



UNIVERSITY OF
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IET Travel Award for International Travel - Report

Lawrence Coles

PhD Student, Bionics Systems Group

Department of Engineering, University of Cambridge

I recently had the invaluable opportunity to attend and present my research at the 2023 Materials Research Society Spring Meeting in San Francisco, California, from April 10-14, thanks to the IET Travel Award for International Travel. Held at the Moscone West Centre, the 2023 MRS Spring Meeting celebrated 50 years of service to the materials research community and served as a convergence point for over 6,000 attendees from across the broad spectrum of the field of materials science. The MRS Spring Meeting is one of the most prestigious conferences in the field of materials science, attracting a diverse range of attendees, from early career researchers to established and leading academics. This makes it a perfect opportunity to both learn about and present on the latest research findings, while also providing an unparalleled networking opportunity.

At the 2023 MRS Spring Meeting, I had the opportunity to present my PhD work on "Implantable bioelectronics with shape actuation for minimally invasive electrocorticography" within the Symposium SB09 "Polymeric Electronic Materials and Devices for Biological Interfaces". During my PhD, I have been developing novel minimally-invasive neural implants to interface with the central nervous system. My work lies at the intersection of two exciting engineering fields, bioelectronics and soft-robotics, combining mechanical engineering design and fabrication techniques developed for soft-robotic applications and integrating them with thin-film bioelectronics fabrication to create implantable devices that can change shape. Therefore, implants with integrated shape-actuation can be implanted with minimally-invasive keyhole surgeries, before changing shape within the body to allow interaction with the surrounding tissue.

During my symposium session on the third day of the conference, I presented my PhD work alongside preeminent researchers from both academia and industry in the field of implantable neural electronics. This environment facilitated an interesting discussion regarding our approach to minimally invasive technologies and the challenges associated with surgical implantation during the symposium session, and further facilitated informal discussions around the state of the field of neural and brain-computer interfaces. This left me with thoughts about potential research directions that could be explored both during the remainder of my PhD, and within a potential future research career. As neural implants are an emerging technology, my symposium session gave me the opportunity to network with entrepreneurs creating exciting start-ups in the field, and discuss the direction of the industry and learn about the infrastructure available to support early-stage startups in implantable neural interfaces.

Due to the multidisciplinary nature of the meeting, it was also an unparalleled opportunity to discuss with fellow researchers in different engineering and materials fields, away from the field of bioelectronics that I regularly interact with. As demonstrated by my research in complementing bioelectronics with soft robotics, separate research fields in engineering can be integrated to unlock unique solutions to some of the healthcare sector's primary challenges. Attending the MRS Spring Meeting, with its many parallel symposium sessions, enabled me to attend a multidisciplinary range of presentations, from soft-robotics to drug-delivery using nanoparticles, giving me food for thought on how these topics could be complementary to implantable bioelectronic devices. Also, during the MRS Spring Meeting, there were also three evening sessions with both academic posters and industrial exhibition stands. Due to the very wide range of work being presented, I was able to find and network with different researchers who work

on neural interfaces and traditional soft-robotic technologies. Specifically, I found that some of these discussions around manufacturing and control techniques being developed for soft-robotic surgical tools could be applied to solve some of the main challenges in our work. After the conclusion of MRS, I also had the chance to explore the hilly city of San Francisco and explore the beautiful nature on offer in California.

I am extremely grateful to the IET for supporting me with a IET Travel Award for International Travel to enable me to attend the 2023 MRS Spring Meeting. It was an outstanding experience to attend one of the largest and most prestigious conferences in materials science, and have the opportunity to present my PhD research to preeminent academics and industry experts. With the wide range of research being presented, it was an amazing opportunity to learn about leading research from institutions all over the world, both in the field of bioelectronics and other complementary engineering disciplines. Attending a large international conference such as the MRS Spring Meeting gave me the opportunity to both expand my professional network, with new contacts in both academia and start-up industries, and form ideas about new research directions I might use in the next stages of my research career. Therefore, I would like to highly encourage any early career researcher to apply for the IET Travel Award for International Travel to have the opportunity to attend a similar international conference.

