Junyi Zhu - CV

Ph.D. Candidate
MIT Electrical Engineering & Computer Science Department
MIT Computer Science and Artificial Intelligence Lab
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Education

Massachusetts Institute of Technology, USA 2019 - now
Ph.D. in Computer Science
MIT EECS Department, MIT Computer Science and Artificial Intelligence Lab
Advisor: Professor Stefanie Mueller

Massachusetts Institute of Technology, USA 2017 - 2019
Master of Science in Computer Science
MIT EECS Department, MIT Computer Science and Artificial Intelligence Lab
Advisor: Professor Stefanie Mueller

University of Washington, USA 2013 - 2017
Bachelor of Science in Electrical Engineering
Department of Electrical & Computer Engineering
Advisor: Professor Joshua R. Smith, Professor Shwetak N. Patel

Full Paper Publications

[14] **Junyi Zhu***, Young Joong Lee*, Yiyue Luo*, Tianyu Xu, Chao Liu, Daniela Rus, Stefanie Mueller and Wojciech Matusik. Liquids Identification and Manipulation via Digitally Fabricated Impedance Sensors. In *2024 IEEE International Conference on Robotics and Automation* (ICRA). IEEE.

[13] Alexander Kyu*, Hongyu Mao*, **Junyi Zhu**, Mayank Goel and Karan Ahuja. EITPose: Wearable and Practical Electrical Impedance Tomography for Continuous Hand Pose Estimation. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (CHI '24). ACM.

[12] Yiyue Luo, **Junyi Zhu**, Kui Wu, Cedric Honnet, Stefanie Mueller and Wojciech Matusik. 2023. MagKnitic: Machine-knitted Passive and Interactive Haptic Textiles with Integrated Binary Sensing. In *Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology* (UIST '23). ACM.

[11] Donghyeon Ko, Yoonji Kim, **Junyi Zhu**, Michael Wessely and Stefanie Mueller. 2023. FlexBoard: A Flexible Breadboard for Interaction Prototyping on Curved and Deformable Surfaces. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (CHI '23). ACM.

[10] Marwa AlAlawi, Noah Pacik-Nelson, **Junyi Zhu**, Ben Greenspan, Andrew Doan, Brandon M Wong, Benjamin Owen-Block, Shanti Mickens, Wilhelm Schoeman, Michael Wessely, Andreea Danielescu and Stefanie Mueller. 2023. MechSense: A Design and Fabrication Pipeline for Integrating Rotary Encoders into 3D Printed Mechanisms. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (CHI '23). ACM.

[9] **Junyi Zhu**, Yuxuan Lei, Aashini Shah, Gila R. Schein, Hamid Ghaednia, Joseph H.

Schwab, Casper Harteveld and Stefanie Mueller. 2022. MuscleRehab: Improving Unsupervised Physical Rehabilitation by Monitoring and Visualizing Muscle Engagement. In *Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology* (UIST ’22). ACM.

[8] Yoonji Kim, **Junyi Zhu**, Mihir Trivedi, Dishita G. Turakhia, Ngai Hang Wu, Donghyeon Ko, Michael Wessely and Stefanie Mueller. 2022. SensorViz: Visualizing Sensor Data Across Different Stages of Prototyping Interactive Objects. In *Proceedings of the 2022 ACM Designing Interactive Systems Conference* (DIS ’22). ACM.

[7] **Junyi Zhu**, Jackson Snowden, Joshua Verdejo, Emily Chen, Hamid Ghaednia, Joseph H. Schwab, and Stefanie Mueller. 2021. EIT-kit: An Electrical Impedance Tomography Toolkit for Health and Motion Sensing. In *Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology* (UIST ’21). ACM.

[6] **Junyi Zhu**, Yunyi Zhu, Jiaming Cui, Leon Cheng, Jackson Snowden, Mark Chounlakone, Michael Wessely and Stefanie Mueller. 2020. MorphSensor: A 3D Electronic Design Tool for Reforming Sensor Modules. In *Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology* (UIST ’20). ACM.

