

Cheng Zhang

CONTACT INFORMATION

231 Gates Hall
Cornell University
Gates Hall, Ithaca, NY

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SciFi Lab: <https://www.scifilab.org/>
Personal Website: <https://www.czhang.org/>

RESEARCH INTERESTS

Ubiquitous Computing, Wearable Computing, Human Computer Interaction

EDUCATION

Georgia Institute of Technology, Atlanta, Georgia USA

Ph.D., Computer Science, Ubicomp Lab August, 2012 - May, 2018

- Advisor: Dr. [Gregory D. Abowd](#) and Dr. [Omer Inan](#)
- Thesis Title : Novel Gestures for Wearables (**Georgia Tech College of Computing Doctoral Dissertation Award and Nominated for ACM Doctoral Dissertation Award**)
- Thesis Committee: Dr. Gregory Abowd , Dr. Omer Inan , Dr. Thad Starner, Dr. Thomas Ploetz, Dr.Chris Harrison

Institute of Software, Chinese Academy of Sciences, Beijing, China

M.S., Computer Applied Technology, **Outstanding Graduates 5%**(Highest Honor) September, 2009 - July, 2012

Nankai University, Tianjin, China

B.A., Software Engineering, September, 2004 - June, 2008

PROFESSIONAL EXPERIENCE

Cornell University, Ithaca, New York USA

Assistant Professor in Information Science at Bowers College of Computing and Information Science
Director of [Smart Computer Interfaces for Future Interaction \(SciFi\) Lab](#) July. 2018 - Present

Georgia Institute of Technology, Atlanta, Georgia USA

Graduate Research Assistant August. 2012 - May. 2018

Yahoo! Labs, Sunnyvale, California, USA *Research Intern*

May, 2014 - July,2014

Distinguish drivers by using sensors from the smartphone and OBD sensor in the car.

IBM China, Beijing, China *Software Engineer Intern*

Dec, 2009 - Feb,2010

Institute of Software, Chinese Academy of Sciences, Beijing, China

Graduate Research Assistant

September, 2009 - July,2012

Researched on tangible programming interface and music interface for children.

SELECTED AWARDS

- Best Poster Award on The ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN) 2024
- Best Paper Honorable Mention on International Symposium on Wearable Computing (ISWC) 2023
- Ubicomp 10-Year Impact Award 2023
- NSF CAREER Award 2023
- ECCV Best Demo Honorable Mention 2020

- Georgia Tech College of Computing Doctoral Dissertation Award 2019
- Outstanding Graduate Research Assistant in College of Computing, Georgia Tech (Top award for graduate research assistants in the College) 2018
- Best Short Paper Award on 20th ACM Conference on Intelligent User Interfaces (less than 1% of all submissions) 2015
- Best Paper Award on UbiComp 2013 (less than 1% of all submissions) 2013
- Outstanding Graduate in Beijing (Top 4% from all graduate students in Beijing) 2012
- Outstanding Graduate in the Graduate University of the Chinese Academy of Sciences (Highest Honor, Top 4% from all graduate students) 2012
- Merit Student at the Chinese Academy of Science (15%) 2011
- 3rd Prize, Outstanding Student Scholarship of Nankai University 2006
- 2nd Prize, Freshman Scholarship of Nankai University (5%) 2004
- 3rd Prize, Mathematical Olympiad Competition for Students at Middle School students in ShaanXi Province, China 2001
- 2nd Prize, Mathematical Olympiad Competition for Students at Elementary School Students in XianYang City, ShaanXi Province, China 1998

TEACHING
EXPERIENCE

Cornell University, Ithaca, New York USA

Instructor

- IS PhD Professionalization Seminar [INFO 7905]. Fall 2020
- Introduction to Rapid Prototyping and Physical Computing [INFO 4320/5321]. Spring 2019, 2020, 2021, 2022, 2023,2024, Fall 2022,2023,2024
- Ubiquitous Computing[INFO 4120/6120]. Fall 2021
- Novel Interaction Techniques” [INFO 4275/6275]. Fall 2019
- Information Science Special Topics: Future User Interfaces [INFO 4940 INFO 6940]. Fall 2018

Georgia Institute of Technology, Atlanta, Georgia USA

Teaching Assistant

- Principles of User Interface Software,[CS 6456, CS 4470]. Fall, 2014
Instructor: Dr. Keith Edwards
- ”Mobile and Ubiquitous Computing” [CS 7470,CS 4605,ID 8900,ID 4823]. Spring, 2016
Instructor: Dr. Thad Starner

PUBLICATIONS

Saif Mahmud,Vineet Parikh, Qikang (Kenny) Liang, Ke Li, Ruidong Zhang, Ashwin Ajit, Vipin Gunda, Devansh Agarwal, Francois Guimbretiere, **Cheng Zhang**. ActSonic: Recognizing Everyday Activities from Inaudible Acoustic Waves Around the Body. Accepted with Minor revision for The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) ,[\[Preprint at arXiv\]](#)

Ke Li, Devansh Agarwal, Ruidong Zhang, Vipin Gunda, Tianjun Mo, Saif Mahmud, Boao Chen, François Guimbretière, and **Cheng Zhang**. SonicID: User Identification on Smart Glasses with Acoustic Sensing. Accepted with Minor revision for The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) [\[Preprint at arXiv\]](#)

Tianhong(Catherine) Yu, Guilin Hu, Ruidong Zhang, Hyunchul Lim, Saif Mahmud, Chi-Jung Lee, Ke Li, Devansh Agarwal, Shuyang Nie, Jinseok Oh, Francois Guimbretiere, **Cheng Zhang**. Ring-a-Pose: A Ring for Continuous Hand Pose Tracking. Accepted with Minor revision for The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) [\[Preprint at arXiv\]](#)

Hwai Yin Ooi , **Cheng Zhang**, Ke Li , Jordan Narins , and Harini Sarva. AI-Powered Eyewear for Routine Facial Expression Analysis in Parkinson’s Disease. International Congress of Parkinson’s Disease and Movement Disorders 2024, To Appear.

