

# Yitian Shao

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## RESEARCH INTERESTS

Embodied Intelligence, Haptics, Wearable Technologies, Extended Reality

## EDUCATION

University of California, Santa Barbara, *U.S.*

- **Ph.D.**, Electrical and Computer Engineering Sep 2020  
Dissertation: Tactile Sensing, Information, and Feedback via Wave Propagation
- **M.S.**, Electrical and Computer Engineering Jun 2019

Tianjin University, *China*

- **B.Eng.**, Electrical Engineering and Automation Jun 2013

## PROFESSIONAL EXPERIENCE

Professor (L4), Harbin Institute of Technology, Shenzhen, *Shenzhen, China* Jul 2023 - Present  
International Research Institute for Artificial Intelligence  
State Key Laboratory of Smart Farm Technologies and Systems  
Cyber-Physical Systems Research Center

Junior Professor (W1), Technische Universität Dresden, *Dresden, Germany* Jul 2022 - Jul 2023  
Faculty of Electrical and Computer Engineering  
Centre for Tactile Internet with Human-in-the-Loop (CeTI)  
6G-life Research Hub

Postdoctoral Researcher, Max Planck Institute for Intelligent Systems, *Stuttgart, Germany* Jan 2021 - Jun 2022  
Haptic Intelligence Department

Graduate Researcher, Univ. California, Santa Barbara, *Santa Barbara, U.S.* Sep 2015 - Jul 2020  
California NanoSystems Institute, RE Touch Lab

Research Intern, Microsoft, *Redmond, U.S.* Jun 2019 - Sep 2019  
Applied Sciences Group

## AWARDS

- Best IEEE Transactions on Haptics Short Paper Award 2024
- Best In-Person Poster/Demo Award, ACM Symposium on Virtual Reality Software and Technology 2022
- EuroHaptics Society Best PhD Thesis Award 2021
- Humboldt Research Fellowship for Postdoctoral Researchers 2021
- Univ. California, Santa Barbara ECE PhD Dissertation Fellowship 2020
- Best Paper Award, IEEE Haptics Symposium 2020
- Best Technical Demonstration Award, IEEE World Haptics Conference 2019

- Best Student Paper Award Finalist, IEEE World Haptics Conference 2019
- Best Paper Award Nomination, IEEE World Haptics Conference 2019
- Best Paper Award Runner Up, IEEE Haptics Symposium 2016
- Best Paper Award, Work-in-Progress Category, IEEE Haptics Symposium 2016

