Yang Zhang

Curriculum Vitae

Carnegie Mellon University
Human-Computer Interaction Institute
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I am a fifth (final) year Ph.D. candidate advised by Prof. Chris Harrison at CMU HCII. Broadly, I build sensing systems that extend interactions beyond touchscreens. My thesis focuses on creating wide-area sensors to achieve ubiquitous sensing with sparse sensor deployments. I will be on the job market 2020 spring.

EDUCATION

2015 - 2020 **Carnegie Mellon University**, *School of Computer Science*.
Ph.D. student at Human-Computer Interaction Institute. Advisor: *Chris Harrison*

2013 - 2015 **Carnegie Mellon University**, *School of Architecture*.
Master of Science in Computational Design

2009 - 2013 **Beihang University**, *School of Automation Science and Electronic Engineering*.
Bachelor of Engineering in Automation Science

AWARDS AND HONORS

2019 **Honorable Mention Award**, *ACM CHI 2019*.
Honorable Mention Award, *ACM CHI 2019*.

2018 **Best Paper Award**, *ACM CHI 2018*.
Honorable Mention Award, *ACM UIST 2018*.
Fast Company Innovation by Design Award, Finalist.

2017 **Qualcomm Innovation Fellowship Winner**.
Fast Company Innovation by Design Award, Finalist.

2016 **Honorable Mention Award**, *ACM CHI 2016*.
People's Choice Best Talks, *ACM CHI 2016*.

2015 **Best Short Paper**, *ACM ITS 2015*.

2014 **1st Most Creative Award at Student Innovation Contest**, *ACM UIST 2014*.

PUBLICATIONS

2019 [C.18] **Yang Zhang**, Yasha Iravantchi, Haojian Jin, Swarun Kumar, Chris Harrison. 2019. Sozu: Self-Powered Radio Tags for Building-Scale Activity Sensing. To Appear in Proceedings of the 32th Annual Symposium on User Interface Software and Technology (UIST '19). ACM, New York, NY, USA.

[C.17] **Yang Zhang**, Wolf Kienzle, Yanjun Ma, Shiu S. Ng, Hrvoje Benko, Chris Harrison. 2019. ActiTouch: Precise Touch Detection for On-Skin AR/VR Interfaces. To Appear in Proceedings of the 32th Annual Symposium on User Interface Software and Technology (UIST '19). ACM, New York, NY, USA.

[C.16] **Yang Zhang**, Michel Pahud, Christian Holz, Haijun Xia, Gierad Laput, Michael McGuffin, Xiao Tu, Andrew Mittereder, Fei Su, William Buxton, and Ken Hinckley. 2019. Sensing Posture-Aware Pen+Touch Interaction on Tablets. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19). ACM, New York, NY, USA, 14 pages, ***Honorable Mention Award***.

[C.15] Yasha Iravantchi, **Yang Zhang**, Evi Bernitsas, Mayank Goel and Chris Harrison. 2019. Interferi: Gesture Sensing using On-Body Acoustic Interferometry. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19). ACM, New York, NY, USA, 13 pages, ***Honorable Mention Award***.

2018 [C.14] **Yang Zhang**, Gierad Laput and Chris Harrison. 2018. Vibrosight: Long-Range Vibrometry for Smart Environment Sensing. In Proceedings of the 31st Annual Symposium on User Interface Software and Technology (UIST '18). ACM, New York, NY, USA, 225-236, ***Honorable Mention Award***.

[C.13] **Yang Zhang**, Chouchang(Jack) Yang, Scott E. Hudson, Chris Harrison, and Alanson Sample. 2018. Wall++: Room-Scale Interactive and Context-Aware Sensing. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA, Paper 273, ***Best Paper Award***.

[C.12] **Yang Zhang** and Chris Harrison. 2018. Pulp Nonfiction: Low-Cost Touch Tracking for Paper. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA, Paper 117.

[C.11] Robert Xiao, Teng Cao, Ning Guo, Jun Zhuo, **Yang Zhang** and Chris Harrison. 2018. LumiWatch: On-Arm Projected Graphics and Touch Input. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA. Paper 95.