Tianhong Catherine Yu , Manru , Zhang , Peter He , Chi-Jung Lee , Cassidy Cheesman, Saif Mahmud , Ruidong Zhang , François Guimbretière , and **Cheng Zhang**. SeamPose: Repurposing Seams as Capacitive Sensors in a Shirt for Upper-Body Pose Tracking. Annual ACM Symposium on User Interface Software and Technology (UIST’24), To Appear [[Preprint at arXiv](#)]

Saif Mahmud, Devansh Agarwal , Ashwin Ajit , Qikang Liang , Thalia Viranda , Francois Guimbretiere , and **Cheng Zhang**. MunchSonic: Tracking Fine-grained Dietary Actions through Active Acoustic Sensing on Eyeglasses. The 2024 international symposium on wearable computers (ISWC ’24). To Appear. [[Preprint at arXiv](#)]

Vineet Parikh , Saif Mahmud , Devansh Agarwal , Ke Li, François Guimbretière, and **Cheng Zhang**. EchoGuide: Active Acoustic Guidance for LLM-Based Eating Event Analysis from Egocentric Videos. The 2024 international symposium on wearable computers (ISWC ’24), To Appear. [[Preprint at arXiv](#)]

Yin LI, Rohan Reddy, **Cheng Zhang**, Rajalakshmi Nandakumar Beyond-Voice: Towards Continuous 3D Hand Tracking on Commercial Home Assistant Devices. International Conference on Information Processing in Sensor Networks, (ISPN’24). **Best Poster Award for accompanying poster presentation**

Ke Li, Ruidong Zhang, Siyuan Chen, Boao Chen, Francois Guimbretiere, **Cheng Zhang**. EyeEcho: Continuous and Low-power Facial Expression Tracking on Glasses. The Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI’24).

Chi-jung Lee, Ruidong Zhang, Devansh Agarwal, Tianhong Catherine Yu, Vipin Gunda, Oliver Lopez, James Kim, Sicheng Yin, Boao Dong, Ke Li, Mose Sakashita, Francois Guimbretiere, **Cheng Zhang**. EchoWrist: Continuous Hand Pose Tracking and Hand-Object Interaction Recognition Using Low-Power Active Acoustic Sensing On a Wristband. The Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI’24).

Ke Li, Ruidong Zhang, Boao Chen, Siyuan Chen, Sicheng Yin, Qikang Liang, Francois Guimbretiere, **Cheng Zhang**. GazeTrak: Exploring Acoustic-based Eye Tracking on a Glass Frame. 2024 International Conference on Mobile Computing and Networking (MobiCom ’24).

Ruidong Zhang, Ke Li, **Cheng Zhang**. HPSpeech: Silent Speech Interface for Commodity Headphones. The 2023 international symposium on wearable computers (ISWC ’23). **Highest Review Score, Best Paper Honorable Mention**

Ruijia Sun, Xiaohe Zhou, Benjamin Steeper, Ruidong Zhang, Sicheng Yin, Ke Li, Shengzhang Wu, Francois Guimbretiere, **Cheng Zhang**. EchoNose: Sensing Mouth, Breathing and Tongue Gestures inside Oral Cavity using a Non-contact Nose Interface. The 2023 international symposium on wearable computers (ISWC ’23).

Hyunchul Lim, Guilin Hu, Richard Jin, Hao Chen, Ryan Mao, Ruidong Zhang, **Cheng Zhang**. C-Auth: Exploring the Feasibility of User Authentication on Smart Glasses Based on Subtle Skin-Deformations. The 2023 international symposium on wearable computers (ISWC ’23).

Saif Mahmud, Ke Li, Guilin Hu, Hao Chen, Ricard Jin, Ruidong Zhang, Francois Guimbretiere, **Cheng Zhang**. PoseSonic: 3D Upper Body Pose Estimation Through Egocentric Acoustic Sensing on Smartglasses. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous

Technologies (IMWUT/UbiComp'23).

Ruidong Zhang, Ke Li, Yihong Hao, Yufan Wang, Zhengnan Lai, Francois Guimbretiere, **Cheng Zhang**. EchoSpeech: Continuous silent speech recognition on minimally-obtrusive eyewear powered by acoustic sensing. The Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23).

Mose Sakashita, Xiaoyi Li, Ruidong Zhang, Hyunju Kim, Michael Russo, Malte Jung, **Cheng Zhang**, Francois Guimbretiere, ReMotion: Supporting Remote Collaboration in Open Space with Automatic Robotic Embodiment. The Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, (CHI '23).

Hyunchul Lim, Samhita Pendyal, Wei Liu, Yaxuan Li, Ruidong Zhang, Jeyeon Jo, Benjamin Steeper, **Cheng Zhang**. D-Touch: Recognizing and Predicting Fine-grained Hand-face Touching Activities Using a Neck-mounted Wearable. The 28th Annual Conference on Intelligent User Interfaces (IUI '23).

Ruidong Zhang, Jihai Zhang, Nitish Gade, Peng Cao, Se Yun Kim, Junchi Yan, **Cheng Zhang**. EatingTrak: Detecting fine-grained eating moments in the wild using a wrist-mounted IMU. The ACM International Conference on Mobile Human-Computer Interaction. (MobileHCI '22).

Hyunchul Lim, Yaxuan Li, Matthew Dressa, Fang Hu, Jae Kim, Ruidong Zhang, **Cheng Zhang**. BodyTrak: Inferring Full-body Poses from Body Silhouettes using a Miniature Camera on a Wristband. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) /UbiComp '22.

Ke Li, Ruidong Zhang, Bo Liang, Francois Guimbretiere, **Cheng Zhang**. EarIO: A Low-power Acoustic Sensing Earable for Continuously Tracking Detailed Facial Movements. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) /UbiComp '22.

Ruidong Zhang, Mingyang Chen, Benjamin Steeper, Yaxuan Li, Zihan Yan, YiZhuo Chen, Songyun Tao, Tuochao Chen, Hyunchul Lim, **Cheng Zhang**. SpeeChin: A Smart Necklace for Silent Speech Recognition. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) /UbiComp '22.

Wei Sun, Franklin Mingzhe Li, Congshu Huang, Zhenyu Lei, Benjamin Steeper, Songyun Tao, Feng Tian, **Cheng Zhang**. ThumbTrak: Recognizing Micro-finger Poses Using a Ring with Proximity Sensing. The ACM International Conference on Mobile Human-Computer Interaction (MobileHCI'21).

