

# CHRIS HARRISON

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Carnegie Mellon University  
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I'm an Associate Professor of Human-Computer Interaction at Carnegie Mellon University. My research group creates new sensing and interface technologies that open new modes of interaction between humans and computers. These efforts often lie in emerging use domains, such as smart environments, wearable computing, and augmented reality. Beyond my immediate background in computer science, my research often incorporates computer vision, artificial intelligence, embedded computation, signal processing, interaction design and physical fabrication.

## PROFESSIONAL EXPERIENCE

### Carnegie Mellon University

Pittsburgh, PA. Associate Professor. (Assistant Professor '14-20).

Direct the Future Interfaces Group, Human-Computer Interaction Institute, School of Computer Science.

2014 – Present

### Qeexo

Mountain View, CA and Pittsburgh, PA. Co-Founder and CTO.

Startup working at the intersection of machine learning and interactive technologies. Software installed on over 200 million consumer devices. Numerous tech awards at CES, MWC and Sensors Expo.

2012 – Present

### Disney Research/Imagineering

Pittsburgh, PA. Research Associate. Advised by Ivan Poupyrev.

Worked on TeslaTouch haptic touchscreen and Touché capacitive sensing technologies.

2010 – 2013

### Microsoft Research

Redmond, WA. Research Intern. Advised by Desney Tan/Dan Morris ('09), Hrvoje Benko/Andy Wilson ('11).

Investigated input mechanisms for on-body and on-environment computing.

2009, 2011

### AT&T Labs

Florham Park, NJ. Research Intern. Advised by Brian Amento.

Developed early social video application in which groups of people could interact asynchronously.

2006 – 2007

### IBM Research

Almaden Research Center, San Jose, CA. Extreme Blue Intern. Advised by John Barton/Stephen Farrell.

Created tablet-based application to help users track information about people, events and topics.

2005

### Curtis Instruments

Mount Kisco, NY. Student Researcher. Advised by Wilfredo Chalusant.

Concurrent with high school. Developed novel thermal-regulated battery charging approach.

2000 – 2002

## SELECTED HONORS & AWARDS

10 Best Paper Awards, 13 Best Paper Honorable Mentions

A. Nico Habermann Chair in Computer Science, Carnegie Mellon University

Alfred P. Sloan Foundation Fellow

Intel Outstanding Researcher Award

Fast Company Innovation by Design Award (for EM-Sense w/ collaborators)

Allen Newell Research Excellence Award (Scott Hudson and his students)

The David and Lucile Packard Foundation Fellow

World Economic Forum Young Scientist

New York University 2014's Distinguished Young Alumnus Award

Qualcomm Innovation Fellow

Google Ph.D. Fellow in Human Computer Interaction

MIT Technology Review's Top 35 Innovators Under 35 (TR35)

Forbes' Top 30 Scientists Under 30 ("30 Under 30")

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2017 – 2020

2018

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2012

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2012

2012

## EDUCATION

### Ph.D., Human-Computer Interaction

2007 - 2013

School of Computer Science, Carnegie Mellon University, Pittsburgh, PA.  
Advised by Prof. Scott Hudson.

### Masters of Science, Computer Science

2005 - 2006


Courant Institute of Mathematical Sciences, New York University, New York, NY.  
Thesis Advisor Prof. Dennis Shasha.





### Bachelors of Arts, Computer Science

2002 - 2005








Courant Institute of Mathematical Sciences, New York University, New York, NY.  
Minor in Mathematics. Division I Athlete, Fencing.

## REFEREED PUBLICATIONS






- P107 Shultz, C., Kim, D., Ahuja, K. and **Harrison, C.** 2022. TriboTouch: Micro-Patterned Surfaces for Low Latency Touchscreens. To appear in *Proceedings of the 40th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 30 – May 6, 2022). CHI '22. ACM, New York, NY.
- P106 Ahuja, K., Shen, V., Fang, C., Riopelle, N., Kong, A. and **Harrison, C.** 2022. ControllerPose: Inside-Out Body Capture with VR Controller Cameras. To appear in *Proceedings of the 40th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 30 – May 6, 2022). CHI '22. ACM, New York, NY.
- P105 Shen, V., Shultz, C. and **Harrison, C.** 2022. Mouth Haptics in VR using a Headset Ultrasound Phased Array. To appear in *Proceedings of the 40th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 30 – May 6, 2022). CHI '22. ACM, New York, NY.
- P104 Fang, C., Gu, J., Yao, L. and **Harrison, C.** 2022. ElectriPop: Low-Cost Shape-Changing Displays with Electrostatically Inflated Mylar Sheets. To appear in *Proceedings of the 40th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 30 – May 6, 2022). CHI '22. ACM, New York, NY.
- P103  Shen, V., Spann, K. and **Harrison, C.** 2021. FarOut: Extending the Range of ad hoc Touch Sensing with Depth Cameras. In *Proceedings of the 9th ACM Symposium on Spatial User Interaction*. (November 9 - 10, 2021). SUI '21. ACM, New York, NY. Article 5, 1–12. **Best Paper Award**
- P102 Kong, A., Ahuja, K., Goel, M. and **Harrison, C.** 2021. EyeMU Interactions: Gaze + IMU Gestures on Mobile Devices. In *Proceedings of the 23rd ACM International Conference on Multimodal Interaction* (October 18 - 22, 2021). ICMI '21. ACM, New York, NY. 577–585.
- P101 Fang, C. and **Harrison, C.** 2021. Retargeted Self-Haptics for Increased Immersion in VR without Hand Instrumentation. In *Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology* (October 10 - 13, 2021). UIST '21. ACM, New York, NY. 1109–1121.
- P100 Choi, F., Mayer, S. and **Harrison, C.** 2021. 3D Hand Pose Estimation on Conventional Capacitive Touchscreens. In *Proceedings of the 23rd International Conference on Human-Computer Interaction with Mobile Devices and Services* (October 5 - 8, 2020). MobileHCI '21. ACM, New York, NY. 1-13.
- P99 Ahuja, K., Jiang, Y., Goel, M. and **Harrison, C.** 2021. Vid2Doppler: Synthesizing Doppler Radar Data from Videos for Training Privacy-Preserving Activity Recognition. In *Proceedings of the 39th Annual SIGCHI Conference on Human Factors in Computing Systems* (May 8 - 13, 2021). CHI '21. ACM, New York, NY. Article 292, 1–10.
- P98 Mayer, S., Xu, X. and **Harrison, C.** 2021. Super-Resolution Capacitive Touchscreens. In *Proceedings of the 39th Annual SIGCHI Conference on Human Factors in Computing Systems* (May 8 - 13, 2021). CHI '21. ACM, New York, NY. Article 12, 1–10.
- P97 Ahuja, K., Shah, D., Paredy, S., Xhakaj, F., Ogan, A., Agarwal, A. and **Harrison, C.** 2021. Classroom Digital Twins with Instrumentation-Free Gaze Tracking. In *Proceedings of the 39th Annual SIGCHI Conference on Human Factors in Computing Systems* (May 8 - 13, 2021). CHI '21. ACM, New York, NY. Article 484, 1–9.

- P96  Iravantchi, Y., Ahuja, A., Goel, M., **Harrison, C.** and Sample, A. 2021. PrivacyMic: Utilizing Inaudible Frequencies for Privacy Preserving Daily Activity Recognition. In *Proceedings of the 39th Annual SIGCHI Conference on Human Factors in Computing Systems* (May 8 - 13, 2021). CHI '21. ACM, New York, NY. Article 198, 1–13. **Best Paper Honorable Mention**
- P95 Ahuja, K., Mayer, S., Goel, M. and **Harrison, C.** 2021. Pose-on-the-Go: Approximating User Pose with Smartphone Sensor Fusion and Inverse Kinematics. In *Proceedings of the 39th Annual SIGCHI Conference on Human Factors in Computing Systems* (May 8 - 13, 2021). CHI '21. ACM, New York, NY. Article 9, 1–12.
- P94 Zhang, Y., Mayer, S., Gonzalez, J. and **Harrison, C.** 2021. Vibrosight++: City-Scale Sensing Using Existing Retroreflective Signs and Markers. In *Proceedings of the 39th Annual SIGCHI Conference on Human Factors in Computing Systems* (May 8 - 13, 2021). CHI '21. ACM, New York, NY. Article 410, 1–14.
- P93 Ahuja, K., Goel, M. and **Harrison, C.** 2020. BodySLAM: Opportunistic Body, Hand and Mouth Tracking in Multi-User AR/VR Experiences. In *Proceedings of the 8th ACM Symposium on Spatial User Interaction*. (October 30 – November 1, 2020). SUI '20. ACM, New York, NY. Article 16, 1–8.
- P92 Ahuja, K., Kong, A., Goel, M. and **Harrison, C.** 2020. Direction-of-Voice (DoV) Estimation for Intuitive Speech Interaction with Smart Devices Ecosystems. In *Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology* (October 20 - 23, 2020). UIST '20. ACM, New York, NY, 1121–1131.
- P91 Xiao, R., Mayer, S. and **Harrison, C.** 2020. VibroComm: Using Commodity Gyroscopes for Vibroacoustic Data Reception. In *Proceedings of the 22nd International Conference on Human-Computer Interaction with Mobile Devices and Services* (October 5 - 8, 2020). MobileHCI '20. ACM, New York, NY. Article 5, 1–9.
- P90 Ahuja, K., Bose, A., Jain, M., Dey, K., Joshi, A., Achary, K., Varkey, B., **Harrison, C.** and Goel, M. 2020. Gaze-based Screening of Autistic Traits for Adolescents and Young Adults using Prosaic Videos. In *Proceedings of the 3rd ACM SIGCAS Conference on Computing and Sustainable Societies*. COMPASS '20. ACM, New York, NY, USA, 6 pages.
- P89  Wu, J., **Harrison, C.**, Bigham, J. and Laput, G. 2020. Listen Learner: Automated Class Discovery and One-Shot Interactions for Acoustic Activity Recognition. In *Proceedings of the 38th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 25 - 30, 2020). CHI '20. ACM, New York, NY. **Best Paper Honorable Mention**
- P88 Mayer, S., Laput, G. and **Harrison, C.** 2020. Enhancing Mobile Voice Assistants with WorldGaze. In *Proceedings of the 38th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 25 - 30, 2020). CHI '20. ACM, New York, NY.
- P87 Iravantchi, Y., Goel, M. and **Harrison, C.** 2020. Digital Ventriloquism: Giving Voice to Everyday Objects. In *Proceedings of the 38th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 25 - 30, 2020). CHI '20. ACM, New York, NY.
- P86  Fang, C., Zhang, Y., Dworman, M. and **Harrison, C.** 2020. Wireality: Enabling Complex Tangible Geometries in Virtual Reality with Worn Multi-String Haptics. In *Proceedings of the 38th Annual SIGCHI Conference on Human Factors in Computing Systems* (April 25 - 30, 2020). CHI '20. ACM, New York, NY. **Best Paper Award**
- P85 Ahuja, K., Paredy, S., Xiao, R., Goel, M. and **Harrison, C.** 2019. LightAnchors: Appropriating Point Lights for Spatially-Anchored Augmented Reality Interfaces. In *Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology* (New Orleans, USA, October 20 - 23, 2019). UIST '19. ACM, New York, NY. 189–196.
- P84 Zhang, Y., Kienzle, W., Ma, Y., Ng, S., Benko, H. and **Harrison, C.** 2019. ActiTouch: Precise Touch Segmentation for On-Skin VR/AR Interfaces. In *Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology* (New Orleans, USA, October 20 - 23, 2019). UIST '19. ACM, New York, NY. 1151–1159.
- P83 Zhang, Y., Iravantchi, Y., Jin, H., Kumar, S. and **Harrison, C.** 2019. Sozu: Self-Powered Radio Tags for Building-Scale Activity Sensing. In *Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology* (New Orleans, USA, October 20 - 23, 2019). UIST '19. ACM, New York, NY. 973–985.
- P82  Ahuja, K., **Harrison, C.**, Goel, M. and Xiao, R. 2019. MeCap: Whole-Body Digitization for Low-Cost VR/AR Headsets. in *Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology* (New Orleans, USA, October 20 - 23, 2019). UIST '19. ACM, New York, NY. 453–462. **Best Paper Honorable Mention**
- P81 Ahuja, K., Kim, D., Xhakaj, F., Varga, V., Xie, A., Zhang, S., Townsend, J.E., **Harrison, C.**, Ogan, A. and Agarwal, Y. 2019. EduSense: Practical Classroom Sensing at Scale. In *Proceedings of the ACM Annual Conference on Interactive, Mobile, and Ubiquitous Technologies* (London, UK, September 11 - 13, 2019). IMWUT '19 (UbiComp). ACM, New York, NY. 3, 3, Article 71 (September 2019), 26 pages.

