Danli Luo

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Portfolio: danli-luo.com

Research Interests

I develop **living instruments** that bridge computational and physical scientific tools through **responsive materials**, **biological fabrication**, and **autonomous systems**. My work combines **HCI**, **materials science**, and experimental research methods to create scientific instruments that adapt and evolve with research needs, making complex experimentation accessible through open-source hardware.

Education

University of Washington, Seattle, WA — 2021 - present
Ph.D, Human-Centered Design & Engineering
Advisor: Nadya Peek

Carnegie Mellon University, Pittsburgh, PA — 2015 - 2017
M.S., Materials Science & Engineering

Imperial College, London, UK — 2010 - 2013
B.Eng., Materials Science & Engineering

Professional Experience

Accenture Labs, Seattle, WA — Jun - Sep 2024
Technology R&D Associate Research Principal
Mentors: Wade Ingram, Andreea Danielescu

Human-Computer Interaction Institute, CMU, Pittsburgh, PA — 2018 - 2021
Research Associate
Mentor: Lining Yao

Honors and Awards

MIT Technology Review 35 Innovators Under 35 — 2024
Heidelberg Laureate Forum Young Researcher — 2024
Fast Company's World Changing Ideas Honorable Mention — 2024

Selected Publication

13. **Danli Luo**, Junchao Yang, Nadya Peek. 3D-Printed Mycelium Biocomposites: Method for 3D Printing and Growing Fungi-Based Composites. *3D Printing and Additive Manufacturing* (2025).
12. Brenden Pelkie, Sterling Baird, Eunice Aissi, Kenzo Aspuru-Takata, Yang Cao, Jin Hyun Chang, Kshitij Gambhir, Wm Salt Hale, Lucy Hao, Chance Hattrick, Jason Hein, **Danli Luo** et al. Democratizing self-driving labs through user-developed automation infrastructure. ChemRxiv. 2025; this content is a preprint and has not been peer-reviewed.

11. **Danli Luo**, Aditi Maheshwari, Andreea Danielescu, Jiaji Li, Yue Yang, Ye Tao, Lingyun Sun, Dinesh K. Patel, Guanyun Wang, Shu Yang, Teng Zhang, Lining Yao. Autonomous self-burying seed carriers for aerial seeding. *Nature* **614**, 463–470 (2023).
10. **Danli Luo**, Daniela Rosner, Nadya Peek. Doufu, Rice Wine, and 面饼: Supporting the Connections between Precision and Cultural Knowledge in Cooking. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23). Association for Computing Machinery, New York, NY, USA, Article 475, 1–13.
9. Guanyun Wang, Yue Yang, Mengyan Guo, Kuangqi Zhu, Zihan Yan, Qiang Cui, Zihong Zhou, Junzhe Ji, Jiaji Li, **Danli Luo**, Deying Pan, Yitao Fan, Teng Han, Ye Tao, Lingyun Sun. 2023. ThermoFit: Thermoforming Smart Orthoses via Metamaterial Structures for Body-Fitting and Component-Adjusting. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '23) 7, 1, Article 31 (March 2023), 27 pages.
8. **Danli Luo**, Chao Zhao, Guanyang Xue, Zhibo Cao, Alparslan Oztekin, Xuanhong Cheng. (2022). Label-free focusing of viral particles under a temperature gradient coupled with continuous swirling flow. *RSC Advances*, 12(7), 4263-4275.
7. Ye Tao, Yi-Chin Lee, Haolin Liu, Xiaoxiao Zhang, Jianxun Cui, Catherine Mondoa, Mahnoush Babaei, Jasio Santillan, Guanyun Wang, **Danli Luo**, Di Liu, Humphrey Yang, Youngwook Do, Lingyun Sun, Wen Wang, Teng Zhang, Lining Yao. Morphing pasta and beyond. *Science Advances* **7**, 19, eabf4098 (2021).
6. Humphrey Yang, **Danli Luo**, Kuanren Qian, Lining Yao. Freeform Fabrication of Fluidic Edible Materials. Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21). Association for Computing Machinery, New York, NY, USA, Article 620, 1–10.
5. Lingyun Sun, Jiaji Li, Yu Chen, Yue Yang, Zhi Yu, **Danli Luo**, Jianzhe Gu, Lining Yao, Ye Tao, Guanyun Wang. FlexTruss: A Computational Threading Method for Multi-material, Multi-form and Multi-use Prototyping. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21), Association for Computing Machinery, New York, NY, USA, 1–12.
4. Lingyun Sun, Yue Yang, Yu Chen, Jiaji Li, **Danli Luo**, Haolin Liu, Lining Yao, Ye Tao, Guanyun Wang. ShrinCage: 4D Printing Accessories that Self-Adapt. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21). Association for Computing Machinery, New York, NY, USA, Article 432, 1–12.
3. **Danli Luo**, Jianzhe Gu, Fang Qin, Guanyun Wang, Lining Yao. E-seed: Shape-Changing Interfaces that Self Drill. In Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST '20). Association for Computing Machinery, New York, NY, USA, 45–57.
2. Yuxuan Yu, Haolin Liu, Kuanren Qian, Humphrey Yang, Matthew McGehee, Jianzhe Gu, **Danli Luo**, Lining Yao, Yongjie Jessica Zhang. Material characterization and precise finite element analysis of fiber reinforced thermoplastic composites for 4D printing. *Computer-Aided Design* 122 (2020): 102817.

