Pragathi Praveena

Human-Computer and Human-Robot Interaction Researcher

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Research Interests

I have 8+ years of experience prototyping interactive systems and studying user interactions with them using both quantitative and qualitative methods. My research interests include human-centered robotics, robotic cameras, mixed-initiative systems, and computer-supported collaborative work.

Education

2017—Dec 2023 (*expected*) **MS and PhD in Computer Science**, University of Wisconsin–Madison, USA
Advisors: Dr. Bilge Mutlu and Dr. Michael Gleicher

2011—2015 **Bachelor of Technology in Electrical Engineering**, Indian Institute of Technology Madras, India

Work & Research Experience

2017—Present **Graduate Researcher**, People and Robots Lab, **University of Wisconsin–Madison**
Designed, built, and evaluated human-robot interfaces to enable remote and collaborative work
Expanded a grant's original scope by initiating a new research direction that combined HRI & CSCW

2015—2017 **Junior Research Scientist**, Data Analytics Lab, **Xerox Research Centre India**
Developed and evaluated novel algorithms to estimate respiratory patterns using a webcam
Patents licensed by a California-based baby monitor startup

2014—2015 **Undergraduate Researcher**, Assistive Technology Lab, **Indian Institute of Technology Madras**

Summer 2014 **Undergraduate Researcher**, Group for Neural Theory, **École Normale Supérieure, France**

Summer 2013 **Project Intern**, Electrical and Electronics Maintenance, **Bosch India**

Publications

See my Google Scholar and ResearchGate profiles for an up-to-date list of my publications and links to papers.

** indicates equal contribution*

Journal Articles

[J3] CSCW '23 **Praveena, P.**, Wang, Y., Senft, E., Gleicher, M., & Mutlu, B. "Periscope: A Robotic Camera System to Support Remote Physical Collaboration." Proceedings of the ACM on Human-Computer Interaction (PACM-HCI), Track: Computer-Supported Cooperative Work and Social Computing.
Oral Presentation at Minneapolis, MN, USA

[J2] Human Factors '22 Ramesh, B., Konstant, A., **Praveena, P.**, Senft, E., Gleicher, M., Mutlu, B., Zinn, M., & Radwin, R. G. "Manually Acquiring Targets from Multiple Viewpoints Using Video Feedback." Human Factors. *(Impact factor: 3.6)*

[J1] TSP '17 Prathosh, A.P., **Praveena, P.**, Mestha, L.K., & Bharadwaj, S. "Estimation of Respiratory Pattern from Video Using Selective Ensemble Aggregation." IEEE Transactions on Signal Processing. *(Impact factor: 4.9)*

Refereed Full Conference Papers

[C10] ICRA '23 Wang, Y., **Praveena, P.**, Rakita, D., and Gleicher, M. "RangedIK: An Optimization-Based Robot Motion Generation Method for Ranged-Goal Tasks." IEEE International Conference on Robotics and Automation.

[C9] IROS '22 Senft, E.*, Hagenow, M.*, **Praveena, P.**, Radwin, R., Zinn, M., Gleicher, M., & Mutlu, B. "A Method for Automated Drone Viewpoints to Support Remote Robot Manipulation." IEEE/RSJ International Conference on Intelligent Robots and Systems.

[C8] HRI '22 **Praveena, P.**, Molina, L., Wang, Y., Senft, E., Mutlu, B., & Gleicher, M. "Understanding Control Frames in Multi-Camera Robot Telemanipulation." ACM/IEEE International Conference on Human-Robot Interaction. *(58/234 = 25% acceptance rate)* *Online Oral Presentation*

[C7] HRI '20 **Praveena, P.**, Rakita, D., Mutlu, B., & Gleicher, M. "Supporting Perception of Weight through Motion-induced Sensory Conflicts in Robot Teleoperation." ACM/IEEE International Conference on Human-Robot Interaction. *(67/279 = 24% acceptance rate)* *Online Oral Presentation*
[Best Paper Award Finalist]

[C6] ICRA '19 **Praveena, P.**, Rakita, D., Mutlu, B., & Gleicher, M. "User-Guided Offline Synthesis of Robot Arm Motion from 6-DoF Paths." IEEE International Conference on Robotics and Automation.

