Yiyue Luo

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EDUCATION

Sep 2020 - Aug 2024 **Massachusetts Institute of Technology**
Ph.D., Electrical Engineering and Computer Science
Advisor: Professor Wojciech Matusik & Professor Tomás Palacios
Thesis: Intelligent Textiles for Physical Human-Environment Interactions

Aug 2018 - May 2020 **Massachusetts Institute of Technology**
M.S., Electrical Engineering and Computer Science
Advisor: Professor Wojciech Matusik & Professor Tomás Palacios
Thesis: Discovering the Patterns of Human-environment Interactions via Scalable Functional Textiles

Aug 2014 - Dec 2017 **University of Illinois at Urbana - Champaign**
B.S., Materials Science and Engineering

HONORS AND AWARDS

2024 **Forbes 30 Under 30 North America, Science**

2023-2024 **Accenture Fellowship**

2023 **The Path of Professorship Workshop Participant, MIT**

2023 **Best Poster Award, GW6 Summit at MIT**

2023 **Meta Fellowship Finalist**

2022-2023 **Schwarzman College of Computing Fellowship by Google**

2021-2022 **MathWorks Engineering Fellowship**

2021 **Best Paper Honorable Mention Award for KnitUI, CHI '21**

2017 **James Scholar**
For outstanding students in Engineering College at UIUC.

2017 **Cullen W. Parmelee International Research Scholar**
For outstanding international undergraduate researcher in Materials Science and Engineering at UIUC.

2015-2017 **Dean's List**
For outstanding academic performance at UIUC.

2015 **Alfred W. Allen Award**
For outstanding students in Materials Science and Engineering department at UIUC.

PROFESSIONAL EXPERIENCE

Aug 2018 - Present **The Computational Design & Fabrication Group, MIT**
Research Assistant | Cambridge, MA
Advisor: Professor Wojciech Matusik & Professor Tomás Palacios

Jun 2023 - Sep 2023 **Boston Dynamics AI Institute**
Research Intern | Cambridge, MA
Mentor: Dr. Brian Okorn & Prof. Jessica Hodgins
Project: Decoding Human-object Interactions via Tactile Sensing

May 2022 - Aug 2022 **RiSE Group, Microsoft Research**
Research Intern | Redmond, WA
Mentor: Dr. Teddy Seyed
Project: Enabling Gestural Interactions on a Keyboard using a Graphene-based Fabric

Mar 2018 - Aug 2018 **Chinese Academy of Science**
Research Intern | Guangzhou, China
Mentor: Dr. Xuetong Sun
Project: Porous Polypyrrole on 3D printed structures for Controlled Drug Release

Feb 2016 - Dec 2017 **Rogers Research Group, UIUC**
Research Assistant | Urbana, IL
Mentor: Professor John A. Roger & Dr. Zheng Yan
Project: Mechanical Assembly of Functional 3D Mesostructures

PUBLICATIONS

Highlighted Peer-reviewed Journals and Conference Publications

2024 **Y. Luo**, C. Liu, Y. Lee, K. Wu, M. Foshey, J. DelPreto, T. Palacios, D. Rus, Y. Li, A. Torralba, W. Matusik. Adaptive Tactile Interaction Transfer with Digitally Embroidered Smart Gloves. Accepted to *Nature Communications 15, 868, 2024*. Featured as Editorial Highlight. [paper link]

2024 **Y. Luo**, M. Wonsik, J. Hodgins, B. Okorn. Tactile Embeddings for Multi-Task Learning. Submitted to *International Conference on Robotics and Automation (ICRA '24)*.

2024 J. Zhu*, Y. Lee*, **Y. Luo***, T. Xu, C. Liu, D. Rus, S. Mueller, W. Matusik. Liquids Identification and Manipulation via Digitally Fabricated Impedance Sensors. Submitted to *International Conference on Robotics and Automation (ICRA '24)*.

