

Gregory J. Reardon

Postdoctoral Scholar

Department of Mechanical Engineering, Northwestern University

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Curriculum vitae last updated on September 5, 2026

EDUCATION

2024 University of California, Santa Barbara

Ph.D. in Media Arts and Technology
Specialization: Haptics, Wave Mechanics
Advisor: Yon Visell, Ph.D.

2018 New York University

M.M. in Music Technology
Specialization: Spatial Audio, Psychophysics
Advisors: Juan Pablo Bello, Ph.D. and Agnieszka Roginska, Ph.D.

2016 Brown University

B.Sc. in Applied Mathematics-Economics, *magna cum laude*
Study Abroad: St. Edmund Hall, Oxford University (2014–2015)

RESEARCH INTERESTS

Haptics, Tactile Sensing, Solid Mechanics, Dexterous Robotics, and Human-Computer Interaction

PUBLICATIONS

Manuscripts Under Review

Reardon, G., Linnander, M., Goetz, D., Tummala, N., Visell, Y.

Wave Focusing in Metamaterials: Tactile Displays Beyond the Diffraction Limit
Under Review [arXiv: <https://arxiv.org/abs/2606.05572>]

Kota, R., Reardon, G.[†], Colgate, J.E.[†]

[†]Equal last-author contribution

The Missing Touch: Spatially Distributed Haptic Feedback Brings Teleoperation Closer to Human Dexterity
Under Review [arXiv: <https://arxiv.org/abs/2608.19372>]

Journal Articles

Reardon, G.^{*}, Lu, S.^{*}, Colgate, J.E. (In press)

^{*}Equal first-author contribution

From Biological to Robotic Touch: The Mechanics of Touch for Tactile Sensing and Robot Dexterity
Annual Review of Control, Robotics, and Autonomous Systems

Trzpit, T., Reardon, G., Shilati, A., Gerber, E., Peshkin, M., Colgate, J.E. (2026)

Toward Eyes-Free Interaction: Whole-Arm Guidance via Fingertip Deflection with the NURing
IEEE Transactions on Haptics

Kota, R., Shah, K., Colgate, J.E., Reardon, G. (2026)

3D Cal: An Open-Source Software Library for Depth Reconstruction on Vision-Based Tactile Sensors
IEEE Robotics and Automation Letters

Kota, R., Dills, P., Reardon, G., Elwin, M., Colgate, J.E. (2026)

Dead Zone Bilateral Control for High Performance Robotic Teleoperation
IEEE Robotics and Automation Letters

Tummala, N., Reardon, G., Dandu, B., Shao, Y., Saal, H.P., Visell, Y. (2026)

Biomechanical Filtering Supports Efficient Tactile Encoding in the Human Hand
Journal of the Royal Society Interface

Linnander, M., Goetz, D., **Reardon, G.**, Kumar, V., Hawkes, E., Visell, Y. (2025)

Tactile Displays Driven by Projected Light

Science Robotics

Distinguished Demonstration Award [1]

Hachisu, T., **Reardon, G.**, Shao, Y., Suzuki, K., Visell, Y. (2023)

Interpersonal Transmission of Vibrotactile Feedback via Smart Bracelets: Mechanics and Perception

IEEE Transactions on Haptics

Reardon, G., Goetz, D., Linnander, M., Visell, Y. (2023)

Rendering Dynamic Source Motion in Surface Haptics via Wave Focusing

IEEE Transactions on Haptics

Best Technical Paper – Journal Track [2], Best Student Presentation Finalist [3]

Reardon, G., Dandu, B., Shao, Y., Visell, Y. (2023)

Shear Shock Waves Mediate Haptic Holography via Focused Ultrasound

Science Advances

Kastor, N.* , Dandu, B.* , Bessari, V., **Reardon, G.**, Visell, Y. (2023)

*Equal first-author contribution

Ferrofluid Electromagnetic Actuators for High-Fidelity Haptic Feedback

Sensors and Actuators A: Physical

Kawazoe, A., **Reardon, G.**, Woo, E., Di Luca, M., Visell, Y. (2021)

