

# LAWRENCE KIM

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## RESEARCH INTERESTS

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Human-Computer Interaction, Wellbeing Technology, Human-Robot Interaction, Robotics, Haptics

## APPOINTMENT

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**Stanford University, School of Medicine** 2020 - present  
Postdoctoral Scholar, Psychiatry and Behavioral Sciences

## EDUCATION

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**Stanford University** 2015 - 2020  
Doctor of Philosophy, Mechanical Engineering  
PhD Minor in Computer Science

**Stanford University** 2013 - 2015  
Master of Science, Mechanical Engineering

**University of Illinois at Urbana-Champaign** 2010 - 2013  
Bachelor of Science, Mechanical Engineering, *Highest Honors*

## RESEARCH EXPERIENCE

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**Pervasive Wellbeing Technology Lab, Stanford School of Medicine** 2020 - present  
Postdoctoral Researcher  
Stanford, CA

Research with Prof. Pablo Paredes on developing technology for well-being.  
Designing a robotic companion for mental health of students (funded by Stanford School of Education).  
Building passive biomechanical sensing software using ubiquitous computing devices (funded by NSF).

**SHAPE Lab, Stanford University** 2015 - 2020  
Research Assistant  
Stanford, CA

Research with Prof. Sean Follmer on interaction with ubiquitous robots and haptic devices.  
Designed and built novel hardware platforms such as swarm robot platform and haptic devices.  
Conducted human subject testings to quantify human perception and elicit qualitative inputs from users.

**Facebook Building 8 thru Pro Unlimited** 2017 Fall  
Research Intern  
Menlo Park, CA

Research with Dr. Ali Israr & Dr. Frances Lau on communication through touch.  
Developed, and ran studies with new haptic device to enable speech communication through the skin.

**CHARM Lab, Stanford University** 2013 - 2014  
Research Assistant  
Stanford, CA

Research with Allison M. Okamura on surgical robotics and trilateral shared control.  
Evaluated effects of tool misalignment and trilateral shared control for robot teleoperation.

**Bretl Research Group, University of Illinois at Urbana** 2012 - 2013  
Undergraduate Researcher  
Urbana, IL

Research with Tim W. Bretl on use of drone in construction sites.  
Designed and developed attachment mechanism for drones to perch on construction beams.

## AWARDS & HONORS

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<b>HRI 2021:</b> Best LBR Award Nominee (7 out of 109)	2021
<b>CHI 2020:</b> Best Paper Honorable Mention (Top 5%)	2020
<b>CHI 2019:</b> Best Paper Honorable Mention (Top 5%)	2019
<b>Fast Company:</b> Innovation by Design: Honorable Mention	2017
<b>UIST 2016:</b> Best Paper Award (Top 1%)	2016
<b>Samsung Scholarship</b> (\$50,000/year for 5 years)	2016 - 2020
<b>Computing Reviews:</b> Notable Books and Articles	2016

## PUBLICATIONS

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Premiere conference venues in human-computer interaction (e.g., ACM CHI and UIST) are highly selective. Unlike in many fields, these venues publish archival papers and are comparable to or exceed many HCI journals in terms of visibility and impact.