- P80 Laput, G., **Harrison, C.** 2019. Exploring the Efficacy of Sparse, General-Purpose Sensor Constellations for Wide-Area Ubiquitous Sensing. In *Proceedings of the ACM annual conference on Interactive, Mobile, and Ubiquitous Technologies* (London, UK, September 11 - 13, 2019). IMWUT '19 (UbiComp). ACM, New York, NY. 3, 2, Article 55 (June 2019), 19 pages.
- P79 Laput, G. and **Harrison, C.** 2019. Sensing Fine-Grained Hand Activity with Smartwatches. In *Proceedings of the 37th Annual SIGCHI Conference on Human Factors in Computing Systems* (Glasgow, UK, May 4 - 9, 2019). CHI '19. ACM, New York, NY. Paper 338, 13 pages.
- P78 Iravantchi, Y., Zhang, Y., Bernitsas, E., Goel, M. and **Harrison, C.** 2019. Interferi: Gesture Sensing using On-Body Acoustic Interferometry. In *Proceedings of the 37th Annual SIGCHI Conference on Human Factors in Computing Systems* (Glasgow, UK, May 4 - 9, 2019). CHI '19. ACM, New York, NY. Paper 276, 13 pages. **Best Paper Honorable Mention**
- P77 Iravantchi, Y., Goel, M. and **Harrison, C.** 2019. BeamBand: Hand Gesture Sensing with Ultrasonic Beamforming. In *Proceedings of the 37th Annual SIGCHI Conference on Human Factors in Computing Systems* (Glasgow, UK, May 4 - 9, 2019). CHI '19. ACM, New York, NY. Paper 15, 10 pages.
- P76 Laput, G. and **Harrison, C.** 2019. SurfaceSight: A New Spin on Touch, User, and Object Sensing for IoT Experiences. In *Proceedings of the 37th Annual SIGCHI Conference on Human Factors in Computing Systems* (Glasgow, UK, May 4 - 9, 2019). CHI '19. ACM, New York, NY. Paper 329, 12 pages.
- P75 Khurana, R., Ahuja, K., Yu, Z., Mankoff, J., **Harrison, C.** and Goel, M. 2018. GymCam: Detecting, Recognizing and Tracking Simultaneous Exercises in Unconstrained Scenes. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*. IMWUT '18 (UbiComp). 2, 4, Article 185 (December 2018), 17 pages.
- P74 Laput, G., Ahuja, K., Goel, M. and **Harrison, C.** 2018. Ubicoustics: Plug-and-Play Acoustic Activity Recognition. In *Proceedings of the 31st Annual ACM Symposium on User Interface Software and Technology* (Berlin, Germany, October 14 - 17, 2018). UIST '18. ACM, New York, NY. 213-224.
- P73 Zhang, Y., Laput, G. and **Harrison, C.** 2018. Vibrosight: Long-Range Vibrometry for Smart Environment Sensing. In *Proceedings of the 31st Annual ACM Symposium on User Interface Software and Technology* (Berlin, Germany, October 14 - 17, 2018). UIST '18. ACM, New York, NY. 225-236. **Best Paper Honorable Mention**
- P72 Guo, A., Jain, A., Ghose, S., Laput, G., **Harrison, C.** and Bigham, J. 2018. Crowd-AI Camera Sensing in the Real World. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*. IMWUT '18 (UbiComp). 2, 3, Article 111 (September 2018). ACM, New York, NY. 20 pages.
- P71 Ahuja, K., Islam, R., Parashar, V., Dey, K., **Harrison, C.** and Goel, M. 2018. EyeSpyVR: Interactive Eye Sensing Using Off-the-Shelf, Smartphone-Based VR Headsets. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*. IMWUT '18 (UbiComp). 2, 2, Article 57 (July 2018). ACM, New York, NY. 10 pages.
- P70 Zhang, Y. and **Harrison, C.** 2018. Pulp Nonfiction: Low-Cost Touch Tracking for Paper. In *Proceedings of the 36th Annual SIGCHI Conference on Human Factors in Computing Systems* (Montreal, Canada, April 21 - 26, 2018). CHI '18. ACM, New York, NY. Paper 117, 11 pages.
- P69 Zhang, Y., Yang, C. Hudson, S. E., **Harrison, C.** and Sample, A. 2018. Wall++: Room-Scale Interactive and Context-Aware Sensing. In *Proceedings of the 36th Annual SIGCHI Conference on Human Factors in Computing Systems* (Montreal, Canada, April 21 - 26, 2018). CHI '18. ACM, New York, NY. Paper 273, 15 pages. **Best Paper Award**
- P68 Xiao, R., Cao, T., Guo, N., Zhuo, J., Zhang, Y. and **Harrison, C.** 2018. LumiWatch: On-Arm Projected Graphics and Touch Input. In *Proceedings of the 36th Annual SIGCHI Conference on Human Factors in Computing Systems* (Montreal, Canada, April 21 - 26, 2018). CHI '18. ACM, New York, NY. Paper 95, 11 pages.
- P67 Xiao, R., Hudson, S. E. and **Harrison, C.** 2017. Supporting Responsive Cohabitation Between Virtual Interfaces and Physical Objects on Everyday Surfaces. In *Proceedings of the 9th ACM SIGCHI Symposium on Engineering Interactive Computing Systems* (Lisbon, Portugal, June 26 - 29, 2017). EICS '17. ACM, New York, NY. Article 11.
- P66 Laput, G., Zhang, Y. and **Harrison, C.** 2017. Synthetic Sensors: Towards General-Purpose Sensing. In *Proceedings of the 35th Annual SIGCHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA, May 6 - 11, 2017). CHI '17. ACM, New York, NY. 3986-3999.
- P65 Zhang, Y., Laput, G. and **Harrison, C.** 2017. Electrick: Low-Cost Touch Sensing Using Electric Field Tomography. In *Proceedings of the 35th Annual SIGCHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA, May 6 - 11, 2017). CHI '17. ACM, New York, NY. 1-14.

- P64  Das, S., Laput, G., **Harrison, C.** and Hong, J. 2017. Thumprint: Socially-Inclusive Local Group Authentication Through Shared Secret Knocks. In *Proceedings of the 35th Annual SIGCHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA, May 6 - 11, 2017). CHI '17. ACM, New York, NY. 3764-3774. **Best Paper Honorable Mention**
- P63 Xiao, R., Laput, G., Zhang, Y. and **Harrison, C.** 2017. Deus EM Machina: On-Touch Contextual Functionality for Smart IoT Appliances. In *Proceedings of the 35th Annual SIGCHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA, May 6 - 11, 2017). CHI '17. ACM, New York, NY. 4000-4008.
- P62 Xiao, R., Hudson, S. E. and **Harrison, C.** 2016. CapCam: Enabling Rapid, Ad-Hoc, Position-Trackd Interactions Between Devices. In *Proceedings of the 11th ACM International Conference on Interactive Surfaces and Spaces* (Niagara Falls, Canada, November 6 - 9, 2016). ISS '16. ACM, New York, NY. 169-178.
- P61 Xiao, R., Hudson, S. E. and **Harrison, C.** 2016. DIRECT: Making Touch Tracking on Ordinary Surfaces Practical with Hybrid Depth-Infrared Sensing. In *Proceedings of the 11th ACM International Conference on Interactive Surfaces and Spaces* (Niagara Falls, Canada, November 6 - 9, 2016). ISS '16. ACM, New York, NY. 85-94.
- P60  Laput, G., Xiao, R. and **Harrison, C.** 2016. ViBand: High-Fidelity Bio-Acoustic Sensing Using Commodity Smartwatch Accelerometers. In *Proceedings of the 29th Annual ACM Symposium on User Interface Software and Technology* (Tokyo, Japan, October 16 - 19, 2016). UIST '16. ACM, New York, NY. 321-333. **Best Paper Award & Best Talk Award**
- P59 Zhou, J., Zhang, Y., Laput, G., and **Harrison, C.** 2016. AuraSense: Enabling Expressive Around-Smartwatch Interactions with Electric Field Sensing. In *Proceedings of the 29th Annual ACM Symposium on User Interface Software and Technology* (Tokyo, Japan, October 16 - 19, 2016). UIST '16. ACM, New York, NY. 81-86.
- P58 Zhang, Y., Xiao, R., and **Harrison, C.** 2016. Advancing Hand Gesture Recognition with High Resolution Electrical Impedance Tomography. In *Proceedings of the 29th Annual ACM Symposium on User Interface Software and Technology* (Tokyo, Japan, October 16 - 19, 2016). UIST '16. ACM, New York, NY. 843-850.
- P57  Zhang, Y., Zhou, J., Laput, G. and **Harrison, C.** 2016. SkinTrack: Using the Body as an Electrical Waveguide for Continuous Finger Tracking on the Skin. In *Proceedings of the 34th Annual SIGCHI Conference on Human Factors in Computing Systems* (San Jose, California, USA, May 7 - 12, 2016). CHI '16. ACM, New York, NY. 1491-1503. **Best Paper Honorable Mention & Best Talk Award**
- P56 Laput, G., Chen, A. and **Harrison, C.** 2016. SweepSense: Ad Hoc Configuration Sensing Using Reflected Swept-Frequency Ultrasonics. In *Proceedings of the 21st Annual International Conference on Intelligent User Interfaces* (Sonoma, California, USA, March 7 - 10, 2016). IUI '16. ACM, New York, NY. 332-335.
- P55  Zhang, Y. and **Harrison, C.** 2015. Quantifying the Targeting Performance Benefit of Electrostatic Haptic Feedback on Touchscreens. In *Proceedings of the ACM International Conference on Interactive Tabletops and Surfaces* (Madeira, Portugal, November 15 - 18, 2015). ITS '15. ACM, New York, NY. 43-46. **Best Short Paper Award**
- P54 Guo, A., Xiao, R. and **Harrison, C.** 2015. CapAuth: Identifying and Differentiating User Handprints on Commodity Capacitive Touchscreens. In *Proceedings of the ACM International Conference on Interactive Tabletops and Surfaces* (Madeira, Portugal, November 15 - 18, 2015). ITS '15. ACM, New York, NY. 59-62.
- P53 Xiao, R. Schwarz, J. and **Harrison, C.** 2015. Estimating 3D Finger Angle on Commodity Touchscreens. In *Proceedings of the ACM International Conference on Interactive Tabletops and Surfaces* (Madeira, Portugal, November 15 - 18, 2015). ITS '15. ACM, New York, NY. 47-50.
- P52  Chatterjee, I., Xiao, R. and **Harrison, C.** 2015. Gaze+Gesture: Expressive, Precise and Targeted Free-Space Interactions. In *Proceedings of the 17th ACM International Conference on Multimodal Interaction* (Seattle, Washington, November 9 - 13, 2015). ICMI '15. ACM, New York, NY. 131-138. **Best Student Paper Award**
- P51 Laput, G., Chen, X. and **Harrison, C.** 2015. 3D Printed Hair: Fused Deposition Modeling of Soft Strands, Fibers and Bristles. In *Proceedings of the 28th Annual ACM Symposium on User Interface Software and Technology* (Charlotte, North Carolina, November 8 - 11, 2015). UIST '15. ACM, New York, NY. 593-597.
- P50  Laput, G., Yang, C., Xiao, R., Sample, A. and **Harrison, C.** 2015. EM-Sense: Touch Recognition of Uninstrumented, Electrical and Electromechanical Objects. In *Proceedings of the 28th Annual ACM Symposium on User Interface Software and Technology* (Charlotte, North Carolina, November 8 - 11, 2015). UIST '15. ACM, New York, NY. 157-166. **Best Talk Award**
- P49  Zhang, Y. and **Harrison, C.** 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* (Charlotte, North Carolina, November 8 - 11, 2015). UIST '15. ACM, New York, NY. 167-173. **Best Talk Nominee**

- P48 Laput, G., Lasecki, W., Wiese, J., Xiao, R., Bigham, J. and **Harrison, C.** 2015. Sensors: Adaptive, Rapidly Deployable, Human-Intelligent Sensor Feeds. In *Proceedings of the 33rd Annual SIGCHI Conference on Human Factors in Computing Systems* (Seoul, Korea, April 18 - 23, 2015). CHI '15. ACM, New York, NY. 1935-1944.
- P47 Vázquez, M., Brockmeyer, E., Desai, R., **Harrison, C.** and Hudson, S. 2015. 3D Printing Pneumatic Device Controls with Variable Activation Force Capabilities. In *Proceedings of the 33rd Annual SIGCHI Conference on Human Factors in Computing Systems* (Seoul, Korea, April 18 - 23, 2015). CHI '15. ACM, New York, NY. 1295-1304.
- P46 Laput, G., Brockmeyer, E., Hudson, S. and **Harrison, C.** 2015. Acoustruments: Passive, Acoustically-Driven, Interactive Controls for Handheld Devices. In *Proceedings of the 33rd Annual SIGCHI Conference on Human Factors in Computing Systems* (Seoul, Korea, April 18 - 23, 2015). CHI '15. ACM, New York, NY. 2161-2170. **Best Paper Award**
- P45 Laput, G., Xiao, R., Chen, X., Hudson, S. and **Harrison, C.** 2014. Skin Buttons: Cheap, Small, Low-Power and Clickable Fixed-Icon Laser Projections. In *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology* (Honolulu, Hawaii, October 5 - 8, 2014). UIST '14. ACM, New York, NY. 389-394.
- P44 Chen, X., Schwarz, J., **Harrison, C.**, Mankoff, J. and Hudson, S. 2014. Air+Touch: Interweaving Touch & In-Air Gestures. In *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology* (Honolulu, Hawaii, October 5 - 8, 2014). UIST '14. ACM, New York, NY. 519-525.
- P43 Xiao, R., Lew, G., Marsanico, J., Hariharan, D., Hudson, S., and **Harrison, C.** 2014. Toffee: Enabling Ad Hoc, Around-Device Interaction with Acoustic Time-of-Arrival Correlation. In *Proc. of the 16th International Conference on Human-Computer Interaction with Mobile Devices and Services* (Toronto, Canada, September 23 - 26, 2014). MobileHCI '14. ACM, New York, NY. 67-76.
- P42 Chen, X., Schwarz, J., **Harrison, C.**, Mankoff, J. and Hudson, S. 2014. Around-Body Interaction: Sensing & Interaction Techniques for Proprioception-Enhanced Input with Mobile Devices. In *Proc. of the 16th International Conference on Human-Computer Interaction with Mobile Devices and Services* (Toronto, Canada, September 23 - 26, 2014). MobileHCI '14. ACM, New York, NY. 287-290.
- P41 **Harrison, C.** and Faste, H. 2014. Implications of Location and Touch for On-Body Projected Interfaces. In *Proceedings of the 10th Biennial ACM Conference on Designing Interactive Systems* (Vancouver, Canada, June 21 - 25, 2014). DIS '14. ACM, New York, NY. 543-552. **Best Paper Nomination**
- P40 Xiao, R., Laput, G., and **Harrison, C.** 2014. Expanding the Input Expressivity of Smartwatches with Mechanical Pan, Twist, Tilt and Click. In *Proceedings of the 32nd Annual SIGCHI Conference on Human Factors in Computing Systems* (Toronto, Canada, April 26 - May 1, 2014). CHI '14. ACM, New York, NY. 193-196.
- P39 Schwarz, J., Xiao, R., Mankoff, J., Hudson, S., and **Harrison, C.** 2014. Probabilistic Palm Rejection Using Spatiotemporal Touch Features and Iterative Classification. In *Proceedings of the 32nd Annual SIGCHI Conference on Human Factors in Computing Systems* (Toronto, Canada, April 26 - May 1, 2014). CHI '14. ACM, New York, NY. 2009-2012.
- P38 **Harrison, C.**, Xiao, R., Schwarz, J., and Hudson, S. 2014. TouchTools: Leveraging Familiarity and Skill with Physical Tools to Augment Touch Interaction. In *Proceedings of the 32nd Annual SIGCHI Conference on Human Factors in Computing Systems* (Toronto, Canada, April 26 - May 1, 2014). CHI '14. ACM, New York, NY. 2913-2916.
- P37 Xiao, R., **Harrison, C.**, Willis, K. D. D., Hudson, S. E., and Poupyrev, I. 2013. Lumitrack: Low Cost, High Precision and High Speed Tracking with Projected m-Sequences. In *Proceedings of the 26th Annual ACM Symposium on User Interface Software and Technology* (St. Andrews, Scotland, UK, October 8 - 11, 2013). UIST '13. ACM, New York, NY. 3-12.
- P36 Xiao, R., **Harrison, C.**, and Hudson, S. E. 2013. WorldKit: Rapid and Easy Creation of Ad-hoc Interactive Applications on Everyday Surfaces. In *Proceedings of the 31st Annual SIGCHI Conference on Human Factors in Computing Systems* (Paris, France, April 27 - May 2, 2013). CHI '13. ACM, New York, NY. 879-888.
- P35 Oney, S., **Harrison, C.**, Ogan, A. and Wiese, J. 2013. ZoomBoard: A Diminutive QWERTY Soft Keyboard Using Iterative Zooming for Ultra-Small Devices. In *Proceedings of the 31st Annual SIGCHI Conference on Human Factors in Computing Systems* (Paris, France, April 27 - May 2, 2013). CHI '13. ACM, New York, NY. 2799-2802. **Best Paper Honorable Mention**
- P34 **Harrison, C.**, Sato, M. and Poupyrev, I. 2012. Capacitive Fingerprinting: Exploring User Differentiation by Sensing Electrical Properties of the Human Body. In *Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology* (Cambridge, Massachusetts, October 7 - 10, 2012). UIST '12. ACM, New York, NY. 537-544.