Hyunchul Lim, David Lin, Jessica Tweneboah, **Cheng Zhang**. HandyTrak: Recognizing the Holding Hand on a Commodity Smartphone from Body Silhouette Images. The 33rd ACM Symposium on User Interface Software and Technology (UIST'21).

Tuochao Chen, Songyun Tao, Yaxuan Li, Hyunchul Lim, Mose Sakashita, Ruidong Zhang, Francois Guimbretiere, **Cheng Zhang**. NeckFace: Continuously Tracking Full Facial Expressions by Deep Learning the infrared images of the chin and face from Neck-mounted wearables. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) /UbiComp '21.

Wei Sun, Franklin Mingzhe Li, Benjamin Steeper, Songlin Xu, Feng Tian, **Cheng Zhang**. Teeth-Tap: Recognizing Discrete Teeth Gestures using Motion and Acoustic Sensing on an Earpiece. The 26th Annual Conference on Intelligent User Interfaces (IUI'21).

Tuochao Chen, Benjamin Steeper, Kinan Alsheikh, Songyun Tao, Francois Guimbretiere, **Cheng Zhang**. C-Face: Continuously Reconstructing Facial Expressions by Deep Learning Contours of the Face with Ear-mounted Miniature Cameras. The 33rd ACM Symposium on User Interface Software and Technology (UIST'20). [[Project Page](#)]

Wei Sun, Tuochao Chen, Jiayi Zheng, Zhenyu Lei, Lucy Wang, Benjamin Steeper, Peng He, Matthew Dressa, Feng Tian, **Cheng Zhang**. VibroSense: Recognizing Home Activities by Deep Learning Subtle Vibrations on an Interior Surface of a House from a Single Point Using Laser Doppler Vibrometry. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) /UbiComp '20. [[Project Page](#)]

Fang Hu, Peng He, Songlin Xu, Yin Li, **Cheng Zhang**. FingerTrak: Continuous 3D Hand Pose Tracking by Deep Learning Hand Silhouettes Captured by Miniature Thermal Cameras on Wrist. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) /UbiComp '20, [[Project Page](#)]

Hong Li, Shishir Chawala, Richard Li, Sumeet Jain, Gregory D. Abowd, Thad Starner, **Cheng Zhang**, Thomas Ploetz. WristWash: Towards Automatic Handwashing Assessment using a Wrist-worn Device. The 2018 international symposium on wearable computers (ISWC '18)

Cheng Zhang, Qiuyue Xue, Anandghan Waghmare, Ruichen Meng, Sumeet Jain, Yizeng Han, Xinyu Li, Kenneth Cunefare, Thomas Ploetz, Thad Starner, Omer Inan, Gregory D. Abowd. FingerPing: Recognizing fine-grained hand poses using active acoustic on-body sensing, (Was named FingerSonar) The Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18) [[Paper](#)][[Video](#)]

Cheng Zhang, Anandghan Waghmare, Pranav Kundra, Scott Gilliland, Thomas Ploetz, Thad Starner, Omer Inan, Gregory D. Abowd. FingerSound: Recognizing unistroke thumb gestures using a Ring, The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)/ Also presented at The ACM international joint conference on pervasive and ubiquitous computing (UbiComp) 2017. [[Paper](#)][[Video](#)]

Bin Guo, Yi Ouyang, **Cheng Zhang**, Jiafan Zhang, Zhiwen Yu, Yu Wang, CrowdStory: Fine-Grained Event Storyline Generation by Fusion of Multi-Modal Crowdsourced Data. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)/UbiComp 2017. [[Paper](#)]

Cheng Zhang, Xiaoxuan Wang, Anandghan Waghmare, Sumeet Jain, Thomas Ploetz, Omer Inan, Thad Starner, Gregory Abowd, FingOrbits: Interaction with Wearables using Synchronized Thumb Movements , The 2017 international symposium on wearable computers (ISWC 2017). [[Paper](#)][[Video](#)]

Cheng Zhang, Qiuyue Xue, Anandghan Waghmare, Sumeet Jain, Yiming Pu, Sinan Hersek, Kent Lyons, Kenneth A. Cunefare, Omer T. Inan, Gregory D. Abowd. 2017. SoundTrak: Continuous 3D Tracking of a Finger Using Active Acoustics. The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)/ Also presented at The ACM international joint conference on pervasive and ubiquitous computing (UbiComp) 2017. [[Paper](#)][[Video](#)]

Caleb Southern, Yunnuo Cheng, **Cheng Zhang**, Gregory D. Abowd. 2017. Understanding the Cost of Driving Trips. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 430-434. [[Paper](#)]

Cheng Zhang, Sinan Hersek, Yiming Pu, Danrui Sun, Qiuyue Xue, Thad E. Starner, Gregory D. Abowd, Omer T. Inan. Bioacoustics-Based Human-body-mediated communication (Published on February Issue 2017 on IEEE Computer Magazine) [[Paper](#)][[Video](#)]

Cheng Zhang, Abdelkareem Bedri, Gabriel Reyes, Bailey Bercik, Omer T. Inan, Thad E. Starner, Gregory D. Abowd. TapSkin: Recognizing on-skin input for smartwatches, Published on 2016 ACM International Conference on Interactive Surface and Spaces (ISS) 2016, Acceptance rate: 33/119 = 27.7% [[Paper](#)][[Video](#)]

Cheng Zhang, Junrui Yang, Caleb Southern, Thad E. Starner, Gregory D. Abowd. WatchOut: extending interactions on a smartwatch with inertial sensing, In Proceedings of the 2016 ACM International Symposium on Wearable Computers (ISWC), 2016, Acceptance rate: 18 papers were accepted as full paper out of 132 submissions [[Paper](#)][[Video](#)]

Cheng Zhang, Anhong Guo, Dingtian Zhang, Yang Li, Caleb Southern, Rosa Arriaga, Gregory D Abowd. Beyond the Touchscreen: An Exploration of Extending Interactions on Commodity Smartphones, In ACM Transactions on Interactive Intelligent Systems, 2016, Special Issue "Highlights of IUI'15) [[Paper](#)]

Cheng Zhang, Senaka Buthpitiya, Mitesh Patel, Kent Lyons, Beverly Harrison, Gregory D. Abowd, Driver Classification based on their behaviors (In Proceedings of the 20th International Conference on Intelligent User Interfaces (IUI) 2016), Acceptance rate 24%. [[Paper](#)]

