ELYSE D. Z. CHASE

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RESEARCH INTERESTS

I design multisensory interactive systems that bridge human perception and machine control. My work combines haptic feedback, perceptual and cognitive modeling, and mechatronic design to enhance interaction between people and technology.

EDUCATION

Stanford University, Ph.D. in Mechanical Engineering 2023
Thesis: In Touch with Causation: The Role of Haptics in Multisensory Phenomenal Causality
Advisor: Dr. Sean Follmer

Stanford University, M.S. in Mechanical Engineering 2020
Depth in Mechatronics

University of Pennsylvania, B.S.E. in Mechanical Engineering and Applied Mechanics 2017
Minors in Fine Arts and Anthropology | Summa Cum Laude

APPOINTMENTS

Mechatronics and Haptic Interfaces Lab, Rice University 2023 - Current
Postdoctoral Fellow, Advisor: Dr. Marcia K. O' Malley
Studying multisensory integration with referred haptic feedback and sensory illusions in virtual reality. Supervising work on haptic feedback for surgical training, robotic rehabilitation, and haptic perception.

SHAPE Lab, Stanford University 2017 - 2023
Graduate Research Assistant, Advisor: Dr. Sean Follmer
Studied haptics and human perception to computationally model causality and explore affective response to robot motion, haptic guidance for the visually impaired, and reach redirection in virtual reality.

Haptics Group, Facebook Reality Labs Research Sept 2020 - Jan 2021
Research Intern, Advisor: Dr. Ali Israr
Studied how the human wrist can transfer information via vibrotactile actuation with a wristband device.

Haptics Group, University of Pennsylvania Spring 2015 - 2017
Undergraduate Research Assistant, Advisor: Dr. Katherine J. Kuchenbecker
Studied cutaneous haptic devices with the da Vinci surgical robot; built devices for robotic palpation.

Caracol Archaeological Project, Belize Annually - 2014
Lab Assistant, Advisors: Drs. Arlen & Diane Chase
Worked for two months every year in the field to document and catalog remains (www.caracol.org).

ACADEMIC HONORS AND ACHIEVEMENTS

Selected as a **Rising Star in Mechanical Engineering** 2024
Future Faculty Fellow (FFF) Rice's George R. Brown School of Engineering and Computing 2024
Intelligence Community Postdoctoral Fellowship 2023, 2024
Rice Academy of Fellows Postdoctoral Fellowship 2023, 2024
NSF Graduate Research Fellowship Program (GRFP) 3 years 2017
Stanford Graduate Fellowship (SGF) 3 years, *Stanford University* 2017

Ralph Teetor Award, *University of Pennsylvania* 2017

Awarded each year to the senior who, in the faculty's judgment, best demonstrates ingenuity, creativity, scholarship, and service.

Goldwater Scholar 2016

Victor W. K. Ku Memorial Award, *University of Pennsylvania* 2016

Awarded annually to a junior who best exemplifies rigorous scholarship, personal discipline, and service to others.

National Merit Finalist Scholarship 2013

Sponsored by the National Distiller's Distributors Foundation

RESEARCH AND DESIGN PRIZES

Best Work in Progress Paper at World Haptics Conference 2021

1st Prize SEAS Senior Design, University of Pennsylvania 2017

Across the School of Engineering and Applied Science, for Backster: an accurate, affordable, and portable torso mapping system.

Francis G. Tatnall Prize, University of Pennsylvania 2017

Awarded to the senior design project judged most outstanding for its ingenuity, technical proficiency, and usefulness.

Abraham Research Award, University of Pennsylvania 2015

Awarded annually to support an undergraduate student conducting summer research

GRANT AND PROPOSAL WRITING EXPERIENCE

Under Review **Sony Research Award Program: Faculty Innovation Award** Sept 2025

Dr. M.K. O'Malley, "Adaptive Referred Haptics: Wrist-Based Inertial Rendering for Intuitive Extended Reality Interaction"

Wrote the full proposal and created all figures.

Under Review **NSF HCC: Human-Centered Computing** Sept 2025

PIs Dr. M.K. O'Malley, Dr. Daniel Preston & Dr. Jeffrey Min-In Yau, "Referred Haptics and Thermal Displays to Modulate Human Perception of Virtual Object Properties"

Wrote sections of the proposal and created figures.