- P33 **Harrison, C.**, Xiao, R. and Hudson, S. E. 2012. Acoustic Barcodes: Passive, Durable and Inexpensive Notched Identification Tags. In *Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology* (Cambridge, Massachusetts, October 7 - 10, 2012). UIST '12. ACM, New York, NY. 563-568.
- P32  Sato, M. Poupyrev, I. and **Harrison, C.** 2012. Touché: Enhancing Touch Interaction on Humans, Screens, Liquids, and Everyday Objects. In *Proceedings of the 30th Annual SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, May 5 - 10, 2012). CHI '12. ACM, New York, NY. 483-492. **Best Paper Award**
- P31 Schwarz, J., Klionsky, D., **Harrison, C.**, Dietz, P. and Wilson, A. D. 2012. Phone as a Pixel: Enabling Ad-Hoc, Large-Scale Displays Using Mobile Devices. In *Proceedings of the 30th Annual SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, May 5 - 10, 2012). CHI '12. ACM, New York, NY. 2235-2238.
- P30  **Harrison, C.**, Horstman, J., Hsieh, G. and Hudson, S. E. 2012. Unlocking the Expressivity of Point Lights. In *Proceedings of the 30th Annual SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, May 5 - 10, 2012). CHI '12. ACM, New York, NY. 1683-1692. **Best Paper Honorable Mention**
- P29 **Harrison, C.** and Hudson, S. E. 2012. Using Shear as a Supplemental Two-Dimensional Input Channel for Rich Touchscreen Interaction. In *Proceedings of the 30th Annual SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, May 5 - 10, 2012). CHI '12. ACM, New York, NY. 3149-3152.
- P28 Raj, B., Kalgaonkar, K., **Harrison, C.** and Dietz, P. 2012. Ultrasonic Doppler Sensing in HCI. *IEEE Pervasive Computing*, 11(2), April - June, 2012. IEEE, Washington, D.C. 24-29.
- P27  **Harrison, C.**, Ramamurthy, S. and Hudson, S. E. 2012. On-Body Interaction: Armed and Dangerous. In *Proceedings of the Sixth International Conference on Tangible, Embedded, and Embodied Interaction* (Kingston, Ontario, Canada, February 19 - 22, 2012). TEI '12. ACM, New York, NY. 69-78. **Best Student Paper Award**
- P26 **Harrison, C.**, Benko, H. and Wilson, A. D. 2011. OmniTouch: Wearable Multitouch Interaction Everywhere. In *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology* (Santa Barbara, California, October 16 - 19, 2011). UIST '11. ACM, New York, NY. 441-450.
- P25 **Harrison, C.**, Schwarz, J. and Hudson S. E. 2011. TapSense: Enhancing Finger Interaction on Touch Surfaces. In *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology* (Santa Barbara, California, October 16 - 19, 2011). UIST '11. ACM, New York, NY. 627-636.
- P24 Saponas, T. S., **Harrison, C.** and Benko, H. 2011. PocketTouch: Through-Pocket Capacitive Touch Input. In *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology* (Santa Barbara, California, October 16 - 19, 2011). UIST '11. ACM, New York, NY. 303-308.
- P23 **Harrison, C.** and Hudson S. E. 2011. A New Angle on Cheap LCDs: Making Positive Use of Optical Distortion. In *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology* (Santa Barbara, California, October 16 - 19, 2011). UIST '11. ACM, New York, NY. 537-539.
- P22  **Harrison, C.**, Hsieh, G., Willis, K. D. D., Forlizzi, J. and Hudson, S. E. 2011. Kineticons: Using Iconographic Motion in Graphical User Interface Design. In *Proceedings of the 29th Annual SIGCHI Conference on Human Factors in Computing Systems* (Vancouver, Canada, May 7 - 12, 2011). CHI '11. ACM, New York, NY. 1999-2008. **Best Paper Honorable Mention**
- P21 Lim, B. Y., Shick, A., **Harrison, C.** and Hudson, S. E. 2011. Pediluma: Motivating Physical Activity Through Contextual Information and Social Influence. In *Proceedings of the Fifth International Conference on Tangible, Embedded, and Embodied Interaction* (Funchal, Portugal, January 22 - 26, 2011). TEI '11. ACM, New York, NY. 123-180.
- P20 Bartindale, T. **Harrison, C.**, Olivier, P. L. and Hudson, S. E. 2011. SurfaceMouse: Supplementing Multi-Touch Interaction with a Virtual Mouse. In *Proceedings of the Fifth International Conference on Tangible, Embedded, and Embodied Interaction* (Funchal, Portugal, January 22 - 26, 2011). TEI '11. ACM, New York, NY. 293-296.
- P19 Bau, O., Poupyrev, I., Israr, A. and **Harrison, C.** 2010. TeslaTouch: Electro vibration for Touch Surfaces. In *Proceedings of the 23rd Annual ACM Symposium on User Interface Software and Technology* (New York, New York, October 3 - 6, 2010). UIST '10. ACM, New York, NY. 283-292.
- P18  **Harrison, C.**, Tan, D. and Morris, D. 2010. Skinput: Appropriating the Body as an Input Surface. In *Proceedings of the 28th Annual SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, April 10 - 15, 2010). CHI '10. ACM, New York, NY. 453-462. **Best Paper Award**

- P17 **Harrison, C.**, Dey, A. K. and Hudson, S. E. 2010. Evaluation of Progressive Image Loading Schemes. In *Proceedings of the 28th Annual SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, April 10 - 15, 2010). CHI '10. ACM, New York, NY. 1549-1552.
- P16 **Harrison, C.**, Yeo, Z. and Hudson, S. E. 2010. Faster Progress Bars: Manipulating Perceived Duration with Visual Augmentations. In *Proceedings of the 28th Annual SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, April 10 - 15, 2010). CHI '10. ACM, New York, NY. 1545-1548. **Best Paper Honorable Mention**
- P15 Schwarz, J., **Harrison, C.**, Mankoff, J. and Hudson, S. E. 2010. Cord Input: An Intuitive, High-Accuracy, Multi-Degree-of-Freedom Input Method for Mobile Devices. In *Proceedings of the 28th Annual SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, April 10 - 15, 2010). CHI '10. ACM, New York, NY. 1657-1660.
- P14 **Harrison, C.** and Hudson, S. E. 2010. Minput: Enabling Interaction on Small Mobile Devices with High-Precision, Low-Cost, Multipoint Optical Tracking. In *Proceedings of the 28th Annual SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, April 10 - 15, 2010). CHI '10. ACM, New York, NY. 1661-1664. **Best Paper Honorable Mention**
- P13 Hudson, S. E., **Harrison, C.**, Harrison, B. L. and LaMarca, A. 2010. Whack Gestures: Inexact and Inattentive Interaction with Mobile Devices. In *Proceedings of the 4th International Conference on Tangible, Embedded and Embodied Interaction* (Cambridge, Massachusetts, January 25 - 27, 2010). TEI '10. ACM, New York, NY. 109-112.
- P12 Bartindale, T. and **Harrison, C.** 2009. Stacks on the Surface: Resolving Physical Order with Masked Fiducial Markers. In *Proceedings of the ACM International Conference on Interactive Tabletops and Surfaces* (Banff, Alberta, Canada, November 23 - 25, 2009). ITS '09. ACM, New York, NY. 57-60.
- P11 **Harrison, C.** and Hudson, S. E. 2009. Abracadabra: Wireless, High-Precision, and Unpowered Finger Input for Very Small Mobile Devices. In *Proceedings of the 22nd Annual ACM Symposium on User Interface Software and Technology* (Victoria, British Columbia, Canada, October 4 - 7, 2009). UIST '09. ACM, New York, NY. 121-124.
- P10 **Harrison, C.** and Hudson, S. E. 2009. Providing Dynamically Changeable Physical Buttons on a Visual Display. In *Proceedings of the 27th Annual SIGCHI Conference on Human Factors in Computing Systems* (Boston, Massachusetts, April 4 - 9, 2009). CHI '09. ACM, New York, NY. 299-308.
- P9 **Harrison, C.** and Hudson, S. E. 2009. Texture Displays: A Passive Approach to Tactile Presentation. In *Proceedings of the 27th Annual SIGCHI Conference on Human Factors in Computing Systems* (Boston, Massachusetts, April 4 - 9, 2009). CHI '09. ACM, New York, NY. 2261-2264.
- P8 **Harrison, C.**, Lim, B. Y., Shick, A. and Hudson, S. E. 2009. Where to Locate Wearable Displays? Reaction Time Performance of Visual Alerts from Tip to Toe. In *Proceedings of the 27th Annual SIGCHI Conference on Human Factors in Computing Systems* (Boston, Massachusetts, April 4 - 9, 2009). CHI '09. ACM, New York, NY. 941-944.
- P7 **Harrison, C.** and Hudson, S. E. 2008. Scratch Input: Creating Large, Inexpensive, Unpowered and Mobile finger Input Surfaces. In *Proceedings of the 21st Annual ACM Symposium on User Interface Software and Technology* (Monterey, California, October 19 - 22, 2008). UIST '08. ACM, New York, NY. 205-208.
- P6 **Harrison, C.** and Hudson, S. E. 2008. Lightweight Material Detection for Placement-Aware Mobile Computing. In *Proceedings of the 21st Annual ACM Symposium on User Interface Software and Technology* (Monterey, California, October 19 - 22, 2008). UIST '08. ACM, New York, NY. 279-282.
- P5 **Harrison, C.** and Hudson, S. E. 2008. Pseudo-3D Video Conferencing with a Generic Webcam. In *Proceedings of the 10th IEEE International Symposium on Multimedia* (Berkeley, California, December 15 - 17, 2008). ISM '08. IEEE, Washington, D.C. 236-241.
- P4 **Harrison, C.**, Amento, B. and Stead, L. 2008. iEPG: An Ego-Centric Electronic Program Guide and Recommendation Interface. In *Proceedings of the 1st International Conference on Designing Interactive User Experiences for TV and Video* (Mountain View, California, October 22 - 24, 2008). UXTV '08. ACM, New York, NY. 23-26.
- P3 Nathan, M., **Harrison, C.**, Yarosh, S., Terveen, L., Stead, L. and Amento, B. 2008. CollaboraTV: Making Television Viewing Social Again. In *Proceedings of the 1st International Conference on Designing Interactive User Experiences for TV and Video* (Mountain View, California, October 22 - 24, 2008). UXTV '08. ACM, New York, NY. 85-94.
- P2 **Harrison, C.** and Dey, A. K. 2008. Lean and Zoom: Proximity-Aware User Interface and Content Magnification. In *Proceedings of the 26th Annual SIGCHI Conference on Human Factors in Computing Systems* (Florence, Italy, April 5 - 10, 2008). CHI '08. ACM, New York, NY. 507-510.

- P1 **Harrison, C.**, Amento, B., Kuznetsov, S. and Bell, R. 2007. Rethinking the progress bar. In *Proceedings of the 20th Annual ACM Symposium on User Interface Software and Technology* (Newport, Rhode Island, October 7 - 10, 2007). UIST '07. ACM, New York, NY. 115-118.

Approximate five-year acceptance averages: ACM UIST: 22.5% | ACM CHI: 24.1% | ACM SIGGRAPH: 27.1% | ACM TEI 28.4% | ACM ISS 27.0%

## INVITED ARTICLES & BOOK CHAPTERS

- I7 **Harrison, C.** 2018. "The HCI Innovator's Dilemma." *Interactions*, 25, 6 (October). ACM, New York, NY. 26-33.
- I6 **Harrison, C.** 2015. "What Lies Beyond Multitouch?" *SID Symposium Digest of Technical Papers*, 46(1). The Society for Information Display, Campbell, CA. 1095-1099.
- I5 **Harrison, C.**, Yeo, Z., Amento, B. and Hudson S. E. 2012. Designing "Faster" Progress Bars: Manipulating Perceived Duration. In *Cognitively Informed Interfaces: System Design and Development*. Eds. Alkhalifa, E. and Gaid, K. IGI Global, Hershey, PA. 280-293.
- I4 **Harrison, C.**, Tan, D. and Morris, D. 2011. "Skinput: Appropriating the Skin as an Interactive Canvas." *Communications of the ACM*, 54(8). ACM, New York, NY. 111-118.
- I3 **Harrison, C.**, Wiese, J. and Dey, A. K., 2010. "Achieving Ubiquity: The New Third Wave." *IEEE Multimedia*, July-September 2010, 17(3). IEEE, Washington, D.C. 8-12.
- I2 **Harrison, C.** 2010. Appropriated Interaction Surfaces. *IEEE Computer Magazine*, June 2010, 43(6). IEEE, Washington, D.C. 86-89.
- I1 Amento, B., **Harrison, C.**, Nathan, M. and Terveen, L. 2009. Chapter XII, Asynchronous Communication: Fostering Social Interaction with CollaboraTV. 204-224. In *Social Interactive Television: Immersive Shared Experiences and Perspectives*. Eds. Geerts, D., Cesar, P. and Chorianopoulos, K. IGI Global, Hershey, PA.

## SELECTED SERVICE

### Program Committees (selected)

CHI '10,'11,'12,'13,'15,'16,'17 · UIST '12,'13,'17,'19 · IUI '15,'16,'17 · DIS '14,'16,'17,'18 · SCF '18  
MobileHCI '11 · TEI '09 · ...

2009 – Present

### Organizing Committees

ACM UIST Sponsorship Co-Chair  
ACM UIST Program Co-Chair  
ACM CHI Subcommittee Co-Chair  
ACM UIST Demos Co-Chair  
ACM UIST Publicity Chair  
ACM UIST Program Committee Coordinator  
ACM UIST Student Innovation Contest Co-Chair  
ACM UIST Student Innovation Contest Chair (inaugural year)

2021, 2022  
2017  
2016, 2017  
2015, 2016  
2014  
2013  
2011  
2009

### Reviewing (selected)

CHI '09 – '21 · UIST '09 – '21 · TEI '09 – '17 · MobileHCI '11 – '18 · IMWUT/UbiComp '11,'12,'14 – '17,'19 – '21  
CSCW '11,'12 · ISWC '11,'15,'16,'19 · DIS '14,'16 – '18,'20 · SIGGRAPH '10,'12,'14,'16,'19,'21 · ITS '10 – '15  
HAPTICS '10,'11,'17 · ToCHI '12,'14,'15 · ACM Computing Surveys '15 · EICS '15 · CACM '14 · ...

2009 – Present

### Crash Course Computer Science

Co-developed and co-wrote with Prof. Amy Ogan 40-episode YouTube educational series on Computer Science. 27M+ views as of March 2021. Produced by Complexly and PBS Digital Studios.

2016 – 2017

### National Science Foundation / Computing Community Consortium (CCC)

Computing Visions 2025 Workshop

2014

### Editor-in-Chief

ACM XRDS (formally Crossroads); responsible for relaunching ACM's flagship periodical for students.

2009 - 2012

### Judge

ACM Chapter Excellence Award Program, 2009-2010.

