotionally Intelligent Robots Demo
 University of Southern California, Los Angeles, CA *24 Oct 2019*

SAR Through Augmented Reality Extensions Demo and Discussion
 Public Affairs Council, Laguna Beach, CA *8-9 Jan 2019*

PROFESSIONAL
SERVICE

Workshop Organizer
 – “The Third International Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interaction (VAM-HRI)”, In *2020 ACM/IEEE International Conference on Human Robot Interaction (HRI '20)*

Reviewer

- International Conference on Social Robotics 2020
- Virtual, Augmented, and Mixed Reality for Human-Robot Interaction Workshop at HRI 2020
- Science Robotics 2018

Women in US Academic Research in Robotics Website *July 2019 - Present*
 – Designed and implemented, under Prof. Matarić’s supervision, an actively curated and monitored list of current women in US academic robotics research
 – Link: us-women-in-robotics-research.github.io

CERTIFICATION

USC Center for Excellence in Teaching’s Future Faculty Teaching Institute
 USC, Los Angeles, CA *Jan 2020 - May 2020*