# Junyi Zhu - CV

Assistant Professor
Electrical Engineering & Computer Science Department
University of Michigan
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## Education

**Massachusetts Institute of Technology,** USA                    2019 - 2024
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

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

[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.

# 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; No. 18/537,224; Pub. No. US 2024/0201792.

## Conference Service

**Organizing Committee**

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|---|---|
| ACM UIST, Video Recording Chair | 2024 |
| ACM CHI, Session Chair | 2023 - 2024 |
| ACM UIST, Video Previews Chair | 2022 - 2023 |

**Associate Chair**

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|---|---|
| ACM CHI | 2025 |
| ACM CHI Workshops | 2023 |
| ACM TEI | 2023 |
| ACM CHI Late Breaking Work | 2021 |

**Reviewer**

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

**Volunteering**

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| 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

**Carnegie Mellon University, School of Computer Science, Human Computer Interaction Institute**. *From Systemic to Regional: Personal Health and Medical Monitoring Systems that Adapt to Individual Variance*, hosted by Prof. Alexandra Ion                                  2024

**Cornell University, Human Centered Design Department**. *From Systemic to Regional: Personal Health and Medical Monitoring Systems that Adapt to Individual Variance*, hosted by Prof. Gary Evans   2024

**Emory University, Computer Science Department**. *From Systemic to Regional: Personal Health and Medical Monitoring Systems that Adapt to Individual Variance*, hosted by Prof. Yolanda Rankin   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 Michigan, Electrical Engineering and Computer Science Department**. *From Systemic to Regional: Personal Health and Medical Monitoring Systems that Adapt to Individual Variance*, hosted by Prof. Robert Dick                                  2024

**New York University, Computer Science and Engineering Department**. *From Systemic to Regional: Personal Health and Medical Monitoring Systems that Adapt to Individual Variance*,   hosted by Prof. Claudio Silva                                  2024

**University of Notre Dame, Computer Science and Engineering Department**. *Towards Personal Health and Medical Monitoring Systems*, hosted by Prof. Walter Scheirer                                  2024

**Zhejiang University, School of Software Technology**. *Towards Personal Health and Medical Monitoring Network*, hosted by Prof. Mengru Xue                                  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**

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EECS and MechE Department
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**Shwetak N. Patel**

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Paul G. Allen School and ECE Department
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185 Stevens Way
Seattle, WA 98195, USA

**Mayank Goel**

Associate Professor, Carnegie Mellon University
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**Eric Paulos**

Professor, UC Berkeley
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Berkeley, CA 94720, USA

**Andrea Colaco**

Senior Staff Software Engineering Manager
Google Labs, AR Team
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Mountain View, CA 94043, USA

**Edward Jay Wang**

Assistant Professor, UC San Diego
Electrical and Computer Engineering department
ejaywang@eng.ucsd.edu
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La Jolla, CA 92039, USA