

Nathaniel Steele Dennler

dennler@usc.edu
ndennler.github.io
Los Angeles, CA

Ph.D. Candidate studying Robotics
University of Southern California
Department of Computer Science

RESEARCH INTERESTS Human-Robot Interaction, Assistive Robotics, Preference Learning, Inverse Reinforcement Learning, User-Centered Design, Participatory Design.

EDUCATION **Ph.D., Computer Science.** Expected Dec 2024
University of Southern California, NSF GRFP Fellow, Annenberg Fellow GPA: 3.95
Dissertation: Enabling Socially Assistive Robots to Adapt to Users' Preferences, *Advisors:* Maja Matarić and Stefanos Nikolaidis

M.S., Computer Science. May 2021
University of Southern California, NSF GRFP Fellow, Annenberg Fellow GPA: 3.95
Advisors: Prof. Maja Matarić and Prof. Stefanos Nikolaidis

B.S., Computer Science, B.Eng., Robotics Engineering. May 2019
Worcester Polytechnic Institute GPA: 3.95
Major Qualifying Project: Mobile Manipulation through Tactile Sensing, *Interactive Qualifying Project:* Implications of Self-Determination Theory on Student Performance, *Advisors:* Prof. Charles Rich, Prof. Loris Fichera, and Prof. Cagdas Onal

PROFESSIONAL **Consumer Incentives Intern**, Uber *Supervisor: E. Chen* Jun 2023 - Sep 2023
Consumer Incentives Intern, Uber *Supervisor: J. Chen* Jun 2022 - Aug 2022
Navigation Systems Intern, iRobot *Supervisor: K. Morris* May 2019 - Aug 2019
Visiting Researcher, MIT Lincoln Labs *Advisor: W.R. Michalson* Aug 2018 - Dec 2018
Visiting Researcher, USC Interaction Lab *Advisor: K. Swift-Spong* May 2018 - Aug 2018
Research Assistant, ASSISTments Lab *Advisor: K. Ostrow* Aug 2017 - May 2018

TEACHING **Teaching Assistant**, CSCI 566–*Deep Learning and Its Applications*. University of Southern California. Developed homework assignments, advised project teams, hosted office hours and guest lectured in Spring 2022.

Teaching Assistant, CSCI 445–*Robotics*. University of Southern California. Directed and managed lab sections, provided supplementary lectures, and hosted office hours in Fall 2021.

Student Teaching Assistant, RBE 3002–*Unified Robotics IV: Mapping and State Estimation*. Worcester Polytechnic Institute. Managed lab sections, hosted office hours, and advised project groups in Fall 2018 and Spring 2019.

Student Teaching Assistant, RBE 3001–*Unified Robotics III: Kinematics and Dynamics*. Worcester Polytechnic Institute. Managed lab sections, hosted office hours, designed lab assignment infrastructure, and advised project groups in Fall 2018 and Spring 2019.

RESEARCH SUPERVISION *Undergraduate Students (19)*
Joyce Ng, low-cost mobile platform for low-cost social robots. Mar 2024 - Present
Dora Meiwes, active learning for post-stroke assessment. Jan 2024 - Present
Allen Tran, robot embodiment perception. Oct 2023 - Present
Joseph Liu, lab tour guide developer. Jun 2023 - October 2023
Melina Daniilidis (REU), adapting difficulty for rehabilitation tasks. Jun 2023 - Aug 2023
Daniel Zeng, personalized signalling mechanical interface development. Sept 2023 - Present
David Delgado, personalized signalling interface development. Sept 2023 - Present
Erica De Guzman, stroke therapy game development. Jan 2022 - Jun 2023