## PUBLICATIONS

### Journal Articles

- [J1] G. Mamillapalli†, R. Rosenkranz†, R. Kirchner, I. Zozulia, E. Altinsoy, Y. Shao†, Influence of design parameters on the physical and perceptual performance of soft liquid dielectric actuators. **Sensors and Actuators A: Physical**, 2026. (†Co-corresponding) [DOI](#)
- [J2] F. Liu, Y. Shao†, M. Chen†, Generative design strategies for additive manufacturing of lattice structures: A review. **Materials & Design**, 2026. (†Co-corresponding) [DOI](#)
- [J3] N. Tummala, G. Reardon, B. Dandu, Y. Shao, H.P. Saal, Y. Visell, Biomechanical filtering supports efficient tactile encoding in the human hand. **Journal of The Royal Society Interface**, 2026. [DOI](#)
- [J4] Y. Shao\*, A. Shagan Shomron\*, B. Javot, C. Keplinger†, K.J. Kuchenbecker†, Wearable electrohydraulic actuation for salient full-fingertip haptic feedback. **Advanced Materials Technologies**, 2025. (**Journal cover**, \*Contributed equally, †Co-corresponding) [DOI](#)
- [J5] A. Shagan Shomron, C. Chase-Markopoulou, J.R. Walter, J. Sellhorn-Timm, Y. Shao, T. Nadler, A. Benson, I. Wochner, E. H. Rumley, I. Wurster, P. Klocke, D. Weiß, S. Schmitt, C. Keplinger†, D.Häufle†, A robotic and virtual testing platform for evaluating wearable devices for wrist tremor suppression. **Device** (Cell Press), 2025. (†Co-corresponding) [DOI](#)
- [J6] Z. Liu, Y. Shao, Q. Li, J. Su, Transformer-based material recognition via short-time contact sensing. **Pattern Recognition**, 2025. [DOI](#)
- [J7] B. Khojasteh, Y. Shao, K.J. Kuchenbecker, Robust surface recognition with the maximum mean discrepancy: degrading haptic-auditory signals through bandwidth and noise. **IEEE Transactions on Haptics**, 2024. [DOI](#)
- [J8] Y. Sung, R. Kim, K.W. Song, Y. Shao, S.H. Yoon, HapticPilot: authoring in-situ hand posture-adaptive vibrotactile feedback for virtual reality. **Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies**, 2024. [DOI](#)
- [J9] T. Hachisu, G. Reardon, Y. Shao, K. Suzuki, Y. Visell, Interpersonal transmission of vibrotactile feedback via smart bracelets: mechanics and perception. **IEEE Transactions on Haptics**, 2023. [DOI](#)
- [J10] G. Reardon, B. Dandu, Y. Shao, Y. Visell, Shear shock waves mediate haptic holography via focused ultrasound. **Science Advances**, 2023. [DOI](#)
- [J11] Y. Peng, C.M. Serfass, A. Kawazoe, Y. Shao, K. Gutierrez, C.N. Hill, V.J. Santos, Y. Visell, L.C. Hsiao, Elastohydrodynamic friction of robotic and human fingers on soft micropatterned substrates. **Nature Materials**, 2021. [DOI](#)
- [J12] Y. Shao, V. Hayward, Y. Visell, Compression of dynamic tactile information in the human hand. **Science Advances**, 2020. [DOI](#)
- [J13] Y. Shao, H. Hu, Y. Visell, A wearable tactile sensing array for large area remote vibration capture in the hand. **IEEE Sensors Journal**, 2020. [DOI](#)
- [J14] S. Biswas, Y. Shao, T. Hachisu, T. Nguyen-Dang, Y. Visell, Integrated soft optoelectronics for wearable health monitoring. **Advanced Materials Technologies**, 2020. [DOI](#)
- [J15] B. Dandu, Y. Shao, Y. Visell, Rendering spatiotemporal haptic effects via the physics of waves in the skin. **IEEE Transactions on Haptics**, 2020. [DOI](#)

- [J16] [Y. Shao](#), V. Hayward, Y. Visell, Spatial patterns of cutaneous vibration during whole-hand haptic interactions. **Proceedings of the National Academy of Sciences**, 2016. [DOI](#)
- [J17] Y. Wang, X. Shi, Z. Zuo, M. Chen, [Y. Shao](#), On finite-time stability for nonlinear impulsive switched systems. **Nonlinear Analysis: Real World Applications**, 2013. [DOI](#)