See: <https://dl.acm.org/citation.cfm?id=1743546.1743569>

### Journal

- [J5] **Lawrence H Kim**, Veronika Domova, Yuqi Yao, Sean Follmer, Chien-Ming Huang, Pablo E Paredes  
“Robotic Presence: The Effects of Anthropomorphism and Robot State on Task Performance and Emotion”  
*IEEE Robotics and Automation Letters (RA-L)* 2022 [Under Review]
- [J4] **Lawrence H Kim**, Gourab Saha, Annel Amelia Leon, Abby C King, Matthew L Mauriello, Pablo E Paredes  
“Shared Autonomy to Reduce Sedentary Behavior among Sit-Stand Desk Users in the U.S and India”  
*2022 JMIR Formative Research* [Under Review]
- [J3] **Lawrence H Kim**, Sean Follmer  
“Generating Legible and Glanceable Swarm Robot Motion through Trajectory, Collective Behavior, and Pre-attentive Processing Features”  
*ACM Transactions on Human-Robot Interaction (THRI)*. 10, 3, Article 21 (July 2021).
- [J2] **Lawrence H Kim**, Pablo Castillo, Sean Follmer, Ali Israr  
“VPS Tactile Display: Tactile Information Transfer of Vibration, Pressure, and Shear”  
*Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*. 3(2), 51, June 2019. (Presented at UbiComp 2019)
- [J1] **Lawrence H Kim**, Sean Follmer  
“UbiSwarm: Ubiquitous Robotic Interfaces and Investigation of Abstract Motion as a Display”  
*Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*. 1(3), 66, Sep. 2017. (Presented at UbiComp 2017) [Acceptance rate = 9%]

### Conference

- [C10] **Lawrence H Kim**, Veronika Domova, Yuqi Yao, Pablo E Paredes  
“Effects of Robotic Presence and Anthropomorphism on People’s Motivation across Gender and Personality”  
*IEEE International Conference on Robot Human Interactive Communication (RO-MAN ’22)* [In Preparation]
- [C9] **Lawrence H Kim\***, Rahul Goel\*, Jia Liang\*, Mert Pilanci, Pablo E Paredes  
“Linear Predictive Coding for Acute Stress Prediction from Computer Mouse Movements”  
*Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC’21)*.

- [C8] Kai Zhang, **Lawrence H Kim**, Yipeng Guo, Sean Follmer  
 “Automatic Generation of Spatial Tactile Effects by Analyzing Cross-modality Features of a Video”  
*ACM Symposium on Spatial User Interaction (SUI’20)* [Acceptance rate = 50%]
- [C7] **Best Paper Honorable Mention (Top 5%)**  
 “User-defined Swarm Robot Control”  
**Lawrence H Kim**, Daniel Drew, Vernoika Domova, Sean Follmer  
*Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI’20)*. p.685  
 [Acceptance rate = 24%]
- [C6] **Best Paper Honorable Mention (Top 5%)**  
**Lawrence H Kim**, Sean Follmer  
 “SwarmHaptics: Haptic Display with Swarm Robots”  
*Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI’19)*. p.688.  
 [Acceptance rate = 24%]
- [C5] Yiwei Zhao, **Lawrence H Kim**, Ye Wang, Mathieu Le Goc, Sean Follmer  
 “Robotic Assembly of Haptic Proxy Objects for Tangible Interaction and Virtual Reality”  
*Proceedings of the 2017 ACM International Conference on Interactive Surfaces and Spaces (ISS’17)*.  
 pp. 82-91. [Acceptance rate = 27%]
- [C4] **Best Paper Award (Top 1%)**  
 Mathieu Le Goc, **Lawrence H Kim**, Ali Parsaei, Jean-Daniel Fekete, Pierre Dragicevic, Sean Follmer  
 “Zooids: Building Blocks for Swarm User Interfaces”  
*Proceedings of the 29th Annual Symposium on User Interface Software and Technology (UIST’16)*.  
 pp. 97-109. [Acceptance rate = 21%]
- [C3] Sungjune Jang, **Lawrence H Kim**, Kesler Tanner, Hiroshi Ishii, Sean Follmer  
 “Haptic Edge Display for Mobile Tactile Interaction”  
*Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI’16)*. pp.  
 3706-3716. [Acceptance rate = 23%]
- [C2] Kamran Shamaei, **Lawrence H Kim**, Allison M Okamura  
 “Design and Evaluation of a Trilateral Shared-Control Architecture for Teleoperated Training Robots”  
*37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC’15)*. pp. 4887-4893.
- [C1] **Lawrence H Kim\***, Cliff Bargar\*, Yuhang Che\*, Allison M Okamura  
 “Effects of Master-Slave Tool Misalignment in a Teleoperated Surgical Robot”  
*IEEE International Conference on Robotics and Automation (ICRA’15)*. pp. 5364-5370. [Acceptance rate = 41%]

