Lei Gao

Lecturer

University College London (UCL)

Department of Computer Science

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Research interests

My research lies at the intersection of **Human–Computer Interaction (HCI), physical computing, and intelligent interactive systems**. I develop **programmable physical interfaces** that integrate computational sensing, actuation, and AI-driven control to enable embodied, adaptive, and multisensory interaction. My work particularly explores acoustic manipulation as a computational medium for contactless interaction and dynamic physical interface, with the broader goal of advancing intelligent and reconfigurable interactive systems.

Work Experiences

University College London 2026.10 – Present
Lecturer in IoT & System Engineering

University College London 2024.12 – 2026.09
Postdoctoral Research Fellow

Education

University College London 2020.10 – 2024.10
PhD of Computer Science in HCI

Supervisors: Prof. Sriram Subramanian and Prof. Diego Martinez Plasencia

Thesis title: Designing and Prototyping Applications Using Acoustophoretic Interfaces

Xidian University 2017.09 – 2020.06
Master of Engineering in Computer Technology

Supervisor: Prof. Bo Wan

Thesis title: Multi-user interactions in Augmented Reality

Shandong University 2013.09 – 2017.06
Bachelor of Engineering in Digital Media

Fellowships and awards

- **UCL-CS Early Career Mini-Fellowship** — Acoustophoretic Food Printing, Feb 2025 – Jul 2025.
- **Best Paper Award**, ACM Designing Interactive Systems Conference (DIS), 2025.

Teaching Experiences

Co-Lecturer — COMP0183, **Designing Sensor Systems**, University College London 2026/27
Co-Lecturer — COMP0182, **Real-World Multi-Agent Systems**, University College London 2026/27
Teaching Assistant — COMP0160, **Perception and Interfaces**, University College London 2023/24
Teaching Assistant — PSYC0095, **Future Interfaces**, University College London 2022/23
Teaching Assistant — COMP0113, **Virtual Environments**, University College London 2021/22
Teaching Assistant — COMP0021, **Interaction Design**, University College London 2020/21

Exhibitions and demonstrations

SIGGRAPH Technical paper demo in Denver, Temporal acoustic point holography 2024
CHI Interactivity Demo in Hamburg, Acoustophoretic Data Physicalisation 2023
UIST Demo in Bend, Acoustophoretic Data Physicalisation 2022
New Scientist Live in London, Interactive acoustic levitation 2022

Academic Services

Associate Chair / Associate Editor
ISS 2026

Conference Reviewing
CHI 2027, CHI 2026, UIST 2025, CHI 2023, ISS 2023, Chinese CHI 2023, TEI 2024

Journal Reviewing
Ultrasonics, International Journal of Human-Computer Studies (IJHCS), Human-Computer Interaction (HCI)

Invited talks, symposiums

Singapore Management University — Enabling Multimodal Interaction Systems with Acoustophoretic Interfaces. Hosted by Professor Tony Tang.	2026
Hong Kong University of Science and Technology (Guangzhou) — Acoustic Interfaces for Mid-air and Tangible Interactions	2025
City University of Hong Kong — Enabling Multimodal Interaction Systems with Acoustophoretic Interfaces. Hosted by Professor Shengdong Zhao.	2025
University of Siena — Food for Thought Seminar, Acoustic Levitation and Beyond Innovations in Food Technology. Hosted by Professor Patrizia Marti.	2025
South West UK Pre-CHI in Bristol — StableLev: Data-Driven Stability Enhancement for Multi-Particle Acoustic Levitation.	2024
Cockney Kai in London — StableLev: Data-Driven Stability Enhancement for Multi-Particle Acoustic Levitation.	2024
Institute of Software, Chinese Academy of Sciences — DataLev: Mid-air Data Physicalisation Using Acoustic Levitation. Hosted by Professor Teng Han.	2023
University of Copenhagen, Post-CHI XR summer school	2023
CHI Workshop in Hamburg, Physicalisation from Theory to Practice.	2023
UIST Workshop San Francisco, XR and AI: AI-Enabled Virtual, Augmented and Mixed Reality.	2023
Xidian University — Modern Magic Tricks: Mid-air displays using acoustic levitation. Hosted by Professor Bo Wan.	2022

Full Paper Publications

1. Jincheng Wang, **Lei Gao**, Zhouyang Shen, Pengyuan Wei and Diego Martinez Plasencia. 2026. AAC: An Acoustic Actor-Critic Trajectory Planning and Correction System for Stable Multi-Particle Levitation Displays. In Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems **(CHI'26)**. https://doi.org/10.1145/3772318.3791903.

2. Ceylan Besevli, **Lei Gao**, Narsimlu Kemsaram, Giada Brianza, Orestis Georgiou, Sriram Subramanian and Marianna Obrist. 2025. SONARIOS: A Design Futuring-Driven Exploration of Acoustophoresis. In Proceedings of the 2025 ACM Designing Interactive Systems Conference **(DIS'25)**. **Best Paper Award.** https://doi.org/10.1145/3715336.3735775

3. Hongyi Chen, James Hardwick, **Lei Gao**, Diego Martinez Plasencia, Sriram Subramanian and Ryuji Hirayama. 2025. Acoustics in additive manufacturing: A path toward contactless, scalable, and high-precision manufacturing. **Applied Physics Reviews**, 12, 031305 (2025). https://doi.org/10.1063/5.0271688

