Jianzhe Gu

PH.D. · RESEARCHER

Human-Computer Interaction Institute, School of Computer Science, Carnegie Mellon University,
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Research Interest: Computational Design, Robotics, Digital Fabrication, HCI

Education

Ph.D. in Human-Computer Interaction

2018 - 2024

CARNEGIE MELLON UNIVERSITY, SCHOOL OF COMPUTER SCIENCE

Pittsburgh, PA, USA

- Advisor: Lining Yao, Ding Zhao

B.S. in Electrical and Computer Engineering

2014 - 2018

SHANGHAI JIAO TONG UNIVERSITY, SCHOOL OF INFORMATION AND ELECTRICAL ENGINEERING

Shanghai, China

- Advisor: Xinbing Wang

Publications

PAPERS

[Nature Communications]

Muscle Synergy Evolution in Actuator Networks

Jianzhe Gu, Ziwen Ye, Tucker Rae-Grant, Shuhong Wang, Josiah Hester, Sam Kriegman, Vickie Webster-Wood, Lining Yao

Nature Communications 2024 (Under Revision)

[CHI 2025]

Wearable Material Properties: Passive Wearable Microstructures as Adaptable Interfaces for the Physical Environment

Yuyu Lin, Hatice G. Guner, **Jianzhe Gu**, Sonia Prashant, Alexandra Ion

In Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (Under Revision)

[ACM TEI 2023]

breatHaptics: Rendering Breath Signals With Fine Granularity Using Shape-changing Soft Interface

Sunniva Liu, **Jianzhe Gu**, Dinesh K. Patel, Lining Yao

In Proceedings of the 2023 ACM International Conference on Tangible, Embedded and Embodied Interaction

[CHI 2022] **PneuMesh: Pneumatic-driven Truss-based Shape Changing System**

Jianzhe Gu, Yuyu Lin, Qiang Cui, Guanyun Wang, Lining Yao

In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems

[CHI 2022] **ElectriPop: Low-Cost Shape-Changing Displays with Electrostatically Inflated Mylar Sheets**

Cathy Fang, **Jianzhe Gu**, Lining Yao, Chris Harrison

In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems

[CHI 2021] **FlexTruss: A Computational Threading Method for Multi-material, Multi-form and Multi-use Prototyping**

Lingyun Sun, Jiaji Li, Yu Chen, Yue Yang, Zhi Yu, Danli Luo, **Jianzhe Gu**, Lining Yao, Ye Tao, Guanyun Wang

In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems

[SCF 2020] **Inverse Design Tool for Asymmetrical Self-Rising Surfaces with Color Texture**

Jianzhe Gu, Vidya Narayanan, Guanyun Wang, Danli Luo, Harshika Jain, Kexin Lu, Fang Qin, Sijia Wang, James McCann, and Lining Yao

In Symposium on Computational Fabrication. ACM.

[UIST 2020] **E-seed: Shape-Changing Interfaces that Self Drill**

Danli Luo, **Jianzhe Gu**, Fang Qin, Guanyun Wang, and Lining Yao

In Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology

[UIST 2020] **SimuLearn: Fast and Accurate Simulator to Support Morphing Materials Design and Workflows**

Humphrey Yang, Kuanren Qian, Haolin Liu, Yuxuan Yu, **Jianzhe Gu**, Matthew McGehee, Yongjie Jessica Zhang, and Lining Yao

In Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology

[CAD 2020] **Material characterization and precise finite element analysis of fiber reinforced thermoplastic composites for 4D printing**

Yuxuan Yu, Haolin Liu, Kuanren Qian, Humphrey Yang, Matthew McGehee, **Jianzhe Gu**, Danli Luo, Lining Yao and Yongjie Jessica Zhang

Computer-Aided Design 2020

[CHI 2019] **Geodesy: Self-rising 2.5D Tiles by Printing along 2D Geodesic Closed Path**
Jianzhe Gu, David E. Breen, Jenny Hu, Lifeng Zhu, Ye Tao, Tyson Van de Zande, Guanyun Wang, Yongjie Jessica Zhang, and Lining Yao
In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems

[UIST 2019] **Self-healing UI: Mechanically and Electrically Self-healing Materials for Sensing and Actuation Interfaces**
Koya Narumi, Fang Qin, Siyuan Liu, Huai-Yu Cheng, **Jianzhe Gu**, Yoshihiro Kawahara, Mohammad Islam and Lining Yao
In Proceedings of the 32st Annual ACM Symposium on User Interface Software and Technology

[UIST 2018] **4DMesh: 4D Printing Morphing Non-Developable Mesh Surfaces**
Guanyun Wang, Humphrey Yang, Zeyu Yan, Nurcan Gecer Ulu, Ye Tao, **Jianzhe Gu**, Levent Burak Kara, and Lining Yao
In Proceedings of the 31st Annual ACM Symposium on User Interface Software and Technology