#### Peer-reviewed posters, demos & extended abstracts

- [P4] **Best LBR Award Nominee (7 out of 109 accepted submissions)**  
**Lawrence H Kim**, Annel Amelia Leon, Ganapathy Sankararaman, Blake M Jones, Gourab Saha, Amanda Spyropolous, Akshara Motani, Matthew L Mauriello, Pablo E Paredes  
 “The Haunted Desk: Exploring Non-Volitional Behavior Change with Everyday Robotics”  
*Companion of the 2021 ACM/IEEE International Conference on Human-Robot Interaction (HRI’21)*
- [P3] **Lawrence H Kim\***, Abena Boadi-Agyemang\*, Alexa Fay Siu, John Tang  
 “When to Add Human Narration in Photo-Sharing Social Media”  
*International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS’20)*

- [P2] Griffin Dietz, Jane L E., Peter Washington, **Lawrence H Kim**, Sean Follmer  
 “Human Perception of Swarm Robot Motion”  
*Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI’17)*
- [P1] Mathieu Le Goc, **Lawrence H Kim**, Ali Parsaei, Jean-Daniel Fekete, Pierre Dragicevic, Sean Follmer  
 “Zooids: Building Blocks for Swarm User Interfaces”  
*Proceedings of the 29th Annual Symposium on User Interface Software and Technology (UIST’16)*

### Workshop

- [W1] **Lawrence H Kim**, Sean Follmer  
 “Interaction with Ubiquitous Robots and Autonomous IoT”  
*Workshop on New Directions for the IoT: Automate, Share, Build, and Care, CHI’19*

### Book Chapters

- [B1] Alexa F. Siu, Shenli Yuan, Hieu Pham, Eric J. Gonzalez, **Lawrence H Kim**, Mathieu Le Goc, Sean Follmer  
 “Investigating Tangible Collaboration for Design Towards Augmented Physical Telepresence”  
*2018 Plattner H., Meinel C., Leifer L. (eds) Design Thinking Research. Understanding Innovation. Springer, Cham*

### Theses

- [T1] **Lawrence H Kim**  
 “Designing In Situ Interaction with Ubiquitous Robots”  
 Committee: Sean Follmer, Allison Okamura, James Landay, Wendy Ju, Martin Fischer  
*2020 Doctoral Thesis*

## INVITED TALKS, POSTERS & DEMONSTRATIONS

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<b>Stanford University, DesignX Symposium</b>	2021
Designing Interaction with Ubiquitous Robots (Invited Talk)	Virtual
<b>Exploratorium, After Dark Session: Tactile</b>	2020
Interactive Tabletop Swarm Robots (Demo)	San Francisco, CA
<b>Hyundai Global Top Talent Forum</b>	2019
Interaction with Ubiquitous Robots and Autonomous Vehicles (Invited Talk)	San Diego, CA
<b>Bay Area Robotics Symposium (BARS)</b>	2019
User-defined Swarm Robot Control (Poster)	Berkeley, CA
<b>Haptics Symposium Technical Tour</b>	2018
Zooids: Building Blocks for Swarm User Interfaces (Demo)	Stanford, CA
<b>Adobe Creative Lab Retreat</b>	2016
Zooids: Building Blocks for Swarm User Interfaces (Demo)	Stanford, CA
<b>CHI Reception</b>	2016
Haptic Edge Display for Mobile Tactile Interaction (Demo)	Stanford, CA
<b>Center for Automotive Research at Stanford (CARS) Annual Meeting</b>	2015
Haptic Edge Display for Mobile Tactile Interaction (Demo)	Stanford, CA

