

TATSUKI FUSHIMI
R&D Center for Digital Nature,
University of Tsukuba
Kasuga 1-2 Tsukuba, Ibaraki, Japan
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EDUCATOIN

University of Bristol, United Kingdom **Bristol, UK**
Ph.D. in Mechanical Engineering (2020)
Dissertation: *Nonlinear Dynamics of Phased Array Levitators*

University of Bristol, United Kingdom **Bristol, UK**
Bachelor of Engineering in Mechanical Engineering (First Class Honours) (2016)
Thesis: *Development of a Reaction Wheel Driven Polygon*

PROFESSIONAL EXPERIENCE

University of Tsukuba **Tsukuba, JP**
Vice Director, R&D Center for Digital Nature
Dec 2022-present

University of Tsukuba **Tsukuba, JP**
Assistant Professor, Institute of Library, Information and Media Science
Oct 2020-present

University of Tsukuba **Tsukuba, JP**
Postdoctoral Researcher, Faculty of Library, Information and Media Science
May 2020-Sep 2020

University of Bristol **Bristol, UK**
Research Associate, Department of Engineering Mathematics
Jan 2020-Apr 2020

FIRST AUTHOR / CORRESPONDING PUBLICATIONS

1. Stone, C., Koroyasu, Y., Ochiai, Y., Kaneko, A., Drinkwater, B. W., & **Fushimi, T.** (2025). Experimental and Numerical Study of Acoustic Streaming in Mid-Air Phased Arrays. *Npj Acoustics* [Accepted]
2. Nagakura, K., **Fushimi, T.**, Tsutsui, A., & Ochiai, Y. (2025). Dynamic caustics by ultrasonically modulated liquid surface. *Scientific Reports*, 15(1), 31928.
3. Mochizuki, S., Ochiai, Y., & **Fushimi, T.** (2025). Spatial sound modulation through manual reconfiguration of phased plate. *Applied Physics Letters*, 126(20).
4. **Fushimi, T.** & Koroyasu, Y., (2024) Multi-Focus Acoustic Field Generation Using Dammann Gratings for Phased Array Transducers, *Results in Physics*, 108040
5. **Fushimi, T.**, Tagami, D., Yamamoto, K., & Ochiai, Y. (2024). A digital twin approach for experimental acoustic hologram optimization. *Communications Engineering*, 3(1), 12.
6. **Fushimi, T.**, & Ochiai, Y. (2023). Acoustic Levitation and Acoustic Holograms. *Acoustic Technologies in Biology and Medicine*, 217-242.
7. Koroyasu, Y., Nguyen, T. V., Sasaguri, S., Marzo, A., Ezcurdia, I., ... & **Fushimi, T.** (2023). Microfluidic platform using focused ultrasound passing through hydrophobic meshes with jump availability. *PNAS Nexus*, pgad207.
8. **Fushimi, T.**, Yamamoto, K., & Ochiai, Y. (2021). Target acoustic field and transducer state optimization using Diff-PAT. *AIP Advances*, 11(12).
9. **Fushimi, T.**, Yamamoto, K., & Ochiai, Y. (2021). Acoustic hologram optimisation using automatic differentiation. *Scientific reports*, 11(1), 12678.

10. **Fushimi, T.**, Marzo, A., Drinkwater, B. W., & Hill, T. L. (2019). What is the ultimate capability of acoustophoretic volumetric displays?. *Applied Physics Letters*, 116(24), 244101.
11. **Fushimi, T.**, Marzo, A., Drinkwater, B. W., & Hill, T. L. (2019). Acoustophoretic volumetric display using a fast-moving levitated particle. *Applied Physics Letters*, 115(6), 064101.
12. **Fushimi, T.**, Marzo, A., Hill, T. L., & Drinkwater, B. W. (2018). Trajectory Optimization of Levitated Particles in Mid-air Ultrasonic Standing Wave Levitators. *2018 IEEE International Ultrasonics Symposium (IUS)*, 1–4.
13. **Fushimi, T.**, Hill, T. L., Marzo, A., & Drinkwater, B. W. (2018). Nonlinear trapping stiffness of mid-air single-axis acoustic levitators. *Applied Physics Letters*, 113(3), 034102.

+ 8 more peer-reviewed co-authored publications.

INVITED PRESENTATIONS

14. **Fushimi, T.**, From Digital Twins to Singularities: Unlocking Acoustic Holograms with Automatic Differentiation, ASA Spring 2025/25th ICA
15. **Fushimi, T.**, Exploring Acoustic Manipulation: From Microfluidics to Holographic Optimization. *2024 International Forum on Acoustofluidics*
16. **Fushimi, T.** & Marzo, A., Strategic Platform for the Next-generation Acoustically Actuated User Interfaces, *AsPIRE and ERC: Japan and EU collaboration webinar*
17. **Fushimi, T.**, Dynamic Acousto-Caustics in Dual-optimized Holographic Fields. *SIGGRAPH 2024*
18. **Fushimi, T.**, Marzo, A., Drinkwater, B. W., & Hill, T. L. (2019). Acoustophoretic volumetric display using a fast-moving levitated particle. *Rank Prize Symposium on the Parallels between acoustics and EM radiation in structured material*.

GRANTS

1. **JST AsPIRE (Adopting Sustainable Partnerships for Innovative Research Ecosystem)**
90,000,000 JPY (approx.. 600,000 USD), *Strategic platform for the next-generation acoustically actuated user interfaces (2024-2027)*
2. **University of Tsukuba TRiSTAR Fellowship**
1,500,000 JPY (approx. 10,000 USD), *Increasing the functionality of ultrasonic microfluidic operation platform using MHz ultrasonic waves (2023-2024)*
3. **JSPS Kaken Grant-in-Aid for Early-Career Scientists**
4,680,000 JPY (approx. 32,000 USD), *Development of tangible user interface using ultrasonic microfluidic manipulation platform, 23K16916, (2023-2024)*
4. **JST SICORP ReNewMAP**
3,770,000 JPY (approx.. 26,000 USD), *Towards Introduction of Society 5.0 in Biology with International Collaboration and Ultrasound, JPMJSC2205, (2023)*
5. **JSPS Kaken Grant-in-Aid for Early-Career Scientists**
4,680,000 JPY (approx. 32,000 USD), *Performance Improvement of Acoustophoretic Volumetric Display through the Optimization of Acoustic Hologram, 21K14103, (2021-2022)*
6. **Graduate Scholarship for Degree Seeking Students**
11,748,000 JPY from JASSO 2016 – 2019; approx. 110,000 USD

On all the fundings above, I was the principal investigator.

PATENTS

19. **Fushimi, T.**, Ochiai, Y., Koroyasu, Y., Droplet operation device and droplet operation method, Patent Application 2022-122138
20. Kojima, R., **Fushimi, T.**, Ochiai, Y., Air vortex generator, Patent Application 2022-131509
21. Ochiai, Y., Sadasue, M., Minagawa, T., **Fushimi, T.**, Flight control system, flight control method, and program, JP Patent 2021-165764
22. Ochiai, Y., Yamamoto, O., **Fushimi, T.**, Optimization of Acoustic Holograms Using Automatic Differentiation, Patent Application 2020-167367