Cheng Zhang, Anhong Guo, Dingtian Zhang, Caleb Southern, Rosa I.Arriaga, Gregory D Abowd. BeyondTouch:Extending the Input Language with Built-in Sensors on Commodity Smartphones, In Proceedings of the 20th International Conference on Intelligent User Interfaces (IUI) 2015, Acceptance rate 22.9% [[Paper](#)][[Video](#)]

Edison Thomaz, **Cheng Zhang**, Irfan Essa, Gregory Abowd, Inferring Meal Eating Activities in Real World Settings from Ambient Sounds: A Feasibility Study, In Proceedings of the 20th International Conference on Intelligent User Interfaces (IUI) 2015, **Best Short Paper 1%**, Acceptance rate 22.9%. [[Paper](#)]

Yoshihiro Kawahara, Steve Hodges, Benjamin S. Cook, **Cheng Zhang**. Gregory D Abowd. Instant Inkjet Circuits: Labbased Inkjet Printing to Support Rapid Prototyping of UbiComp Devices. The 2013 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp 2013). [[Paper](#)] **Best Paper Award, less than 1% , 10-Year Impact Award**

Cheng Zhang, A Tangible Programming Tool for Children, Master in Computer Applied Technology Thesis, Institute of Software and Graduate University of Chinese Academy of Sciences, July, 2012.

Danli Wang, **Cheng Zhang** (*The only student author*), Hongan Wang. T-Maze: A Tangible Programming Tool for Children The 10th ACM International Conference on Interaction Design and Children (IDC) 2011, Acceptance Rates 30%. [[Paper](#)]

POSTER &
DOCTORAL SCHOOL Ricardo Gonzalez Penuela, Paul Vermette, Zihan Yan, **Cheng Zhang**, Keith Vertanen, Shiri Azenkot, Proceedings of the 24th International ACM SIGACCESS Conference on Computers and Accessibility (Poster, ASSETS'23)

Fang Hu, Peng He, Songlin Xu, Yin Li, **Cheng Zhang**. FingerTrak: Continuous 3D Hand Pose Tracking by Deep Learning Hand Silhouettes Captured by Miniature Thermal Cameras on Wrist. Demo for ECCV'20, **ECCV'20 Best Demo Honorable Mention**. [[Project Page](#)]

Cheng Zhang, Aman Parnami, Caleb Southern, Edison Thomaz, Gabriel Reyes, Rosa Arriaga, Gregory Abowd BackTap: Robust Four-Point Tapping on the Back of an Off-the-shelf Smartphone, Video, Proceedings of the Adjunct Publication of the 26th Annual ACM Symposium on User Interface Software and Technology (UIST'13). [[Paper](#)][[Video](#)]

Cheng Zhang, Rosa I. Arriaga, Gregory D Abowd. BeyondTouch: A Framework for Extending Input on Commodity Smartphones. The Doctoral School of UbiComp 2013, Zurich, Switzerland, September 8-12, 2013. [Paper]

Cheng Zhang, Li Shen, Danli Wang, Feng Tian, Hongan Wang. “CoolMag: A Tangible Interaction Tool to Customize Instruments for Children in Music Education ” the 13th ACM International Conference on Ubiquitous Computing (UbiComp’11) (Poster). [Paper]

SELECTED PATENTS / PATENT APPLICATIONS **Cheng Zhang**, Ruidong Zhang, Benjamin Steeper Acoustic Interface System for Silent Recognition and Other Applications Appl No. 63/392,716

Cheng Zhang, Francois Guimbretiere, Ruidong Zhang, Ke Li Wearable Facial Movement Tracking devices Appl No. 63/343,023

Cheng Zhang, Ruidong Zhang, Se Yun Kim, Peng Cao, Xiayan Ji Machine learning based activity detection utilizing reconstructed 3D arm postures, Pat. App. PCT/US21/29189

Cheng Zhang, Tuochao Chen, Wei Sun, SYSTEMS, Software and Methods for recognizing home activities by deep learning subtle vibrations on an interior surface of a house from a single point using vibration sensing devices. U.S. Pat. App. 63/075,746, Sep 8, 2020

Cheng Zhang, et al. FingerTrak: Deep Continuous 3D hand posture tracking, U.S. Provisional Patent Application No. 63/015,381 April 24, 2020;

Cheng Zhang, Tuochao Chen, Ben Steeper, C-Face: Continuously Reconstructing facial expressions by deep learning contours of the face with Ear-mounted, U.S. Provisional Patent Application No. 63/025,979, May 15, 2020;

Cheng Zhang, Gregory D. Abowd, Omer Inan, Pranav Kundra, Thomas Ploetz, Yiming Pu, Thad Starner, Anandghan Waghmare, Xiaoxuan Wang, Kenneth Cunefare, Qiuyue Xue, “Systems, Methods and Devices for Gesture Recognition” U.S. Patent Application 16/644,651, International Application Number: PCT/US2018/049740, Canadian Patent Application No. 3,033,852

Cheng Zhang, Gregory D. Abowd, Omer Inan, Thad Starner, Electronic Device and Method of Controlling the Same , U.S. Issued Patent NO 11,389,084 ; European patent application 17841995.8, International Application No.: PCT/US17/46960 . [Licensed to create a new Start-up at Montreal, Canada: ProximityHCI](#)

Cheng Zhang, Gregory D Abowd, Junrui Yang, Extending Interactions of A Portable Electronic Device, United States Patent Application Publication , Pub No: US 2019/0204932 A1, Pub date Jul 4, 2019 , Issue Date, Jan. 2020. European Patent Application No. 17847362.5, International Application No.: PCT/US2017/049103 [Licensed to create a new Start-up at at Montreal, Canada:ProximityHCI](#)

Dangli Wang, **Cheng Zhang**(*The only student author*), Hongan Wang, Guozhong Dai, A tangible programming method and system. *Chinese Patent NO. 102136208A* Issued Date 2013

Dangli Wang, **Cheng Zhang** (*The only student author*), Hongan Wang, Guozhong Dai, A collaborative tangible programming method. *Chinese Patent NO. 102800223A* Issued Date 2014

Dangli Wang, Tianyuan Gu, **Cheng Zhang**, Hongan Wang, A tangible programming method and system using wireless communication. *Chinese Patent NO. 102789713A* Issued Date 2015