Awarded

Technical Committee on Haptics: Innovation in Haptics Research Proposal Oct 2024

Dr. E.D.Z. Chase, "Inertial Rendering: Referring Haptic Feedback from the Fingertips to the Wrist"

$2,100: *Research Stipend, Travel Budget*

Intelligence Community Postdoctoral Fellowship Sept 2023 - 2025

Dr. E.D.Z. Chase & Dr. M.K. O'Malley, "Enabling Components of Human Augmentation"

$181,500: *Postdoc Salary, Research Stipend, Travel Budget*

Rice Academy Postdoctoral Fellowship Aug 2023 - 2025

Dr. E.D.Z. Chase & Dr. M.K. O'Malley, "Understanding Multisensory Perception within Sensory Illusions"

$70,000: *Postdoc Salary, Research Stipend*

Stanford HAI (Human-Centered Artificial Intelligence) Seed Grant 2021

PI Dr. Sean Follmer, Co-PIs Dr. Jeannette Bohg & Dr. Tobias Gerstenberg, "In Touch With Causation"

Contribution: Helped to plan projects, provide preliminary data, and write those sections of the proposal.

$75,000: *PI Salary, Graduate Student Salary, Research Funds*

PUBLICATIONS

Journal Publications

Published

[4] Mahan E.E., King S.T., **Chase E.D.Z.**, Schearer E.M., O'Malley M.K. (2025) Nonlinear Optimization for Personalized Path Planning for a Hybrid FES-Exoskeleton System. *IEEE Robotics and Automation Letters*.

[3] Mahan E.E., Oh J., **Chase E.D.Z.**, Dunkelberger N.B., King S.T., Sayenko D., O'Malley M.K. (2024) Assessing the Effect of Cervical Transcutaneous Spinal Stimulation with an Upper Limb Robotic Exoskeleton and Surface Electromyography. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. (underlining indicates equal contribution by authors)

[2] Sullivan D.H., **Chase E.D.Z.**, O'Malley M.K. (2024) Comparing the Perceived Intensity of Vibrotactile Cues Scaled Based on Inherent Dynamic Range. *IEEE Transactions on Haptics*, 17(1): 45-51.

[1] Murdock R.J., Putnam S.A., Das S., Gupta A., **Chase E.D.Z.**, Seal S. (2017) High-Throughput, Protein-Targeted Biomolecular Detection Using Frequency-Domain Faraday Rotation Spectroscopy. *Small*, 13 (12): 1613 - 682.

In Revision

[6] **Chase E.D.Z.**, Israr A., Schepmann M.S., O'Malley M.K., Hartcher-O'Brien J. (2025) Information Bandwidth of the Wrist: Signal Variations from Single to Multiple Tactors. *ACM Transactions on Human-Robot Interaction (THRI)*.

[5] **Chase E.D.Z.**, Smith K., Follmer S., Gerstenberg T. (2025) Seeing, Hearing, and Feeling Causality. *Cognitive Psychology*.

Under Review

[7] Mahan E.E., King S.T., **Chase E.D.Z.**, Schearer E.M., O'Malley M.K. (2025) Upper Limb Movement Assistance through Model-Based Path Planning and Control of Hybrid FES-Exoskeleton Systems. *IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE)*.

Conference Papers (***** indicates oral presenter)

[8] **Chase E.D.Z.***, Sullivan D.H., O'Malley M.K. (2025) Hands-On or Hands-Off? Active Touch Influences Multisensory Perception of Referred Haptics. In *IEEE World Haptics Conference*.

[7] Stovicek K.C.*, King S.T., **Chase E.D.Z.**, Fleck J.J., Zandiyeh P., O'Malley M.K. (2025) Walking Does Not Diminish Localizability of Vibrotactile Feedback on the Waist. In *IEEE World Haptics Conference*.

[6] **Chase E.D.Z.***, O'Malley M.K. (2024) The Interplay of Vision and Referred Haptic Feedback in VR Environments. In *International Conference on Human Haptic Sensing and Touch Enabled Computer Applications*, pp. 385-397. Springer International Publishing.

[5] **Chase E.D.Z.***, Gerstenberg T., Follmer S. (2023) Realism of Visual, Auditory, and Haptic Cues in Phenomenal Causality. In *IEEE World Haptics Conference*, pages 306-312.