4. Narsimlu Kemsaram, James Hardwick, Jincheng Wang, Bonot Gautam, Ceylan Besevli, Giorgos Christopoulos, Sourabh Dogra, **Lei Gao**, Akin Delibasi, Diego Martinez Plasencia, Orestis Georgiou, Marianna Obrist, Ryuji Hirayama and Sriram Subramanian. 2025. AcoustoBots: A swarm of robots for acoustophoretic multimodal interactions. **Frontiers in Robotics and AI**, 12, 1537101. https://doi.org/10.3389/frobt.2025.1537101

5. Hongnan Lin, **Lei Gao**, Shengsheng Jiang, Hongyu Yue, Ziyi Fu, Jinyi Luo, Chengxiao Wu, Teng Han, Feng Tian, and Sriram Subramanian. 2025. Slip-Grip: An Electrotactile Method to Simulate Weight. In Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems **(CHI'25)**. https://doi.org/10.1145/3706598.3713361

6. Tor-Salve Dalsgaard, Arpit Bhatia, **Lei Gao**, Ryuji Hirayama, Sriram Subramanian, Joanna Bergström, and Kasper Hornbæk. Ultrasound can deliver chemical stimulants to the skin and modulate their perception. **Nature Scientific Reports** 15, no. 1 (2025): 10297. DOI: https://doi.org/10.1038/s41598-025-94463-7

7. **Lei Gao**, Giorgos Christopoulos, Prateek Mittal, Ryuji Hirayama, and Sriram Subramanian. 2024. StableLev: Data-Driven Stability Enhancement for Multi-Particle Acoustic Levitation. In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems **(CHI'24)**. DOI: https://doi.org/10.1145/3613904.3642286

8. **Lei Gao**. 2024. Designing and Prototyping Applications Using Acoustophoretic Interfaces. In Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems **(CHI EA'24)**. DOI: https://doi.org/10.1145/3613905.3651135

9. Giorgos Christopoulos, **Lei Gao**, Diego Martinez Plasencia, Marta Betcke, Ryuji Hirayama, Sriram Subramanian. Temporal acoustic point holography. ACM SIGGRAPH 2024 Conference Papers **(SIGGRAPH'24)** DOI: https://doi.org/10.1145/3641519.3657443

10. **Lei Gao**, Pourang Irani, Sriram Subramanian, Gowdham Prabhakar, Diego Martinez Plasencia, and Ryuji Hirayama. 2023. DataLev: Mid-air Data Physicalisation Using Acoustic Levitation. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems **(CHI'23)**. DOI: https://doi.org/10.1145/3544548.3581016

11. Xianbing Zhao, Yixin Chen, Wanting Li, **Lei Gao**, and Buzhou Tang. "MAG+: An Extended Multimodal Adaptation Gate for Multimodal Sentiment Analysis." In IEEE International Conference on Acoustics, Speech and Signal Processing **(ICASSP 2022)**, pp. 4753-4757. IEEE, 2022. DOI: https://doi.org/10.1109/ICASSP43922.2022.9746536
12. **Lei Gao**, Bo Wan, Gang Liu, Guojun Xie, Jiayang Huang, and Guanglan Meng (2021). Investigating the effectiveness of virtual reality for culture learning. International Journal of Human–Computer Interaction **(IJHCI)** 37.18 (2021): 1771-1781. DOI: https://doi.org/10.1080/10447318.2021.1913858
13. **Lei Gao**, Bo Wan, Cheng Fang, Yangyang Li, and Chen Chen (2019). Automatic Clustering of Different Solutions to Programming Assignments in Computing Education. In Proceedings of the ACM Conference on Global Computing Education **(CompEd '19)**. ACM, New York, NY, USA, 164-170. DOI: https://doi.org/10.1145/3300115.3309515

Short Papers, Demos and Workshops

1. Hongyue Wang, Jialin Deng, Yuchen Zheng, Ziqi Fang, Charles Spence, Ferran Altarriba Bertran, Koya Narumi, **Lei Gao**, Weijen Chen, Lining Yao, Mako Miyatake, Marianna Obrist, Homei Miyashita, Chi Thanh Vi, Oussama Metatla, Florian 'Floyd' Mueller. Beyond Interfaces: the Future of Edible Interactions. In Companion Publication of the 2026 ACM Designing Interactive Systems Conference **(DIS 2026 Workshop)**. DOI: https://www.edibleinteractions.art/
2. **Lei Gao**, Yutaka Tokuda, Shubhi Bansal, Sriram Subramanian. Computational Gastronomy and Eating with Acoustophoresis. In Companion Publication of the 26th International Conference on Multimodal Interaction **(ICMI'24 Companion)**. DOI: https://doi.org/10.1145/3686215.3686218
3. **Lei Gao**, Pourang Irani, Sriram Subramanian, Gowdham Prabhakar, Diego Martinez Plasencia, and Ryuji Hirayama. 2023. DataLev: Mid-air Data Physicalisation Using Acoustic Levitation. **(CHI'23 Interactivity demo)**
4. **Lei Gao**. Domain-specific data physicalisations enabled by DataLev (CHI'23 Workshop on physicalisation from Theory to Practice)
5. **Lei Gao**, James Hardwick, Diego Martinez Plasencia, Sriram Subramanian, and Ryuji Hirayama. 2022. DATALEV: Acoustophoretic Data Physicalisation. In Adjunct Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology **(UIST'22 Demo)**. DOI: https://doi.org/10.1145/3526114.3558638