

Lei Gao

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UCL Interaction Center, Multi-Sensory Devices Group, 169 Euston Road, London, NW1 2AE

RESEARCH INTERESTS

My research investigates the computational design of novel interactive and intelligent systems that integrate advanced physical actuation mechanisms, multisensory interaction, and algorithmic methods. My current work advances acoustophoresis by using ultrasonic fields to enable contactless object manipulation, fabrication, and multisensory and haptic interaction.

WORK EXPERIENCES

- **University College London** *Postdoctoral Research Fellow* 2024.12 - Now
 - Funding source: Royal Academy of Engineering Chair in Emerging Technologies Grant of Prof. Sriram Subramanian

EDUCATION

- **University College London** *PhD of Computer Science in HCI* 2020.10 - 2024.10
 - Supervisor: Prof. Sriram Subramanian, Fellow of the Royal Academy of Engineering, and Prof. Diego Martinez Plasencia
 - Thesis title: Designing and Prototyping Applications Using Acoustophoretic Interfaces
 - Funding source: UCL Research Studentship (EU Horizon 2020 Program)
- **Xidian University** *Master of Engineering in Computer Technology* 2017.9 - 2020.7
 - Supervisor: Prof. Bo Wan
 - Thesis title: Multi-user interactions in Augmented Reality
- **Shandong University** *Bachelor of Engineering in Digital Media* 2013.9 - 2017.7

FELLOWSHIPS AND AWARDS

- **UCL-CS Early Career Mini-Fellowship**
Acoustophoretic Food Printing 2025.2.1 - 2025.7.31
- **Best Paper award** at 2025 ACM Designing Interactive Systems Conference

TEACHING EXPERIENCES

- COMP0160 Perception and Interfaces (2023-2024), TA at University College London
- PSYC0095 Future Interfaces (2022-2023), TA at University College London
- COMP0113 Virtual Environments (2021-2022), TA at University College London
- COMP0021 Interaction Design (2020-2021), TA at University College London

EXHIBITIONS AND DEMONSTRATIONS

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

ACADEMIC SERVICES

Peer reviewer for conferences including CHI 2026, UIST 2025, CHI 2023, ISS 2023, Chinese CHI 2023, and TEI 2024, as well as journals such as Ultrasonics and the International Journal of Human-Computer Studies.

INVITED TALKS, SYMPOSIUMS

- 2025 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
- 2025 University of Siena, Food for Thought Seminar, Acoustic Levitation and Beyond Innovations in Food Technology.
- 2024 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.
- 2023 Institute of Software, Chinese Academy of Sciences, DataLev: Mid-air Data Physicalisation Using Acoustic Levitation.
- 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.
- 2022 Xidian University, Modern Magic Tricks: Mid-air displays using acoustic levitation.

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**) **Accepted**.
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 AND WORKSHOP PAPERS

1. **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>.
2. **Lei Gao**. Domain-specific data physicalisations enabled by DataLev (CHI'23 Workshop on physicalisation from Theory to Practice)
3. **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>