[4] Gonzalez E.J.*, **Chase E.D.Z.**, Kotipalli P., Follmer S. (2022) A Model Predictive Control Approach for Reach Redirection in Virtual Reality. In *ACM CHI Conference on Human Factors in Computing Systems*.

[3] **Chase E.D.Z.***, Israr A., Preechayasomboon P., Sykes S., Gupta A., Hartcher-O'Brien J. (2021) Learning Vibes: Communication Bandwidth of a Single Wrist-Worn Vibrotactile Actuator. In *IEEE World Haptics Conference*, pages 421-426.

[2] **Chase E.D.Z.***, Follmer S. (2019) Differences in Haptic and Visual Perception of Expressive 1DoF Motion. In *ACM Symposium on Applied Perception*, pages 1-9.

[1] Brown J.D.*, Ibrahim M., **Chase E.D.Z.**, Pacchierotti C., Kuchenbecker K.J. (2016) Data-Driven Comparison of Four Cutaneous Displays for Pinching Palpation in Robotic Surgery. In *IEEE Haptics Symposium*, pages 147-154.

Book Chapters

[2] Chase A.S.Z., **Chase E.D.Z.**, Chase D.Z., Chase A.F. (2024) Population History for Caracol, Belize: Numbers, Complexity, and Urbanism. A.S.Z. Chase, A.F. Chase, & D.Z. Chase Eds. In *Ancient Mesoamerican Population History: Demography, Social Complexity, and Change*, pp. 67-88, University of Arizona Press, Tucson.

[1] Siu A.F., **Chase E.D.Z.**, Kim G.S-H., Boadi-Agyemang A., Gonzalez E.J., Follmer S. (2021) Haptic Guidance to Support Design Education and Collaboration for Blind and Visually Impaired People. In C. Meinel and L. Leifer, Eds. *Design Thinking Research: Translating, Prototyping, and Measurement*, pp. 167 - 180, Springer Nature Switzerland AG.

Posters, Demonstrations, Work In Progress Papers, Late-Breaking Works, & Extended Abstracts
(* indicates presenter)

[12] **Chase E.D.Z.***, O'Malley M.K. (2025) Modeling Physical Perception in Virtual Interactions. In *IEEE RO-MAN International Conference on Robot and Human Interactive Communication*.

[11] Tomassetti O.*, **Chase E.D.Z.**, Follmer S. (2025) Understanding the Role of Explicit Error-based Feedback Through a Sensorimotor Modeling Approach. In *IEEE World Haptics Conferences*.

[9, 10] Chen X.*, Hlibok B.*, Morriss N.*, Nik-Ahd A.*, Tan W., Zhou D., **Chase E.D.Z.**, O'Malley M.K. (2025) WRIST: A Wearable Radial Interface for Sensory hapTic feedback. In *IEEE World Haptics Conferences*. (poster & demonstration)

[8] Schepmann M.S.*, **Chase E.D.Z.**, O'Malley M.K. (2025) Good Vibes: The Influence of Intensity on Vibrotactile Haptic Feedback Perception. In *Rice Undergraduate Research Poster Symposium*.

[7] [***Best Fast Talk***] Mahan E.E.*, King S.T., **Chase E.D.Z.**, O'Malley M.K. (2024) Nonlinear Trajectory Optimization to Improve Performance of a Hybrid FES and Exoskeleton System. In *BioRob Workshop*.

[6] **Chase E.D.Z.***, O'Malley M.K. (2024) From Integration to Illusion: Advancing Multisensory Perception with Haptic Feedback. In *Interface Rice*.

[5] Johnson L.R.*, **Chase E.D.Z.**, Byrne M.D., O'Malley M.K. (2024) Real-Time Vibrotactile Haptic Feedback Based on Tool Movement Smoothness for Endovascular Surgical Skill Training. In *IEEE Haptics Symposium*.

[4] **Chase E.D.Z.***, Wolff P., Gerstenberg T., Follmer S. (2021) In Touch with Causation: Understanding the Impact of Kinesthetic Haptics on Causality. In *Annual Meeting of the Cognitive Science Society*, 43(43).

[3] [***Best Work in Progress Paper***] **Chase E.D.Z.***, Wolff P., Gerstenberg T., Follmer S. (2021) A Causal Feeling: How Kinesthetic Haptics Affects Causal Perception. In *IEEE World Haptics Conferences*, pages 421-426.