2017 [C.10] Jun Gong, **Yang Zhang**, Xia Zhou, and Xing-dong Yang. 2017. Pyro: Thumb-Tip Gesture Recognition Using Pyroelectric Infrared Sensing. In Proceedings of the 30th Annual Symposium on User Interface Software and Technology (UIST '17). ACM, New York, NY, USA, 553-563.

[C.9] **Yang Zhang**, Gierad Laput, and Chris Harrison. 2017. Electrick: Low-Cost Touch Sensing Using Electric Field Tomography. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 1-14.

[C.8] Gierad Laput, **Yang Zhang**, and Chris Harrison. 2017. Synthetic Sensors: Towards General-Purpose Sensing. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 3986-3999.

[C.7] Robert Xiao, Gierad Laput, **Yang Zhang**, and Chris Harrison. 2017. Deus EM Machina: On-Touch Contextual Functionality for Smart IoT Appliances. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 4000-4008.

2016 [C.6] **Yang Zhang**, Robert Xiao, and Chris Harrison. 2016. Advancing Hand Gesture Recognition with High Resolution Electrical Impedance Tomography. In Proceedings of the 29th Annual Symposium on User Interface Software and Technology (UIST '16). ACM, New York, NY, USA, 843-850.

[C.5] Junhan Zhou, **Yang Zhang**, Gierad Laput, and Chris Harrison. 2016. AuraSense: Enabling Expressive Around-Smartwatch Interactions with Electric Field Sensing. In Proceedings of the 29th Annual Symposium on User Interface Software and Technology (UIST '16). ACM, New York, NY, USA, 81-86.

[C.4] **Yang Zhang**, Junhan Zhou, Gierad Laput, and Chris Harrison. 2016. SkinTrack: Using the Body as an Electrical Waveguide for Continuous Finger Tracking on the Skin. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16). ACM, New York, NY, USA, 1491-1503, ***Honorable Mention Award***.

2015 [C.3] **Yang Zhang** and Chris Harrison. 2015. Tomo: Wearable, Low-Cost Electrical Impedance Tomography for Hand Gesture Recognition. In Proceedings of the 28th Annual ACM Symposium on User Interface Software and Technology (UIST '15). ACM, New York, NY, USA, 167-173.

[C.2] **Yang Zhang** and Chris Harrison. 2015. Quantifying the Targeting Performance Benefit of Electrostatic Haptic Feedback on Touchscreens. In Proceedings of the 2015 International Conference on Interactive Tabletops & Surfaces (ITS '15). ACM, New York, NY, USA, 43-46, ***Best Short Paper Award***.

2013 [C.1] Danli Wang, Yunfeng Qi, **Yang Zhang**, and Tingting Wang. 2013. TanPro-kit: a tangible programming tool for children. In Proceedings of the 12th International Conference on Interaction Design and Children (IDC '13). ACM, New York, NY, USA, 344-347.

POSTERS AND DEMOS

2019 [D.5] Sozu: Self-Powered Radio Tags for Building-Scale Activity Sensing. 32nd Annual ACM Symposium on User Interface Software and Technology (UIST '19, New Orleans, LA).

2017 [D.4] Electrick: Low-Cost Touch Sensing Using Electric Field Tomography. 2017 CHI Conference on Human Factors in Computing Systems (CHI '17, Denver, CO).

[D.3] Synthetic Sensors: Towards General-Purpose Sensing. 2017 CHI Conference on Human Factors in Computing Systems (CHI '17, Denver, CO).

[D.2] Deus EM Machina: On-Touch Contextual Functionality for Smart IoT Appliances. 2017 CHI Conference on Human Factors in Computing Systems (CHI '17, Denver, CO).

2015 [D.1] Tomo: Wearable, Low-Cost Electrical Impedance Tomography for Hand Gesture Recognition. 28th Annual ACM Symposium on User Interface Software and Technology (UIST '15, Charlotte, NC).

2012 [P.2] E-Block: A Tangible Programming Tool for Children. 25th Annual ACM Symposium on User Interface Software and Technology (UIST '12, Cambridge, MA).