2010

## Ph.D. STUDENTS SUPERVISED

<b>Karan Ahuja</b> Applying machine learning to new frontiers in human-computer interaction. Co-advised with Mayank Goel.	2017 – Present
<b>Nathan Riopelle</b> Developing novel worn sensing modalities.	2020 – Present
<b>Vivian Shen</b> Exploring room-scale touch tracking approaches.	2020 – Present
<b>Gierad Laput (graduated)</b> Now running a research group at Apple AI. <a href="http://gierad.com">http://gierad.com</a>	2014 – 2019
<b>Robert Xiao (graduated)</b> Now an Assistant Professor at University of British Columbia (UBC). Co-advised with Scott Hudson. ACM SIGCHI Dissertation Award (2019). <a href="http://robertxiao.ca">http://robertxiao.ca</a>	2013 – 2018
<b>Yang Zhang (graduated)</b> Now an Assistant Professor at University of California, Los Angeles (UCLA). <a href="https://yangzhang.dev">https://yangzhang.dev</a>	2015 – 2020

## OTHER SCHOLARS SUPERVISED

<b>Craig Shultz</b> Post Doc. Ph.D. Northwestern University (2017).	2021 – Present
<b>Sven Mayer</b> Post Doc. Ph.D. University of Stuttgart (2019). Now faculty at Ludwig Maximilian University of Munich (LMU). <a href="http://sven-mayer.com">http://sven-mayer.com</a>	2019 – 2020
<b>Virag Varga</b> Visiting Scholar. ETH Zurich and Disney Research.	2018

## Ph.D. THESIS COMMITTEES

<b>Anhong Guo</b> HCII, School of Computer Science, CMU. Thesis title: “Human-AI Systems for Visual Information Access.”	2020
<b>Noreen Saeed</b> Computational Design, School of Architecture, CMU. Thesis title: “A Computational Approach to Predicting Thermal Conductivity of Construction Material: Towards Rapid In-Situ Energy Evaluation of Existing Buildings.”	2020
<b>Cheng Zhang</b> School of Computing, Georgia Institute of Technology. Thesis title: “Novel Gestures for Wearables.”	2018
<b>James Pierce</b> HCII, School of Computer Science, CMU. Thesis title: “Working by Not Quite Working: Designing Resistant Interactive Proposals, Prototypes, and Products.”	2015

## UNDERGRADATE AND MASTERS STUDENTS SUPERVISED

<b>Daehwa Kim</b> Exploring new touch input and human pose tracking technologies. Paper in review.	2021 – Present
<b>Cassandra Scheirer</b> Investigating new mobile augmented reality experiences using dynamic fiducial markers. Paper in review.	2021 – Present
<b>Andy Kong</b> Developed new approach for estimating direction of voice in speech enabled interfaces. Led to paper publications at UIST 2020 and ICMI 2021.	2020 – Present

<b>Cathy Fang</b> Designed new haptic approaches to enable complex tangible geometries in virtual reality. Led to paper publications at CHI 2020 (Best Paper Award) and UIST 2021. One more paper in review.	2019 – 2021
<b>James Spann</b> Increasing depth-camera-based touch input to room scales by applying super resolution processing techniques. Now a Ph.D. student at University of Rochester. Led to paper publication at SUI 2021.	2020 – 2021
<b>Fred Choi</b> Estimating 3D hand pose using 2D capacitive touchscreen data. Paper in review. Now a Ph.D. student at UIUC. Led to paper publication at MobileHCI 2021.	2020 – 2021
<b>Deval Shah</b> Created new classroom “digital twin” VR experience for visualizing and replaying student and instructor gaze behaviors. Led to paper publication at CHI 2021.	2020
<b>Ketaki Rao and Chinmay Hejmadi</b> Expanded the analysis and real-time audio capabilities of the EduSense classroom sensing platform.	2020
<b>Yue Jiang</b> Researched transforming video into synthetic RF doppler data for training human activity recognition systems. Led to paper publication at CHI 2021. Now a Ph.D. student at Max Plank Institute. <a href="https://yuejiang-nj.github.io">https://yuejiang-nj.github.io</a>	2020
<b>Stanley Zhang</b> Built first version of a classroom analytics suite for the EduSense sensing system. Led to paper publication at UbiComp/IMWUT 2019.	2019
<b>Matthew Savage and Zachary Wade</b> Researched how to scale and deploy crowd-AI powered sensing systems in the wild. Led to startup.	2018
<b>Evi Bernitsas</b> Developed new acoustic interferometry approach for capturing facial expression in VR/AR systems. Led to paper publication at CHI 2019 (Best Paper Honorable Mention).	2017 – 2018
<b>Anuraag Jain</b> Investigated new architectures for robust, large-scale, crowd-AI sensing systems. Led to paper publication at UbiComp/IMWUT 2018 and startup company.	2017 – 2018
<b>Ronnie Ghose</b> Investigated new models for text entry and large-scale crowd AI sensing systems. Led to paper publication at UbiComp/IMWUT 2018.	2017
<b>Avi Romanoff and Cyrus Tabrizi</b> Co-advised with Amy Ogan and Yuvraj Agarwal. Built proof-of-concept classroom sensing system.	2016 – 2017
<b>Darcy Cao</b> Iteratively crafted custom enclosures for self-contained, light-fixture-compatible InfoBulb prototypes.	2016
<b>Junhan Zhou</b> Worked on novel finger-on-skin tracking technology, as well as electric field sensing interactions for smartwatches. Led to paper publications at CHI 2016 (Best Paper Honorable Mention & Best Talk Award) and UIST 2016.	2015 – 2016
<b>Yang Zhang</b> Studied performance benefits of electrostatic haptic feedback and developed new hand gesture sensing technology. Led to paper publication at UIST 2015 (Best Talk Nominee) and another at ITS 2015 (Best Short Paper Award).	2014 – 2015
<b>Susan So Eun Park</b> Researched global tattoo traditions to inform on-body interface design strategies.	2014 – 2015
<b>Ishan Chatterjee</b> Explored new interactions combining eye gaze and free-space hand gestures. Led to paper publication at ICMI 2015 (Best Student Paper Award).	2014
<b>Zach Sweigart</b> Investigating human search performance of app page transitions on mobile GUIs.	2014

<b>Divya Hariharan, Gregory Lew and James Marsanico</b> Developed acoustic sensing technique for mobile interaction on ad hoc surfaces (team project). Led to paper publication at MobileHCI 2014.	<b>2012 – 2013</b>
<b>Brendan Kiu</b> Co-advised with Scott Hudson. Constructed depth-camera-driven multitouch wall.	<b>2011 – 2012</b>
<b>John Horstman</b> Co-advised with Scott Hudson. Explored design space of point light source (e.g., LED). Led to paper publication at CHI 2012 (Best Paper Honorable Mention).	<b>2011 – 2012</b>
<b>Shilpa Ramamurthy</b> Co-advised with Scott Hudson. Developed novel on-body computing interface paradigms. Led to paper publication at TEI 2012 (Best Student Paper Award)	<b>2010 – 2011</b>
<b>Zhiquan Yeo</b> Co-advised with Scott Hudson. Researched perceptually augmented progress bars. Led to paper publication at CHI 2010 and book chapter in “Cognitively Informed Interfaces”.	<b>2007 – 2010</b>
<b>Jason Mirra</b> Co-advised with Scott Hudson. Built intelligent audio techniques for noisy environments.	<b>2008 – 2009</b>
<b>Adam Borochoff</b> Co-advised with Scott Hudson. Studied privacy preserving video techniques.	<b>2008 – 2009</b>

## TEACHING

<b>Instructor</b> Various “Intro to HCI” courses covering ideation, iteration, observation, development and fabrication skills.	<b>2014 – Present</b>
<b>Instructor</b> Programming Usable Interfaces: Prototyping. Semester course covering intro software and physical prototyping.	<b>2011</b>
<b>Teaching Assistant, Carnegie Mellon University</b> Programming Usable Interfaces	<b>2010</b>
<b>Teaching Assistant, Computer Science Department, New York University</b> Computer Architecture (2004), Unix Tools (2004, 2005), Internet Technologies (2006)	<b>2004 – 2006</b>

## FABRICATION

<b>Metal</b> MIG, SMAW/stick, and spot welding; plasma cutting; power tools and shop equipment.	<b>2010 – Present</b>
<b>Glass</b> Blown, solid and leaded glass; cold work.	<b>2010 – Present</b>
<b>Plastics</b> Laser cutting, vacuum forming, casting, 3D printing; power tools.	<b>2007 – Present</b>
<b>Ceramics</b> Wheel and hand construction; kiln and Raku firing.	<b>2000 – Present</b>
<b>Wood</b> Small- and large-scale construction; CNC milling; power tools and shop equipment.	<b>1999 – Present</b>

## INVITED KEYNOTES, TALKS AND PRESENTATIONS

**University of Melbourne** (2021). HCI Seminar Series. “Why are ‘smart’ devices so dumb?” Virtual. October 21.  
**BayCHI** (2021). “Integrating Physical Events and Social Context.” Virtual. October 12.  
**University of Auckland** (2021). Empathic Computing Laboratory Distinguished Speaker Program. “Why are ‘smart’ devices so dumb?” Virtual. October 6.  
**Arm Startup Day** (2021). “Open Discussion with Accomplished Entrepreneurs.” Panelist. Virtual. July 27.  
**Bose Innovation Series** (2021). “The Curious Case of the ‘Smart’ Home.” Virtual. May 13.  
**MEMS & Sensors Technical Congress** (2021). “Truly Smart Interactivity with Sensors and ML at the Edge.” Virtual. April 15.  
**Beyond Big Data: AI/Machine Learning Summit** (2021). Pittsburgh Technology Council. Virtual. March 23.  
**IxDA Pittsburgh** (2021). “The Curious Case of the ‘Smart’ Home.” Virtual. February 25.  
**TCL Technology Innovation Conference** (2020). “Advancing HCI with AI.” Plenary Speaker. Virtual. October 21.

**Arm TechCon** (2020). "Machine Learning at the Edge." Panelist. Virtual. October 8.  
**U. Chicago** (2020). Distinguished speaker series. "Truly responsive environments" Virtual. October 5.  
**Arm TechCon** (2019). "Next-Generation Machine Learning for Mobile." San Jose, CA. October 10.  
**TIE Pittsburgh** (2018). Keynote: "Interactive IoT." Pittsburgh, PA. October 30.  
**Qualcomm** (2018). "Towards True Ambient Computing." San Diego, California. January 26.  
**Google** (2017). Internet of Things Tech Talk. Mountain View, California. September 5.  
**Intel** (2017). Systems and Software Research Tech Talk. Hillsboro, Oregon. May 25.  
**World Economic Forum** (2016). IdeasLab and Consumer Governors Sessions. Davos, Switzerland. January 19 - 23.  
**JASON Advisory Group** (2015). Washington, D.C. November 20.  
**Microsoft Faculty Summit** (2015). "Digital Ink and Touch Driven Research" workshop. Redmond, WA. July 7 - 10.  
**SID Display Week** (2015). Closing Speaker: "What Lies Beyond Multitouch?" San Jose, CA. May 31 - June 5.  
**University of Toronto** (2015). "Interacting with Small Devices in Big Ways." DGP Lecture Series. Toronto, Canada. March 23.  
**Gigaom Structure Connect Conference** (2014). San Francisco, CA. October 21 - 22.  
**World Economic Forum, Annual Meeting of the New Champions** (2014). "The Future of Interaction: Touch or Touchless?" Tianjin, China. September 10.  
**Microsoft Faculty Summit** (2014). "Impossibly Small Devices" session. Redmond, WA. July 14.  
**ACM Tangible and Embedded Interaction Conference** (2014). Keynote: "The Rich-Touch Revolution is Coming." Munich, Germany. February 17.  
**Sierra CIO Summit** (2013). "What's next in touch." East Palo Alto, California. October 29.  
**Interactive Technology Summit** (2013). "Insights and Visions" talk and panel. San Jose, California. October 24.  
**Qualcomm Display Summit** (2013). Keynote: "The Future of Touch Interaction." San Diego, California. October 22.  
**Mobile Marketing Association CEO Summit** (2013). "Looking Beyond Multi-Touch." Park City, Utah. July 22.  
**Touch Gesture Motion Conference** (2012). Keynote: "Interacting with Small Devices in Big Ways." Austin, Texas. December 12.  
**University of Texas at Austin** (2012). School of Information. Brown bag lunch. Austin, Texas. December 11.  
**University of Wisconsin-Madison** (2012). Department of Computer Sciences. HCI Seminar Series. November 29.  
**Massachusetts institute of Technology** (2012). CSAIL. HCI Seminar Series. Cambridge, Massachusetts. November 15.  
**New York University** (2012). Computers and Society class speaker series. Courant Institute of Mathematical Sciences. November 13.  
**EmTech Conference** (2012). "Meet the TR35." MIT Technology Review. Cambridge, Massachusetts. October 25.  
**TTI/Vanguard** (2012). "Understanding Understanding" Conference. Pittsburgh, Pennsylvania. October 4.  
**General Electric Technovation** (2012). Café session with GE's "top 50 up and coming" IT executives. Pittsburgh, Pennsylvania. October 3.  
**UC San Diego** (2012). CSE Colloquium Series. La Jolla, California. April 23.  
**Stanford University** (2012). Computer Science Department. HCI Seminar Series. Palo Alto, California. April 20.  
**Google** (2012). Tech Talk. "Interacting with Small Devices in Big Ways." Mountain View, California. April 19.  
**NASA** (2012). Information Science and Technology Colloquium Series. Goddard Space Flight Center, Maryland. February 29.  
**University of Auckland** (2011). Department of Computer Science. HCI Group Lunch. Auckland, New Zealand. July 1.  
**Dorkbot Pittsburgh** (2010). "Data Tapestries." Gave presentation on information visualization work. Pittsburgh, Pennsylvania. January 28.  
**Conference on Emerging Technologies in Visual Communication** (2009). "Interface-less Interfaces" Düsseldorf, Germany. Sept. 30.  
**Microsoft Research** (2009). Adaptive Systems and Interaction Group lunch. Redmond, Washington. August 20.  
**University of Washington** (2009). DUB Talk. "Interaction without infrastructure: Appropriating the environment for input." Seattle, Washington. August 19.  
**SIGGRAPH Emerging Technologies** (2009). Invited to present Scratch Input at E-Tech demos. New Orleans, Louisiana. August 3-7.  
**Forty-Fourth Student Conference on Linguistics** (2008). Keynote: "Human Perception and Information Visualization." Münster, Germany. November 22  
**Intel Research Seattle, Open House** (2008). Presented Scratch Input and Pseudo-3D Video Conferencing. Seattle, Washington. October 1.

## RESEARCH APPEARING IN SELECTED BOOKS

**Urban Machines** (2016). Marcella del Signore and Gernot Riether. ACTAR Publishers, New York, NY.  
**Computers Are Your Future** (2014). Catherine LaBerta. Pearson Education, Boston, MA.  
**Implementing Responsive Design** (2012). Tim Kadlec. New Riders Press. Berkeley, CA.  
**User Experience in the Age of Sustainability** (2012). Kem-Laurin Kramer. Morgan Kaufmann. Waltham, MA.  
**On Computing: The Fourth Great Scientific Domain** (2012). Paul Rosenbloom. MIT Press, Boston, MA.  
**Ready to Wear: A Rhetoric of Wearable Computers and Reality-Shifting Media** (2012). Isabel Pedersen. Parlor Press, Anderson, SC.  
**Interaction Design: Beyond Human-Computer Interaction** (2011). 3rd edition. Yvonne Rogers, Helen Sharp, and Jenny Preece. John Wiley & Sons, Ltd.  
**Information Technology in a Global Society** (2011). Skinput included in textbook chapter on "future input devices." International Baccalaureate Organization.  
**Ripley's Believe It or Not** (2011). Skinput featured. Ripley Publishing, Herts, UK.  
**Welcome to the Future Cloud** (2010). Marcel Bullinga. Skinput included in book discussing 100 predictions for 2025.  
**Ready to Wear** (2010). Skinput highlighted. Isabel Pedersen. Parlor Press, West Lafayette, IN.  
**Computers Are Your Future** (2010). LaBerta et al. Skinput included. Pearson Education, Upper Saddle River, NJ.  
**Interaction- und Interfacedesign** (2010). Torsten Stapelkamp. Springer, Berlin. Deformable multitouch displays included in book on interface technologies.