**Bay Area Robotics Symposium (BARS)** 2015  
Haptic Edge Display for Mobile Tactile Interaction (Demo) Stanford, CA

## MENTORING

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Yikun Chi, Stanford Statistics MS 2021 - present  
Jason Jia Liang, Stanford Institute for Computational and Mathematical Engineering 2020 - 2021  
(ICME) MS - now Stanford ICME PhD  
Annel Amelia Leon, Stanford Computer Science BS 2020 - present  
Yuqi Yao, Stanford Education MS – now at Osmo 2019 - present  
Yiwei Zhao, Stanford Mechanical Eng MS – now at Electronic Art (EA) Digital Plat- 2016 - 2017  
form  
Ye Wang, Stanford ME/CS Cotermin/undergraduate – now at Apple 2017  
Ali Parsaei, Stanford Mechanical Eng MS – now at Omron Automation 2015 - 2016

## TEACHING

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**ME 101: Visual Thinking** 2015  
Course Assistant for Instructors John Edmark and Patrick Fenton  
**ENGR 105: Introduction to Feedback Control** 2015  
Course Assistant for Prof. Abbas Emami-Naeini  
**ENGR 105: Introduction to Feedback Control** 2015  
Course Assistant for Prof. Allison M. Okamura and Inst. Adam Leeper

## RESEARCH FUNDING

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**Stanford Graduate School of Education** (\$67,500) 2020 - 2021  
*Transforming Learning: Seed grants for research on K-12 education in the time of COVID-19*  
Pablo Paredes, Sean Follmer, **Lawrence Kim**

## SELECTED PRESS

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**Fast Company Design**, This Swarm Of Little Robots Is A Totally New Kind Of Interface. 2017  
**Hackaday**, Zooids - Swarm User Interface 2017  
**NowThis Future**, Check Out These Hive Mind Robots, >12M views 2016  
**Circuit Breaker**, Swarm of Tiny Robots, >4M views 2016  
**TechCrunch**, Swarms of tiny, cute robots will one day bring you your phone, like this 2016  
**WIRED.it**, Zooids, come funzionano gli sciame di nano robot 2016  
**IEEE Spectrum**, Video Friday: Swarm User Interface 2016  
**Adafruit**, 'Zooids' are Open-Source, Open-Hardware 'Bots for 'Swarm User Interfaces' 2016  
**Makery**, Zooids: who are these cute robots? 2016

## OPEN-SOURCE PROJECTS

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**Zooids**: Instruction and code to build and program Swarm User Interface  
<https://github.com/ShapeLab/SwarmUI>

## PROFESSIONAL SERVICES

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<b>Program Committee</b>	ACM Conference on Human Factors in Computing Systems (CHI), Late Breaking Work (LBW)	2022
<b>Reviewing</b>	ACM Conference on Human Factors in Computing Systems (CHI)	2020 - 2022
	ACM Symposium on User Interface Software and Technology (UIST)	2019 - 2020
	ACM Proceedings on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)	2018 - 2021
	ACM/IEEE International Conference on Human-Robot Interaction (HRI)	2021-2022
	ACM Conference on Tangible, Embedded and Embodied Interaction (TEI)	2022
	IEEE Transactions on Robotics (T-RO)	2021
	Science Robotics	2021
	ACM Transactions on Human-Robot Interaction (T-HRI)	2021
	Virtual Reality, Springer	2021
	Frontiers in Robotics and AI	2021
	IEEE World Haptics Conference (WHC)	2019 - 2021
	Graphics Interface (GI)	2020
	ACM Designing Interactive Systems (DIS)	2019
<b>Outreach</b>	Rainstorm Academic Outreach Program for Grades 9-12	2021 - present
	Stanford's Splash Academic Outreach Program for Grades 9-12	2019 - present
	Stanford CS URM Undergraduate Mentoring Program	2020 - 2021
	Lab Tour, Duncan Polytechnical High School's Health and Technology Pathways	2014
	Lab Tour, Manteca High School's Health Science Pathway	2014