

In May 2026, I participated in the Microfluidic Horizons 2026 Conference in Padua, Italy. This conference brings together experts from around the world to share ideas, present cutting-edge research, and establish new collaborations. Through plenary talks, oral and poster sessions, and interactive discussions, the conference aimed to catalyse the next wave of microfluidic innovations while strengthening connections within the global scientific community. It also served as an inspiring platform for future advancements across the field and beyond.

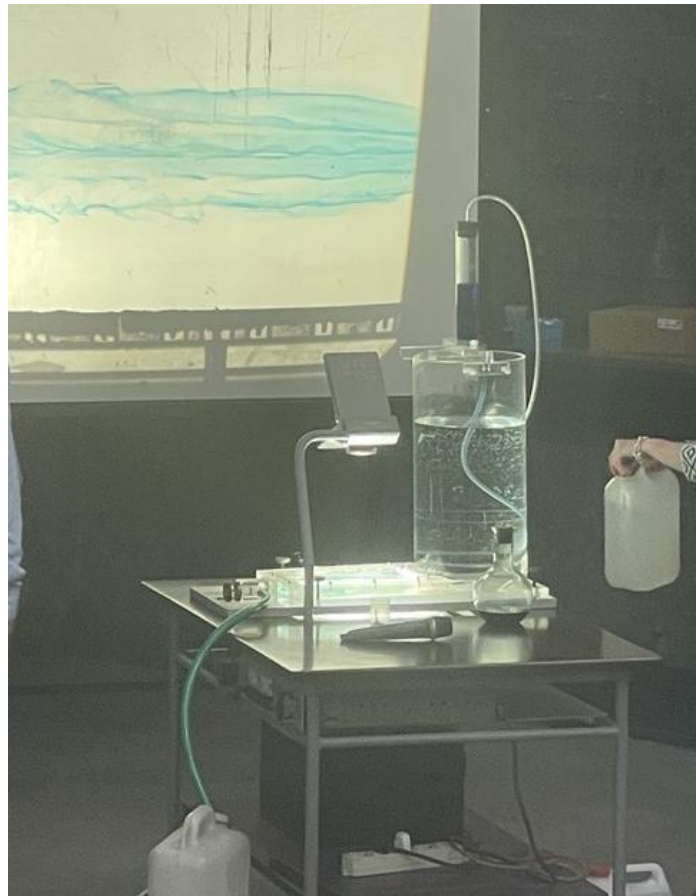
The conference focused on a broad range of topics, including:

1. Flow, wetting, and transport phenomena
2. Microfabrication and device engineering
3. Analytical and chemical applications
4. Ecology and sustainable processes
5. Cell, microbe, and extracellular vesicle manipulation
6. Organ-on-a-chip and translational models
7. Nanofluidics and molecular transport
8. Computational and data-driven approaches in microfluidics
9. High-energy spectroscopy and advanced imaging methods coupled with microfluidics
10. Space and microgravity research

Many of these topics were new to me, particularly those outside my immediate research area. Being exposed to such a diverse range of subjects and engaging with researchers from different backgrounds broadened my understanding of the field of microfluidics and provided valuable insights into emerging research directions and applications. The conference highlighted the interdisciplinary nature of microfluidics and demonstrated how technology is being applied to address challenges across healthcare, biotechnology, environmental science, and space research.

In addition to the conference program, I attended a specialized microfluidics course held prior to the conference. The course focused on fundamental and advanced aspects of microfluidics, including microfluidic mechanics, device fabrication techniques, control systems, readout strategies, and practical implementation of microfluidic technologies. The course provided valuable hands-on learning opportunities, including live demonstrations and experiments that illustrated key microfluidic principles and phenomena. These practical sessions covered topics such as fluid behavior at the microscale, device fabrication methods, and experimental techniques commonly used in microfluidics research.