## SUPPLEMENTAL: PRESS & MEDIA

### SELECTED COVERAGE

**Pittsburgh Post-Gazette** (2021). "Pittsburgh researchers [...] can try to protect your identity." Front page story of Sunday issue. August 16.

**Popular Science** (2021). "How Amazon's radar-based sleep tracking could work." July 19.

**Hackaday** (2021). "With a big enough laser, the world is your sensor." May 21.

**Cult of Mac** (2021). "Full-body Animoji? Smart tech uses iPhone camera to track body motion." May 12.

**TechCrunch** (2021). "CMU researchers show potential of privacy-preserving activity tracking using radar." May 11.

**Hackaday** (2020). "Robots can finally answer, are you talking to me?" November 8.

**Engadget** (2020). "AI could tell smart speakers what direction your voice is coming from." November 3.

**Digital Trends** (2020). "In the future, touchscreens will be obsolete. This lab designs what's next." May 3.

**Gizmodo** (2020). "Video Chat's Impressive History Makes It Harder to Hate." July 24.

**Apple Insider** (2020). "Siri may improve accuracy by mapping the room like a HomePod does." April 23.

**Tech Crunch** (2020). "Apple and CMU researchers demo a low friction learn-by-listening system for smarter home devices." April 23.

**Android Authority** (2020). "What if your smart speaker could react to sounds in your home?" April 22.

**Digital Trends** (2020). "Crazy VR accessory simulates touch by turning users into living marionettes." April 22.

**Engadget** (2020). "This VR system tethers your hands to your shoulders to improve haptics." April 21.

**Gizmodo** (2020). "This Smart Speaker Prototype Can Throw Its Voice Like a Ventriloquist." April 20.

**VentureBeat** (2020). "WorldGaze uses phone cameras as gaze trackers, helping AIs see context." April 15.

**Android Authority** (2020). "This wild video shows what could be the future of mobile voice assistants." April 15.

**Tech Crunch** (2020). "WorldGaze uses smartphone cameras to help voice AIs cut to the chase." April 15.

**Hackaday** (2019). "Modulated Pilot Lights Anchor AR to Real World." December 17.

**The Register** (2019). "LightAnchors array: LEDs in routers, power strips, and more, can sneakily ship data to this smartphone app." December 12.

**Popular Science** (2019). "The Pixel 4's new radar sensor lets you control your phone without touching it." October 15.

**Popular Science** (2019). "Google and Levi's built a new gesture-sensing smart jacket." October 8.

**Wired** (2019). "Touchless Gesture Controls on Phones? Think Bigger." August 12.

**The Economist** (2019). "Household electronics are undergoing a sensory makeover." May 9.

**Fast Company** (2019). "Your smartwatches may soon know way, way more about what you're doing." May 8.

**ZDNet** (2019). "Smartwatches may soon know exactly what you're doing all day." May 7.

**SlashGear** (2019). "This LIDAR smart speaker imagines Alexa with eyes." May 6.

**Engadget** (2018). "Speculative gadgets at the Future Interfaces Group." December 17.

**Popular Science** (2018). "Here's what you need to know about Samsung's new folding phone concept." November 15.

**Wired** (2018). "The brief history—and uncertain future-of foldable phones." November 10.

**Hackaday** (2018). "Vibrosight hears when you are sleeping. It knows when you're awake." October 22.

**TechCrunch** (2018). "This robot uses lasers to 'listen' to its environment." October 15.

**Inc.** (2018). "Carnegie Mellon Researchers Just Gave the Humble Piece of Paper a Futuristic Redesign." May 4.

**Gizmodo** (2018). "This Cheap Painting Technique Turns Walls into Giant Touch Sensors." May 2.

**Daily Mail** (2018). "Presenting the first projection smartwatch, the LumiWatch." April 30.

**New Scientist** (2018). "Paint a touchpad on your wall to control lights with a swipe." April 30.

**Smithsonian** (2018). "This Conductive Paint Turns Walls into Giant Touchscreens." April 30.

**Daily Mail** (2018). "The smartwatch that can turn your arm into a touchscreen." April 30.

**The Verge** (2018). "You may soon be able to control your home with a smart wall." April 28.

**CNET** (2018). "LumiWatch smartwatch turns your arm into a touchscreen." April 28.

**Hackaday** (2018). "A Low Cost, Dead Tree Touch Screen." April 27.

**The Verge** (2018). "This projector smartwatch turns your arm into a terrible touchscreen." April 27.

**Architect** (2018). "Transforming Walls into Smart Surfaces." April 26.

**Gizmodo** (2018). "The World's First Working Projector Smartwatch Turns Your Arm Into a Big Touchscreen." April 26.

**NBC News** (2018). "New smart wall lets you control your home with swipes, taps." April 25.

**Hackaday** (2018). "Roll Up Your Sleeve, Watch a Video with This Smart Watch Forearm Projector." April 25.

**Engadget** (2018). "Touch-sensitive wall might let you control home devices in the future." April 24.

**The Register** (2018). "Turn that bachelor pad into a touch pad: Now you can paint buttons, sensors on your walls." April 24.

**Digital Trends** (2018). "Smartwatch prototype uses laser projection to turn your arm into a touchscreen." April 24.

**Fast Company** (2018). "Turn Your Wall Into A Touch Screen For \$20." April 23.

**Allure Magazine** (2018). "Human Microchipping Is Here, and It's About to Rock Your Skin's World." March 26.

**BBC Radio** (2018). Radio 5 Live, The Emma Barnett Show. Interviewed about the future of hair. January 11.

**Scientific American** (2017). "How Many Gigs Are You Wearing?" December 26.

**NPR** (2017). "Our Homes May Get Smarter, But Have We Thought It Through?" All Things Considered. August 14.

**Wired** (2017). "Inside Andy Rubin's Quest to Create an OS for Everything." July 25.

**Wired** (2017). "Soon your desk will be a computer too." July 5.

**MIT Technology Review** (2017). "Augmented Reality on Your Desk—All You Need Is a Lightbulb Socket." July 4.

**Daily Mail** (2017). "Turn your entire desk into a touchscreen: Projector screws in like a light-bulb and lets you interact with apps on any surface." June 29.

**Digital Trends** (2017). "Desktopography turns even the most cluttered desk into a smart display." June 29.

**Popular Mechanics** (2017). "This Projector Light Bulb Turns Your Whole Desk Into a Touchscreen." June 28.

**Gizmodo** (2017). "Screwing in This Lightbulb Turns Your Entire Desk Into a Touchscreen Smartphone." June 28.

**PC Gamer** (2017). "Your desk turns into touch screen with a lightbulb replacement." June 28.

**The Times** (2017). "Paint turns walls into touchpads." May 15.

**Android Authority** (2017). "This could turn your entire home into a smart home with a simple click." May 15.

**Wall Street Journal** (2017). "How to Turn Anything Into a Touchpad." May 12.

**Engadget** (2017). "A smart home mega sensor can track what goes on in a room." May 12.

**Wired** (2017). "A Sensor That Could Soon Make Homes Scary-Smart." May 11.

**Popular Science** (2017). "What a Jell-O brain tells us about the future of human-machine interaction." May 11.

**Tech Crunch** (2017). "Google-funded 'super sensor' project brings IoT powers to dumb appliances." May 11.

**Android Authority** (2017). "Forget tap and pay: tap and control is the future." May 11.

**CNET** (2017). "Electrick Paint Turns any Object into a Touch-Enabled Device." May 10.

**New Scientist** (2017). "Spray-on touch controls give an interactive twist to any surface." May 10.

**MIT Technology Review** (2017). "This Mega-Sensor Makes the Whole Room Smart." May 10.

**Discover Magazine** (2017). "Turn Anything into a Touchscreen With Electrick." May 9.

**Tech Crunch** (2017). "How a tap could tame the smart home." May 9.

**Newsweek** (2017). "Conductive Spray Paint can turn any Surface into a Touchscreen." May 9.

**Fast Company** (2017). "Did This Experimental Smartphone Just Solve One Of Tech's Big Problems?" May 9.

**The Verge** (2017). "Someday we might be able to use smart gadgets through electromagnetic emissions." May 9.

**Engadget** (2017). "Future phones will ID devices by their electromagnetic fields." May 9.

**Tech Crunch** (2017). "New technique turns anything into a touch sensor." May 8.

**Popular Mechanics** (2017). "High-Tech Spray Paint Can Make Anything Into a Touchscreen." May 8.

**Engadget** (2017). "Get ready to 'spray' touch controls onto any surface." May 8.

**Daily Mail** (2017). "Graffiti goes hi-tech: Radical spray paint can turn anything into a touchpad." May 8.

**The Verge** (2017). "Electrick lets you spray touch controls onto any object or surface." May 8.

**MIT Technology Review** (2017). "Connectivity A Cheap, Simple Way to Make Anything a Touch Pad." May 8.

**Gizmodo** (2017). "Scientists Figure Out How to Turn Anything Into a Touchscreen Using Conductive Spray Paint." May 8.

**Popular Science** (2017). "Levi's new Bluetooth-connected jacket seems both cool and weird" March 17.

**New Scientist** (2017). "E-tattoos turn knuckles and freckles into smartphone controls." March 17.

**TechCrunch** (2016). "Overclocked smartwatch sensor uses vibrations to sense gestures, objects and locations." November 21.

**Gizmodo** (2016). "Brilliant Mod Makes Smartwatches Actually Useful." November 20.

**The Verge** (2016). "Carnegie Mellon researchers hacked an LG smartwatch to turn it into a gesture device." November 2.

**Yahoo News** (2016). "A hacked smartwatch can tell what your hands are doing, holding or touching." October 27.

**Fast Company** (2016). "A smartwatch that recognizes what you touch." October 18.

**Contagious Magazine** (2016). "Feature: Interaction Beyond Screens." Q4 Issue.

**Fast Company** (2016). "Innovation by Design Awards 2016." September 12.

**Wired** (2016). "The Science of Waiting ... and Waiting ... for Your Page to Load." August 25.

**Scientific American** (2016). "Maker Movement Turns Scientists into Tinkerers." August 22.

**The Verge** (2016). "This new gesture software could be the future of multitouch." August 2.

**Android Authority** (2016). "Is this the future of multi-touch on mobile?" August 2.

**Engadget** (2016). "Multitouch is about to get more advanced thanks to Qeexo." August 1.

**TechRepublic** (2016). "Next-gen light bulb could turn any surface into a computer screen, as envisioned by CMU professor." June 20.

**WESA, NPR Pittsburgh** (2016). "CMU's SkinTrack Technology Turns Your Forearm into Smartwatch Trackpad." This American Life. June 15.

**ABC News** (2016). "This Invention Lets You Use Your Skin as Smartwatch Trackpad." May 13.

**Wired** (2016). "SkinTrack Turns Your Arm Into a Touchpad. Here's How It Works." May 13.

**Tech Crunch** (2016). "Making wearables more useful and smart homes less of a chore." May 13.

**Fast Company** (2016). "8 Incredible Prototypes That Show The Future Of Human-Computer Interaction." May 13.

**Daily Mirror** (2016). "Non-invasive 'Skintrack' technology turns your flesh into a trackpad for controlling an Apple Watch." May 13.

**Huffington Post** (2016). "New Tech Turns Your Arm Skin Into A Touchpad." May 9.

**KRON, San Francisco** (2016). "Tech Trends: Smartwatch makes your skin an extension of the touchscreen." May 9.

**Newsweek** (2016). "Smart Ring Turns your Skin into a Touch Pad for your Smartwatch." May 6.

**Tech Crunch** (2016). "Want more screen space on your smartwatch? Put a ring on it..." May 6.

**CNN Money** (2016). "This watch turns your arm into a touchscreen." May 6.

**Daily Mail** (2016). "Frustrated with tiny smartwatch screens? Gadget turns the skin on your Arm into a touchpad." May 6.