[P.1] TempoString: A Tangible Tool for Children's Music Creation. 13th Annual ACM Conference on Ubiquitous Computing (UbiComp '15, Pittsburgh, PA).

EMPLOYMENT EXPERIENCE

2019 **Georgia Tech Ubicomp Lab**, *COSMOS: COmputational Skins for Multi-functional Objects and Systems*, Advised by Dr. Gregory Abowd.

2018 **Microsoft Research Redmond**, *Enhance touch interaction with electric field sensing*, Advised by Dr. Ken Hinckley.

2017 **Disney Research Pittsburgh**, *Enable room-scale interaction and context-aware applications with mutual capacitance sensing and Electromagnetic sensing*, Advised by Prof. Scott Hudson and Dr. Alanson Sample.

2014 **Marvell Semiconductor**, *Developing IoT applications for the Kinoma Create*, Advised by Dr. Andy Carle.

2012 **Institute of Software Chinese Academy of Sciences**, *Building tangible interfaces for STEM learning of young children*, Advised by Prof. Danli Wang.

CONFERENCE CHAIRING

CHI '20 Papers and Notes, *Program Committee*.

MobileHCI '19 Late Breaking Results, *Program Committee*.

CHI '19 "Novel Tracking Method", *Session Chair*.

CHI '18 Late Breaking Work, *Program Committee*.

CHI '18 "Human Senses", *Session Chair*.

PAPER REVIEWING

CHI '16, '17, '18, '19.

UIST '16, '17, '18, '19.

ISS '18, '19.

TEI '18, '19.

IMWUT '19.

MobileHCI '19.
IUI '17.

STUDENT SUPERVISED

Fang Qin — Capacitive sensing for shape changing materials.

Cathy Fang — Haptic interfaces for the whole hand and arm for AR/VR applications.

Evi Bernitsas — Acoustic beamforming techniques for smartwatches and AR/VR headsets, *Resulted in 1 publication.*
(Next stop: Apple)

Junhan Zhou — Wearable Electric Field Sensing techniques for interactions beyond smartwatch touchscreens, *Resulted in 2 publications.*
(Next stop: Google)

Chen Chen — PCB design of a multi-sensor wide-area sensing platform and sensor fusion methods for general-purpose smart home sensing.
(Next stop: PhD at UCSD)

SELECTED TALKS AND PRESENTATIONS

2019 **Columbia University**, *Wide-Area Sensors for Sparse Ubiquitous Sensing.*
Georgia Tech, Ubicomp Lab, *Extend Interactions beyond Computing Devices.*
Facebook Reality Labs, *Enrich the Expressivity of AR/VR Interactions.*
University of Washington, *DUB Talk: Wide-Area Sensors for Sparse Ubiquitous Sensing.*
University of California, San Diego, *Wide-Area Sensors for Sparse Ubiquitous Sensing.*
University of California, Los Angeles, *Wide-Area Sensors for Sparse Ubiquitous Sensing.*
Stanford University, *Wide-Area Sensors for Sparse Ubiquitous Sensing.*

2018 **Microsoft Research**, *Enhancing Tablet Interactions with Screen Capacitive Images and Peripheral Electric Field Sensing.*
Microsoft Applied Science Group, *Enhancing Tablet Interactions with Screen Capacitive Images and Peripheral Electric Field Sensing.*

2017 **Qualcomm**, *Towards General-Purpose Sensing with Synthetic Sensors.*
Disney Research Pittsburgh, *Smart Walls for Room-Scale Interactions and Activity Sensing.*

SELECTED PRESS COVERAGE

2018 **TechCrunch**, *This robot uses lasers to 'listen' to its environment.*
Hackaday, *Vibrosight hears when you are sleeping. It knows when you're awake.*
Fast Company, *Turn Your Wall Into A Touch Screen For $20.*
NBC News, *New smart wall lets you control your home with swipes, taps.*
Engadget, *Touch-sensitive wall might let you control home devices in the future.*
Digital Trends, *This conductive paint transforms regular walls into giant touchpads.*
The Verge, *You may soon be able to control your home with a smart wall.*
Architect Magazine, *Transforming Walls into Smart Surfaces.*
Science Magazine, *Watch researchers turn a wall into Alexa's eyes and ears.*