#### Peer-Reviewed Conference Papers

- [C1] Y. Wu, S. Hou, H. Zheng, Y. Li, W. Lu, X. Zhou, [Y. Shao](#), TranTac: leveraging transient tactile signals for contact-rich robotic manipulation. **IEEE International Conference on Robotics and Automation (ICRA '26)**, 2026. [DOI](#)
- [C2] W. Tan, [Y. Shao](#), Distributed contact sensing enabled by vibration propagation on robot end-effector. **IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS '25)**, 2025. [DOI](#)
- [C3] C. Zhang, X. Zhou, [Y. Shao](#), J. Luo, Adjacency-aware deep reinforcement learning for centralized vehicle repositioning. **IEEE International Conference on Big Data (BigData '25)**, 2025. [DOI](#)
- [C4] S. Ying-Lei, D. Tang, W. Hu, S. H. Yoon, [Y. Shao](#), VibWalk: mapping lower-limb haptic experiences of everyday walking. **CHI Conference on Human Factors in Computing Systems (CHI '25)**, 2025. [DOI](#)
- [C5] N. Tummala, [Y. Shao](#), Y. Visell, Spatiotemporal organization of touch information in tactile neuron population responses. **IEEE Haptics Symposium (HAPTICS '23)**, 2023. [DOI](#)
- [C6] Y. Sung, [Y. Shao](#), R. Kim, S.H. Yoon, Exploring vibration intensity map of hand postures for haptic rendering in XR. **28th ACM Symposium on Virtual Reality Software and Technology (VRST '22)**, 2022. [DOI](#)
- [C7] [Y. Shao](#), S. Ma, S.H. Yoon, Y. Visell, J. Holbery, SurfaceFlow: large area haptic display via compliant liquid dielectric actuators. **IEEE Haptics Symposium (HAPTICS '20)**, 2020. [DOI](#)
- [C8] T. Hachisu, G. Reardon, [Y. Shao](#), K. Suzuki, Y. Visell, Interpersonal vibrotactile feedback via waves transmitted through the skin: Mechanics and perception. **IEEE Haptics Symposium (HAPTICS '20)**, 2020. [DOI](#)
- [C9] G. Reardon, N. Kastor, [Y. Shao](#), Y. Visell, Elastowave: Localized tactile feedback in a soft haptic interface via focused elastic waves. **IEEE Haptics Symposium (HAPTICS '20)**, 2020. [DOI](#)
- [C10] B. Dandu\*, [Y. Shao](#)\*, A. Stanley, Y. Visell, Spatiotemporal haptic effects from a single actuator via spectral control of cutaneous wave propagation. **IEEE World Haptics Conference (WHC '19)**, 2019. (\*Contributed equally) [DOI](#)
- [C11] G. Reardon, [Y. Shao](#), B. Dandu, W. Frier, B. Long, O. Georgiou, Y. Visell, Cutaneous wave propagation shapes tactile motion: Evidence from air-coupled ultrasound. **IEEE World Haptics Conference (WHC '19)**, 2019. [DOI](#)
- [C12] T. Hachisu, [Y. Shao](#), K. Suzuki, Y. Visell, Empirical study on transfer functions from wrists to hands. **IEEE World Haptics Conference (WHC '19)**, Work-in-Progress, 2019. [LINK](#)
- [C13] H. Schäfer, Z. Wells, [Y. Shao](#), Y. Visell, Transfer properties of touch elicited waves: Effect of posture and contact conditions. **IEEE World Haptics Conference (WHC '17)**, 2017. [DOI](#)
- [C14] [Y. Shao](#), Y. Visell, Learning constituent parts of touch stimuli from whole hand vibrations. **IEEE Haptics Symposium (HAPTICS '16)**, 2016. [DOI](#)
- [C15] M. Chartier, N. Thomas, [Y. Shao](#), Y. Visell, Toward a wearable tactile sensory amplification device: Transfer characteristics and optimization. **IEEE Haptics Symposium (HAPTICS '16)**, Work-in-Progress, 2016. [LINK](#)

#### BOOK

- [B1] M.E. Altinsoy, P.A. Romeo, C. Böhmer, C. Cherif, G. Cuniberti, A. Ganguly, S. Groß, S. Haddadin, S. Huang, T. Hulin, G. Mamillapalli, A. Nag, S. Nuthalapati, L. Riemenschneider, R. Rosenkranz, [Y. Shao](#), H. Singh, A. Swikir, G. Uhlig, M. Warncke, G.A. Whitaker, H. Winger, Chapter 18 - Sensors and actuators – new materials and technologies, *Humans, Robots, and Virtual Worlds in the Tactile Internet*. Academic Press, 2026. [DOI](#)

[B2] [Y. Shao](#), Tactile Sensing, Information, and Feedback via Wave Propagation. Springer, Cham, 2022. (Part of the Springer Series on Touch and Haptic Systems book series). [DOI](#)