[C5] HRI '19 **Praveena, P.**, Subramani, G., Mutlu, B., & Gleicher, M. "Characterization of Input Methods for Human-to-robot Demonstrations." ACM/IEEE International Conference on Human-Robot Interaction. *(48/201 = 24% acceptance rate)* *Oral Presentation at Daegu, South Korea*

[C4] BIBE '16 Chatterjee, A., Prathosh, A.P., **Praveena, P.**, & Upadhya, V. "Real-time Visual Respiration Rate Estimation with Dynamic Scene Adaptation." IEEE International Conference on Bioinformatics and Bioengineering.

[C3] BIBE '16 Chatterjee, A., Prathosh, A.P., **Praveena, P.**, & Upadhya, V. "A Vision Based Method for Real-time Respiration Rate Estimation Using a Recursive Fourier Analysis." IEEE International Conference on Bioinformatics and Bioengineering.

[C2] BIBE '16 Upadhya, V., Chatterjee, A., Prathosh, A.P., & **Praveena, P.** "Respiration Monitoring through Thoraco-Abdominal Video with an LSTM." IEEE International Conference on Bioinformatics and Bioengineering.

[C1] EMBC '16 Chatterjee, A., Prathosh, A.P., & **Praveena, P.** "Real-time Respiration Rate Measurement from Thoracoabdominal Movement with a Consumer Grade Camera." IEEE International Conference of the Engineering in Medicine and Biology Society. *Poster Presentation at Orlando, FL, USA*

Refereed Extended Abstracts

[S2] CSCW '23 Meng, H., Wang, Y., **Praveena, P.**, Gleicher, M., & Mutlu, B. "Demonstrating Periscope: A Robotic Camera System to Support Remote Physical Collaboration." ACM Conference On Computer-Supported Cooperative Work and Social Computing. *Demo at Minneapolis, MN, USA*

[S1] CHI '23 **Praveena, P.***, Cagiltay, B.*, Gleicher, M., & Mutlu, B. "Exploring the Use of Collaborative Robots in Cinematography." ACM Conference on Human Factors in Computing Systems. *(330/968 = 34% acceptance rate)* *Poster Presentation at Hamburg, Germany*
[ACM SIGCHI Gary Marsden Travel Award]

Doctoral Consortia

[DC2] HRI '23 **Praveena, P.**, Gleicher, M., & Mutlu, B. "Designing Robotic Camera Systems to Enable Synchronous Remote Collaboration." ACM/IEEE International Conference on Human-Robot Interaction. *(19/75 = 25% acceptance rate)* *Poster Presentation at Stockholm, Sweden*

[DC1] RSS '20 **Praveena, P.**, Mutlu, B., & Gleicher, M. "Human-Robot Interfaces for Physical Interactions." Robotics: Science and Systems. *(28/88 = 32% acceptance rate)* *Online Oral Presentation*

Other Publications

[M2] HCIC '18 **Praveena, P.**, Mutlu, B., & Gleicher, M. "Communicating Physical Interactions to Robots." Human–Computer Interaction Consortium Workshop: AI and HCI.
Poster Presentation at Watsonville, CA, USA

[M1] BEATS '14 **Praveena, P.**, Kavalam, J., & Jacob, N. "A smartphone-based vision simulator." International Conference on Biomedical Engineering and Assistive Technologies.
Oral Presentation at Chandigarh, India

Patents

[P2] "System and method for extracting a periodic signal from video." 2019. US Patent 10,192,307.
[P1] "Determining respiration rate from a video of a subject breathing." 2018. US Patent 9,861,302.

Research Grants

Co-Authored

Expanding Our Vision Award, McPherson Eye Research Institute, UW–Madison
"Designing Interfaces to Enhance the Experience of Remote Vision through Robotic Cameras"
Investigator: Bilge Mutlu (PI); **Period:** 2023-2024; **Amount:** $10,000

Honors & Awards

2023 **ACM SIGCHI Gary Marsden Travel Award**, Full support of $2200 for travel to CHI (Hamburg, Germany)
2023 **HRI Pioneer**, Funded participant in selective doctoral consortium *(25% acceptance)* at HRI (Stockholm, Sweden)
2020 **RSS Pioneer**, Funded participant in selective doctoral consortium *(32% acceptance)* at RSS (virtual)
2020 **Best Paper Award Finalist** *(top 5%)*, ACM/IEEE Human-Robot Interaction (HRI)
2016 **Xerox Patent Award**, Awarded by Xerox Co. to the lead inventor on a filed patent
2015 **Institute Blues** *(top 3 in ~800 graduates)* and **Motorola prize** *(#1 in ~150 EE and CS graduates)*
Recognized for exceptional overall achievement during undergraduate studies at IIT Madras
2014 **French Government Charpak Scholarship**, 2 months support for research at ENS, Paris

