LAWRENCE KIM

lawkim@stanford.edu ⋄ www.lhkim.com

RESEARCH INTERESTS

Human-Computer Interaction, Well-Being Technology, Human-Centered Design, Robotics, Haptics

APPOINTMENT

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

EDUCATION

Stanford University 2015 - 2020
Doctor of Philosophy, Mechanical Engineering
PhD Minor in Computer Science
Thesis: Designing In Situ Interaction with Ubiquitous Robots
Committee: Sean Follmer, Allison Okamura, James Landay, Wendy Ju, Martin Fischer

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

PWTL Lab, School of Medicine, Stanford University 2020 -
Postdoctoral Researcher *Stanford, CA*

Research with Prof. Pablo Paredes on non-anthropomorphic robots for physical and mental health.

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

CHI Best Paper Honorable Mention (Top 5%)	2020
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MDPI Robotics Travel Award	2019
Stanford Bio-X Travel Award	2019
Fast Company: Innovation by Design: Honorable Mention	2017
UIST Best Paper Award (Top 1%)	2016
Samsung Scholarship ($50,000/year for 5 years)	2016 - 2020
Computing Reviews: Notable Books and Articles	2016
Dean's List for Academic Excellence	2010 - 2013
National Merit Scholarship	2010 - 2013
Guy Richard Collins Scholarship	2012

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

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). 2020. [Accepted]

7. Best Paper Honorable Mention (Top 5%)
   Lawrence H Kim, Daniel Drew, Vernoika Domova, Sean Follmer
   "User-defined Swarm Robot Control"
   Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI). p.685
   [Acceptance rate = 23%]

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). 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"
   In Proceedings of the 2017 ACM International Conference on Interactive Surfaces and Spaces (ISS).
   pp. 82-91. [Acceptance rate = 27%]

4. Best Paper Award (Top 1%)
   Mathieu Le Goc, **Lawrence H Kim**, ..., Jean-Daniel Fekete, Pierre Dragicevic, Sean Follmer
   "Zooids: Building Blocks for Swarm User Interfaces"
   In Proceedings of the 29th Annual Symposium on User Interface Software and Technology (UIST).
   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"
   In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI). 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"
   *In 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology
   Society (EMBC).* 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"
   In 2015 IEEE International Conference on Robotics and Automation (ICRA). pp. 5364-5370. [Acceptance rate = 41%]

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

MANUSCRIPTS UNDER REVIEW

2. **Lawrence H Kim**, Gourab Saha, Annel Amelia Leon, Ganapathy Sankararaman, Blake M Jones,
   Matthew L Mauriello, Pablo E Paredes
   "The Haunted Desk: Exploring Non-Volitional Behavior Change with Autonomous Sit-Stand Desks
   Across Culture"
   Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT).
   2020.

1. **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)*
   2020.

POSTERS & DEMOS

Lawrence H Kim*, Abena Boadi-Agyemang*, Alexa Fay Siu, John Tang	2020
"When to Add Human Narration in Photo-Sharing Social Media"	
International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS)	

"User-defined Swarm Robot Control"	2019
Bay Area Robotics Symposium (BARS)	

Griffin Dietz, Jane L E., Peter Washington, **Lawrence H Kim**, Sean Follmer	2017
"Human Perception of Swarm Robot Motion"	
Proceedings of the CHI Conference Extended Abstracts on Human Factors in Computing Systems	

"Zooids: Building Blocks for Swarm User Interfaces"
Haptics Symposium 2018
Adobe Creative Lab Retreat at Stanford 2016
Annual Symposium on User Interface Software and Technology (UIST) Demo 2016

"Haptic Edge Display for Mobile Tactile Interaction"
Stanford CHI Reception 2016
Center for Automotive Research at Stanford (CARS) Annual Meeting 2015
Bay Area Robotics Symposium (BARS) 2015

RESEARCH FUNDING

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

INVITED TALKS & DEMOS

2. Interactive Tabletop Swarm Robots
   Exploratorium, After Dark Session: *Tactile*, San Francisco, CA January 2020

1. Interaction with Ubiquitous Robots and Autonomous Vehicles
   Hyundai Global Top Talent Forum, San Diego, CA, August 2019

OPEN-SOURCE PROJECTS

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

TEACHING

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

MENTORING

Annel Amelia Leon, CS Undergraduate	2020
Yuqi Yao, Education Masters	2019 - 2020
Yiwei Zhao, ME Masters – now at Electronic Art (EA) Digital Platform	2016 - 2017
Ye Wang, ME/CS Coterm/undergraduate – now at Apple	2017
Ali Parsaei, ME Masters – now at Omron Automation	2015 - 2016

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

PROFESSIONAL SERVICES

International Program Committee	Graphics Interface 2020
Reviewer	CHI, UIST, IMWUT, WHC, DIS
Outreach	Teacher, "Stories in Motion: Mechanical Automata and Rapid Prototyping", **Stanford's Splash Program**, Nov 2019
	Demo of haptic technology, Duncan Polytechnical High School's Health and Technology Pathways, May 2014
	Demo of haptic technology, Manteca High School's Health Science Pathway, April 2014

SELECTED PRESS

Fast Company Design, This Swarm Of Little Robots Is A Totally New Kind Of Interface. 2017
www.fastcodesign.com/90136009

Hackaday, Zooids - Swarm User Interface 2017
https://hackaday.com/2017/02/17/zooids-swarm-user-interface/

NowThis Future, Check Out These Hive Mind Robots, >12M views 2016
https://www.facebook.com/NowThisFuture/videos/1310676325640211/

Circuit Breaker, Swarm of Tiny Robots, >4M views 2016
https://www.facebook.com/circuitbreaker/videos/1640944836198339/

Adafruit, 'Zooids' are Open-Source, Open-Hardware 'Bots for 'Swarm User Interfaces' 2016
https://blog.adafruit.com/2016/11/07/

Makery, Zooids: who are these cute robots? 2016
http://www.makery.info/en/2016/11/28/zooids-mais-qui-sont-ces-robots-mignons/

TechCrunch, Swarms of tiny, cute robots will one day bring you your phone, like this 2016
https://techcrunch.com/2016/10/20/