## PATENTS

- [P1] Keller, S.J., Trutna, T.T., Benko, H., King, R., Stanley, A.A., Di Luca, M., Visell, Y., Shao, Y. and Dandu, B., Methods, devices, and systems for modifying perceived haptic stimulations on a user. U.S. Patent No. 11,422,628, issued August 23, 2022. [LINK](#)
- [P2] Keller, S.J., Trutna, T.T., Benko, H., King, R., Stanley, A.A., Di Luca, M., Visell, Y., Shao, Y. and Dandu, B., Methods, devices, and systems for creating localized haptic stimulations on a user. U.S. Patent No. 10,684,690, issued June 16, 2020. [LINK](#)
- [P3] Keller, S.J., Trutna, T.T., Benko, H., King, R., Lou, Y., Visell, Y., Shao, Y. and Dandu, B., Methods, devices, and systems for creating haptic stimulations and tracking motion of a user. U.S. Patent No. 10,678,335, issued June 9, 2020. [LINK](#)

## TEACHING

Professor (L4), Harbin Institute of Technology, Shenzhen

- Introduction to Robotics and Machine Intelligence (COMP6022) Spring '26
- Data Structures (COMP2006E) Spring '25, '26
- High-Level Language Programming (COMP2030E) Fall '24
- Foundations of Computer Science and Electronic Information (COMP2031E) Fall '24

Guest Lecture: Introduction to Haptics and Extended Reality

- School of Computer Science and Technology, HIT Shenzhen Fall '24 – '26
- HIT Shenzhen International School of Design Spring '26
- Shenzhen International Graduate School, Tsinghua University Fall '25

Junior Professor, TU Dresden

- Electronic Media (Guest Lecture: Introduction to Haptic Actuators) Winter '22

Teaching Assistant and Lab Lecturer, University of California, Santa Barbara

- Haptics (ECE194/594T) Winter '18
- Introduction to Robotics - Dynamics & Control (ECE-179D/289) Fall '17
- Multimedia Systems (ECE-160) Spring '17

Teaching Assistant, Drexel University

- Electrical Lab (ECEL-304) Summer '15
- Electric Circuits (ECE-201) Fall '13, Spring '14, '15
- Programming for Engineers (ECE-203) Winter '14
- Robotics I (ECES-490) Fall '14
- Advances in DSP: Multimedia & Information Security (ECE-435) Winter '13

## MENTORING

- **Postdoctoral Researcher:** Fuyuan Liu
- **Ph.D.:** Siyu Liu, Yinghao Wu, Gangadhar Mamillapalli
- **M.S.:** Rui Qiu, Weiming Hu, Zhuoyi Ren, Jiahui Lin, Haowen Zheng, Jianting Liao, Dongxu Tang, Tong Wu, Gebreyesus Tewelde Teklehaimanot, Yinglei Shi, Wangbo Tan, Chen Lu
- **B.S.:** Yifeng Li, Jingru Wang, Yichen Li, Wenxuan Ou, Mercedes Chartier

## PROFESSIONAL SERVICE

- **Review editor:** Frontiers in Robotics and AI
- **Journal reviews:** Science Advances, Advanced Materials, Advanced Functional Materials, IEEE Robotics and Automation Letters (RA-L), IEEE/ASME Transactions on Mechatronics (TMECH), IEEE Transactions on Haptics (ToH), The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), International Journal of Human-Computer Studies (IJHCS), International Journal of Human-Computer Interaction (IJHCI), IEEE Transactions on Industrial Electronics (TIE), International Journal of Mechanical Sciences (IJMS)
- **Conference reviews:** IEEE International Conference on Robotics & Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Conference on Robot Learning (CoRL), ACM Conference on Human Factors in Computing Systems (CHI), ACM Symposium on Virtual Reality Software and Technology (VRST), IEEE World Haptics Conference (WHC), Eurohaptics
- **Conference organization:** Chair of student innovation challenge in the 5th China Haptic Technology and Application Conference (2026)
- **Proposal reviews:** IEEE TCH Innovation in Haptics
- **Summer School:** Organizer, Dresden International Summer School on Haptics and Cognitive Robotics (HAPCOR)
- **Symposium:** Session chair, International Max Planck Research School Ph.D. Interview Symposium 2022