[5] **Junyi Zhu**, Lotta-Gili Blumberg, Yunyi Zhu, Martin Nisser, Ethan Carlson, Xin Wen, Kevin Shum, Jessica Quaye, Stefanie Mueller. 2020. CurveBoards: Integrating Breadboards into Physical Objects to Prototype Function in the Context of Form. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (CHI '20). ACM.

[4] Martin Nisser, **Junyi Zhu**, Tianye Chen, Katarina Bulovic, Parinya Punpongsanon, Stefanie Mueller. Sequential Support: 3D Printing Dissolvable Support Material for Time-Dependent Mechanisms. In *Proceedings of the Thirteenth International Conference on Tangible, Embedded, and Embodied Interaction* (TEI '19). ACM.

[3] Edward Wang, **Junyi Zhu**, Mohit Jain, Tien-Jui Lee, Elliot Saba, Lama Nachman, and Shwetak N. Patel. 2018. Seismo: Blood Pressure Monitoring using Built-in Smartphone Accelerometer and Camera. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (CHI '18). ACM. **[BEST PAPER NOMINEE]**

[2] Edward Wang, William Li, **Junyi Zhu**, Rajneil Rana and Shwetak N. Patel. Noninvasive hemoglobin measurement using unmodified smartphone camera and white flash. *2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society* (EMBC), Seogwipo, 2017.

[1] Edward Wang, **Junyi Zhu**, William Li, Rajneil Rana, and Shwetak Patel. 2017. HemaApp IR: noninvasive hemoglobin measurement using unmodified smartphone cameras and built-in LEDs. In *Proceedings of the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers* (UbiComp '17). ACM.

Full Paper Under Review

[3] **Junyi Zhu**, Tianyu Xu, Malinda Lu, Gila Schein, Piotr Zygmanski and Stefanie Mueller. Radiation Monitoring During and After Radiotherapy via Electrochemical Impedance Spectroscopy. *Physics in Medicine & Biology*, 2024.

[2] Yunyi Zhu, Cedric Honnet, Yixiao Kang, **Junyi Zhu**, Angelina J Zheng, Kyle Heinz, Grace Tang, Luca Musk, Michael Wessely, Stefanie Mueller. ChromoWrap: A Flexible Contact Light Source for Fast Re-Programmable Multi-Color Textures. In *Proceedings of the 37th Annual ACM Symposium on User Interface Software and Tech.* (UIST '24). ACM.

[1] **Junyi Zhu**, Jiayu Wang, Tianyu Xu, Gil Zoizner-Agar, Norman Friedman and Stefanie Mueller. Patient-specific Upper Airway Obstruction Location Detection via Multi-frequency Electrical Impedance Tomography. *Sleep*, 2024.

Short Papers, Extended Abstracts & Demonstrations

[10] Yunyi Zhu, Cedric Honnet, Yixiao Kang, **Junyi Zhu**, Angelina J. Zheng, Kyle Heinz, Grace Tang, Luca Musk, Michael Wessely and Stefanie Mueller. 2023. Demonstration of ChromoCloth: Re-Programmable Multi-Color Textures through Flexible and Portable Light Source. In *Adjunct Publication of the 36th Annual ACM Symposium on User Interface Software and Technology* (UIST ’23 Adjunct). ACM.

[9] Donghyeon Ko, Yoonji Kim, **Junyi Zhu**, Michael Wessely and Stefanie Mueller. 2023. Demonstration of FlexBoard: A Flexible Breadboard for Interaction Prototyping on Curved and Deformable Surfaces. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems* (CHI EA'23). ACM

[8] Xinyi Yang, Katarina Bulovic, Susanna Chen, **Junyi Zhu** and Stefanie Mueller. 2023. Azimuth Calculation and Telecommunication between VR Headset and Smartphones for Nearby Interaction. In *Proceedings of the Seventeenth International Conference on Tangible, Embedded, and Embodied Interaction* (TEI ’23 Work in Progress). ACM.