Tactile Echoes: Multisensory Augmented Reality for the Hand

IEEE Transactions on Haptics

Best Application Paper Finalist [4]

Conference Papers

Trzpit, T., **Reardon, G.**, Shilati, A., Gerber, E., Peshkin, M., Colgate, J.E. (2025)

NURing: A Tendon-Driven Wearable Ring for On-Demand Kinesthetic Haptic Feedback

In: *2025 IEEE World Haptics Conference*

Tummala, N.* , **Reardon, G.***, Fani, S., Goetz, D., Bianchi, M., Visell, Y. (2024)

*Equal first-author contribution

SkinSource: A Data-Driven Toolbox for Predicting Touch-Elicited Vibrations in the Upper Limb

In: *2024 IEEE Haptics Symposium*

Best Technical Paper [5]

Goetz, D.* , **Reardon, G.***, Linnander, M., Visell, Y. (2023)

*Equal first-author contribution

Dynamic Feedback in Wave-Mediated Surface Haptics: A Modular Platform

In: *2023 IEEE World Haptics Conference*

Dinulescu, S., Tummala, N., **Reardon, G.**, Dandu, B., Goetz, D., Topp, S., Visell, Y. (2022)

A Smart Bracelet Supporting Tactile Communication and Interaction

In: *2022 IEEE Haptics Symposium*

Best Technical Paper – Runner-Up [6]

Reardon, G., Kastor, N., Shao, Y., Visell, Y. (2020)

Elastowave: Localized Tactile Feedback in a Soft Haptic Interface via Focused Elastic Waves

In: *2020 IEEE Haptics Symposium*

Best Technical Paper [7], Best Presentation – Honorable Mention [8]

Hachisu, T., **Reardon, G.**, Shao, Y., Suzuki, K., Visell, Y. (2020)

Interpersonal Vibrotactile Feedback Via Waves Transmitted through the Skin: Mechanics and Perception

In: *2020 IEEE Haptics Symposium*
Encouragement Award [9]

Reardon, G., Shao, Y., Dandu, B., Frier, W., Long, B., Georgiou, O., Visell, Y. (2019)
Cutaneous Wave Propagation Shapes Tactile Motion: Evidence from Air-Coupled Ultrasound
In: *2019 IEEE World Haptics Conference*

Genovese, A., Zalles, G., **Reardon, G.**, Roginska, A. (2018)
Acoustic Perturbations in HRTFs Measured on Mixed Reality Headsets
In: *2018 Audio Engineering Society International Conference on Audio for Virtual and Augmented Reality*

Reardon, G., Genovese, A., Zalles, G., Flanagan, P., Roginska, A. (2018)
Evaluation of Binaural Renderers: Multidimensional Sound Quality Assessment
In: *2018 Audio Engineering Society International Conference on Audio for Virtual and Augmented Reality*

Reardon, G., Genovese, A., Zalles, G., Flanagan, P., Roginska, A. (2018)
Evaluation of Binaural Renderers: Localization
In: *Audio Engineering Society Convention 144*

Reardon, G., Zalles, G., Genovese, A., Flanagan, P., Roginska, A. (2018)
Evaluation of Binaural Renderers: Externalization, Front/Back and Up/Down Confusions
In: *Audio Engineering Society Convention 144*

Reardon, G., Calle, J.S., Genovese, A., Zalles, G., Olko, M., Jerez, C., Flanagan, P., Roginska, A. (2017)
Evaluation of Binaural Renderers: A Methodology
In: *Audio Engineering Society Convention 143*

AWARDS

2025 EuroHaptics Society Best PhD Thesis Award
2024 Best Technical Paper at 2024 IEEE Haptics Symposium [5]
2024 Distinguished Demonstration Award at 2024 IEEE Haptics Symposium [1]
2023 Best Technical Paper – Journal Track at 2023 IEEE World Haptics Conference [2]
2023 Best Student Presentation Finalist at 2023 IEEE World Haptics Conference [3]
2022 Best Application Paper Finalist from IEEE Transactions on Haptics [4]
2022 Best Technical Paper – Runner-Up at 2022 IEEE Haptics Symposium [6]
2021 Encouragement Award from Institute of Electrical Engineers of Japan, Workshop [9]
2020 Best Technical Paper at 2020 IEEE Haptics Symposium [7]
2020 Best Presentation – Honorable Mention at 2020 IEEE Haptics Symposium [8]
2018 Chancellor's Fellowship (full doctoral funding for 5 years) from University of California, Santa Barbara
2017 Fleishman Scholarship for academic distinction from New York University
2017/18 Academic Excellence in Music Technology Program from New York University