**Maxim** (2016). "This Freakily Futuristic Technology Lets you use your Skin as a Touchscreen." May 6.

**Mashable** (2016). "Researchers create wild skin-touch interface for tiny smart watches." May 5.

**Engadget** (2016). "Navigate your smartwatch by touching your skin." May 5.

**The Verge** (2016). "New tech turns your skin into a touchscreen for your smartwatch." May 5.

**CNET** (2016). "SkinTrack turns your entire forearm into a smartwatch touchpad." May 5.

**Popular Science** (2016). "This Smartwatch Turns your Skin into a Touchscreen." May 5.

**MIT Technology Review** (2016). "Use Your Arm as a Smart-Watch Touch Pad." May 5.

**Gizmodo** (2016). "This New 'Skinterface' Could Make Smartwatches Suck Less." May 5.

**InformationWeek** (2016). "Smartwatches Still Lack Killer App." April 26.

**Digital Trends** (2016). "Your smartwatch screen becomes a joystick in this awesome prototype." March 15.

**MIT Technology Review** (2016). "Pause Your Tunes by Taking Out Your Earbuds." February 3.

**Forbes** (2016). "From Fitbit To Volkswagen: The Dangers Of Inaccurate Data." January 10.

**Wired** (2015). "Here's What Real 3D Touch Looks Like." November 20.

**Fast Company** (2015). "How A Simple Software Update Could Make Your iPhone Screen Smarter." November 17.

**SlashGear** (2015). "FingerAngle challenges 3D Touch with finger angle recognition." November 17.

**Gizmodo** (2015). "A Touchscreen That Knows the Angle of Your Finger Is Way Cooler than 3D Touch." November 16.

**Discovery News** (2015). Daily Planet segment. November 16.

**Wired** (2015). "EM-Sense Enabled Smartwatch Can Detect When You Touch a Doorknob." November 12.

**NBC News** (2015). "Disney Smartwatch Knows What You're Touching and Tells You What to Do Next." November 11.

**Discovery News** (2015). "Smartwatch Turns Your Body into an Antenna." November 11.

**BBC News** (2015). "The Smartwatch Gets Serious." BBC "Click" segment on EM-Sense. November 11.

**New Scientist** (2015). "No-touch smartwatch scans the skin to see the world around you." November 10.

**Hackaday** (2015). "Disney's designing a smart watch that knows what you're touching." November 10.

**ArsTechnica** (2015). "Disney's smartwatch prototype can identify and track everything you touch." November 10.

**SlashGear** (2015). "Strap can read arm muscle movement to control smartwatch." November 10.

**Gizmodo** (2015). "Your Smartwatch Might Soon Know Exactly What You're Touching." November 9.

**Popular Mechanics** (2015). "Disney's Wild New EM-Sense Tech Can Identify Any Gadget You Touch." November 9.

**Fast Company** (2015). "This \$10 Hack Could Let Your Apple Watch Sense Everything You Touch." November 9.

**Gizmodo** (2015). "This Smartwatch Detects Gestures By Watching the Muscles Inside Your Arm Move." November 9.

**Tech Crunch** (2015). "Researchers Can Now Create 3D-Printed (Plastic) Hair." November 4.

**Fast Company** (2015). "This Delicate Hair Is Artisan-Level 3-D Printing." November 2.

**Plastics Today** (2015). "Carnegie Mellon fur-bricates plastic hair with low-cost 3D printer." November 2.

**Hackaday** (2015). "Hair enthusiasts rejoice! Synthetic follicles are now 3d-Printable." November 1.

**MIT Technology Review** (2015). "You Can Now 3-D Print a Toupee." October 30.

**WESA, NPR Pittsburgh** (2015). "Bad Hair Day? Try Printing It Instead." October 29.

**KDKA** (2015). Aired story on 3D printed hair work. October 29.

**CNET** (2015). "3D-printed hair puts a coiffure on your plastic creations." October 29.

**Gizmodo** (2015). "Sorry, Hair Club — We Can Finally 3D Print Hair." October 29.

**Engadget** (2015). "3D printing hair is as easy as using a hot glue gun." October 29.

**New York Magazine** (2015). "So Long, Weaves. 3-D Printers Can Now Make Hair." October 30.

**Wired** (2015). "The Smart UI Design Behind Apple's Frictionless 3D Touch." September 10.

**MIT Technology Review** (2015). "A Sensor for Logging People Traffic at the Gym or Café." July 28.

**Fast Company** (2015). "A look inside Google and Carnegie Mellon's IoT Campus." July 24.

**IEEE Spectrum** (2015). "Google Funds University Living Lab for Internet of Things." July 13.

**Fast Company** (2015). "Google is Outfitting Carnegie Mellon with Smart Tech to Create a Living Lab". July 9.

**MIT Technology Review** (2015). "The Struggle for Accurate Measurements on Your Wrist." June 22.

**Wired** (2015). "There's a Way to Control Phones With Sound, Not Electronics." May 5.

**Wired** (2015). "Human Smarts Plus AI Could Unlock Computer Vision." April 29.

**SlashGear** (2015). "Sensors wants to make dumb stuff smart in your home." April 23.

**Engadget** (2015). "Scientists turn old smartphones into all-seeing eyes." April 22.

**Gizmodo** (2015). "One Old Android Phone Could Make All Your Dumb Things Smart." April 21.

**Fast Company** (2015). "Disney's Incredible iPhone Accessories Can Hear How You Touch Them." April 21.

**Engadget** (2015). "Disney's 'acoustruments' can control phones using their own sounds." April 21.

**TechCrunch** (2015). "Disney's Lab Builds Buttons That Work By Manipulating Soundwaves Rather Than Electricity." April 20.

**PCWorld** (2015). "Weird Disney tech lets you play Pied Piper to your smartphone." April 20.

**Gizmodo** (2015). "Disney Invented a Way To Control Your Phone Using the Sounds It Emits." April 20.

**Mashable** (2015). "Researchers use sound waves to control iPhones." April 20.

**Gizmodo** (2014). "The 7 Most Important UI and UX Ideas of 2014." December 31.

**The New York Times** (2014). "In a Small Space, a Big Issue." November 20.

**CBC** (2014). Robert Xiao interviewed about Skin Buttons. October 21.

**Tech Crunch** (2014). "Skin Buttons Are Working Buttons Projected Onto The Skin." October 20.

**Wired** (2014). "A Smartwatch That Projects Buttons Onto Your Skin." October 17.

**Fast Company** (2014). "This Smartwatch Projects Laser Buttons Onto Your Skin." October 13.

**Gizmodo** (2014). "7 Experimental Interfaces That Show the Future of UI Design." October 6.

**New Scientist** (2014). "Sonic sensors let you control tablets with table taps." October 2.

**National Geographic Channel** (2014). "Stephen Hawking's Science of the Future." Episode 4.

**Wired** (2014). "Tiny Startup Completely Reinvents How We Use Touchscreens." June 12.

**Venture Beat** (2014). "Qeexo and its touchscreen software spin out of Carnegie Mellon, land \$2.3M." May 29.

**Tech Crunch** (2014). "Qeexo Raises \$2.3 Million To Tell A Knuckle From A Nail." May 29.

**IEEE Spectrum** (2014). "Wearable Computers Will Transform Language." May 28.

**Wired** (2014). "Hardware Whizzes Solve a Big Smartwatch Problem: Your Fat Fingers." May 27.

**MIT Technology Review** (2014). "A Smart Watch Controlled by Twists, Tilts, and Clicks." May 14.

**PAGE Magazine** (2014). "Der sechste sinn." May 14 issue.

**ACM TechNews** (2014). "Carnegie Mellon Group Shows iPad Skeuomorphism." May 14.

Gizmodo (2014). "What Life Would Be Like If Skeuomorphism Ruled Our iPad Gestures." May 2.

The Economic Times (2014). "How a joystick could iron out kinks in smartwatches." May 2.

Fast Company (2014). "This iPad Interface Prefers 'Real' Tools To Digital Ones." May 2.

Daily Mail (2014). "Time to play! The twistable smartwatch that doubles up as a joystick." May 1

Engadget (2014). "Experimental UI equips you with a virtual tape measure and other skeuomorphs." May 1.

PC World (2014). "Researchers try a new 'twist' on smartwatch control." April 30.

Engadget (2014). "Concept smartwatch uses the whole screen as a joystick." April 30.

Gizmodo (2014). "A Joystick-Inspired Interface Could Solve Smartwatches' Biggest Problem." April 29.

New Scientist (2014). "Tilting smartwatch cuts need for fiddly screen-jabbing." April 29.

The Boston Globe (2014). "Company aims to reinvent reading in mobile era." March 10.

New York Times Magazine (2014). "Who made that progress bar?" March 7.

Pittsburgh Magazine (2014). "You should know Chris Harrison." March issue.

Technology Review, Germany (2014). "The body computer." March issue.

The Economist (2014). "Joining the dots." February 1<sup>st</sup> issue.

Communications of the ACM (2013). "It's Time for Smartwatches!" October 31.

The Times of India (2013). "With new tech, any surface can be touchscreen." July 10.

Fox News (2013). "WorldKit projector turns everything into a touchscreen." July 8.

Wired (2013). "Researchers Figure Out How You Can Type on a Smartwatch." May 1.

Slashdot (2013). "Carnegie Mellon Offers Wee QWERTY Texting Tech For Impossibly Tiny Devices." May 1.

Gizmodo (2013). "How Typing on a Smart Watch Might Actually Make Sense." April 29.

MIT Technology Review (2013). "A QWERTY Keyboard for Your Wrist." April 27.

New Scientist (2013). "Kinect plus projector makes anything a remote control." Issue 2914, April 27.

The Times of India (2013). "New tech turns your desk into touchscreen." April 26.

CNN Money (2013). "Forget touchscreens: paint a computer interface anywhere with WorldKit." Syndicated. April 25.

NBC News (2013). "Any surface becomes a touchscreen with smart projected interface." April 25.

NSF (2013) "News From the Field: With Wave of the Hand, Carnegie Mellon Researchers Create Touch-based Interfaces." April 25.

Discovery News (2013). "'Paint' a TV Remote onto Your Coffee Table." April 25.

MIT Technology Review (2013). "A Simple Way to Turn Any LCD into a Touch Screen." Quoted; April 24.

Popular Science (2013). "How It Works: A Touchscreen That Knows You." April issue.

Irish Times (2013). "Touchscreen technology rises to surface at Microsoft." March 28.

Technology Review (2013). "Authentication System Would Use the Body to Secure Guns and Gadgets." Quoted; March 8.

Popular Science (2013). "An Unfolding Story: How engineers are putting more stuff into less space." March 7.

New Scientist (2013). "Muscle-zapper forces gamers' own hands against them." January 31.

Smithsonian (2012). "Six Innovators to Watch in 2013." December 27.

Discovery News (2012). "Acoustic Barcodes React to a Scratch." December 13.

Gizmodo (2012). "Knuckle and Fingernail Gestures Could Be Coming Soon to a Touchscreen Near You." November 18.

Engadget (2012). "FingerSense lets touchscreens listen, makes any object an input device." November 18.

New Scientist (2012). "Knuckles and nails get invite to the touchscreen party." November 18.

Technology Review (2012). "Touch Screen Tech Can Distinguish Fingernails from Knuckles." November 15

Discovery (2012). "Acoustic Barcodes React to a Scratch." October 16.

Engadget (2012). "Acoustic barcodes store data in sound, go on just about anything." October 13.

The Verge (2012). "Acoustic Barcodes can use sound waves to create a binary ID on most surfaces." October 13.

New Scientist (2012). "A touchscreen that knows how you feel." October 12.

Technology Review (2012). "What Comes After the Touch Screen?" October 11.

The Verge (2012). "Disney Research explores capacitive fingerprinting to create multi-user touchscreens." October 9.

Engadget (2012). "Disney Research develops capacitive touch that detects multiple users through their fingertips." October 9.

New York Magazine (2012). Peter Andrey Smith. "The Future Is Calling." October 5.

Pittsburgh Post Gazette (2012). "Foot-powered phone charger among Project Olympus innovations." October 4.

Intel Digital Nibbles (2012). Interviewed about mobile interaction research. October 3.

Technology Review (2012). "35 Innovators under 35." September Issue. August 22.

CNN (2012). "Xbox Kinect hacks set innovation in motion." August 16.

CNN Money (2012). "Microsoft's Google Glass rival." July 31.

New Scientist (2012). "Touch and go." June 9 issue.

Fast Company (2012). "Tactus Creates Touchscreen Keys You Can Feel." June 6.

New Scientist (2012). "Beyond Kinect: Gestural computer spells keyboard death." May 15.

Daily Mail (2012). "Forget touch screens ... Touch everything! Disney unveils new technology that can turn ANYTHING into a button." May 14.

Engadget (2012). "New shear touch technology lets you skip a double-tap, push your device around." May 11.

SlashGear (2012). "Touchscreen research is sheer dragging genius." May 10.

The Huffington Post (2012). "Disney Touché: Advanced Gesture Control Tech Turns Everything Into A Touchscreen." May 9.

PC World (2012). "Disney Technology Turns Everything into a Touch Device." May 7.

Engadget (2012). "Disney Research's Touché system detects your touch on most things, even water." May 7.

Slate (2012). "Disney's Touché Makes Awesome Touchable Digital Interface With Tables, Water." May 7.

**PC Magazine** (2012). "Disney Turns Your Body Into a Touch Screen." May 7.

**Forbes** (2012). "Disney's New Touché Technology Turns The World into a Touchscreen." May 7.

**Technology Review** (2012). "Gesture Control System Uses Sound Alone." May 7.

**Time** (2012). "When I Think About My Computer, I Touch Myself." May 7.

**Wall Street Journal** (2012). "Bringing Touch Recognition to Everything." May 7.

**The Washington Post** (2012). "Disney may be on to something: New technology could bring objects to life." May 7.

**TechCrunch** (2012). "Touché Teaches Objects To Sense Your Touch." May 7.

**Fox News** (2012). "Disney bringing touch controls to body parts, water, more." May 7.

**Gizmodo** (2012). "Mind-Blowing Disney Sensor Tech Brings Gesture Based Computing To Everyday Objects." May 6.

**Ars Technica** (2012). "Disney researchers put gesture recognition in door knobs, chairs, fish tanks." May 6.

**Wired** (2012). "Augmented Reality: Disney Touche haptics." May 5.

**New Scientist** (2012). "Touché brings touch control to everyday things." May 4

**Venture Beat** (2015). "Amazing new touch technology could revolutionize smartphones, doorknobs, your sofa." May 4.

**CNN Money** (2012). "The quietest device in the room." March 15.

**USA Today** (2012). "SXSWi welcomes innovators, inventors to Austin." March 9.

**Engadget** (2012). "Microsoft Research's shoulder mounted system makes anything a multitouch display." March 7.

**Seattle Times** (2012). "Microsoft's TechFest shows off touchscreens on hands, bilingual avatars and more." March 6.

**Seattle Times** (2012). "Microsoft's TechFest trots out 'what is now possible' for computers." March 6.

**The Economist** (2012). "Meaningful Gestures." March 3.

**Popular Mechanics** (2012). "Why the Progress Bar Is Lying to You." February 27.

**CBC** (2012). Interviewed about on-body computing and natural interaction. February 22.

**New York Times** (2012). "Here's Looking at You (but I'm Still Texting)" February 11.

**The Economist** (2012). "Gestures of intent." February 6.

**Fast Company** (2012). "What Does The Perfect Mobile Interface Look Like?" February issue.

**BBC Focus** (2012). "When will we see the end of computer keyboards?" February issue.

**New Scientist** (2012). "Pinch-screen puts all your fingers in control." January 28 issue.

**AllThingsD** (2012). Wall Street Journal Network. "How Touchscreens Are Forcing the Reinvention of Keyboards." January 20.

**Fast Company** (2012). "What Does The Perfect Mobile Interface Look Like?" January 9.

**PC World** (2012). "10 Tech Research Projects to Watch." January 3.

**Wired** (2012). "25 big ideas for 2012: The new haptics." January issue.

**Technology Review** (2012). "Stealth Texting: Touch screens that work through fabric." January issue.

**Forbes** (2011). "30 under 30." Listed as one of the top 30 scientists under 30 years of age. December 12.

**Fast Company** (2011). "TapSense Lets You "Right-Click" On Touchscreens." December 11.

**Sydney Morning Herald** (2011). A keyboard in the palm of your hand. December 1.

**ABC News** (2011). "The End of Keyboards & Monitors: the OmniTouch." November 3.

**Discovery News** (2011). "Knuckle or nail: new touchscreen responds to both." October 25.

**Wired** (2011). "Augmented Reality: OmniTouch Kinect hack." October 24.

**HackADay** (2011). "Using an LCD's poor viewing angle to your advantage." October 24.

**PC World** (2011). "TapSense Touchscreens Know How You Touched Them." October 24.

**Gizmodo** (2011). "Future Touchscreens Could Know Exactly What Touched Them." October 22.

**Wall Street Journal** (2011). OmniTouch highlighted in Saturday paper. October 22.

**ZDNet** (2011). "Microsoft's OmniTouch turns any surface into a touchscreen." October 20.

**WBZ/CBS Radio, Boston** (2011). Interviewed on air about OmniTouch technology. October 20.

**New Scientist** (2011). "Control a touchscreen with raps, taps and flicks." October 20.

**Wall Street Journal** (2011). "How a Microphone Could Improve a Touchscreen." October 20.

**PC World** (2011). "OmniTouch Turns Everything Into a Touchscreen." October 19.

**Discovery News** (2011). "Your hand, wall or notepad as touchscreen." October 19.

**Fast Company** (2011). "A Wearable Computer Turns Any Surface Into A Touchscreen." October 19.

**Ars Technica** (2011). "Microsoft researchers want to turn your hand into a touchscreen." October 19.

**Forbes** (2011). "Turn Any Surface Into a Touch Screen." October 19.

**Tech Crunch** (2011). "New Screen Technology, TapSense, Can Distinguish Between Different Parts Of Your Hand." October 19.