2023 **Y. Luo**, J. Zhu, C. Honnet, S. Muller, W. Matusik. MagKnitic: Machine-knitted Passive and Interactive Haptic Textiles with Integrated Binary Sensing. *ACM Symposium on User Interface Software and Technology (UIST '23)*. [paper link]

2022 J. DelPreto*, C. Liu*, **Y. Luo**, M. Foshey, Y. Li, A. Torralba, W. Matusik, D. Rus.ActionSense: A Multimodal Dataset and Recording Framework for Human Activities Using Wearable Sensors in a Kitchen Environment. *Conference on Neural Information Processing Systems, Datasets and Benchmarks track (NeurIPS '22)*. [paper link]

2022 **Y. Luo**, K. Wu, A. Spielberg, M. Foshey, T. Palacios, D. Rus, W. Matusik. Digital Fabrication of Pneumatic Actuators with Integrated Sensing by Machine Knitting. *Conference on Human Factors in Computing Systems (CHI '22)*. Exhibited at Kent State University Museum. [paper link]

2022 L. Zlokapa, **Y. Luo**, J. Xu, M. Foshey, K. Wu, P. Agrawal, W. Matusik. An Integrated Design Pipeline for Tactile Sensing Robotic Manipulators. *International Conference on Robotics and Automation (ICRA '22)*. [paper link]

2022 Q. Zhang*, Y. Li*, **Y. Luo**, W. Shou, M. Foshey, J. Yan, J. B Tenenbaum, W. Matusik, A. Torralba. Dynamic Modeling of Hand-Object Interactions via Tactile Sensing. *International Conference on Intelligent Robots and Systems (IROS '22)*. Exhibited at MIT Museum. [paper link]

2021 **Y. Luo**, Y. Li, M. Foshey, W. Shou, P. Sharma, T. Palacios, A. Torralba, W. Matusik. Intelligent Carpet: Inferring 3D Human Pose from Tactile Signals. *Computer Vision and Pattern Recognition (CVPR '21)*. [paper link]

2021 **Y. Luo**, Y. Li, P. Sharma, W. Shou, K. Wu, M. Foshey, T. Palacios, A. Torralba, W. Matusik. Learning human-environment interactions using 3D conformal functional textiles. *Nature Electronics 4, 193–201, 2021.* Featured as cover and Commentary in Nature Electronics. [paper link]

2021 **Y. Luo***, K. Wu*, T. Palacios, W. Matusik. KnitUI: Fabricating Interactive and Sensing Textiles with Machine Knitting. *Conference on Human Factors in Computing Systems (CHI '21).* Best Paper Honorable Mention. [paper link]

Other Peer-reviewed Journals, Conference Publications, and Short Papers

2024 Y. Li, **Y. Luo**. Intelligent Textiles Are Looking Bright. *Science 384, 29-30, 2024.* [paper link]

2023 **Y. Luo**. Intelligent Textiles for Physical Human-Environment Interactions. *ACM Symposium on User Interface Software and Technology Doctoral Symposium (UIST '23).* [paper link]

2023 **Y. Luo**, E. Barhudarian, T. Seyed. Project Mihr: Enabling Gestural Interactions on a Keyboard using a Graphene-based Fabric. *Conference on Human Factors in Computing Systems Late-Breaking Work (CHI '23).* [paper link]

2023 L. Zhan, Y. Cao, Q. Chen, H. Guo, J. Gao, **Y. Luo**, S. Guo, G. Zhou, J. Gong. Enable Natural Tactile Interaction for Robot Dog based on Large-format Distributed Flexible Pressure Sensors. *International Conference on Robotics and Automation (ICRA '23).* [paper link]

2023 Y. Choi, D. Park, S.a Lee, I. Han, E. Akan, H. Jeon, **Y. Luo**, S. Kim, W. Matusik, D. Rus., K. Kim. Seamless-walk: natural and comfortable virtual reality locomotion method with a high-resolution tactile sensor. *IEEE Virtual Reality 1-15*. [paper link]

2023 B Li, B Deng, W Shou, TH Oh, Y Hu, **Y. Luo**, L Shi, W Matusik. Computational Discovery of Microstructured Composites with Optimal Strength-Toughness Trade-Offs. *arXiv preprint arXiv:2302.01078*. [paper link]

2022 M. Xue, C. Mackin, W. Weng, J. Zhu, **Y. Luo**, A. Lu, M. Hempel, E. McVay, J. Kong, T. Palacios. Highly Integrated Bioelectronic System Based on Graphene Transistor Arrays for Ion Sensing. *Nature Communication 13(1), 1-11*. [paper link]