PROFESSIONAL EXPERIENCE

Postdoctoral Scholar

May 2024–present

Department of Mechanical Engineering, Northwestern University

- Designed, modeled, and fabricated a thin, compact tactile sensor that can sense over large areas with few sensing elements using a novel ultrasound-based, dual-plate architecture.
- Developed a new class of instrumented objects using vision-based tactile sensing methods to quantify and benchmark human and robot dexterous behavior.

- Developed machine learning algorithms to transform raw tactile data into physically informed representations for downstream robot learning tasks.

Graduate Student Researcher

September 2018–March 2024

Media Arts and Technology Program, University of California, Santa Barbara

- Designed and fabricated a thin-plate metamaterial to produce ultraslow flexural waves to enable far-field superfocusing on rigid touch surfaces for haptic display.
- Designed novel rendering and wavefield control methods for generating dynamic source motion and spatially and temporally resolved haptic feedback on wave-mediated surface haptic displays.
- Leveraged theory, numerical simulation, and time-resolved optical imaging to demonstrate that mid-air haptic displays generate viscoelastic shear shock fronts in the skin and that these artifacts impair perception.

Graduate Student Researcher

January 2016–August 2018

Music and Audio Research Laboratory, New York University

- Designed and conducted a 70-participant psychophysical study on the perception and psychophysics of different spatial audio rendering methods to determine which percepts are most predictive of perceived quality.
- Led an industry-funded project sponsored by THX Ltd. that yielded 4 first-author publications in audio technology conferences.
- Leveraged computing clusters to parse 5.2 terabytes of audiovisual recordings and text metadata to create a curated dataset for audiovisual learning.

TEACHING EXPERIENCE

Invited Speaker, Tactile Sensing and Processing Summer School

August 2025

- Designed a half-day lecture on human vibration sensing that covered topics including evolutionary biology of the human hand, tissue mechanics, and peripheral sensory processing for a week-long summer school that brought together tactile sensing experts and graduate students from across a wide range of engineering disciplines.

Research Mentor, Northwestern University

• **Undergraduate Kaival Shah**

September 2024–present

Kaival is building tactile prediction models and has successfully contributed code underlying two separate publications, with portions of his work released as part of an open-source software library for tactile sensor calibration.

• **Undergraduate Gautham Anne**

September 2024–present

Gautham is fabricating an instrumentation device to evaluate the mechanical properties of the fingerpad under shear stimulation and is preparing a contribution to an upcoming haptics conference.

• **Graduate Student Rohan Kota**

May 2024–present

Rohan enhanced robotic teleoperation by capturing tactile interactions at the robot end effector and displaying that information to a human operator with high-resolution haptic displays. His work has resulted in multiple publications in leading robotics journals.

• **Graduate Student Tomasz Trzpit**

May 2024–present

Tomasz created a finger-worn haptic guidance device for individuals with visual impairments. His work has been published in and demonstrated at leading haptics and HCI venues, and he has initiated the patent application process for the technology.

Guest Lecturer, Haptics: Perception, Interaction, Technologies, Applications

February 2022, 2023

University of California, Santa Barbara (MAT 594H/ECE 594T/ECE 194)

- Gave guest lectures (one each year) on the relationship between human vibration perception and skin mechanics.

Guest Lecturer, Continuum Media: Waves and Acoustics

November 2021

University of California, Santa Barbara (MAT 594T)

- Gave a guest lecture on emerging computational and material methods for wavefield control in solid media.