Ashley Perez , stroke therapy game development.	Jan 2022 - Jun 2022
Claudia Chiu , user input modeling for reward learning.	Feb 2021 - Jun 2022
Brenna Chen , models for robot perception.	Feb 2021 - Jun 2021
Jessica Hadiwijoyo , model for personalizing robot voices	Oct 2019 - May 2022
Lia Vargas (REU) , visualizing user expectations of robots.	May 2021 - Aug 2021
Yenessa Maldonado (SURE) , designing robots in virtual reality.	May 2021 - Aug 2021
Sophia Hager (DREU) , controllable text generation.	May 2021 - Aug 2021
Changxiao Ruan , web interface for embodiment perception.	Oct 2019 - May 2020
Hanzo Huang , interface for animating facial expressions.	Oct 2019 - May 2019
Yunhao Zhao , dynamic motion primitives for robot expressions.	Oct 2019 - Dec 2019
Kangmin Tan , interactive text-to-speech for social robot faces.	Oct 2019 - Dec 2019

HONORS AND AWARDS	IEEE/ACM HRI 2024 Best Late-Breaking Poster (with Uksang Yoo)	March 2024
	ACM FAccT 2023 Best Paper Award	June 2023
	USC George Bekey Service Award	May 2023
	WPI Salisbury Award	April 2019
	NSF Graduate Research Fellow	April 2019
	USC Annenberg Fellow	February 2019
	WPI Charles O. Thompson Scholar	March 2016

CO-AUTHORED AWARDED GRANTS	NSF/NIH Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (\$1,200,000 total)	Aug 2024 - Aug 2028
	“Personalized AI-Driven Models for Supporting User Engagement and Adherence in Health Interventions: Validation in Cognitive Behavioral Therapy for Anxiety,” PI: Maja Matarić, Co-PIs: Stefanos Nikolaidis, Bruna Martins-Klein. Motivated problem through the psychological framework of self-determination theory, provided background on self-determination theory, described mathematical formulation for learning user preferences from explicit user feedback, designed all user studies (co-design sessions and randomized controlled trials), and identified outcome instruments and measurements.	
	Amazon Research Award (\$100,000 total)	Sep 2022 - Aug 2023
	“Learning User Preferences for In-Home Robots Through In Situ Augmented Reality,” PI: Maja Matarić, Co-PI: Stefanos Nikolaidis. Provided motivation for grant, described mathematical formulation for learning user preferences, designed user studies, and created timeline and budget.	

PUBLICATIONS **Journal Publications**

Nathaniel Dennler, Mina Kian, Stefanos Nikolaidis, and Maja J. Matarić. Designing Robot Identity: The Role of Voice, Clothing, and Task on Robot Gender Perception. *International Journal of Social Robotics*. *Under Review*.

Nathaniel Dennler, Amelia Cain, Erica De Guzman, Claudia Chiu, Carolee J. Winstein, Stefanos Nikolaidis, and Maja J. Matarić. “A metric for characterizing the arm nonuse workspace in poststroke individuals using a robot arm.” *Science Robotics* 8, no. 84 (2023): eadf7723. DOI: 10.1126/scirobotics.adf7723

(IF: 25.0)

Nathaniel Dennler, Changxiao Ruan, Jessica Hadiwijoyo, Brenna Chen, Stefanos Nikolaidis, and Maja Matarić. “Design metaphors for understanding user expectations of socially interactive robot embodiments.” *ACM Transactions on Human-Robot Interaction* 12, no. 2 (2023): 1-41. DOI: 10.1145/3550489

(IF: 5.1)

Conference Publications

Nathaniel Dennler, Stefanos Nikolaidis, Maja Mataric. “Using Exploratory Search to Learn Representations for Human Preferences”, *Companion of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI LBR)*. 2024.

(3.38 Impact Score)

Uksang Yoo, **Nathaniel Dennler**, Maja Matarić, Stefanos Nikolaidis, Jean Oh, Jeffrey Ichnowski. “MOE-Hair: Toward Soft and Compliant Contact-rich Hair Manipulation and Care”, *Companion of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI LBR)*. 2024.

