

Thomas R Groechel

CONTACT INFORMATION	3425 Motor Ave #310 Los Angeles, CA 90034	<i>Mobile:</i> 248-921-3254 <i>E-mail:</i> groechel@usc.edu
RESEARCH INTERESTS	Computational Modeling for Human-Machine Interaction, Virtual and Augmented Reality, Socially Assistive Robotics, Computer Science Education	
EDUCATION	University of Southern California , Los Angeles, CA <i>July 2018 - Present</i> – Ph.D. Computer Science: <i>Expected May 2023</i> – Masters Computer Science: <i>Completed May 2020</i> – Research Advisor: Professor Maja J. Matarić University of Michigan , Ann Arbor, MI <i>Sep 2014 - May 2018</i> – B.S.E. Computer Science: <i>Completed May 2018</i> – Undergraduate Research Advisor: Professor Odest C. Jenkins	
EXPERIENCE	Ph.D. Researcher, USC Interaction Lab , Los Angeles, CA <i>July 2018 - Present</i> – Created mixed reality robot tutor aiming to teach K-12 students coding through modeling student kinesthetic learning processes – 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 <i>May 2016 - May 2018</i> – Developed 2D SLAM algorithm using Iterative Closest Point visualization – Implemented Stochastic Gradient Descent for loop closure based on <i>Fast Iterative Alignment of Pose Graphs with Poor Initial Estimates</i> (Olson et al.) using the Fetch Staff Development Czar and TA, UofM , Ann Arbor, MI <i>Sep 2016 - May 2018</i> – 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 <i>Summer 2017</i> – 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 Northwestern University Computer Science	

- İpek Göktan Viterbi Fellow, USC SHINE Program, USC Computer Science
- Karen Ly Merit Research Fellow, USC Computer Science

Previous Students

- Annika Modi USC SHINE Program, High School Student
- Jacob Zhi USC SHINE Program, High School Student
- Roxanna Pakkar Merit Research Fellow, USC Electrical Engineering
- Zhonghao Shi USC Computer Science
- 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**

- 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 *July 2019 - June 2020*
USC Robotics Academy Judge
University of Southern California, Los Angeles, CA *Dec 2018/19, Apr 2019*
Robotics Family Night
Monterey Hills Elementary, Los Angeles, CA *May 2019, Nov 2019*
The Help Group STEM³ Academy Visit
STEM³ Academy, Los Angeles, CA *June 2019*
VEX Robotics Team Leader
Clifford Street Elementary, Los Angeles, CA *Oct 2018 - Feb 2019*

HONORS AND AWARDS **USC CSCI Best Research Assistant** *May 2020*
USC Viterbi Undergraduate Research Mentoring Award *May 2020*
USC Robotics George Bekey Service Award *May 2019*

- PEER-REVIEWED PUBLICATIONS
- [1] **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”, In *17th International Symposium on Experimental Robotics (ISER)*, Virtual, Mar 2021.
 - [2] Eric Rosen, **Thomas R. Groechel**, Micahel Walker, Christine T. Chang, Jessica Zosa Forde “Virtual, Augmented, and Mixed Reality for Human-Robot Interaction (VAM-HRI)”, In *Companion of the 2021 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI '21)*, Virtual, Mar-2021.
 - [3] 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”, In *Proceedings of 2020 International Conference on Social Robotics (ICSR '20)*, Colorado, USA, Nov 2020. *Best Paper Award Finalist (5 nominated out of 113)*
 - [4] 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 *Proceedings of 2020 ACM/IEEE International Conference on Human Robot Interaction (HRI '20)*, Cambridge, UK, Mar 2020.

- [5] 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 *Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI '20)*, Cambridge, UK, Mar 2020.
- [6] 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.
- [7] **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

Virtual, Augmented, and Mixed Reality for Human-Robot Interaction
USC Robotics Ed Week via Zoom 10 Apr 2020

Communicate, Share, Adapt: A Mixed Reality Framework for Facilitation Robot Integration and Customization Virtual Poster Presentation
NSF NRI 2.0 PI Meeting via Hopin 10 Mar 2021

Guest Lecture: Online Features and Measures for K-12 Robot Computer Science Tutoring Through Mixed Reality Modalities
CSCI 699: Computational Human-Robot Interaction via Zoom 8 Mar 2021

Robot Operating System (ROS) Tutorial and Demo
USC Makers Club via Zoom 4 Mar 2021

What is a Socially Assistive Robotics Ph.D.?
Temple City High School Robotics Team Talk via Zoom 15 Nov 2020

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 Fourth International Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interaction (VAM-HRI)”, In *2021 ACM/IEEE International Conference on Human Robot Interaction (HRI '21)*

- “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

- Virtual, Augmented, and Mixed Reality for Human-Robot Interaction Workshop at HRI 2020 & 2021
- International Conference on Robotics and Automation 2021
- International Conference on Human Robot Interaction 2021
- International Conference on Social Robotics 2020
- Applied Sciences 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*