Graduate Teaching Assistant, Continuum Media: Waves and Acoustics

Fall 2019, Fall 2021

University of California, Santa Barbara, Media Arts and Technology Program (MAT 594T)

- Tutored students in analytical and numerical solutions to wave equations, building up from simple harmonic motion and oscillations on a string to 3D wave equations.
- Wrote code and led workshops to aid students in simulating and understanding wave phenomena (e.g., Huygens' principle and evanescent waves).
- Simulated the acoustics of a snare drum in MATLAB for teaching numerical simulation using finite-difference time-domain methods.

Research Mentor, University of California, Santa Barbara

- **Undergraduate Jephtha Sidharta** *Summer 2023*
Jephtha fabricated a soft, hand-held tactile display capable of producing multi-touch feedback using wave focusing as part of the Mathematics, Engineering, Science Achievement (MESA) University Program.
- **Graduate Student Stejara Dinulescu** *September 2019–September 2022*
Stejara designed and fabricated a wearable, assistive device that can decode tactile sign language for deafblind individuals. Her work received a *Most Promising Work-in-Progress — Honorable Mention* at the 2020 IEEE Haptics Symposium and later developed into a *Best Technical Paper — Runner-Up* at the same conference in 2022.
- **Undergraduate Irene Cho** *Summer 2021*
Irene created an augmented reality “whac-a-mole” game for a soft multi-touch haptic display as part of the EU-REKA! Scholars Program.

Co-Lead, Spatial Audio Interest Group, New York University

January 2016–August 2018

Extracurricular student organization focused on spatial audio and immersive media

- Taught a four-week lecture series on programming spatial audio in the Unity game engine, covering topics from basic object-oriented programming to implementation of multichannel audio in virtual and augmented reality environments.
- Mentored students through a project to capture 360° audiovisual recordings of live concerts and develop a VR environment for immersive playback, culminating in a live demonstration at the annual Music Technology Open House.

RESEARCH TALKS AND POSTERS

August 2025 “Wave Field Control for Spatially Distributed Haptic Feedback,” Invited Talk at the *Cognitive Robotics Department*, Delft University of Technology (TU Delft), Netherlands.

July 2025 “Wave-Mediated Haptics: Leveraging Wave Transport for Dynamic Tactile Feedback,” Dissertation Award Talk at *2025 IEEE World Haptics Conference*, Suwon, South Korea.

November 2023 “Spatially Distributed Haptics Using Mechanical Waves,” Invited Talk at the *Center for Robotics and Biosystems*, Northwestern University, Chicago, USA.

July 2023 “Rendering Dynamic Source Motion in Surface Haptics via Wave Focusing,” Talk at *2023 IEEE World Haptics Conference*, Delft, Netherlands.

June 2020 “Elastowave: Localized Tactile Feedback in a Soft Haptic Interface via Focused Elastic Waves,” Talk at *2020 IEEE Haptics Symposium*, Washington, D.C., USA.

July 2019 “Cutaneous Wave Propagation Shapes Tactile Motion: Evidence from Air-Coupled Ultrasound,” Talk at *2019 IEEE World Haptics Conference*, Tokyo, Japan.

PROFESSIONAL SERVICE

2026 Associate Editor, Program Committee
2026 EuroHaptics Conference

2025 Invited Speaker

Tactile Sensing and Processing Summer School
Dresden, Germany

2024 Editorial Board Member, Work-in-Progress (WIP) Papers

2024 IEEE Haptics Symposium

2022 Organizing Committee, Web Chair

2022 IEEE Haptics Symposium

2019 Organizing Committee and Brochure Editing for M.A.D.E.

Media Arts and Technology End of Year Show [<https://show.mat.ucsb.edu/2019/>]

Journal Reviewer Nature Communications (1 manuscript), IEEE Transactions on Haptics (7 manuscripts), IEEE Robotics and Automation Letters (1 manuscript), IEEE Computer Graphics and Applications (1 manuscript)

Conference Reviewer IEEE Haptics Symposium/IEEE World Haptics Conference/EuroHaptics Conference (5 manuscripts), ACM Symposium on User Interface and Software Technology (UIST; 1 manuscript)