2022 K. Nan, S. Babaee, W. Chan, J. Kuosmanen, V. Feig, **Y. Luo**, S. Srinivasan, C. Patterson, A. M. Jebran, G. Traverso. Low-cost gastrointestinal manometry via silicone–liquid-metal pressure transducers resembling a quipu. *Nature Biomedical Engineering 6 (10), 1092-1104*. [paper link]

2021 A. Kaspar, K. Wu, **Y. Luo**, L. Makatura, W. Matusik. Knit Sketching: from Cut & Sew Patterns to Machine-Knit Garments. *ACM Transactions on Graphics (SIGGRAPH '21).* [paper link]

2017 Z. Yan, M. Han, S. Shi, A. Badea, Y. Yang, A. Kulkarni, E. Hanson, M. Kandel, X. Wen, F. Zhang, **Y. Luo**, et al. Mechanical Assembly, Transfer and Release of Three-Dimensional Mesostructures as High Temperature Growth Templates, Electronic Cellular Scaffolds and Self-Propelled Micro-Robots. *Proceedings of the National Academy of Sciences (PNAS) 114.45: E9455-E9464*. [paper link]

2017 Z. Yan, M. Han, Y. Yang, K. Nan, H. Luan, **Y. Luo**, Y. Zhang, Y. Huang, J. A. Rogers. Deterministic Assembly of 3D Mesostructures in Advanced Materials via Compressive Buckling: A short Review of Recent Progress. *Extreme Mechanics Letters 1: 96-104*. [paper link]

PATENTS

2023 **Resistive Sensing Arrays and Methods of Manufacturing the Same.** Wojciech Matusik. Michael J Foshey, Yiyue Luo. Provisional Patent Filed.

2021 **Systems and Methods for Estimating 3d Position and Movement from Tactile Signals.** Wojciech Matusik, Antonio Torralba, Michael J Foshey, Wan Shou, Yiyue Luo, Pratyusha Sharma, Yunzhu Li. US Patent Application No. 17/226.564.

TEACHING AND MENTORING

Teaching

Sep 2023 - Dec 2023 **Kaufman Teaching Certificate, MIT**
Cambridge, MA

Sep 2021 - Jan 2022 **6.336: Introduction to Numerical Simulation, MIT**
Teaching Assistant | Cambridge, MA

Nov 2021 - Jan 2022 **MAS.865: Rapid-Prototyping of Rapid-Prototyping Machines, MIT**
Guest Lecturer | Cambridge, MA

Sep 2021 **3.173: Computing Fabrics, MIT**
Guest Lecturer | Cambridge, MA

Jan 2017 - May 2017 **IEFX 198: Introductory first-year experience courses, UIUC**
Teaching Assistant | Urbana, IL

Jan 2016 - May 2016 **ENG 100: Introductory first-year experience courses, UIUC**
Teaching Assistant | Urbana, IL

Mentoring

2023-present **Devin Murphy** | Master Student at MIT

2022-present **Young Joon Lee** | Ph.D. Student at MIT | Coauthored on submitted works

2022-present **Yunyi Zhu** | Ph.D. Student at MIT | Coauthored on submitted works

2022-2024 **Tiffany Louie** | B.S. Student at MIT | Now M.ENG. at MIT EECS

2022-2023 **Lishuang Zhan** | M.S. Student at Tsinghua University, China | Coauthored on ICRA '23

2022-2023 **Yunho Choi** | M.S. Student at GIST, South Korea | Coauthored on Virtual Reality

2022 **Sylvie Waft** | B.S. Student at MIT | Now M.ENG. at MIT EECS

2022 **Joshua Jacob** | B.S. Student at UMass Amherst | Now visiting student at MIT EECS

2022 **Lara Zlokapa** | M.S. Student at MIT| Coauthored on ICRA '22, now at Illumina

2022 **Lucas Ventura** | M.S. Student at UPC, Spain | Now Ph.D. at ENPC

2022 **Qiang Zhang** | B.S. Student at SJTU, China | Coauthored on IROS '22, now Ph.D. at Princeton

