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 kids through movement
– Developed on and deployed telepresence robots in schools for home-bound students
– Supported in-home deployments of robot tutor for students with ASD

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, 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 staff members and seasoned veterans
– 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 TRACLabs, 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 Undergraduates

– 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

– 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

- 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-Present*

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^3 Academy Visit
STEM^3 Academy, Los Angeles, CA — *June 2019*

VEX Robotics Team Leader
Clifford Street Elementary, Los Angeles, CA — *Oct 2018 - Feb 2019*

Honors and Awards

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

Publications

[1] 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", Accepted in *2020 ACM/IEEE International Conference on Human Robot Interaction (HRI '20)*, Cambridge, UK, Mar-2020.

[2] 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)", Accepted in *Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI '20)*, Cambridge, UK, Mar-2020.

[3] Matthew Rueben, **Thomas R. Groechel**, Yulun Zhang, Gisele Ragusa, Maja J. Matarić "Increasing Telepresence Robot Operator Awareness of Speaking Volume Appropriateness: Initial Model Development", Accepted in *Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction (Companion-HRI '20)*, Cambridge, UK, Mar-2020.

[4] **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)", Accepted *2020 ACM/IEEE International Conference on Human Robot Interaction (HRI '20)*

Reviewer

- VAM-HRI 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`