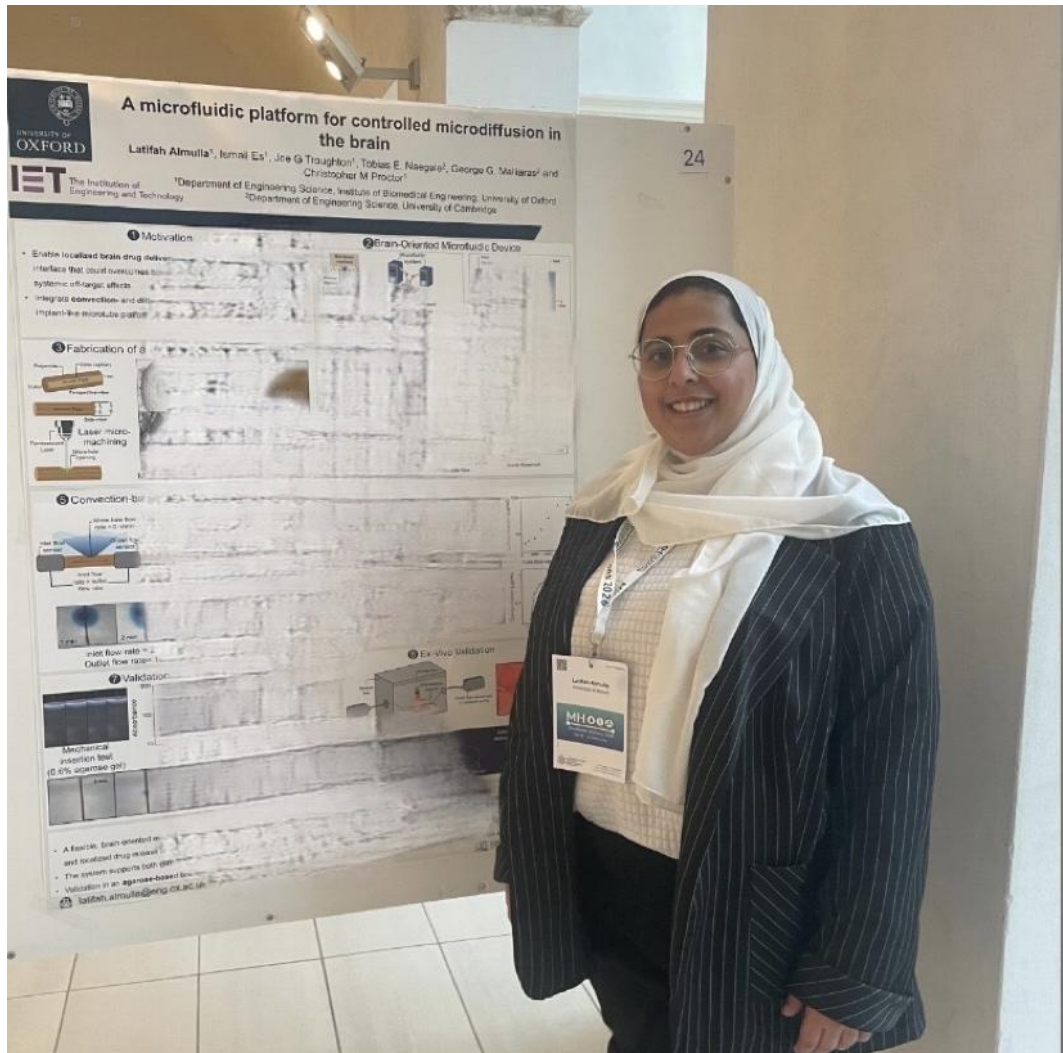
Alongside the practical components, the course also provided important theoretical knowledge that is directly relevant to my doctoral research. The combination of practical demonstrations and expert-led lectures strengthened my understanding of advanced microfluidic technologies, device design principles, and the underlying physics governing microscale fluid transport. The knowledge gained from this course will directly support the development of my research and future experimental work involving microfluidic systems.



**Picture 1.** Microfluidics horizons pre-conference courses, life experiments explaining turbulent and limner flow phases.

I also presented a poster titled “*A microfluidic platform for controlled microdiffusion in the brain*”, which provided an excellent opportunity to discuss my research with leading academics and industry partners working in related fields. These interactions allowed me to exchange ideas on experimental design, microfabrication techniques, drug transport mechanisms, and challenges commonly encountered in the development of microfluidic systems. By asking detailed questions and discussing specific obstacles encountered during my research, I received valuable feedback, practical troubleshooting suggestions, and insights drawn from both academic and industrial experience. The discussions highlighted potential improvements to my experimental approach and identified new avenues for future investigation. In addition, the conference enabled me to establish connections with researchers and industry representatives

whose expertise and interests closely align with my research area, creating opportunities for future collaboration and knowledge exchange.



**Picture 2.** Presenting a poster entitled “A microfluidic platform for controlled microdiffusion in the brain” during the conference.

Alongside the conference, I visited the University of Bologna before and after the event to support ongoing collaborative animal studies that form an important part of my doctoral research. These studies focus on the translation and validation of the microfluidic technologies I have developed in relevant animal models. During the visit, we conducted two in vivo experiments involving the implantation of my microfluidic devices into the rodent brain, providing valuable insights into device performance and informing future work towards chronic implantation.

To ensure the trip was conducted as sustainably as possible, I carefully planned all aspects of travel and accommodation. Public transport was used wherever feasible, including train travel between Bologna and Padova and public transport connections between Oxford and Heathrow Airport. A single direct flight was selected to reduce emissions associated with multiple flight connections, and accommodation was chosen within walking distance of the conference venue to minimize local

travel requirements. Combining the conference with the collaborative research visit also reduced the need for separate international trips, maximizing the value of the travel undertaken.

In conclusion, the IET International Travel Award enabled me to combine conference participation with this important collaborative research visit, maximizing the scientific value of the trip. The opportunity to engage with experts, receive feedback on my work, and contribute to in vivo studies has strengthened both the technical and translational aspects of my project. The knowledge, experience, and connections gained through these activities will support the next stages of my doctoral research and contribute to the development of microfluidic and bioelectronic technologies for neurological applications.