

## Thomas R Groechel

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| CONTACT<br>INFORMATION           | 3425 Motor Ave #310<br>Los Angeles, CA 90034  | <i>Mobile:</i> 248-921-3254<br><i>E-mail:</i> groechel@usc.edu |
| RESEARCH<br>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><br>– Ph.D. Computer Science: <i>Expected May 2023</i><br>– Masters Computer Science: <i>Completed May 2020</i><br>– Research Advisor: Professor Maja J. Matarić<br><br><b>University of Michigan</b> , Ann Arbor, MI <i>Sep 2014 - May 2018</i><br>– B.S.E. Computer Science: <i>Completed May 2018</i><br>– Undergraduate Research Advisor: Professor Odest C. Jenkins   |  |
| EXPERIENCE                       | <b>Ph.D. Researcher, USC Interaction Lab</b> , Los Angeles, CA <i>July 2018 - Present</i><br>– Created mixed reality robot tutor aiming to teach K-12 students coding through modeling student kinesthetic learning processes<br>– Developed and deployed telepresence robots in schools for home-bound students<br>– Supported month-long in-home deployments of robot tutor for students with Autism Spectrum Disorder<br><br><b>UG Researcher, UofM 4Progress Lab</b> , Ann Arbor, MI <i>May 2016 - May 2018</i><br>– Developed 2D SLAM algorithm using Iterative Closest Point visualization<br>– 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<br><br><b>Staff Development Czar and TA, UofM</b> , Ann Arbor, MI <i>Sep 2016 - May 2018</i><br>– Created Staff Development program for teaching staff of 30 graduate and undergraduate TAs to improve teaching skills of new and returning staff members<br>– Structured 35-student lab session to review and teach concepts in a specialized alternative to traditional lecture, tailoring for active learning<br>– Produced class-specific help and tip videos to give students an extra resource to common issues in a newer format<br><br><b>Robotics Software Intern at TRAC Labs</b> , Houston, TX <i>Summer 2017</i><br>– 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<br>– Refitted and rebuilt action server nodes into custom system to perform dynamic re-planning based on real time observations |  |
| STUDENT<br>RESEARCH<br>MENTORING | <b>Current Students</b><br>– Chloe Kuo Merit Research Fellow, USC Computer Science<br>– Julia Cordero Merit Research Fellow, USC Computer Science<br>– Roddur Dasgupta USC Computer Science<br>– Haemin Lee USC Computer Science<br>– Kartik Mahajan Merit Research Fellow, USC Computer Science<br>– Radhika Agrawal Merit Research Fellow, USC Computer Science<br>– Nisha Chatwani Merit Research Fellow, USC Computer Science<br>– 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 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*

PUBLICATIONS

- [1] 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”, *Refereed Workshop ACM/IEEE International Conference on Human Robot Interaction (HRI) Workshop on Child-Robot Interaction and Child’s Fundamental Rights.*, Mar-2021.
- [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”, In *17th International Symposium on Experimental Robotics (ISER)*, Virtual, Mar 2021.
- [3] 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.
- [4] Kartik Mahajan\*, **Thomas R. Groechel\***, Roxanna Pakkar, Julia Cordero, Haemin Lee, Maja J. Matarić “Adapting Usability Metrics for a Socially Assistive, Kines-

thetic, 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)*

- [5] 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.
- [6] Tom Williams, Daniel Szafr, 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.
- [7] 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.
- [8] **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](https://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*