(Best LBR Poster) (3.38 Impact Score)

Melina Daniilidis, **Nathaniel Dennler**, Maja Matarić, Stefanos Nikolaidis. “Adapting Task Difficulty in a Cup-Stacking Rehabilitative Task”, *Companion of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI LBR)*. 2024.

(3.38 Impact Score)

Nathaniel Dennler, David Delgado, Daniel Zeng, Stefanos Nikolaidis, Maja Matarić. “The RoSiD Tool: Empowering Users to Design Multimodal Signals for Human-Robot Collaboration”, *18th International Symposium on Experimental Robotics (ISER)*. 2023.

(2.48 Impact Score)

Nathaniel Dennler, Anaelia Ovalle, Ashwin Singh, Luca Soldaini, Arjun Subramonian, Huy Tu, William Agnew, Avijit Ghosh, Kyra Yee, Irene Font Peradejordi, Zeerak Talat, Mayra Russo, Jess De Jesus De Pinho Pinhal. “Bound by the Bounty: Collaboratively Shaping Evaluation Processes for Queer AI Harms”, *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society (AIES)*. 2023.

(with Queer in AI) (38% Acceptance Rate)

Ilaria Torre, Erik Lagerstedt, **Nathaniel Dennler**, Katie Seaborn, Iolanda Leite, Eva Szekeley. “Can a gender-ambiguous voice reduce gender stereotypes in human-robot interactions?”, *32nd IEEE International Conference on Robot and Human Interactive Communication (ROMAN)*. 2023.

(65% Acceptance Rate)

Anaelia Ovalle, Arjun Subramonian, Ashwin Singh, Claas Voelcker, Danica J. Sutherland, Davide Locatelli, Eva Breznik, Filip Klubicka, Hang Yuan, Hetvi J, Huan Zhang, Jaidev Shriram, Kruno Lehman, Luca Soldaini, Maarten Sap, Marc Peter Deisenroth, Maria Leonor Pacheco, Maria Ryskina, Martin Mundt, Milind Agarwal, Nyx Mclean, Pan Xu, A Pranav, Raj Korpan, Ruchira Ray, Sarah Mathew, Sarthak Arora, St John, Tanvi Anand, Vishakha Agrawal, William Agnew, Yanan Long, Zijie J. Wang, Zeerak Talat, Avijit Ghosh, **Nathaniel Dennler**, Michael Noseworthy, Sharvani Jha, Emi Baylor, Aditya Joshi, Natalia Y. Bilenko, Andrew Mcnamara, Raphael Gontijo-Lopes, Alex Markham, Evyn Dong, Jackie Kay, Manu Saraswat, Nikhil Vytla, Luke Stark. “Queer In AI: A Case Study in Community-Led Participatory AI”, *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency (FAccT)*. 2023.

(Best Paper) (with Queer in AI) (25% Acceptance Rate)

Zhonghao Shi, Han Chen, Anna-Maria Velentza, Siqi Liu, **Nathaniel Dennler**, Allison O’Connell, and Maja Mataric. “Evaluating and Personalizing User-Perceived Quality of Text-to-Speech Voices for Delivering Mindfulness Meditation with Different Physical Embodiments”, *Proceedings of the 2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*. 2023.

(24% Acceptance Rate)

Nathaniel Dennler, Eura Shin, Maja Matarić, and Stefanos Nikolaidis. “Design and Evaluation of a Hair Combing System Using a General-Purpose Robotic Arm”, *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2021.

(45% Acceptance Rate)

Nathaniel Dennler, Catherine Yunis, Jonathan Realmuto, Terence Sanger, Stefanos Nikolaidis, and Maja Matarić. “Personalizing User Engagement Dynamics in a Non-Verbal Communication Game for Cerebral Palsy”, 30th *IEEE International Conference on Robot and Human Interactive Communication (ROMAN)*. 2021.

