

# 高蕾

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伦敦大学学院人机交互中心 (UCLIC), 多感知设备课题组 (Multi-Sensory Devices Group)

## 研究领域

我的研究致力于通过计算方法设计新型智能交互系统, 并融合先进的物理驱动机制、多感官交互方式与算法方法。当前的研究兴趣主要发展声场操控技术, 利用超声场实现非接触式的物体操控, 先进制造, 以及多感官和触觉交互。

## 工作经验

- 伦敦大学学院 (UCL) 博士后研究员 2024.12 - 今
  - 英国皇家工程院新兴技术讲席教授项目 (Prof. Sriram Subramanian)

## 教育背景

- 伦敦大学学院 (UCL) 计算机科学博士-人机交互方向 2020.10 - 2024.10
  - 导师: 英国皇家工程院院士 Prof. Sriram Subramanian 和 Prof. Diego Martinez Plasencia
  - 博士论文课题: 基于声场操控界面的应用设计与原型构建
  - UCL 全额奖学金 (欧盟地平线 2020 项目)
- 西安电子科技大学 计算机技术工程硕士 2017.9 - 2020.7
  - 导师: 万波教授
  - 硕士论文课题: 增强现实环境中的多用户交互机制研究
- 山东大学 数字媒体技术工学学士 2013.9 - 2017.7

## 科研资助和获奖

- UCL-CS 青年学者短期资助计划  
Acoustophoretic Food Printing 2025.2.1 - 2025.7.31
- 最佳论文奖 2025 ACM Designing Interactive Systems Conference

## 教学经历

- COMP0160 Perception and Interfaces (23-24), University College London
- PSYC0095 Future Interfaces (22-23), University College London
- COMP0113 Virtual Environments (21-22), University College London
- COMP0021 Interaction Design (20-21), University College London

## 学术服务

- 论文审稿: 会议: CHI 2026, UIST 2025, CHI 2023, ISS 2023, Chinese CHI 2023, TEI 2024. 期刊: Ultrasonics, International Journal of Human-Computer Studies(IJHCS).
- 志愿者: ICRA 2023, London

## 学术外展

- 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

## 主题报告, 研讨会

- 2025 香港科技大学 (广州), Acoustic Interfaces for Mid-air and Tangible Interactions
- 2025 香港城市大学, Enabling Multimodal Interaction Systems with Acoustophoretic Interfaces
- 2025 意大利锡耶纳大学, Food for Thought Seminar, Acoustic Levitation and Beyond Innovations in Food Technology.
- 2024 英国布里斯托大学, South West UK Pre-CHI, StableLev: Data-Driven Stability Enhancement for Multi-Particle Acoustic Levitation.
- 2024 英国伦敦大学学院, Cockney Kai, StableLev: Data-Driven Stability Enhancement for Multi-Particle Acoustic Levitation.
- 2023 中国科学院软件研究所, DataLev: Mid-air Data Physicalisation Using Acoustic Levitation.
- 2023 德国汉堡, CHI Workshop on physicalisation from Theory to Practice.
- 2023 丹麦哥本哈根大学, Post-CHI XR summer school
- 2023 美国旧金山, UIST Workshop on XR and AI: AI-Enabled Virtual, Augmented and Mixed Reality.
- 2022 西安电子科技大学, Modern Magic Tricks: Mid-air displays using acoustic levitation.

## 会议期刊论文

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**). **最佳论文奖**.
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>. (CCF A 类人机交互顶会)
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 CHI Conference on Human Factors in Computing Systems (**CHI'24**). DOI: <https://doi.org/10.1145/3613904.3642286>. (CCF A 类人机交互顶会)
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>. (CCF A 类人机交互顶会)
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>. (CCF A 类图形学顶会)
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>. (CCF A 类人机交互顶会)
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>. (CCF B 类多媒体期刊)
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>(CCF B 类人机交互期刊)
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>

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> (CCF A 类人机交互顶会)