AWARDED FUNDING
TO MY LAB

- Center for Data Science for Enterprise and Society at Cornell. PI, AWS Credit for \$10,000, July. 2024
- Gift from Qualcomm, to support my PhD students Ruidong Zhang and Ke Li for winning Qualcomm Innovation Fellowship on research to develop AI-powered wearables to synthesize personalized speech silently, \$100,000 May. 2024
- Gift from CISCO \$2,000 May. 2024
- Cornell ELI Undergraduate Research Funding \$3,250 Summer, 2023
- "I-Corps: Active Acoustic Sensing for Wearables". PI, NSF I-Corp: \$50,000, Nov. 2023
- "CAREER: Towards sensing and understanding fine-grained body postures in daily life using intelligent wearables with acoustic sensing ". PI, NSF CAREER Award: \$687,000 Feb. 2023
- Cornell ELI Undergraduate Research Funding \$5,996 Summer, 2022
- "Hands-free and eyes-free interaction for the next generation of smart glass empowered by intelligent low-power, minimally-obtrusive, and privacy-sensitive acoustic sensors". PI, Cornell Ignite Innovation Acceleration : \$50,000 2022
- "Recognizing Fine-grained Hand-Face Touching Behaviors using Minimally-obtrusive Wearables with Magnetic Sensing". PI, Cornell China Center-SJTU Seed Grant : \$15,000 2022
- "Towards automated eating activity recognition in the wild using a commodity smartwatch". PI, Cornell China Center-SJTU Seed Grant : \$14,000 2020
- Cornell ELI Undergraduate Research Funding \$700 Fall, 2019
- Georgia Tech Wearable Computing Center Engagement Grant \$8,000 2014

SELECTED TALKS

- "Comprehending Human Behaviors with Everyday Wearables", Embedded Intelligence, DFKI, German Research Center for AI (Online), Hosted by Dr. Paul Lukowicz July 2024
- "Comprehending Human Behaviors with Everyday Wearables", Northeastern University, Hosted by Dr.Gregory Abowd July 2024
- "Comprehending Human Behaviors with Everyday Wearables", MIT Media Lab, Hosted by Dr.Joe Paradiso July 2024
- "Comprehending Human Behaviors with Everyday Wearables", UIUC Hosted by Dr.Romit Roy Choudhury July 2024
- "Comprehending Human Behaviors with Everyday Wearables", CU Boulder Hosted by Dr.Qin (Christine) Lv June 2024
- "Comprehending Human Behaviors with Everyday Wearables", Columbia University Hosted by Dr.Xia Zhou June 2024
- "Comprehending Human Behaviors with Everyday Wearables", UMass Amherst Hosted by Dr.Deepak Ganesan June 2024
- "Advancing Everyday Wearable Computing in the Wild: Intelligent Wireless Sensing on the Body", Bose Innovation Series, Bose R&D Headquarter Sep 2023
- "Tracking detailed body movements using AI-powered minimally-obtrusive wearables", Global Innovation Exchange Institute July 2022
- "Tracking detailed body movements using AI-powered minimally-obtrusive wearables", Facebook Reality Lab May 2021
- " Novel Gestures for Wearables", Google Sep 2017
- "Sensing + Interaction On and Around the Body", InfoSci Cornell University Mar 2018

- “Sensing + Interaction On and Around the Body”, EECS University of Michigan Mar 2018
- “Sensing + Interaction On and Around the Body”, EECS Peking University June 2018
- “Sensing + Interaction On and Around the Body”, CS Nanjing University June 2018
- “Sensing + Interaction On and Around the Body”, CAG Lab, Zhejiang University June 2018
- “Sensing + Interaction On and Around the Body”, EECS, Shanghai Jiaotong University June 2018
- “Sensing + Interaction On and Around the Body”, CS, Fudan University June 2018
- “Sensing + Interaction On and Around the Body”, John Hopcroft Center, Shanghai Jiaotong University Oct 2018
- “Sensing + Interaction On and Around the Body”, AI Seminar, Cornell University Oct 2018
- “Sensing + Interaction On and Around the Body”, Robotics Seminar, Cornell University Nov 2018
- “Sensing + Interaction On and Around the Body”, CS, Huazhong University of Science and Technology Jun 2019

SERVICES

- Steering Committee Co-Chair for International Symposium on Wearable Computers (ISWC) Feb 2024 - Now
- Program Committee Co-Chair for Ubicomp’24
- Program Committee Co-Chair for the 2023 International Symposium on Wearable Computers (ISWC’23)
- Associate Editor for Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 2019 - Present
- Associate Chair for CHI’20, CHI’23, CHI’24, CHI’25
- Registration Chair for The ACM Symposium on User Interface Software and Technology 2022 and 2023 UIST’22, UIST’23
- Reviewers for The ACM CHI Conference on Human Factors in Computing Systems (CHI) 2013-21, ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp) 2014-16, The International Symposium on Wearable Computers (ISWC) 2014-21, ACM Symposium on User Interface Software and Technology (UIST) 2016-21, MobileHCI 2016-17, Intelligent User Interface(IUI) 2015-16, ACM International Conference on Interactive Surfaces and Spaces (ISS) 2017, Designing Interactive Systems (DIS) 2017-19, Pervasive Health 2015,
- Journal Reviewer for International Journal of Human Computer Studies(IJHCS), TOCHI, IEEE Transaction of Mobile Computing, Pervasive and Mobile Computing, The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT),
- Student Volunteer Chair for Ubicomp 17/ISWC 17 2017
- Program Committee on MobileHCI’17 workshop on object recognition for input and mobile interaction 2017
- Student Volunteer on IUI’16 March, 2016
- Volunteer: Atlanta Maker Fair 2015,2016
- Volunteer coordinator: Chinese Symposium on Human Computer Interaction 2011 March, 2011
- Volunteer coordinator: Chinese Strategy Symposium on Human Computer Interaction 2011 January, 2011
- Volunteer: 2010 Visual Information Communication International Symposium September, 2010