(65% Acceptance Rate)

Refereed Workshop Papers

“Robot Costume Design: Identity as a Narrative,” Mar 2024
presented at **HRI 2024** Workshop on Robo-Identity.

“Using Causal Trees to Estimate Personalized Task Difficulty,” Oct 2023
presented at **IROS 2023** Workshop on Assistive Robotics for Citizens.

“Singing the Body Electric: Robot Embodiment on User Expectations,” Jul 2023
presented at **RSS 2023** Workshop on Social Intelligence in Humans and Robots.

INVITED TALKS “Shaping User Expectations through Robot Design” May 2024
presented at the *Bot Intelligence Group (BIG)* at **Carnegie Mellon University**.

“Shaping User Expectations through Robot Design” May 2024
presented at the *USC Robotics Seminar* at **University of Southern California**.

“Characterizing the Arm Nonuse Workspace in Post-stroke Individuals” Feb 2024
presented at the *WiSE STEM Bytes Seminar* at **University of Southern California**.

“Characterizing the Arm Nonuse Workspace in Post-stroke Individuals” Apr 2023
presented at the *USC Robotics Seminar* at **University of Southern California**.

“Socially Assistive Robots that Adapt to Users’ Preferences,” Apr 2024
invited lecture for *CSCI 699: Computational Human-Robot Interaction* at **University of Southern California**.

“Developing Assistive Technologies: Social and Functional Considerations,” Mar 2023
invited lecture for the *Assistive Technology course* at **Seoul National University**. Presented virtually.

“Robot-Assisted Hair Combing,” Dec 2019
demoed at **NeurIPS 2019** Demo Track in Vancouver, Canada.

“Expression Salience in Socially Assistive Robots,” Oct 2019
presented at the **National Science Foundation Engineering and Education Centers Conference** in Alexandria Virginia.

SERVICE

Journal Reviewer: International Journal of Robotics Research (IJRR), Transactions on Neural Systems and Rehabilitation Engineering (TSNRE), Robotics and Automation Letters (RA-L), Science Robotics, and Public Library of Science ONE (PLOS ONE), Frontiers in Robotics, Transactions on Human-Robot Interaction (T-HRI), Autonomous Robotics

Conference Reviewer: Human-Robot Interaction (HRI), International Conference on Robot and Human Interactive Communication (RO-MAN), International Conference on Social Robotics (ICSR), International Conference on Intelligent Robots and Systems (IROS), International Conference on Robotics and Automation (ICRA), Knowledge Discovery and Data Mining (KDD)

Core Organizer	Jun 2023 - Present
Queer in AI / Queer in Robotics	
<ol style="list-style-type: none"> 1. Documenting organizational procedures to facilitate other special interest groups to develop grassroots efforts for inclusion. 2. Organizing socials at conferences, fostering community among queer researchers in robotics. 3. Organizing workshops to publicize queer works and considerations. Previously organized a CRAFT workshop at FAccT, assessing what queer harms exist in AI systems and how to measure these harms. 	

Coding Club Instructor	Nov 2021 - Dec 2023
South LA Robotics	
<ol style="list-style-type: none"> 1. Teaching coding fundamentals to elementary and middle school students in the South Los Angeles area. 	

Merit Badge University Director, Service Vice President	Jan 2018 - Apr 2019
Alpha Phi Omega	
<ol style="list-style-type: none"> 1. Lead a committee to plan a two-day conference for 300 boy scouts. 2. Designed courses according to merit badge specifications. 3. Planned community service opportunities for over 80 active members, resulting in a total of 3000 hours across the organization, the largest number of hours in the chapter's history for one semester 	

OTHER COMPETITIVE ACTIVITIES	Program of the Year , for excellence in planning Merit Badge University	Apr 2019
	Distinguished Service Key , highest award for service in Alpha Phi Omega	Apr 2019
	U.S. Challenge Skate Pairs Champion	Oct 2017
	US Figure Skating National Silver Medalist , for Intermediate Pairs	Jan 2015