## PRESENTATIONS & MEDIA COVERAGE

- From Human Touch to Embodied Intelligence: Exploring Wide-Bandwidth Tactile Sensing. Invited talk, School of Computing, Korea Advanced Institute of Science and Technology, *Daejeon, Korea*, Dec 17, 2025
- Wide Bandwidth Tactile Information in Human Touch Interactions. Invited talk, 13th China National Conference on Social Media Processing, *Wuhan, China*, Nov 23, 2025
- Distributed contact sensing enabled by vibration propagation on robot end-effector. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS '25), oral session, *Hangzhou, China*, Oct 23, 2025
- Wide Bandwidth Tactile Sensing of Human and Embodied Intelligence. Invited talk, The 2nd International Conference on AI Sensors and Transducers, *Kuala Lumpur, Malaysia*, July 31, 2025
- Wide-Bandwidth Tactile Sensing for Machines. Workshop W3 AI in Haptics, IEEE World Haptics Conference (WHC '25), *Suwon, Korea*, Jul 8, 2025
- Wide Bandwidth Tactile Sensing of Human and Embodied Intelligence. Invited talk, iCANX Youth Talks Vol.100: Embodied Intelligent Robots and Tactile Sensors/Actuators, *Online: ican-x.com*, June 3, 2025
- Wide Bandwidth Tactile Sensing of Human and Embodied Intelligence. Invited talk, School of Advanced Technology, Xi'an Jiaotong-Liverpool University, *Suzhou, China*, May 9, 2025
- Acoustic Signatures of Haptic Interactions: Sensory Experience and Contextual Information. Workshop, AsiaHaptics 2024 Conference, *Sunway, Malaysia*, October 28, 2024
- Wearable Haptic Feedback Based on Electrohydraulic Actuators. 2021 MRS Fall Meeting & Exhibit, EQ15-Virtual, December 7, 2021
- Special talk for winning the Eurohaptics Best PhD Thesis: Tactile Sensing, Information, and Feedback via Wave Propagation. IEEE World Haptics Conference (WHC '21), online, July 9, 2021
- Tactile Sensing, Information, and Feedback via Wave Propagation. Invited talk, Haptic Intelligence Department, Max Planck Institute for Intelligent Systems, *Online: is.mpg.de*, July 28, 2020
- SurfaceFlow: Large Area Haptic Display Via Compliant Liquid Dielectric Actuators. IEEE Haptics Symposium (HAPTICS '20) online video presentation [LINK](#)
- In May 13, 2020, The Daily Nexus published an article by Sean Crommelin: “A Touchy Subject: UCSB Researchers Model Signals of Touch in the Human Hand”, in which Y. Shao was interviewed about his research published in Science Advances. [LINK](#)
- In April 16, 2020, Science Podcast producer Sarah Crespi talked with Prof. Visell in the podcast about the research with Y. Shao as one of the major contributors. [LINK](#)

- In April 15, 2020, UCSB The Current published an article by Sonia Fernandez: “Skin That Computes”, which highlighted the research with Y. Shao as one of the major contributors. [LINK](#)
- Tactile Sensing, Information, and Display via Cutaneous Wave Propagation. Invited talk, Microsoft Applied Sciences Group, *Redmond, U.S.*, June 27, 2019
- Learning Constituent Parts of Touch Stimuli from Whole Hand Vibrations. IEEE Haptics Symposium (HAPTICS '16), single-track oral session, *Philadelphia, U.S.*, April 11, 2016