**PC World** (2011). "Microsoft PocketTouch Lets You Use Your Phone Through Fabric." October 18

**Gizmodo** (2011). "Microsoft's PocketTouch Encourages You To Touch Yourself." October 18

**Pittsburgh Post-Gazette** (2011). "OmniTouch could shrink smartphones dramatically." Pittsburgh, PA. October 18.

**Huffington Post** (2011). "Microsoft 'PocketTouch' Enables Device Input Through Fabric." October 18

**Engadget** (2011). "Microsoft's PocketTouch prototype is like x-ray vision for your fingers." October 18

**PCMag.com** (2011). "Researchers Discover a Way To Make Anything a Touch Screen." October 18.

**Popular Science** (2011). "Wearable Projector and Kinect-Like Camera Turns Any Object Into a Touchscreen." October 18.

**New Scientist** (2011). "Turn anything (even your clothes) into a touchscreen." October 18.

**Slashdot** (2011). "CMU Researchers Create Multitouch Surface Anywhere." October 18.

**Technology Review** (2011). "Kinect Turns Any Surface Into a Touch Screen." October 18.

**Engadget** (2011). "OmniTouch projection interface makes the world your touchscreen." October 18.

**Tech Crunch** (2011). "CMU Researchers Turn Any Surface Into A Touchscreen." October 17.

**Gizmodo** (2011). "The OmniTouch Makes Any Surface Interactive." October 17.

**G4TV** (2011). Attack of the show. "Jessica Chobot Visits the Microsoft Campus." Skinput demoed. July 12.

**CNET** (2011). "Tactus touch screen sprouts keys and buttons." June 18.

**Engadget** (2011). "Apple's patent application opens the door to free-form acoustic gesture commands." February 21.

**Welt am Sonntag** (2011). "Handys geben küsschen." Skinput highlighted in magazine on the future of learning." January 30.

**PBS** (2011). "10 Mobile Trends in 2011." January 10.

**Orlando Sentinel** (2011). "Disney brand to be part of this year's Consumer Electronics Show in Las Vegas." January 4.

**CrunchGear** (2010). "Progress Bar Illusions." December 31.

**MSNBC** (2010). "Feel the future: Touch screens that touch back." December 29.

**TechNewsDaily** (2010). "Touch Screens That Touch Back: Feeling in the Future." December 29.

**Gizmodo** (2010). "Understanding the Devious Progress Bar Illusion." December 28.

**Gawker** (2010). "The Progress Bar Illusion is Sneaky." December 28.

**New Scientist** (2010). "Best videos of 2010: The progress bar illusion." December 24.

**New Scientist** (2010). "2010 Review: New Scientist's pick of the biggest technology stories of the year." December 23.

**Der Spiegel** (2010). "The body as a screen" (translated). Hamburg, Germany. December 13.

**BBC** (2010). "Touchscreen mobile technology developed to aid blind." Click segment. December 3.

**New Scientist** (2010). "Microsoft develops shape-shifting touchscreen." TeslaTouch mentioned. November 26.

**Technology Review** (2010). "A Touch Screen with Texture." October 13.

**CNN** (2010). "When glass touch screens feel like sandpaper." October 8.

**New Scientist** (2010). "Acoustic trick gives 'dumbphones' touchscreen feel." Issue 2778, September 18.

**Gadget Girlz** (2010). Skinput featured on internationally syndicated educational program. August 26.

**Popular Mechanics** (2010). "Top Weird Science Stories of 2010." Skinput included in top 19. August 12.

**IEEE Computer** (2010). "Project Converts Arms and Hands into Input Devices." IEEE, Washington D.C. August issue.

**BBC** (2010). "Haptics brings a personal touch to technology." TeslaTouch discussed. July 5.

**Photonics Spectra** (2010). "Optical sensors let gadgets point their own way." July issue.

**CNN** (2010). "New tech moves beyond the mouse, keyboard and screen." June 18.

**Natuurwetenschap & Techniek** (2010). "Beeldscherm op je arm" (Monitor on your arm). June 13.

**SonntagsZeitung** (2010). "We are too clumsy for the devices of the future" (translation). May 16.

**KRON 4 News** (2010). Gabriel Slate Tech Report. San Francisco. Skinput featured. May 15.

**Popular Science** (2010). "With Optical Sensors, Mobile Devices Become Their Own Mice." April 27.

**Wall Street Journal** (2010). "The Skinny on Touch Technology." Also interviewed by Simon Constable for Digits video story. April 26.

**ACM Tech News** (2010). "Minput Makes Movement a New Way to Control Small Electronics." April 26.

**CNET** (2010). "Minput brings mouse control to small devices." April 21.

**Sirius Hits 1** (2010). "How about that scientist who can make your skin a computer screen?" April 20.

**CNN** (2010). Front page: "Microsoft's Skinput turns hands, arms into buttons." April 19.

**Seattle PI** (2010). "Microsoft Research's 'Skinput' on CNN." Microsoft Blog. April 19.

**Voice of America** (2010). "Exploring New Frontiers of Computer-Human Interaction." April 17.

**WABE, Atlanta** (2010). Story about CHI 2010; Skinput highlighted. April 16.

**IDG News Service** (2010). World Tech Update. Syndicated on Macworld, others. April 15.

**PC World** (2010). "Talk About Touch Interface: Turn Your Body into an Audio-Based Input Device." April 14.

**Morning News with Larry Richert and John Shumway**, KDKA (2010). Interviewed live about Skinput technology. April 14.

**PC World** (2010). "Skinput Makes the Entire Body a Touch Interface." April 13.

**WTAE** (2010). Pittsburgh ABC affiliate. Primetime news story: "CMU Student's 'Skinput' Turns Human Body Into Touchscreen." April 9.

**New Scientist** (2010). "Visual tricks can make downloads seem quicker." April 9.

**Science Daily** (2010). "Student Uses Skin as Input for Mobile Devices." April 7.

**Technology Review** (2010). "Bioakustic Touchscreen Auf Dem Unterarm." April issue.

**Courrier Cadres** (2010). "Pour décrocher, grattez-vous l'oreille!" ("To hang up, scratch you ear!"). April issue.

**Al Arabiya** (2010). Primetime news broadcast featured Skinput, with local expert discussing the technology. Dubai, UAE. March 29.

**BBC News** (2010). "Sensors turn skin into gadget control pad." March 26.

**BBC ClickBits** (2010). Skinput included in rundown of the week's top tech stories. March 26.

**BFBS Radio** (2010). Skinput featured in piece on gadgets. Also on DAB Digital UK, Sky Guide 0211, and Freesat 786. March 23.

**BoingBoing** (2010). "The Beauty of Bones (and Skinput)." March 22.

**ExtremeTech** (2010). "With Skinput, Your Body Is Your Keyboard." March 19.

**DailyMail Online** (2010). "Skinput gadget turns your own ARM into a touchscreen display." March 9.

**TV Azteca** (2010). Skinput discussed during morning news on Mexico's second largest television network. March 9.

**NPR "Wait, Wait, Don't Tell Me"** (2010). Skinput used as answer to question on show. March 8.

**CMU** (2010). "Skinput: Harrison's Touchscreen Revolution." Front-page story on Carnegie Mellon University's website. March 7.

**NPR News** (2010). Host Stever Inskeep. "Technology: Skin Used As An Input Device." March 4.

**Slashdot** (2010). "Skinput Turns Your Body Into Your I/O." March 4.

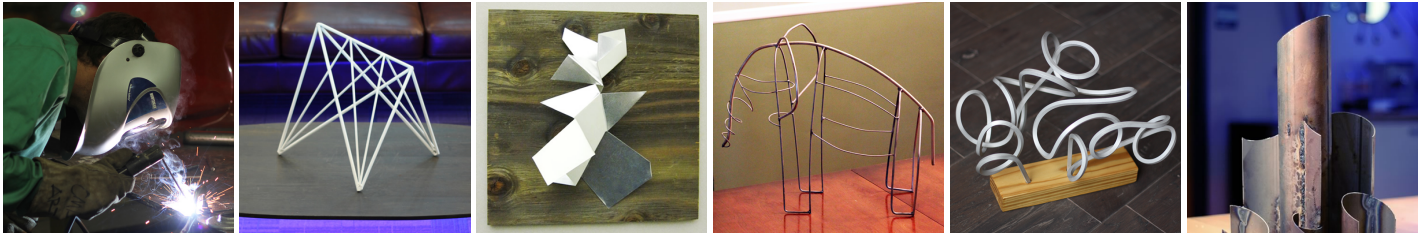
**MSNBC** (2010). "Skinput turns body into touchscreen interface." March 4.

**PC World** (2010). "Skinput Transforms Your Body Into a Touch-Sensitive Input Device." March 4.

**Wired** (2010). "Skinput Turns Your Arm into a Touch-Screen." March 3.  
**Popular Science** (2010). "Skinput Turns Any Bodily Surface Into a Touch Interface." March 3.  
**G4TV** (2010). Attack of the show. "You want the Skinput!" March 3.  
**Discovery News** (2010). "Tap your skin to dial your phone." March 2.  
**Engadget** (2010). "Skinput: because touchscreens never felt right anyway." March 2.  
**CNET** (2010). "Turn your arm into a phone with Skinput." March 2.  
**The Huffington Post** (2010). "Skinput Turns Your Skin Into A Touchscreen: Tap Your Arm To Control Your Gadgets." March 2.  
**Tom's Hardware** (2010). "Skinput Uses Your Body as a Touchscreen." March 2.  
**Gizmodo** (2010). "Skinput, the Touch-Interface For Your Skin, Brings a Whole Nother Meaning to Touch Typing." March 2.  
**New Scientist** (2010). "Body acoustics can turn your arm into a touchscreen." March 1.  
**ZDNet** (2010). "Skinput turns the body into an input surface." March 1.  
**The Seattle Times** (2010). "A peek at where Microsoft thinks we're going tomorrow." March 1.  
**New Scientist** (2010). "Magnet Magic Puts Phone Control in the Air." February 23.  
**Communications of the ACM** (2010). Interviewed and research profiled for article on "Alternate Interface Technologies Emerge." February issue.  
**Pittsburgh Post-Gazette** (2010). "Exhibition at Carnegie Mellon gives geography a new meaning." January 27.  
**Gizmodo** (2010). "Savagely Beating Cellphones Into Silent Mode: A Proposal." January 13.  
**New Scientist** (2010). "Silence that ringing cellphone with a whack." January 13.  
**Chicago Tribune** (2010). "Seniors, tech becoming savvy." January 2.  
**TV Tokyo** (2010). Tokyo, Japan. Interviewed about Lean & Zoom and placement detection research projects.  
**Times of India** (2010). Skinput discussed in India's largest English daily.  
**Contagious Magazine** (2010). Skinput featured in quarterly magazine.  
**Slashdot** (2009). "Giving Touch-Screen Buttons Depth and Height With Pneumatics." November 24.  
**The Independent** (2009). "Why touch screens push our buttons." September 9 issue.  
**Gizmodo** (2009). "After Pressing, Touching, Tapping and Shaking? A Scratch." August 10.  
**CrunchGear** (2009). "Crazy scratch UI to create cheap, unpowered touch surfaces." August 10.  
**Wired** (2009). Interviewed for "To Answer the Phone, Scratch Your Jeans." August 7.  
**Slashdot** (2009). "Mind-Blowing Interfaces On Display At SIGGRAPH 2009." August 5.  
**Technology Review** (2009). Scratch Input listed as one of "Five Futuristic Interfaces on Display at SIGGRAPH." August 4.  
**ReadWriteWeb** (2009). "Where's my Jet Pack? Apple Tablet and Future Interfaces." August 4.  
**Popular Mechanics** (2009). Interviewed about research on deformable multitouch screens. August issue.  
**Wired** (2009). "Experimental Touchscreen Has Physical Buttons That Can Pop Up, Disappear." May 13.  
**HackADay** (2009). "Tangible, changeable, multitouch controls." May 1.  
**Slashdot** (2009). "A Touch Screen With Morphing Buttons." April 29.  
**Engadget** (2009). "Carnegie Mellon morphs 'pop-up buttons' onto multi-touch display." April 28.  
**Gizmodo** (2009). "Step Aside, Multitouch and Haptics: This Touchscreen Has Buttons." April 28.  
**Technology Review** (2009). "Touch Screens with Pop-up Buttons: Future touch screens may need to supply tactile feedback." April 28.  
**The Register** (2009). "Boffins pump out pop-up touchscreen." April 28.  
**CMU** (2009). "Lean and Zoom: Here's to the Future." Front-page story on Carnegie Mellon University's website. February 16.  
**Make** (2009). "Pseudo-3D video conferencing." February 2.  
**Slashdot** (2009). "CMU Video Conference System Gets 3D From Cheap Webcams." January 29.  
**HackADay** (2009). "Pseudo 3D chat." January 29.  
**Wired** (2009). "3D Video Chat Using Regular Webcams." January 29.  
**Los Angeles Times** (2009). "Grandparents get their widgets on." January 10.  
**FOX Business** (2009). Reporting from CES 2009. Lean and Zoom highlighted as assistive technology in story on "gadgets for senior citizens." January.  
**Make** (2008). "Surface scratch control input." November 17.  
**Slashdot** (2008). "Researchers Turn Tables and Walls Into 'Scratch Input' Surfaces." November 15.  
**HackADay** (2008). "Scratch Input." November 14.

## SUPPLEMENTAL: ART & DESIGN

### SCULPTURE (2003 - Present)



Partial gallery: <http://art.chrisharrison.net>

### MIXED MEDIA (2003 - Present)



Partial list: <http://chrisharrison.net/index.php/Fun>

### CERAMICS (2000 - 2007)



Partial gallery: <http://chrisharrison.net/index.php/Fun/Ceramics>

### INFORMATION VISUALIZATION (2006 - 2009)



Partial list: <http://chrisharrison.net/index.php/Visualizations>

### MISCELLANEOUS (Birth - Present)



Partial list: <http://chrisharrison.net/index.php/Fun>

## GALLERIES, MUSEUMS AND EXHIBITIONS

<b>MAXXI Museo Nazionale delle arti del XXI secolo</b> (National Museum of 21st Century Arts) Rome, Italy. "A Story for the Future. MAXXI's first decade." Jan 9, 2020 - December 31, 2021.	<b>2020 – 2021</b>
<b>Mons 2015, Mundaneum Museum and Archive Centre</b> Mons, Belgium. "Mapping Knowledge: Understanding the World Through Data." June 12, 2015 - May 2016.	<b>2015 – 2016</b>
<b>Weizmann Institute of Science</b> Rehovot, Israel. "Map, Map on the Wall." Mapping in science and art. Curator: Yivsam Azgad.	<b>2014</b>
<b>Triennale di Milano</b> Milan, Italy. "The architecture of the World: Infrastructure, Mobility, New Landscapes." October 9 - February 10.	<b>2013 – 2014</b>
<b>Expoviz</b> Paris, France. Futur en Seine Festival. June 16 - 23.	<b>2012</b>
<b>Museum of Science and Industry</b> Tampa, FL. "Viz-IT." Arc Gallery. March 15 - 31.	<b>2012</b>
<b>New Art Center</b> Newton, MA. "Artistic Mediums." Series of bible visualizations included in show. January 24 - February 25.	<b>2011</b>
<b>Das Tirol Panorama</b> Innsbruck, Austria. Internet Map visualization included in interactive presentation as part of museum exhibit.	<b>2011</b>
<b>Biennale Internationale Design</b> Saint-Etienne, France. World Internet City-to-City Connections visualization part of exhibit. Nov. 20 - Dec. 5.	<b>2010</b>
<b>New York Hall of Science</b> New York, NY. Bible visualization included as part of NSF Visualization Challenge traveling exhibit. February - May.	<b>2010</b>
<b>Expo 2010</b> Shanghai, China. Extension of Indo-German train-based multimedia exhibition; see Science Express below.	<b>2010</b>
<b>Galleria di Piazza San Marco</b> Venice, Italy. "Migropolis: Venice / Atlas of a Global Situation." Oct. 8 - Dec. 6.	<b>2009</b>
<b>American University Museum</b> Washington, D.C. NSF traveling exhibit. June 16 - August 16.	<b>2009</b>
<b>Science Express</b> (train-based multimedia exhibition) Federal Ministry for Education and Research and The Max Planck Society for the Advancement of Science, Germany.	<b>2009</b>
<b>New Children's Museum</b> San Diego, CA. "Electronic City." Wall-sized Internet connections visualization included. April 11 - May 11.	<b>2009</b>
<b>Experimenta - Das Science Center</b> Helibronn, Germany. Internet visualizations included in exhibit on communication and technical media.	<b>2009</b>
<b>The National Science Library of the Chinese Academy of Sciences</b> Beijing, China. "Places & Spaces: Mapping Science Exhibit." Provided data. May 17 - June 30.	<b>2008</b>
<b>Intermedia Arts</b> (gallery) Minneapolis, MN. "W(e are) here: Mapping the Human Experience." March 31 - May 9.	<b>2008</b>
<b>Detroit Museum of New Art</b> Detroit, MI. "Artistic Mediums." April 5 - 26.	<b>2008</b>

## ARTISTIC WORK APPEARING IN SELECTED

### Books:

**Blown to Bits: Peril and Promise of the Digital Explosion** (2020). 2<sup>nd</sup> Ed. Hal Abelson, Ken Ledeen, and Harry Lewis. Addison-Wesley.  
**The Mantle of the Earth: Genealogies of a Geographical Metaphor** (2020). Veronica Della Dora. University of Chicago Press, USA.

