LAWRENCE KIM

lawkim@stanford.edu ◇ www.lhkim.com

RESEARCH INTERESTS

Human-Computer Interaction, Wellbeing Technology, Human-Centered Design, Robotics, Haptics

APPOINTMENT

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

EDUCATION

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

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
Graduate 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 a swarm robotic 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 a new multidimensional haptic device and ran studies to evaluate tactile information transfer.

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

Research with Allison M. Okamura on surgical robotics and trilateral shared control.
Evaluated effects of a tool misalignment and a 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 an attachment mechanism for drones to perch on construction beams.

AWARDS & HONORS

HRI 2021: Best LBR Award Nominee (7 out of 109)	2021
CHI 2020: Best Paper Honorable Mention (Top 5%)	2020
CHI 2019: Best Paper Honorable Mention (Top 5%)	2019
MDPI Robotics Travel Award	2019
Stanford Bio-X Travel Award	2019
Fast Company: Innovation by Design: Honorable Mention	2017
UIST 2016: Best Paper Award (Top 1%)	2016
Samsung Scholarship ($50,000/year for 5 years)	2016 - 2020
Computing Reviews: Notable Books and Articles	2016
B.S. awarded with **Highest Honors**	2013
Guy Richard Collins Scholarship	2012
Dean's List for Academic Excellence	2010 - 2013
National Merit Scholarship	2010 - 2013

PUBLICATIONS

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

3. **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).

2. **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)

1. **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

8. 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)

7. **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%]

6. **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%]

5. 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%]

4. **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%]

3. 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%]

2. 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.

1. **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

4. **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)

3. **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)

2. 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)

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)

WORKSHOP

1. **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

1. 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

1. **Lawrence H Kim**
   "Designing In Situ Interaction with Ubiquitous Robots"
   Reading Committee: Sean Follmer, Allison Okamura, James Landay
   2020 Doctoral Thesis

MANUSCRIPTS UNDER REVIEW

2. **Lawrence H Kim**, Gourab Saha, Annel Amelia Leon, Matthew L Mauriello, Pablo E Paredes
   "Shared Autonomy Preferences to Reduce Sedentary Behavior among Sit-Stand Desk Users in the U.S and India"
   PNAS. 2021.

1. **Lawrence H Kim***, Rahul Goel*, Jia Liang, Mert Pilanci, Pablo E Paredes
   "Linear Predictive Coding as a Valid Approximation of a Mass Spring Damper Model for Acute Stress Prediction from Computer Mouse Movement"
   IEEE EMBC. 2021.

INVITED TALKS, POSTERS & DEMONSTRATIONS

Stanford DesignX Symposium 2021
Designing Interaction with Ubiquitous Robots (Invited Talk) Virtual (Stanford, CA)

Exploratorium, After Dark Session: *Tactile* 2020
Interactive Tabletop Swarm Robots (Demo) San Francisco, CA

Hyundai Global Top Talent Forum 2019
Interaction with Ubiquitous Robots and Autonomous Vehicles (Invited Talk) San Diego, CA

Bay Area Robotics Symposium (BARS) 2019
User-defined Swarm Robot Control (Poster) Berkeley, CA

Haptics Symposium Technical Tour 2018
Zooids: Building Blocks for Swarm User Interfaces (Demo) Stanford, CA

Adobe Creative Lab Retreat 2016
Zooids: Building Blocks for Swarm User Interfaces (Demo) Stanford, CA

CHI Reception 2016
Haptic Edge Display for Mobile Tactile Interaction (Demo) Stanford, CA

Center for Automotive Research at Stanford (CARS) Annual Meeting 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

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

TEACHING

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

1. **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**

PROFESSIONAL SERVICES

Reviewing

ACM Conference on Human Factors in Computing Systems (CHI) 2020 - 2021
ACM Symposium on User Interface Software and Technology (UIST) 2019 - 2020
ACM Proceedings on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 2018 - 2021
Science Robotics 2021
ACM Transactions on Human-Robot Interaction (T-HRI) 2021
Virtual Reality, Springer 2021
ACM/IEEE International Conference on Human-Robot Interaction (HRI) 2021
Frontiers in Robotics and AI 2021
IEEE World Haptics Conference (WHC) 2019 - 2021
Graphics Interface (GI) 2020
ACM Designing Interactive Systems (DIS) 2019

Outreach

Stanford CS URM Undergraduate Mentoring Program 2020 - 2021
Stanford's Splash Program 2019
Lab Tour, Duncan Polytechnical High School's Health and Technology Pathways 2014
Lab Tour, Manteca High School's Health Science Pathway 2014

SELECTED PRESS

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 sciami 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

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

SKILLS

Design	Pro/Engineering, Solidworks, Floworks, Adobe Photoshop, Illustrator, Premiere Pro
Program	C++, C, MATLAB, LaTeX, Chai3D, MotionGenesis, Java
Fabrication	3D printing, Laser cutting, PCB etching