1. Jianzhe Gu, Vidya Narayanan, Guanyun Wang, **Danli Luo**, Harshika Jain, Kexin Lu, Fang Qin, Sijia Wang, James McCann, Lining Yao. 2020. Inverse Design Tool for Asymmetrical Self-Rising Surfaces with Color Texture. In Proceedings of the 5th Annual ACM Symposium on Computational Fabrication (SCF '20). Association for Computing Machinery, New York, NY, USA, Article 14, 1–12.

POSTER & DEMO

2. **Danli Luo**, Nadya Peek. 2022. Demonstrating a Fabricatable Bioreactor Toolkit for Small-Scale Biochemical Automation. In Adjunct Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology (UIST '22 Adjunct). Association for Computing Machinery, New York, NY, USA, Article 81, 1–3.
1. **Danli Luo**, Humphrey Yang, Malika Khurana, Kuanren Qian, Lining Yao. 2021. Demonstrating Freeform Fabrication of Fluidic Edible Materials. In Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA '21). Association for Computing Machinery, New York, NY, USA, Article 201, 1–4.

PATENT

1. Lining Yao, **Danli Luo**, Jianzhe Gu, Fang Qin, Guanyun Wang
Methods and devices for biomimetic hygromorphic composite.
US Patent App. US 2022/0322599 A1, patent granted.

INVITED TALKS

Are You Smarter Than A Commedian?
Coffee, Fungi, and the Future of Stuff — Sep 2025
Olympic Peninsula Fungi Festival
Coffee, Fungi, and the Future of Stuff — Oct 2025

SERVICE

Organizing Committee, Student Volunteer Co-Chair
ACM UIST — 2024, 2025
Program Committee, Associate Chair
ACM Chinese CHI — 2021, 2023
Paper Reviewing
ACM CHI — 2023, 2024, 2025
ACM UIST — 2023, 2024
ACM TEI — 2024
ACM DIS — 2023
ACM Chinese CHI — 2022
Session Chairing
ACM SCF — 2022
Student Volunteer
ACM SCF — 2019

Students Mentored

Taylor Hilton, Masters, Materials Science and Engineering, UW	2024
Yuecheng Peng, Masters, Global Innovation Exchange, UW	2023
Malika Khurana, Masters, Computational Design, CMU	2020
Prabin Paneru, Research Intern, CMU	2019
Rahul Sharma, Masters, Mechanical Engineering, CMU	2019

Selected Press

Nature Cover Story Gone to earth

Wall Street Journal Five farming technologies tackle climate change threats

London Design Biennale 2023, Automorph Network Self-burying seed

Science Friday A new twist on sowing seeds

Reuters Wooden seed carriers mimic self-burying seeds

New Atlas Plant-inspired E-seeds drill themselves into the dirt when moistened

Futurity Wooden carrier unwinds to bury seeds

ZME Science Scientists create wooden seeds carrier that imitates self-burying seeds

New York Times Flat pasta that turns into 3-D shapes — just add boiling water

Science Magazine A new twist on pasta dough could reshape food manufacturing

ABC News Groovy flat-packed pasta could help revolutionize food production

Science Friday A bowl full of pasta engineering

Smithsonian Magazine Mighty morphing 'flat-pack' pasta changes shape in boiling water

UK Daily Mail Don't tell the Italians! 'Flat-pack pasta' morphs from 2D to 3D while cooking and could slash the need for excessive plastic packaging

Designboom This flatpack pasta will morph into all sorts of 3D shapes when cooked

UW News Coffee grounds and Reishi mushroom spores can be 3D printed into a compostable alternative to plastics

3D Printing Industry Coffee grounds for 3D printing? A unique take on sustainable options for molds

Academic Teaching Experience

HCDE 439: Physical Computing
Teaching Assistant — Spring 2025

HCDE 439: Physical Computing
Co-instructor — Fall 2025