PHD STUDENTS ADVISED, CHAIR OF THE COMMITTEE

Hyunchul Lim, InfoSci Ph.D. Student, Cornell, Passed A-exam	Aug. 2019 - now
Ruidong Zhang, InfoSci Ph.D. Student (admitted to Fall 20, remote in the first year 20-21 due to the pandemic), Cornell, Passed A-exam	Aug. 2020 - now
Ke Li, InfoSci Ph.D. Student (admitted to Fall 20, deferred to Summer 2021 due to the pandemic), Cornell,	Aug. 2021 - now

Saif Muhmud, InfoSci Ph.D. Student, Cornell,	Aug. 2022 - now
Catherine Yu, InfoSci Ph.D. Student, Cornell,	May. 2023 - now
Chi-Jung Lee, InfoSci Ph.D. Student, Cornell,	May. 2023 - now
Tan Gemicioglu, InfoSci Ph.D. Student (Co-advised with Tanzeem Choudhury), Cornell,	Aug. 2023 - now

PHD COMMITTEE
MEMBER

Yin Li, InfoSci Ph.D. Student, Cornell	
Pin-Sung Ku, InfoSci Ph.D. Student, Cornell	
Ricardo Gonzalez, InfoSci Ph.D. Student, Cornell	
Ruojin Cai, Computer Science PhD student, Cornell	
Jatin Aurora, Information Science PhD Student, Cornell	
Tzu Yun Hsu, MAE PhD student, Cornell	
Qianqian Wang, Computer Science PhD student, Cornell, Graduated in 2023	
Matthew Law, InfoSci Ph.D. Student, Cornell. Graduated in 2023	

UNDERGRAD AND
MS STUDENTS
ADVISED

Kian Mahmoodi, ECE Undergrad, NSF REU	June 2024- Now
Nam Anh Dang, CS Undergrad, BURE Program,	June 2024- Now
Sarena Zhang, CS Undergrad, BURE Program,	June 2024- Now
Ryan Leifer (RIT CS Undergrad) : NSF REU	July 2024- now
Charlie Zhang : Visiting Undergrad from The University of Hong Kong	July 2024- now
Jacky Jiang : Visiting Undergrad from Rice University	June 2024- now
Charlie Zhang : Visiting Undergrad from The University of Hong Kong	July 2024- now
Tangwuyou Su, MPS in InfoSci,	Oct 2023- Now
Kenny Liang, CS Undergrad,	May 2023- Now
Ashwin Ajit, CS Undergrad,	May 2023- Now
Morris Mo, InfoSci Undergrad,	Oct 2023- Now
Vipin Gunda, CS Undergrad,	Nov 2022- Now
Oliver Lopez, CS Undergrad,	June 2023- May 2024
Vineet Parikh , MS in Computer Science,	Jan 2023- May 2024

Adeyinka Oyemade, InfoSci, Undergrad,	September 2023- Now
Cassidy Cheesman, InfoSci Undergrad,	Oct 2023- May 2024
James Kim, CS Undergrad,	September 2023- May 2024
Anant Shyam, CS Undergrad,	September 2023- Dec 2023
Afua Ansah, ECE Undergrad,	September 2023- May 2024
Guilin Hu, CS Undergrad, Honorable Mention for CRA Outstanding Undergraduate Research Award	Jan 2022- May 2024
James Chen, CS Undergrad,	Jan 2022- Dec 2023
Hao Chen, InfoSci Undergrad,	Jan 2022- May 2024
Devansh Agarwal, CS M.Eng Student,	Aug 2022- May 2023
Shengzhang (Jerray) Wu, MPS Student,	Aug 2022- May 2023
Margia Rounok, CS M.Eng Student,	Jan 2022- May 2023
Richard Jin, CS Undergrad,	Jan 2022- Dec 2023
Boao Dong, CS Undergrad,	May 2022- Aug 2023
Sissel Sun, CS Undergrad,	June 2022- May 2023
Claire Zhou, CS Undergrad,	Oct 2022- Dec 2023
Grace Wang, CS Undergrad,	Nov 2022- May 2023
Rochelle Barsz, ECE Undergrad,	Jan 2023- May 2023
Joy Zhu, CS Undergrad,	Aug 2022- Dec 2022
Lucy Wang, InfoSci Undergrad, Cornell,	March. 2019 - May 2021
Jessica Tweneboah, ECE Undergrad, Honorable Mention for CRA Outstanding Undergraduate Research Award	June 2020 - May 2021
Samhita Pendyal , Biometry and Stats , Undergrad	July 2020 - May 2021
David Lin, CS Undergrad, Cornell,	Jan. 2020 - May 2021
Austin Brown, InforSci Undergrad, Cornell,	Jan. 2021 - May 2021
Michelle Li, CS Undergrad, Cornell,	Jan. 2021 - May 2021
Rishitha Thambireddy, CS Undergrad, Rawlings Presidential Research Scholars, Cornell,	Jan. 2020 - May 2021

Vy Nguyen, CS Undergrad, Cornell,	Jan. 2021 - May 2021
Nitish Gade, Math'20, MPS Student , Cornell,	Jan 2021 - Dec 2021
Benjamine Steeper, InfoSci'20, Currently enrolled in CS Master Program, Cornell, Honorable Mention for CRA Oustanding Undergraduate Research Award	Jan. 2019 - Aug 2022
Yaxuan Li, Remote Intern, Master student in McGill University,	May. 2020 - Jan 2022
Zihan Yan, Remote Intern, Junior in Zhejiang University,	Oct. 2020 - May 2021
Nianyi Wang, CS MS student, Cornell,	Aug. 2019 - May 2020
Mingyang Chen, Remote Intern, Senior in Shanghai Jiaotong University,	June. 2020 - Nov 2020
Wei Liu, Remote Intern, Senior in Shanghai Jiaotong University,	June. 2020 - Nov 2020
Clara Song , CS Undergrad, Cornell,	Jan. 2020 - May 2020
Andrew Xu, CS Undergrad, Cornell,	Jan. 2020 - Dec 2020
Chris Oh, CS Undergrad, Cornell,	Jan. 2020 - Dec 2020
Tianlin Zhao, CS Undergrad, Cornell,	July. 2020 - Dec 2020
Tuochao Chen, Visiting Student from Peking University	Jan. 2020 - Dec. 2020
Nianyi Wang , CS MS, Cornell,	Sep. 2019 - June 2020
Wei Sun , Visiting student from Institute of Software, Chinese Academy of Sciences ,	Nov. 2018 - Jan 2020
Se Yun Kim, CS Undergrad, Cornell,	Jan. 2019 - June 2020
Songyun Tao, MPS, Cornell,	Oct. 2019 - Dec 2020
Kinan Alsheikh , CS Undergrad, Cornell	Oct 2019 - Dec 2020
Xiayan JI, Visiting Student from University of Pennsylvania	May. 2019 - Sep 2019
Peng Cao, Visiting Student from Peking University	Sep. 2019 - Dec. 2019
Zhenyu Lei, Visiting Student from Huazhong university of Science and Technology	July. 2019 - Dec. 2020
Songlin Xu, Visiting Student from Chinese University of Science and Technology	July. 2019 - Jan. 2020
Fang Hu, Visiting Student from Shanghai Jiaotong University	July. 2019 - Feb. 2020
Peng He, Visiting Student from Hangzhou dianzi University	Sep. 2019 - Feb. 2020
Xueting Bao, ECE Master of Engineering student, Cornell,	Sep. 2018 - May 2019

