

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	
TECHNICAL	Languages: C#, C++, Python, Javascript, R, Bash Tools: Unity, Robot Operating System (ROS), RosSharp, Mixed Reality Toolkit (MRTK), Jupyterlab (pandas, seaborn, sklearn)	
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	Robotics Software Intern, iRobot , Pasadena, CA <i>May 2021 - Present</i> 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	
	<ul style="list-style-type: none"> – Chloe Kuo – Julia Cordero – Haemin Lee – Nisha Chatwani – Adam Wathieu – İpek Gökten – Karen Ly – Karen Berba – Daniel Ramirez 	<ul style="list-style-type: none"> Merit Research Fellow, USC Computer Science Merit Research Fellow, USC Computer Science USC Computer Science Merit Research Fellow, USC Computer Science Northwestern University Computer Science Viterbi Fellow, USC SHINE Program, USC Computer Science Merit Research Fellow, USC Computer Science Cal State LA Computer Science MS Cal State LA Computer Science
	Previous Students	
	<ul style="list-style-type: none"> – Radhika Agrawal – Kartik Mahajan – Roddur Dasgupta – Annika Modi – Jacob Zhi – Roxanna Pakkar – Zhonghao Shi – Mena Hassan – Adnan Karim – Ryan Stevenson – Ashley Perez – Bryan Pyo 	<ul style="list-style-type: none"> Merit Research Fellow, USC Computer Science Merit Research Fellow, USC Computer Science USC Computer Science USC SHINE Program, High School Student USC SHINE Program, High School Student Merit Research Fellow, USC Electrical Engineering USC Computer Science USC SHINE Program, High School Student SURE Student, University of Calgary Computer Science USC Computer Science Games USC SHINE Program, High School Student 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	Virtual, Augmented, and Mixed Reality for Human-Robot Interaction USC Robotics Ed Week via Zoom <i>10 Apr 2020</i> What is a Socially Assistive Robotics Ph.D.? Temple City High School Robotics Team Talk via Zoom <i>15 Nov 2020</i> Microsoft TEALS Teaching Volunteer Los Angeles Center for Enriched Studies, Los Angeles, CA <i>July 2019 - June 2020</i> Live Mixed Reality Demo and How it Applies to Socially Assistive Robotics USC Remote Robotics Open House via Zoom <i>19 May 2020</i> USC Robotics Academy Judge University of Southern California, Los Angeles, CA <i>Dec 2018 & 2019, 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> Mixed Reality and the Kuri Robot USC Robotics Open House <i>10 Apr 2019</i> VEX Robotics Team Leader Clifford Street Elementary, Los Angeles, CA <i>Oct 2018 - Feb 2019</i>	
HONORS AND AWARDS	USC Viterbi Undergraduate Research Mentoring Award <i>May 2020 & 2021</i> USC CSCI Best Research Assistant <i>May 2020</i> USC Robotics George Bekey Service Award <i>May 2019</i>	

PUBLICATIONS

- [1] Matthew Rueben, Mohammad Syed, Emily London, Mark Camarena, Eunsook Shin, Yulun Zhang, Timothy S. Wang, **Thomas R. Groechel**, Rhianna Lee, and Maja J. Matarić. “Long-Term, In-the-Wild Study of Feedback About Speech Intelligibility for K-12 Students Attending Class via a Telepresence Robot”, Accepted in *23rd International Conference on Multimodal Interaction (ICMI)*, Montreal, Canada, Oct-2021.
- [2] Zhonghao Shi, Manwei Cao, Sophia Pei, Xiaoyang Qiao, **Thomas R. Groechel** and Maja J. Matarić. “Personalized Affect-Aware Socially Assistive Robot Tutors Aimed at Fostering Social Grit in Children with Autism”, In *Refereed Workshop ACM/IEEE International Conference on Human Robot Interaction (HRI) Workshop on Child-Robot Interaction and Child’s Fundamental Rights.*, Mar-2021.
- [3] **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.
- [4] 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.
- [5] 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)*
- [6] 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.
- [7] 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.
- [8] 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.
- [9] **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	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
	Planning A Successful Summer Research Experience	USC Summer Research Program Talks via Zoom	1 June 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
	Workshop Organizer	– “The Fourth International Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interaction (VAM-HRI)”, In <i>2021 ACM/IEEE International Conference on Human Robot Interaction (HRI '21)</i> – “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>	
	Reviewer	– Frontiers in Robotics and AI 2021 – International Conference on Development and Learning 2021 – International Conference on Intelligent Robots and Systems 2021 – Transactions on Human-Robot Interaction 2021 – 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	
PROFESSIONAL SERVICE	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