2017 **MIT Technology Review**, *A Cheap, Simple Way to Make Anything a Touch Pad.*
The Wall Street Journal, *How to Turn Anything Into a Touchpad.*
The Verge, *Electrick lets you spray touch controls onto any object or surface.*
Engadget, *Get ready to 'spray' touch controls onto any surface.*
CNET, *Almost anything can become a touchpad with some spray paint.*
Popular Science, *What a Jell-O brain tells us about the future of human-machine interaction.*
Gizmodo, *Scientists Figure Out How to Turn Anything Into a Touchscreen Using Conductive Spray Paint.*

TechCrunch, *New technique turns anything into a touch sensor.*

Pittsburgh Post-Gazette, *Touch-sensing technology born of CMU researchers grabs companies' interest.*

Discover Magazine, *Turn Anything into a Touchscreen With 'Electrick'.*

Digital Trends, *Carnegie Mellon Have Developed a Spray Paint for Turning Any Surface into a Touchpad.*

Newsweek, *Conductive spray paint can turn any surface into a touchscreen.*

New Atlantas, *Spray-on technology turns Jell-O into a touch control.*

Geek, *Thanks to Science and Your Imagination, Everything Can Be a Touch Screen.*

New Scientist, *Spray-on touch controls give an interactive twist to any surface.*

Bloomberg, *This Spray Can Make Your Wall a Touchpad.*

Live Science, *Spray-On Touch Screens? How to Turn Any Flat Surface into a Touchpad.*

TechCrunch, *Google-funded 'super sensor' project brings IoT powers to dumb appliances.*

Science Daily, *Internet of things made simple: One sensor package does work of many.*

NFC, *Researchers develop system that lets smartphones interact with objects using electromagnetic sensing.*

TechCrunch, *How a tap could tame the smart home.*

2016 **MIT Technology Review**, *Use Your Arm as a Smart-Watch Touch Pad.*

The Verge, *New tech turns your skin into a touchscreen for your smartwatch.*

Engadget, *Navigate your smartwatch by touching your skin.*

Gizmodo, *This New 'Skinterface' Could Make Smartwatches Suck Less.*

CNET, *SkinTrack turns your entire forearm into a smartwatch touchpad.*

Wired, *SkinTrack Turns Your Arm Into a Touchpad. Here's How It Works.*

Newsweek, *SkinTrack system transforms the skin on your arm into a touch interface that lets you do things you couldn't normally do with a smartwatch—like play Angry Birds.*

Nerdist, *Skintrack wants to turn your arm into touchpad.*

90.5 WESA, *CMU's SkinTrack Technology Turns Your Forearm Into Smartwatch Trackpad.*

Discover Magazine, *With SkinTrack, Your Arm is the Touchpad.*

Inverse, *Carnegie Mellon Can Turn Your Beautiful Skin Into a Vast Smartwatch Trackpad.*

CNN, *This Watch Turns Your Arm into a Touchscreen.*

Digital Trends, *SkinTrack Turns Your Whole forearm into a Smartwatch Interface.*

2015 **Gizmodo**, *This Smartwatch Detects Gestures By Watching the Muscles Inside Your Arm Move.*

Digital Trends, *Researchers at Carnegie Mellon have developed a wristband that can sense hand gestures.*

New Scientist, *No-touch smartwatch scans the skin to see the world around you.*

Hackaday, *Impedance Tomography is the new X-ray Machine.*

References

Ken Hinckley
Principal Researcher
Microsoft Research Redmond
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Scott E. Hudson
Professor
HCII at Carnegie Mellon University
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Hrvoje Benko
Research Science Manager
Facebook Reality Labs
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Alanson Sample
Associate Professor
EECS at University of Michigan
✉ alanson.p.sample@ieee.org

Christian Holz
Assistant Professor
CS at ETH Zurich
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