[CHI 2018] **Thermorph: Democratizing 4D printing of self-folding Materials and Interfaces**
Kwon An, Ye Tao, **Jianzhe Gu**, Tingyu Cheng, Anthony Chen, Xiaoxiao Zhang, Wei Zhao, Youngwook Do, Shigeo Takahashi, Hsiang-Yun Wu, Teng Zhang, and Lining Yao
In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems

[CHI 2018] **Printed Paper Actuator: A Low-cost Reversible Actuation and Sensing Method for Shape Changing Interfaces**
Guanyun Wang, Tingyu Cheng, Youngwook Do, Humphrey Yang, Ye Tao, **Jianzhe Gu**, Byoungkwon An, and Lining Yao
In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems

Patent

[Patent US 2022] **Methods and devices for biomimetic hygromorphic composite**
Lining Yao, Danli Luo, **Jianzhe Gu**, QIN Fang, Guanyun Wang

Workshop, Demonstrations and Posters

[CHI 2024 EA] **Guttation Sensor: Wearable Microfluidic Chip for Plant Condition Monitoring and Diagnosis**
Qiuyu Lu, Lydia Yang, Aditi Maheshwari, Hengrong Ni, Tianyu Yu, **Jianzhe Gu**, Advait Wadhwani, Haiqing Xu, Andreea Danielescu, Lining Yao
Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems

[ICML 2022 Workshop] **Computational Co-Design for Variable Geometry Truss**
Jianzhe Gu, Lining Yao
2022 International Conference on Machine Learning

[UIST 2020 Adjunct] **FabricFit: Transforming Form-Fitting Fabrics**
Lingyun Sun, Ziqian Shao, Danli Luo, **Jianzhe Gu**, Ye Tao, Lining Yao, and Guanyun Wang
In Adjunct Publication of the 33rd Annual ACM Symposium on User Interface Software and Technology

[UIST 2020 Adjunct] **WireTruss: A Fast-Modifiable Prototyping Method Through 3D Printing**
Lingyun Sun, Jiaji Li, Yu Chen, Yue Yang, **Jianzhe Gu**, Ye Tao, Lining Yao, and Guanyun Wang
In Adjunct Publication of the 33rd Annual ACM Symposium on User Interface Software and Technology

Talks

Thermorph: Democratizing 4D Printing of Self-folding Materials and Interfaces *2018*
ACM CHI 2019 Montreal, CA

Geodesy: Self-rising 2.5D Tiles by Printing along 2D Geodesic Closed Path *2019*
ACM CHI 2019 Glasgow, UK

Inverse Design Tool for Asymmetrical Self-Rising Surfaces with Color Texture *2020*
ACM SCF 2020 Boston, USA (virtual)

From Origami to Pasta: Material-driven Computational Self-Folding *2022*
INCOSE 2022 Detroit, USA (virtual)

PneuMesh: Pneumatic-driven Truss-based Shape Changing System *2022*
CHI 2022 New Orleans, USA

Computational Co-Design for Variable Geometry Truss *2022*
ICML 2022 Baltimore, USA

Service

Reviewing	**ACM CHI** (2019-2024)
	ACM UIST (2019-2024)
	ACM SCF (2021)
Teaching	**TA for 05-630(CMU) Programming Usable Interface** (taught by Alexandra Ion) Fall 2021
	TA for 05-610(CMU) User-Centered Research & Evaluation (taught by Aniket Kittur & Raelin Musuraca) Spring 2022
	Guest Lecture for 05-899(CMU) Inclusive Tangible and Material Interfaces (taught by Lining Yao) Spring 2022
	Guest Lecture for 05-835(CMU) Applied Fabrication Techniques for HCI (taught by Alexandra Ion) Spring 2023

Courses & Technical Skills

Languages	**English** - Full Professional Proficiency, **Chinese (Mandarin)** -Native or bilingual proficiency, **Japanese** - Limited Working Proficiency
Programming	**Python**, **C/C++**, **Javascript/Html/CSS**, Objective-C, Matlab, LaTeX, SQL, Java, etc.
Frameworks	Pytorch, Tensorflow, OpenGL, React.js, Node.js, Eigen, LibIGL
Tools	**Rhino/Grasshopper**, **Blender**, Fusion360, Maya, Hudini, Adobe Illustrator
Courses	Deep Learning, Deep Reinforcement Learning, Optimal Control, Convex Optimization, Computer Graphics, Discrete Differential Geometry, Programmable User Interface, User-Centered Research and Evaluation, Numerical Methods, Solid Mechanics