[7] **Junyi Zhu**. 2022. Design and Fabricate Personal Health Sensing Devices. In *Adjunct Publication of the 35th Annual ACM Symposium on User Interface Software and Technology* (UIST ’22 Adjunct). ACM.

[6] **Junyi Zhu**, Yuxuan Lei, Aashini Shah, Gila Schein, Hamid Ghaednia, Joseph H. Schwab, Casper Harteveld, Stefanie Mueller. Monitoring Muscle Engagement via Electrical Impedance Tomography for Unsupervised Physical Rehabilitation. In *Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology* (UIST ’22). ACM.

[5] **Junyi Zhu**, Liang He, Jun Nishida, Hamid Ghaednia, Hsin-Liu (Cindy) Kao, Jon E. Froehlich, Edward Wang, and Stefanie Mueller. 2022. SIG: Towards More Personal Health Sensing. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts* (CHI ’22 Extended Abstracts). ACM.

[4] Cedric Honnet, Yunyi Zhu, **Junyi Zhu**, Michael Wessely and Stefanie Mueller. 2022. WearaFab: Digital Fabrication for Wearables Toolkits. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts* (CHI ’22 Extended Abstracts). ACM.

[3] **Junyi Zhu**, Jackson Snowden, Joshua Verdejo, Emily Chen, Hamid Ghaednia, Joseph H. Schwab, and Stefanie Mueller. 2021. EIT-kit Demo: An Electrical Impedance Tomography Toolkit for Health and Motion Sensing. In *Adjunct Publication of the 34th Annual ACM Symposium on User Interface Software and Technology* (UIST ’21). ACM.

[2] **Junyi Zhu**, Yunyi Zhu, Jiaming Cui, Leon Cheng, Jackson Snowden, Mark Chounlakone, Michael Wessely and Stefanie Mueller. 2020. Demonstration of MorphSensor: A 3D Electronic Design Tool for Reforming Sensor Modules. In *Adjunct Publication of the 33rd Annual ACM Symposium on User Interface Software and Technology* (UIST ’20). ACM.

[1] **Junyi Zhu**, Lotta Blumberg, Yunyi Zhu, Martin Nisser, Ethan Carlson, Xin Wen, Kevin Shum, Jessica Quaye, Stefanie Mueller. CurveBoards Demo: Integrating Breadboards into Physical Objects to Prototype Function in the Context of Form. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems* (CHI EA '20). ACM.

Patents

[1] **Junyi Zhu**, Stiven Morvan, Dongeek Shin, Andrea Colaco, Sambuddha Basu, Sean Bae. Full Hand Kinematic Reconstruction Using Electrical Impedance Tomography Wearable. U.S. Patent Application No. 63/387,443.

Conference Service

Organizing Committee

ACM CHI, Session Chair	2023
ACM UIST, Video Previews Chair	2022 - 2023

Associate Chair

ACM CHI Workshops	2023
ACM TEI	2023
ACM CHI Late Breaking Work	2021

Reviewer

ACM CHI	2020 - 2024
ACM UIST	2020 - 2023
ACM UbiComp	2020 - 2023
ACM TEI	2020 - 2024
ACM ISS	2020

Volunteering

ACM CHI Student Volunteer	2020
ACM CHI Program Committee Meeting, Subcommittee Chair Assistant	2019

Research Internships

Google AR Team, Google LLC — 2022 - 2023
Research Intern, Mountain View, CA Office
Advisor: Dr. Andrea Colaco & Dr. D. Shin

UW Ubicomp Lab, University of Washington — 2016 - 2017
Research Assistant, Paul G. Allen School of Computer Science & Engineering
Advisor: Professor Shwetak Patel

UW SEAL Lab, University of Washington — 2016
Research Assistant, Department of Electrical & Computer Engineering
Advisor: Professor Alexander V. Mamishev