Mentoring

PhD Students, UW–Madison

2023—Present **Yuna Hwang**, Expressive robot motion generation using natural language
2023—Present **Christine Lee**, Explanations for unexpected robot behavior and program repair
2022—2023 **Yeping Wang**, Robot motion generation for ranged-goal tasks; **Paper:** C10

Pre-Doctoral Trainees, UW–Madison

2020—2021 **Luis Molina**, Multi-camera interface for robot telemanipulation; **Paper:** C8

Undergraduate Students, UW–Madison

2022—2023 **Haoming Meng**, Web interface for robot-supported collaboration; **Paper:** S2
2022 **Lily Reback**, Qualitative coding of multi-modal data
2022 **Alexander Peseckis**, Web-based robot motion viewer
2022 **William Cong**, VR platform for robot experiments
2021—2022 **Gia-phong Nguyen**, Web-based robot motion viewer
2021—2022 **Sage Livingstone**, Blender plugin for creating models of robots and scenes
2019—2020 **Jack Yang**, VR platform for robot experiments
2019—2020 **Sayem Wani**, Web interface for MOVO, a mobile bi-manual manipulator robot
2019—2020 **Joshua Mathews**, Control system for MOVO, a mobile bi-manual manipulator robot

Peer Mentoring, UW–Madison

(April 2022—Present) I structured and executed a peer mentorship program in the People and Robots lab in which 2–3 graduate students meet with a different student mentor each week (original concept by Bengisu Cagiltay). Through this program, I provide peer mentorship to 12 graduate students across various sub-disciplines in HCI including HRI, assistive technology, and interaction design through **weekly sessions**.

Current Mentees: Yuna Hwang, Hailey Johnson, Amy Koike, Callie Kim, Nitzan Orr, Christine Lee, Dakota Sullivan, Irene Ho, Bengisu Cagiltay, Yaxin Hu, Laura Stegner, Nathan White

Past Mentees: Kevin Welsh

Teaching Experience

Summers 2018, 2019 **Social Robotics Instructor,** Grandparents University, UW–Madison
Co-designed and co-taught lecture and lab session for children and their grandparents

Fall 2017 **Teaching Assistant**, ECE 203: Signals, Information and Computation, UW–Madison
Co-taught in a flipped classroom, held office hours, managed online Q&A for ~200 students

2014—2015 **President and Instructor**, Web Operations Club, Centre for Innovation, IIT Madras
Co-organized introductory and advanced sessions for 400+ students on web development
Taught graphics editing and design thinking to 100+ students for web & app development

Academic Service

Reviewing

2023 Automation in Construction
2023 Proceedings of the ACM on Human-Computer Interaction (PACM-HCI: CSCW)
2023 ACM Conference on Human Factors in Computing Systems (CHI)
2022 IEEE Robotics and Automation Letters (RA-L)
2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
2021—2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI)

Organization

2024 **Panel Chair**, Pioneers Workshop at HRI, Boulder, CO, USA
2021 **Local Chair**, Pioneers Workshop at RSS, Virtual

Outreach

2023 **Staff**, UW–Madison CS recruitment booth, Grace Hopper Celebration, Orlando, FL, USA
2023 **Speaker**, CS Departmental Research Symposium, UW–Madison
"Designing Robotic Camera Systems to Enable Synchronous Remote Collaboration"
[Best Talk Award - Top 2 in 14]
2023 **Volunteer**, Demos in the lab for 60 students from La Follete High School, Madison, WI, USA
2022 **Organizer** (along with Yaxin Hu), Human-Centered Computing Meetup

Extra-Curricular

2019 **Morgridge Entrepreneurial Bootcamp**, UW–Madison
Selected to attend a one-week training program in technology entrepreneurship for graduate students
2018 **gALPHA Entrepreneurship Program**, UW–Madison
Selected to attend a four-week venture-creation program by *gener8tor*, a nationally ranked accelerator
2018 **Hackathon winner** *(#1 in 8 teams)*, EnerHack, UW–Madison
2014 **Hackathon winner** *(#1 in ~20 teams)*, Geek Up, IIT Madras; Invited to present at Google DevFest, Chennai