Qinya Zeng, ECE Master of Engineering student, Cornell,	Sep. 2018 - May 2019
Ji Wu, ECE Master of Engineering student, Cornell,	Sep. 2018 - May 2019
Jie Huang, ECE Master of Engineering student, Cornell,	Sep. 2018 - May 2019
Zhonghao Zhan, MPS student, Cornell,	Sept. 2018 - Jan 2019
Fanwen Ji, MPS student, Cornell,	Aug. 2018 - Jan 2019
Ru Wang, Undergraduate Summer Intern from EECS, Shanghai Jiaotong University,	July 2018 - Sep. 2018
Bailey Bercik, CS Undergraduate student , Georgia Tech,	Spring 2016 - April 2018
Qiuyue Xue, CS-MS student, Georgia Tech	September 2017 - April 2018
Yuhui Zhao, Undergrad in Mechanical Engineering, Georgia Tech	Summer 2017 - April 2018
Xi Chen, Undergraduate Visiting Student, Peking University	October 2017 - January 2018
Shaurye Aggarwal, CS Undergrad, Georgia Tech,	Summer 2017 - April 2018
Yaxiong Liu, CS MS, Georgia Tech,	July 2017 - Dec 2017
Ruichen Meng, MS-HCI, Georgia Tech,	Spring 2017 - April 2018
Yizeng Han, Visiting Undergraduate Student , Tsinghua University,	Summer 2017
Yiming Pu, MS-HCI , Georgia Tech,	May 2016- May 2017
Anandghan Waghmore, MS-HCI , Georgia Tech,	August 2016 - May 2017
Sumeet Jain, MS-HCI , Georgia Tech,	August 2016- May 2017
Xinyu Li, MS-HCI student, Georgia Tech	September 2016 - May 2017
Pranav Kundra, CS-MS , Georgia Tech,	August 2016- May 2017
Danrui Sun, MS-HCI student, Georgia Tech	Summer, 2016
Junrui Yang, Visiting undergraduate student from Peking University,	Dec. 2015 - Feb. 2016
Anhong Guo, MS-HCI, Georgia Tech,	2013-2014

SELECTED MEDIA
COVERAGE

- Forbes [No-Camera Eye Tracking: Cornell Invents Tech To Track Gaze Minus Surveillance](#) April 2024
- New Scientist [Smart glasses use sonar to work out where you're looking](#) April 2024
- Cornell Chronicle [AI-powered 'sonar' on smartglasses tracks gaze and facial expressions](#) April 2024
- Hackster.IO [Smart Glasses See Without Vision](#) April 2024
- News Atlas [Odd-looking glasses track your eyes and facial expressions without cameras](#) April 2024
- Inceptive Mind [These smartglasses track gaze, facial expressions without cameras](#) April 2024

- Hackster.IO [A Sound Solution to Hand Tracking](#) April 2024
- Tech Explore [Wristband uses echoes and AI to track hand positions for VR and more](#) April 2024
- Cornell Chronicle [Wristband uses echos, AI to track hand positions for VR and more](#) April 2024
- Engadget [These sonar-equipped glasses could pave the way for better VR body tracking](#) November. 2023
- Tech Explorist [New sonar-equipped glasses use AI to interpret upper body poses in 3D](#) November. 2023
- TechExplore [Glasses use sonar, AI to interpret upper body poses in 3D](#) November. 2023
- Hackster.IO [Spec-tacular Body Pose Estimation](#) November. 2023
- Cornell Chronicle [Glasses use sonar, AI to interpret upper body poses in 3D](#) November. 2023
- Fast Company [These wild AI-powered glasses can read your own lips](#) April. 2023
- Engadget [Researchers built sonar glasses that track facial movements for silent communication](#) April. 2023
- Popular Science [These glasses can pick up whispered commands](#) April. 2023
- Neuroscience News [AI-Equipped Eyeglasses Read Silent Speech](#) April. 2023
- Voice of America / Video Interview [Fitness camera on the wrist and "electrified" atmosphere of the auto show in Los Angeles — "Details"](#) Feb. 2023
- CNET [Unique Wearable Tracker Can Detect the Whole Body in 3D](#) Nov. 2022
- Hackster [You Ain't Seen Nothin' Yet](#) Nov. 2022
- Interesting Engineering [First-of-its-kind wristband can track body's posture in 3D using a tiny camera](#) Nov. 2022
- New ATLAS [BodyTrak wrist camera constructs 3D models of the body in real time](#) Nov. 2022
- Tech Xplore [Wearable wristband captures entire body in 3D](#) Nov. 2022
- Cornell Chronicle [Wrist-mounted camera captures entire body in 3D](#) Nov. 2022
- TechXplore <https://techxplore.com/news/2022-07-wearable-device-sonar-reconstruct-facial.html> July. 2022
- New ATLAS [Wearable sonar tracks facial expressions using sound instead of cameras](#) July. 2022
- Hackster [You Sound Mad](#) July. 2022
- Engadget [Researchers made a sonar-equipped earphone that can capture facial expressions](#) July. 2022
- Cornell Chronicle ['Earable' uses sonar to reconstruct facial expressions](#) July. 2022
- Cornell Chronicle [Smart necklace recognizes English, Mandarin commands](#) Feb. 2022
- Gizmodo [This Wearable Smart Camera Can Detect Voice Commands Without a Sound](#) Feb. 2022
- New Atlas [Speechin necklace recognizes its wearer's silently spoken words](#) Feb. 2022
- TechXplore [Smart necklace recognizes 'silent' English, Mandarin commands](#) Feb. 2022
- Hackster [SpeeChin Sits on Your Neck and Films Your Chin to Watch for Silent Speech Commands](#) Feb. 2022
- Cornell Chronicle [Smart necklace could track your detailed facial expressions](#) Aug. 2021
- News Atlas [Smart necklace monitors facial expressions to gauge your emotions](#) Aug. 2021
- Hackster [Face Your Emotions](#) Aug. 2021
- MIT Technology Review China [Earphone can detect facial expressions? Even with a face mask](#) Nov. 2020
- NowThis [Earphone cameras watch your facial expressions and read your lips](#) Oct. 2020
- New Scientist [Earphone cameras watch your facial expressions and read your lips](#) Oct. 2020
- Yahoo News [Cornell researchers created an earphone that can track facial expressions](#) Oct. 2020
- Mashable [Researchers created a way to track facial expressions with an earphone](#) Oct. 2020
- Engadget [Cornell researchers created an earphone that can track facial expressions](#) Oct. 2020
- Vision System Design [Miniature thermal camera system provides hand tracking](#) Oct. 2020
- Cornell Chronicle [Earphone tracks facial expressions, even with a face mask](#) Oct. 2020
- MSN News [Earphone wearables designed at Cornell convert facial expressions into emoji with nearly 90 per cent accuracy](#) Oct. 2020
- New Atlas [C-Face tech "sees" people's expressions, even through masks](#) Oct. 2020