2021 **Jacqueline Aslarus** | High School Student | Now B.S. student at MIT

PROFESSIONAL ACTIVITIES AND SERVICES

Program Chair/Committee

2024 ICRA Wearable Workshop 2024

2022 AHRI 2022

2021 WRC SARA 2021

Department Service

2023 Course Aid for Academic Faculty Search Seminar, MIT

2019-2020 Volunteer for PhD visit days, EECS Graduate Student Association, MIT

2018 Vice President for PhD visit days, EECS Graduate Student Association, MIT

Reviewing

Journals Nature Electronics, Science, Soft Robotics, Computer-Aided Design, Nature Machine Intelligence; IEEE Sensors; Virtual Reality

Conferences ACM CHI 2021-2024; ACM UIST 2021-2023; ACM HRI 2021-2023; ICRA 2023

SELECTED TALK AND PRESENTATION

Intelligent Textiles for Physical Interactions

Apr 2024 Invited talk at University of Michigan - Ann Arbor | Ann Arbor, IN

Apr 2024 Invited talk at Brown University | Providence, RI

Mar 2024 Invited talk at University of Illinois - Urbana Champaign | Virtual

Mar 2024 Invited talk at Stanford University | Stanford, CA

Mar 2024 Invited talk at Massachusetts Institute of Technology | Cambridge, MA

Mar 2024 Invited talk at Princeton University | Princeton, NJ

Feb 2024 Invited talk at New York University | Brooklyn, NY

Feb 2024 Invited talk at Dartmouth | Virtual

Feb 2024 Invited talk at University of California - Berkeley | Berkeley, CA

Feb 2024 Invited talk at Carnegie Mellon University | Pittsburgh, PA

Feb 2024 Invited talk at University of Washington | Seattle, WA

Jan 2024 Invited talk at University of Notre Dame | Notre Dame, IN

Intelligent Textiles for Physical Human-Environment Interactions

Oct 2023 Doctoral Dissertation at UIST '23 | San Francisco, USA

Machine-knitted Passive and Interactive Haptics Textiles with Integrated Binary Sensing

Oct 2023 Technical paper presentation at UIST '23 | San Francisco, USA

Digital Fabrication of Functional Textiles

Jul 2022 Invited talk at Tsinghua University | virtual

Apr 2022 Invited talk at Computational Fabrication Seminar | virtual

Digital Fabrication of Pneumatic Actuators with Integrated Sensing by Machine Knitting

May 2022 Technical paper presentation at CHI '22 | New Orleans, USA

Learning human-environment interactions using 3D conformal functional textiles

May 2023 Invited talk at TechBlick | virtual

Jun 2021 Invited talk at MIT Open Learning | virtual

May 2021 Invited talk at Smart Fabrication Seminar | virtual

KnitUI: Fabricating Interactive and Sensing Textiles with Machine Knitting

May 2021 Technical paper presentation at CHI '21 | virtual

SELECTED PRESS

2024 **Smart glove teaches new physical skills**
MIT News

2023 **Exhibition of machine-knitted pneumatic hand and walking robot**
Kent State University Museum, Knitting Beyond the Body

2023 **Exhibition of machine-knitted tactiel sensing vest**
Mobile World Congress in Europe and India

2023 **A natural and comfortable 'seamless-walk' virtual reality locomotion system**
MIT News, Yahoo Finance, Benzinga EurekAlert

2022 **A helping hand for robotic manipulator design**
MIT News, Hackaday, Tech Briefs, Tech Xplore, Robotics.ee

2022 **Exhibition of high-resolution tactile sensing gloves**
Massachusetts Institute of Technology Museum

2022 **Soft assistive robotic wearables get a boost from rapid design tool**
MIT News, Mashable, TechCrunch, Pioneering Minds

2022 **A simple diagnostic tool for gastrointestinal disorders**
MIT News Medical Design Briefs

2021 **Intelligent carpet gives insight into human poses**
MIT News, Inceptive Mind, Daily Mail, ZDNet

2021 **Tactile textiles sense movement via touch**
MIT News, Nature Electronics News & Views, Fast Company, Mashable, Tech Xplore