[2] **Chase E.D.Z.***, Siu A.F., Boadi-Agyemang A., Kim G.S-H., Gonzalez E., Follmer S. (2020) PantoGuide: A Haptic and Audio Guidance System To Support Tactile Graphics Exploration. In *ACM SIGACCESS Conference on Computers and Accessibility*, pages 1-4. (underlining indicates equal contribution by authors)

[1] Ibrahim M.*, **Chase E.D.Z.***, Brown J.D., Pacchierotti C., Kuchenbecker K.J. (2016) One Sensor, Three Displays: A Comparison of Tactile Rendering From a BioTac Sensor. In *IEEE Haptics Symposium*.

INVITED TALKS

Tactile Intelligence: Active Perception, Wrist Bandwidth, and Adaptive Modeling. Invited Speaker for the Intelligence Community Tech Week. McLean, VA (Remote). September 24, 2025.

Beyond the Fingertips: Wrist-Worn Haptics for Immersive Interaction. Invited Speaker for Workshop on Emerging Challenges in Wearable Haptics, World Haptics Conference. Suwon, S. Korea. July 8, 2025.

Multisensory Integration in Extended Reality: Design & Implementation. Invited Speaker for UMass Amherst Mechanical & Industrial Engineering Department. Amherst, MA. February 26, 2025.

Human Augmentation Through Referred Haptic Feedback. Invited Speaker for the Intelligence Community Tech Week. McLean, VA. September 12, 2024.

Referred Haptics in Virtual Environments and Multisensory Integration. Spotlight Speaker for Texas Regional Robotics Symposium (TEROS). College Station, TX. April 30, 2024.

TEACHING EXPERIENCE

Guest Lecturer, **Haptic Interface Design for Human Robot Interaction** (EN.530.691) — Fall 2024
Johns Hopkins University, Dr. Jeremy Brown – Graduate Level
Topic: Haptics in Multisensory Integration

Guest Lecturer, **Translational Neuroengineering** (MECH 599) — Spring 2024
Rice University, Dr. Marcia O'Malley – Graduate Level (12 students)
Topic: IRB and Experimental Design

Course Assistant, **Design and Control of Haptic Systems** (ME 327) — Spring 2022
Stanford University, Dr. Allison Okamura – Graduate Level (79 students)
Course Assistant Effectiveness rating available only for this course: 4.55/5.00

Course Assistant, **Advanced Dynamics & Computation** (ME 331A) — Winter 2022
Stanford University, Dr. Paul Mitiguy – Graduate Level (29 students)

Course Assistant, **Human-Computer Interaction Seminar** (CS 547) — Fall 2021
Stanford University, Dr. Sean Follmer – Graduate & Undergraduate Levels

PROFESSIONAL SERVICE AND MEMBERSHIPS

Honor Society Memberships & Affiliations Tau Beta Pi, Sigma Xi, SWE, ASME, ACM, IEEE

Editorial

Associate Editor for Haptics Symposium, Haptic-Technology Subtrack — 2026
Work in Progress Editorial Board for Haptics Symposium — 2024

Workshops

Centering the Person in Haptics Research at the IEEE World Haptics Conference — 2025
Organizers: Daziyah H. Sullivan, Elyse D. Z. Chase, & Marcia K. O'Malley
Topics: participatory design, human-centered design, and user-experience design

Reviewer

Journals

IEEE RA-L Robotics and Automation Letters	2025
IEEE TNSRE Transactions on Neural Systems and Rehabilitation Engineering	2025
IEEE TOH Transactions on Haptics	2024, 2025
Nature Reviews Electrical Engineering	2024
ACM THRI Transactions on Human-Robot Interaction	2024

Conferences

WHC World Haptics Conference	2021, 2025
EuroHaptics	2022, 2024
ACM CHI Human Factors in Computing Systems	2023-2025
IEEE HS Haptics Symposium	2024, 2026
IEEE ICRA International Conference on Robotics and Automation	2025
IEEE RAS International Conference on Soft Robotics – RoboSoft	2025

