

LAWRENCE KIM

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RESEARCH INTERESTS

Human-Computer Interaction, Human-Robot Interaction, Human-Centered Design, Robotics, Haptics

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

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 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

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.

KIST, Urban Energy System Center 2012 Summer

Research Intern

Seoul, Korea

Research with Dae-Young Lee on a hybrid desiccant cooling system.

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
Advanced Placement Scholar with Honor	2009

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

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 = 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). 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 IN PREPARATION

2. **Lawrence H Kim**, Sean Follmer

“Generating Legible and Glanceable Swarm Robot Motion through Trajectory, Collective Behavior, and Pre-attentive Processing Features”

1. Kai Zhang, **Lawrence H Kim**, Yipeng Guo, Sean Follmer

“Automatic Generation of Spatial Tactile Effects by Analyzing Cross-modality Features in a Video”

POSTERS & DEMOS

“User-defined Swarm Robot Control”

Bay Area Robotics Symposium (BARS)

2019

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

2017

“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

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

MENTORING

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

PROFESSIONAL SERVICES

International Program Committee	Graphics Interface 2020
Reviewer	CHI 2020, DIS 2019, UIST 2019-2020, WHC 2019, IMWUT 2018-2020, JCDE 2018
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

SKILLS

	Technical
Design Program	Pro/Engineering, Solidworks, Floworks, Adobe Photoshop, Illustrator, Premiere Pro
Fabrication	C++, C, MATLAB, L ^A T _E X, Chai3D, MotionGenesis, JAVA
	3D printing, Laser cutting, PCB etching
	Languages
Native	English, Korean

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/>