Exposure Sciences Group, University of Washington — 2016
Research Assistant, School of Public Health
Advisor: Professor Edmund Seto

Work Experience

Senosis Health, Seattle, USA — 2016 - 2017
Software Engineer, supervisor: Mike Clarke

Jiangsu SEUIC Technology Co., Ltd, China — 2015
Software Engineer, supervisor: Prof. Chen Hu (Southeast University, China)

Invited Talks

MIT Digital Health and Wellness Seminar. *Keynote Speaker*, hosted by Prof. Rosalind Picard 2024

Harvard Medical School, The 10th Annual International Symposium on Regenerative Rehabilitation. *Active Impedance Sensing for Muscle Engagement Monitoring*, hosted by Prof. Fabrisia Ambrosio 2024

University of California, Berkeley, Hybrid Ecologies Lab. *Towards Personal Health and Medical Monitoring Network*, hosted by Prof. Eric Paulos 2023

Stanford University, SHAPE Lab. *Towards Personal Health and Medical Monitoring Network*, hosted by Prof. Sean Follmer 2023

Tsinghua Youth Talent Development Seminar. *Bridging Between Clinical and Daily Environment: Design and Fabricate Personal Health Sensing Devices.* hosted by Department of Computer Science and Technology, Tsinghua University 2023

International Youth Festival on Design Futures, Smart & Digital Futures. *Digital Healthcare: Future Personal Health Sensing Devices*, hosted by Dr. Yuqi Liu, Tsinghua University 2022

Google LLC, AR Perception Team. *Electrical Impedance Tomography: Introduction, Implementation, and Intuitions*, hosted by Dr. D. Shin 2022

University of Illinois at Urbana-Champaign, Coordinated Science Laboratory. *Building Personal Physical Rehabilitation Monitoring Devices*, hosted by CSLSC 2022

University of Chicago, Human Computer Integration Lab. *Towards More Personal Health Sensing Devices*, hosted by Prof. Pedro Lopes 2021

MIT, MIT Nano Explorations. *Integrating Object Form and Electronic Function in Rapid Prototyping and Personal Fabrication*, hosted by Prof. Vladimir Bulović 2020

Harvard University, Graduate School of Design, hosted by Prof. Krzysztof Wodiczko 2018

Awards and Honors

Siebel Scholars, Thomas and Stacey Siebel Foundation, 2022 - 2023

Thomas Stockham Jr. Fellowship, MIT, 2021 - 2022

Frederick C. Hennie III Teaching Award, MIT EECS Department, 2021

Best Paper Nominee, ACM CHI 2018

Seneff-Zue Computer Science Fellowship Award, MIT, 2017 - 2018

Dean's List, University of Washington, 2013 - 2017

Selected Press

MIT News. Toward more flexible and rapid prototyping of electronic devices. 2023

MIT News. 3D-printed revolving devices can sense how they are moving. 2023

Medical Design & Outsourcing. MIT researchers seek to 'see' inside the body during rehab. 2022

Hackster.io. MuscleRehab Provides an Inside Look at What Your Muscles Do During Physiotherapy and More. 2022

MIT News. MIT system "sees" the inner structure of the body during physical rehab. 2022

Healthcare IT News. MIT, MGH create VR system to advance physical therapy at home. 2022

Medical Design & Outsourcing. MIT researchers seek to 'see' inside the body during rehab. 2022

MIT News. Making health and motion sensing devices more personal. 2021

Yahoo News, MIT's toolkit lets anyone design their own muscle-sensing wearables. 2021

Hackster.io. It's What's on the Inside That Counts. 2021

Espressif Systems. ESP32-powered Electrical Impedance Tomography Toolkit by MIT. 2021

MIT News. A hands-on class responds to Covid. 2021

Engadget, MIT's toolkit lets anyone design their own muscle-sensing wearables. 2021