**Data, Matter, Design** (2020). Marcella Del Signore, Nancy Diniz, and Frank Melendez. Routledge, United Kingdom.

**Introduction to Visual Information Design** (2018). Anna Myczkowska-Szczerska. Academy of Fine Arts, Krakow, Poland.

**History: The Definitive Visual Guide** (2015). 3<sup>rd</sup> Edition. Dorling Kindersley Limited, United Kingdom.

**Graphic Elements: Fundamental Subject of Graphic Design** (2015). Ryutaro Shirao et al. Musashino Art University, Japan.

**The Social Machine: Designs for Online Living** (2014). Judith Donath. MIT Press, Cambridge, MA.

**Human Geography: People, Place, and Culture** (2014). Erin H. Fouberg, Alexander B. Murphy, Harm J. de Blij. John Wiley & Sons, Etobicoke, ON.

**Becoming America** (2014). David Henkin and Rebecca McLennan. McGraw-Hill Higher Education, Columbus, OH.

**The Big Idea** (2014). National Geographic Society, Washington, D.C.

**Visual Simplicity** (2013). Markus Nix. Entwickler Press, Frankfurt, Germany.

**Digital Crossroads** (2013). Jonathan Nuechterlein and Philip Weiser. MIT Press, Cambridge, MA.

**The Human Face of Big Data** (2013). Rick Smolan and Jennifer Erwit. Against All Odds Productions.

**The Boulder Statements on Legal Research Education** (2013). Susan Mart. William S. Hein Publishing, Buffalo, NY.

**Sociology in Our Times** (2012). Nelson Education Ltd. & Cengage Learning, Inc.

**Ville Mobile** (2012). John Lovett. EPCC Cité du design. Sainte Etienne, France.

**Social Media Metrics Secrets** (2011). John Lovett. Wiley and Sons, Indianapolis, IN.

**The Image of Contemporary Metropolis** (2011). Lukasz Damurski. Warsaw University Publishers, Poland.

**Making the World Work Better: The Ideas that Shaped a Century and a Company** (2011). Pearson Education/IBM Press, Indianapolis, IN.

**Visual Complexity: A Visual Exploration on Mapping Complex Networks** (2011). Manuel Lima. Princeton Architectural Press, New York, NY.

**Castells and the Media** (2011). Philip Howard. Polity Press, Cambridge, UK.

**Complexity, networks and regulation** (2011). Andres Guadamuz. Edward Elgar Publishing Ltd, Northampton, MA.

**The Structure of Complex Networks** (2011). Ernesto Estrada. Oxford University Press, Oxford, UK.

**Towards a New Kind of Building** (2010). Kas Oosterhuis. Internet Maps incorporated. NAI Publishers, Rotterdam, The Netherlands.

**Diagraphics** (2010). Book "aims to prove that there is life beyond bar graphs." HarperCollins, New York, NY.

**Mapping America: Exploring the continent** (2010). Black Dog Publishing, London, UK.

**L'économie Immatérielle: Industries et marchés d'expériences** (2010). Olivier Bomsel. Service Artistique, Paris, France.

**The Prism and the Rainbow** (2010). Joel W. Martin. Johns Hopkins University Press. Baltimore, MD.

**Mannahatta: A Natural History of New York City** (2009). Eric Sanderson. Abrams, New York. Custom visualization of Muir webs included.

**Nelson Media: VCE Units 1-4** (2009). Jo Flack. Cengage Learning, South Melbourne, Australia.

**Imagine Rainbow** (2009). Ed. Thomas Bertschi. Rainbow Project, Schwanden, Switzerland.

**Ästhetik und Interaktion - Kommunikationsdesign für Alle** (2009). Translation: "Aesthetics and Interaction." Christof Breidenich. Springer, Berlin, Germany.

**Politik entdecken 9/10 NDS** (textbook, 2009). "Discover Politics". A. Dagmar Schmidt Cornelsen Verlag, Berlin, Germany.

**No Small Matter** (2009). Felice Frankel. Harvard University Press, Cambridge, MA.

**Internet Stories** (2009). Amosson Leedy. Lulu Enterprises, Morrisville, NC.

**Mapping a Critical Introduction** (2009). Jeremy W. Crampton. Wiley-Blackwell, Hoboken, NJ.

**Leaders Make the Future** (2009). Berrett-Koehler Publishers, San Francisco, CA.

**La Nuova Ecologia Politica** (2009). G.G. Feltrinelli Editore S.r.l., Milan, Italy.

**The Prism and the Rainbow** (2009). Johns Hopkins University Press. Baltimore, MD.

**New Internationalist's Youth Diary** (2009). New Internationalist Publications, Adelaide, Australia.

**Computing in Bioinformatics** (2008). Shuba Gopal, Anne Haake, Rhys Price Jones and Paul Tymann. McGraw-Hill, Inc.

**Blown to Bits: Peril and Promise of the Digital Explosion** (2008). Hal Abelson, Ken Ledeen, and Harry Lewis. Addison-Wesley.

**Data Flow** (2008). Die Gestalten, Berlin, Germany. Visualizations featured in "comprehensive survey of innovatively designed diagrams."

**Conocimientos Fundamentales de Computación** (2008). Ed. Sergio Rajsbaum. Dirección General de Publicaciones, Universidad Nacional Autónoma de México.

**Best of DC: 'Defining Change' in American Leadership** (2008). Global Village Publishing, Alexandria, VA.

**Migropolis: Venice/Atlas of a Global Situation** (2008). Ed. Wolfgang Scheppe, Hatje Cantz Verlag. Collaborated with team to produce custom visualizations.

**Online Nation: Five Year Growth Trends in Online Learning** (2007). I. Elaine Allen and Jeff Seaman, Sloan Foundation.

## Other Outlets and Media:

**Royal Geographical Society** (2018). In presentation by Sunand Prasad (PPRIBA). October.

**National Geographic** (2015). "Taking Data Visualization From Eye Candy to Efficiency". September 22.

**Neue Zürcher Zeitung** (2015). Internet Map used in January 5<sup>th</sup> issue. Zurich, Switzerland.

**100 Scientific Discoveries that Changed the World** (2014). National Geographic special issue. National Geographic Society, Washington, D.C.

**Kohkoku Magazine** (2012). "Where art and science fall in love." Hakuodo Inc. Vol 53.2.

**PBS Nightly Business Report** (2012). Internet maps used in shows transition graphics.

**GalleristNY** (2012). "At 47 Canal, Antoine Catala Looks at the Meaning of Catastrophes." February 23.

**Popular Science** (2011). Bible cross-references visualization featured. November Issue.

**Wired** (2011). "Data as Art: 10 Striking Science Maps." March 8.

**Gizmodo** (2011). "Google shows why the world is screwed" January 12.

**Slashdot** (2011). "How Do You Visualize 100 GB of Google Text Data?" January 11.

**Fast Company** (2011). "Infographic of the Day: What Google Knows About Men vs. Women." January 10.

**Klassekampen** (2010). Internet Map appeared in Norwegian Newspaper; accompanied book review on the growth of internet and social media.

**PBS** (2010). "Six Stunning Projects That Show the Power of Data Visualization." October 5.

**Communications of the ACM** (2010). Digg Rings visualization shown in feature article on "Predicting the Popularity of Online Content." August issue.

**Kulturaustausch** (2010). Internet Map visualization appeared in magazine. Berlin, Germany. August Issue.

**Internationale Politik** (2010). Internet Map used for cover art.

**Arte TV** (2010). Mit offenen Karten: Internet und Geopolitik. Strasbourg, France. Internet map used to illustrate how the world is connected.

**TED** (2010). Dillon Dhanecha. "Africa - Inspire and be Inspired." World Internet Maps included in talk.

**National Geographic** (2009). Visualization of Muir web data featured in "Before New York" article on what Manhattan Island was like in 1609. Sept. issue.

**Discover Magazine** (2009). Visualizations featured in September issue.

**TED Global** (2009). Oxford, England. "Eric Sanderson pictures New York -- before the City." Custom Muir web visualization included in talk.

**Institutional Capacity Building and Societal Development** (2009). UNESCO National Commission. Internet map used as graphical centerpiece in booklet.

**Discover** (2009). "What Is This? Spirograph 2.0?" August 24.

**Internationale Politik** (2009). Deutsche Gesellschaft für Auswärtige Politik, Berlin, Germany. Internet map visualization featured in July issue.

**FFFFound** (2009). "Web Trigrams Visualization." July 7.

**National Geographic** (2009). "Best Science Images of 2008 Announced." May 19.

**Infosthetics** (2009) "Dynamically Changeable Buttons on a Visual Display." May 1.

**Focus** (2009). Poland. Bible visualization featured. May issue.

**Physics World** (2009). Wikipedia visualizations appeared in "Doing Science in the Open" article. May issue. Bristol, United Kingdom.

**Cooperant** (2009). Dirección General de Cooperación del Govern Balear, Spain. Internet Map visualization used in April issue.

**Communications of the ACM** (2009). Internet map included in article on "Improving Performance on the Internet." February issue.

**FFFFound** (2009) "Chris Harrison - WikiViz: Visualizing Wikipedia." January 17.

**Computertechnik** (2009). Internet map appeared in "Visualisierung: Komplexe Informationen vermitteln." Vol. 4. Hannover, Germany.

**Kopfball** (2009). WDR, Cologne, Germany. Internet map visualization used in public-broadcast science show on how the Internet works.

**QI** (2009). BBC. Produced by talkbackTHAMES, London, UK. Bible visualization used as topic of discussion.

**John and Stephanie Show, WORD FM** (2008). Discussed Bible visualizations on air. December 8.

**Popular Mechanics** (2008). Custom rendition of the Internet Map provided for a story on "The Coming Digital War." New York, NY.

**Popular Mechanics Russia** (2008). Interviewed by magazine for six-page article on visualization projects. Moscow, Russia.

**Neue Zürcher Zeitung** (2008). "Visualizing the Bible" featured as one of NSF's SEVC winners. October 1. Zurich, Switzerland.

**Die Zeit** (2008). Internet Maps visualization featured in double-page spread on the Internet. No. 19, Vol. 63. Hamburg, Germany.

**Physics World** (2008). Internet Maps visualization appeared in "The Global-Village Pioneers" article, October issue. Bristol, United Kingdom.

**Tages-Anzeiger** (2008). "Visualizing the Bible" featured as one of NSF's SEVC winners. September 26. Zurich, Switzerland.

**Science** (2008). "Visualizing the Bible." Honorable mention, illustration category, NSF Science and Engineering Visualization Challenge. Vol. 321. Sept. 26, 2008.

**Infosthetics** (2008) "2008 Visualization Challenge Winners." September 26.

**MSNBC** (2008). "Science you can see." September 25.

**Freitag** (2008). Internet Maps included in "Was ihr wollt" (as in Shakespeare) article. September 19. Berlin, Germany.

**Make** (2008). "Chris Harrison's visualization projects." August 8.

**FlowingData** (2008) "12 Cool Visualizations to Explore Books." June 12.

**Infosthetics** (2008) "Digg Stories History Rings Book Map." June 3.

**Symmetry** (2008). Internet connection density visualization used in "Mapping the Digital Divide" article. Fermilab. Batavia, IL.

**Infosthetics** (2008) "Google Trigram Frequency Visualization." May 9.

**DAG** (2008). Internet map to appear in "Is the web bursting from heavy traffic?" (trans.) article. Amsterdam, The Netherlands.

**GEO** (2008) Bible visualization featured in September issue article on "The Beauty in the Art of Data." Hamburg, Germany.

**FlowingData** (2008) "World Internet City-to-City Connections and Density Maps." April 1.

**The National Post** (2008). Ran full-page spread on the Bible Visualizations. February 27. Toronto, Canada.

**Visual Complexity** (2008) "Visualizing the Bible."

**Aperture** (2008). Internet Map visualization appeared in the Summer 2008 issue. New York, NY.

**GIS Magazine** (2008). Internet Map visualization appeared in the March edition. Amsterdam, The Netherlands.

**De:bug** (2008). Bible visualizations featured in an article about social networks. Berlin, Germany.

**Atlas of Science** (2008). Cyberinfrastructure for Network Science Center, Indiana University.

**Infosthetics** (2008) "Visualizing the Bible." January 24.

**Homme/Femme Perfumes** (2008). O Boticário (cosmetics company), São José dos Pinhais, Brazil. Internet Map visualization used for box art.

**Social Science History Test** (2008). Educational Testing Service (ETS), Lawrenceville, NJ. Internet map visualization used in standardized test.

**São Paulo Fashion Week** (2007). AG407 (advertising Firm), São Paulo, Brazil. Internet Map visualization used in the event's advertising materials.

**NSF and the Birth of the Internet** (2007). NSF Special Report, December 20, 2007. Internet Map visualization included as resource material.

**Internet Society, German Chapter** (2007). Internet map shown during presentation in annual meeting of chapter. The Internet in Africa. November 27.

**Slashdot** (2007) "A New Map of the Internet." October 4.

**Infosthetics** (2007) "Clusterball Wikipedia Categories." June 19.

**Visual Complexity** (2007) "Internet Map."

**Visual Complexity** (2007) "WikiViz."

**Visual Complexity** (2007) "ClusterBall: Visualizing Wikipedia." April 19.

**PingMag** (2007). "Infosthetics: the beauty of data visualization." March 23.

**Slashdot** (2007) "Visualizing Searches Over Time." March 2.

**Infosthetics** (2007) "400 Years of Academic Papers." February 1.