- South China Morning Post Earphone wearables designed at Cornell convert facial expressions into emoji with nearly 90 per cent accuracy Oct. 2020
- Science Daily Earphone tracks facial expressions, even with a face mask Oct. 2020
- TechXplore Earphone tracks facial expressions, even with a face mask Oct. 2020
- News Break Watch: Earbud device translates facial expressions into emojis Oct. 2020
- PhysicsWorld Machine learning and Doppler vibrometer monitor household appliances Sep 2020
- New Atlas VibroSense tracks home appliance usage via deep learning and lasers Sep 2020
- The Engineer Smart homes boost with VibroSense home appliance tracker Sep 2020
- Cornell Chronicle Device tracks house appliances through vibration, AI Sep 2020
- Yahoo Cornell's VibroSense makes appliances 'smart' by tracking their vibrations Sep 2020
- Engadget Cornell's VibroSense makes appliances 'smart' by tracking their vibrations Sep 2020
- News Break Cornell's VibroSense makes appliances 'smart' by tracking their vibrations Sep 2020
- Hackster.io Cornell Tracks Appliances, Home Activities Using a Single Laser-Based VibroSense Sensor Sep 2020
- Forbes Hand-Movement Sensing Bracelet Could Revolutionize Activity Tracking July 2020
- BBC 3D hand tracking wristband and other technology news July 2020
- Gizmodo Using Thermal Cameras to Track Hand Motions Could Be the Key to Interacting with Smart Glasses Jul 2020
- Cornell Chronicle Researchers develop 3D hand-sensing wristband July 2020
- Engadget Wrist-mounted wearable tracks your hand in 3D using thermal sensors Jul 2020
- VentureBeat Researchers show FingerTrak, a hand tracking wristband for AR/VR input Jul 2020
- News Break Researchers show FingerTrak, a hand tracking wristband for AR/VR input Jul 2020
- Science Daily 3D hand-sensing wristband signals future of wearable tech Jul 2020
- The Engineer FingerTrak wearable captures human hands in 3D Jul 2020
- MSN News Wrist-mounted wearable tracks your hand in 3D using thermal sensors Jul 2020
- Yahoo Wrist-mounted wearable tracks your hand in 3D using thermal sensors Jul 2020
- Hackster A Handy User Interface A wearable that continuously tracks hand pose, even in the presence of obstructions. Jul 2020
- New Atlas Thermal camera bracelet reads your wrist to track your fingers Jul 2020
- NBC 15 WMTV New device developed at UW may help recognize early signs of Parkinson's or Alzheimer's Jul 2020
- TechXplore 3-D hand-sensing wristband signals future of wearable tech Jul 2020
- News Break Hand Tracking Wristband Brings More Detailed Hand Movements To VR & AR Jul 2020
- Georgia Tech News Center Wearable Computing Ring Allows Users to Write Words and Numbers with Thumb Nov 2017
- Science Daily Electronic Ring: Write With Thumb, See On Display Nov 2017
- MSN News In the palm of your hand: Wearable thumb tech to revolutionize how we text Nov 2017
- TechRadar This smart ring lets you write words and numbers with your thumb Nov 2017
- RT In the palm of your hand: Wearable thumb tech to revolutionize how we text Nov 2017
- Phys.org Wearable computing ring allows users to write words and numbers with thumb Nov 2017
- New Atlas Fingersound ring allows control of devices with thumb gestures Nov 2017
- Georgia Tech News Center & Georgia Tech Research Horizons New Techniques Allow Greater Control of Smartwatches Jan 2017
- Digital Trends Breathe in, breathe out: New technique controls smartwatch using breath and skin Jan 2017
- TechExplore New techniques allow greater control of smartwatches Jan 2017
- Tech2 New ways to interact with smartwatches to help user-device communication developed by researchers Jan 2017

- Yahoo News [Breathe in, breathe out: New technique controls smartwatch using breath and skin](#) Jan 2017
- TechRadar [We may control the next generation of smartwatches by breathing on them](#) Jan 2017
- Georgia Tech News Center [Georgia Tech Develops Inkjet-Based Circuits at Fraction of Time and Cost](#) Nov 2013
- ZDNet [Instant inkjet circuits](#) Oct 2013
- New Scientist [Print a working paper computer on an \\$80 inkjet](#) Oct 2013
- PHYS.ORG [Georgia Tech develops inkjet-based circuits at fraction of time and cost](#) Nov 2013
- Fast Company [Hack Your Useless Inkjet To Print Electronics Circuits](#) Nov 2013
- Science Daily [Inkjet-based circuits created at fraction of time and cost](#) Nov 2013
- HACKADAY [Instant inkjet circuits with silver nanoparticle ink](#) Dec 2013