MIT News. Electronic design tool morphs interactive objects. 2020

MIT News. Integrating Electronics onto Physical Prototypes. 2020

Hackster.io. Prototype Like a Pro. 2020

3D Printing Industry. MIT RESEARCHERS DEVELOP NOVEL 3D DESIGN SOFTWARE FOR EMBEDDED ELECTRONICS. 2020

UW ECE Spotlight. ECE alum Junyi Zhu integrates electronics onto physical prototypes at MIT with "CurveBoards". 2020

ACM TechNews. 3D-printed CurveBoards enable easier testing of circuit design on products. 2020

Inverse. TIRED: BREADBOARDS. WIRED: CURVEBOARDS. 2020

GeekWire. Google buys Seattle health monitoring startup Senosis, bolstering digital health push 2017

MIT Technology Review. How to make a smart phone detect anemia. 2016

Mentoring

Master thesis (All students are co-advised with Prof. Stefanie Mueller.**)**

[4]	Gila R Schein	2022 - 2023
[3]	Yuxuan Lei	2021 - 2022
[2]	Joshua Verdejo	2020 - 2021
[1]	Lotta G. Blumberg	2018 - 2019

Research project students (SuperUROPs, UROPs)

[20]	Jiayu Wang	2023	[10]	Jiaming Cui	2019-2020
[19]	Masarah Ahmedhussain	2023	[9]	Mark Chounlakone	2019
[18]	Malinda Lu	2023	[8]	Jessica Ayeley Quaye	2019
[17]	Aashini Shah	2022	[7]	Ethan Levi Carlson	2019
[16]	Zipei Tan	2021	[6]	Xin Wen	2019
[15]	Sloke Shrestha	2021	[5]	Kevin Shum	2019
[14]	Emily Chen	2021	[4]	Leon Cheng	2019-2020
[13]	Gila R Schein	2020	[3]	Yunyi Zhu	2018-2020
[12]	Jenny Chen	2020	[2]	Katharina Bulovic	2018
[11]	Jackson Snowden	2020	[1]	Tianye Chen	2018

Teaching

Co-Instructor

[1]	**6.810**	**Engineering Interactive Technologies**, MIT	Autumn 2021

Teaching Assistant

[5]	**6.810**	**Engineering Interactive Technologies**, MIT	Autumn 2020
[4]	**6.810**	**Engineering Interactive Technologies**, MIT	Autumn 2018
[3]	**CSE/EE 474**	**Introduction to Embedded Systems**, UW	Autumn 2016
[2]	**CSE/EE 472**	**Introduction to Embedded Systems**, UW	Summer 2016
[1]	**CSE/EE 371**	**Design of Digital Circuits and Systems**, UW	Spring 2016

Lectures

6.4860	**Medical Device Design**, Active Sensing Wearable Devices, MIT	Spring 2024
6.810	**Engineering Interactive Technologies**, Health Sensing, MIT	Autumn 2020
6.810	**Engineering Interactive Technologies**, Computer Vision Workshop, MIT	Autumn 2018

References

Stefanie Mueller

Associate Professor, MIT
EECS and MechE Department
stefanie.mueller@mit.edu
32 Vassar Street,
Cambridge, MA 02139, USA

Mayank Goel

Associate Professor, Carnegie Mellon University
S3D & HCII, School of Computer Science
mayankgoel@cmu.edu
5000 Forbes Avenue
Pittsburgh, PA 15213, USA

Andrea Colaco

Senior Staff Software Engineering Manager
Google Labs, AR Team
andreacolaco@google.com
1255 Pear Ave
Mountain View, CA 94043, USA

Shwetak N. Patel

Professor, University of Washington
Paul G. Allen School and ECE Department
shwetak@cs.washington.edu
185 Stevens Way
Seattle, WA 98195, USA

Eric Paulos

Professor, UC Berkeley
Electrical and Computer Engineering department
paulos@berkeley.edu
415 Sutardja Dai Hall
Berkeley, CA 94720, USA