

## Thomas R Groechel

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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	<b>University of Southern California</b> , 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  <b>University of Michigan</b> , 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	<b>Ph.D. Researcher, USC Interaction Lab</b> , 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  <b>UG Researcher, UofM 4Progress Lab</b> , 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  <b>Staff Development Czar and TA, UofM</b> , 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  <b>Robotics Software Intern at TRAC Labs</b> , 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	<b>Current Students</b> – Chloe Kuo – Julia Cordero – Roddur Dasgupta – Haemin Lee – Kartik Mahajan – Radhika Agrawal – Nisha Chatwani – Adam Wathieu	
		Merit Research Fellow, USC Computer Science Merit Research Fellow, USC Computer Science USC Computer Science USC Computer Science Merit Research Fellow, USC Computer Science Merit Research Fellow, USC Computer Science Merit Research Fellow, USC Computer Science Georgetown 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 - Jan 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 STEM<sup>3</sup> Academy Visit**  
STEM<sup>3</sup> 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”, To appear in *17th International Symposium on Experimental Robotics (ISER)*, Mar 2021.

[2] 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)*

[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 *Proceedings of 2020 ACM/IEEE International Conference on Human Robot Interaction (HRI '20)*, 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 *Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI ’20)*, 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	<b>What is a Socially Assistive Robotics Ph.D.?</b>	
	Temple City High School Robotics Team Talk via Zoom	15 Nov 2020
	<b>Planning A Successful Summer Research Experience</b>	
	USC Summer Research Program Talks via Zoom	1 June 2020
	<b>Live Mixed Reality Demo and How it Applies to Socially Assistive Robotics</b>	
	USC Remote Robotics Open House via Zoom	19 May 2020
	<b>Communicate, Share, Adapt: A Mixed Reality Framework for Facilitation</b>	
	<b>Robot Integration and Customization Poster Presentation</b>	
	NSF NRI 2.0 PI Meeting, Arlington, VA	27 Feb 2020
	<b>Human-Robot Interaction &amp; Socially Assistive Robots</b>	
PROFESSIONAL SERVICE	Laguna Woods Village, Laguna Woods, CA	19 Feb 2020
	<b>USC Robotics Visions &amp; Voices: Emotionally Intelligent Robots Demo</b>	
	University of Southern California, Los Angeles, CA	24 Oct 2019
	<b>SAR Through Augmented Reality Extensions Demo and Discussion</b>	
	Public Affairs Council, Laguna Beach, CA	8-9 Jan 2019
	<b>Workshop Organizer</b>	
	– “The Third International Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interaction (VAM-HRI)”, In <i>2020 ACM/IEEE International Conference on Human Robot Interaction (HRI ’20)</i>	
	<b>Reviewer</b>	
	– International Conference on Human Robot Interaction 2020	
	– International Conference on Social Robotics 2020	
CERTIFICATION	– Applied Sciences 2020	
	– Virtual, Augmented, and Mixed Reality for Human-Robot Interaction Workshop at HRI 2020	
	– Science Robotics 2018	
	<b>Women in US Academic Research in Robotics Website</b>	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: <a href="https://us-women-in-robotics-research.github.io">us-women-in-robotics-research.github.io</a>	
	<b>USC Center for Excellence in Teaching’s Future Faculty Teaching Institute</b>	
	USC, Los Angeles, CA	Jan 2020 - May 2020