MENTORING

Rice University

Rodrigo Gallardo, *Architecture Masters Student*	Summer 2025 - current
Joseph Engelking, *ME Undergraduate Student*	Summer 2025 - current
Kyra Stovicek, *ME PhD Student* [Conference 7]	Fall 2024 - current
Amelia Pillar, *ME Undergraduate Student*	Fall 2024 - current
Mina Schepmann, *ME Undergraduate Student* [Journal 6, Poster 8]	Summer 2024 - current
Buckley-Sartwelle Scholarship	Spring 2025
Awarded to an outstanding junior in mechanical engineering	
Daziyah Sullivan, *ME PhD Student* [Journal 2, Conference 8]	Fall 2023 - current
Shawn-Michael Ferguson, *ME Undergraduate Student*	Summer 2025
Erin Mahan, *ME PhD Student* [Journals 7, 4, 3, WIP 7]	Fall 2023 - Spring 2025
Noah Kim, *ME PhD Student*	Fall 2023 - Summer 2024
Anas Yousaf, *ME Undergraduate Student*	Fall 2023 - Spring 2024

Undergraduate Senior Capstone Teams

WRIST: A Wearable Radial Interface for Sensory hapTic feedback — Fall 2024 - Summer 2025

Ali Nik-Ahd (*ME*), Brendan Hlibok (*ME*), Didi Zhou (*ECE*), Nathan Morriss (*ME*), Wendy Tan (*ECE*), and Xinghe (Mark) Chen (*ECE*) [WIP 9, Demo 10]

IEEE CASS Student Design Competition World Winner (1st Place) — May 2025

International competition for undergraduates to design and execute circuit- and system-based solutions to real-world problems.

OEDK Staff Favorite Award — April 2025

Special recognition given to a student project based on a staff member's favorite.

Stanford University

Olivia Tomassetti, *ME PhD Student* [WIP 11]	January 2025 - Current
Amy Zhou, *PD Undergraduate Student*	Summer 2021 - Fall 2022
Yuyu Lin, *CS Masters Student*	Fall 2021
Cherie Frances, *ME Undergraduate Student*	Summer 2021
Abena Boadi-Agyemang, *ME Undergraduate Student* [WIP 2]	Summer 2019
Julea Chin, *ME Undergraduate Student*	Summer 2018

ACTIVITIES AND OUTREACH

Teacher, **Stories in 2D: Sketching & Design Thinking** — Spring 2021

Stanford University, Stanford Rainstorm

Co-designed and co-taught a 1.5-hour online design thinking workshop for 20 middle and high school students, featuring collaborative brainstorming and peer feedback on new product ideas.

Demonstrator, **Exploratorium After Dark: Tactile** — Jan 2020

Exploratorium, San Francisco, CA

Helped to run public demo booths at the SF Exploratorium with other members of the Shape Lab.

Teacher, **Stories in Motion: Mechanical Automata and Rapid Prototyping** 2019
Stanford University, Stanford Splash (November 2019) and SeeME (April 2019)
Co-designed and co-taught a 2-hour automata prototyping class for 20 middle and high school students, preparing laser-cut materials to enable rapid motion testing.

Women's Community Center STEM Mentor 2021 - 2023
Shape Lab Outreach Coordinator 2018 - 2023
Created and conducted activities centered around prototyping and design for middle and high school students (e.g., hands-on projects, online courses, lab tours)

MEDIA COVERAGE

Mechanical Engineer Researches Haptics to Improve Medical Procedure Simulators and Flight Training
Oak Ridge Institute for Science and Education: Success Stories [Link] June 13, 2024

Elyse Chase, 2013 National Merit National Distillers Distributors Foundation Scholarship
National Merit Scholarship Corporation News [Link] February 2, 2018

Three University of Pennsylvania Students Win Goldwater Scholarships
Penn Today [Link] April 15, 2016

SKILLS

Programming Experience: MATLAB, C, C++, C# (Unity), R, Python, Javascript, Arduino, Processing, Embedded Hardware

Design and Fabrication: SolidWorks, laser cutting, 3D printing, soldering, mechatronic design, precision machining, CNC machining, silicone molding, photoshop, illustrator

Printmaking: I apprenticed at Flying Horse Press, University of Central Florida, with Professor Ke Francis, learning different printmaking techniques on my pieces and printing pages for books created by Ke Francis (Summer 2013). Later, I studied under Professor Marc Blumthal at the University of Pennsylvania with silk-screen, etching, letterpress, woodcut, linocut, and monotype projects (2016 - 2017).

Fine Arts: watercolor, acrylic, oil, pencil, charcoal, pastels, mixed media, photography, fiber arts