In February 2019, the OATECH+ network cofunded a trip I made to visit the 3D bioprinting laboratories of Prof. Gordon Wallace (https://ipri.uow.edu.au/people/UOW001346.html) at the University of Wollongong. Prof. Wallace, in close collaboration with Prof. Peter Choong (https://www.cmo.net.au/our-team/) has developed a novel approach for intraoperative repair of cartilage lesions[1–4]. This technique involves printing a bio-ink containing viable stem cells directly into cartilage lesions or injuries to prevent the development of degenerative conditions such as osteoarthritis. The liquid bio-ink is extruded from a handheld, surgeon operated instrument known as the Bio Pen. Immediately post extrusion, the bio-ink is subject to light mediated cross-linking to harden the liquid and provide the mechanical properties required to sustain load bearing forces. Prof's Wallace and Choong have assembled a talented team of interdisciplinary researchers, and built world-leading research facilities in their quest to translate 3D bioprinting as an approved treatment for cartilage repair. My interest in this research area originates from my background in biophotonics and how novel optical instruments can be developed to non-destructively monitor subtle changes in cartilage biochemistry and metabolism.

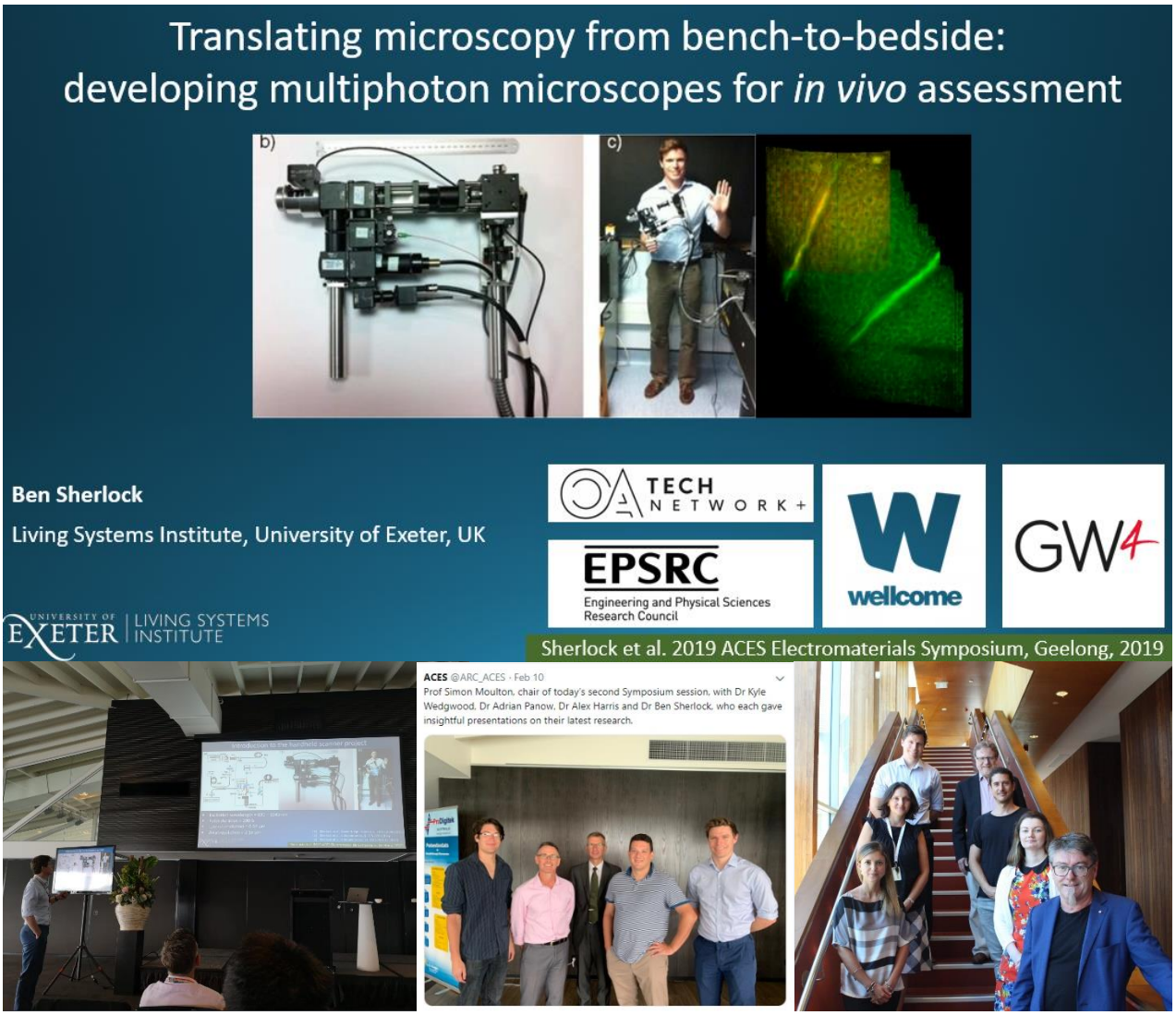

Figure 1. (Top) The title slide for my invited talk at the 2019 ACES Electromaterials Symposium. (Bottom left) Presenting at the SCES symposium. (Bottom centre) Picture with the speakers and chair from the conference session. (Bottom right) Picture with speakers from a workshop on "Contactless characterisation" run at the University of Wollongong during my visit.

My visit began with a conference organised by Prof. Wallace in Geelong, a coastal town near Melbourne. During the invited talk at the 2019 ACES Electromaterials symposium I gave an overview of my past and current research in biophotonics and provided a vision of how optical imaging might support and inform the development 3D bioprinted implants. The conference served as an excellent opportunity to present my own research and have some highly productive conversations with Prof. Wallace. Following this conference I travelled to Melbourne to spend two days visiting Prof. Choong's research group in the custom built BioFab3D centre (https://www.biofab3d.org/) on the St. Vincent's hospital site, the first hospital based 3D bioprinting facility in Australia. One of the aim of the BioFab3D centre is realise the potential of 3D bioprinting as clinical tool for in vivo cartilage repair. During this visit I was fortunate to meet with Dr. Claudia Di Bella - academic orthopaedic consultant, Cathal O'Connell – Centre Manager at

the BioFab3D and Serena Duchi and Carmine Onofrillo – Senior postdoctoral researchers in the BioFab3D. During the second week of my trip, I visited Prof. Wallace's world leading bioprinting laboratories at the University of Wollongong, including the recently opened Translational Research Initiative for Cellular Engineering and Printing (https://www.tricep.com.au/). During my time in Wollongong I enjoyed many insightful and promising research discussions and also presented at a workshop on "Contactless Characterisation of biosystems". In the final leg of my trip I visited Dr. Irina Kabakova (https://www.uts.edu.au/staff/irina.kabakova) at the University of Technology Sydney (UTS). Dr. Kabakova is a pioneer in Brillouin imaging, an optical technique which directly probes the mechanical properties of tissues such as cartilage. At UTS I gave a seminar at the Institute for Biomedical Materials & Devices, toured some of the imaging laboratories and enjoyed several fruitful conversations on the topic of future collaboration with Dr. Kabakova.

In summary, my trip to Australia allowed me to gain first-hand experience of the outstanding work being performed by Prof. Gordon Wallace and his collaborators in the field of 3D bioprinting. During my visit I was able to develop ties with key researchers in different aspects of cartilage bioprinting, and appreciate from them how non-destructive assessment techniques could have a transformative impact on their research. My hope is that these early stage conversations will lay the foundations for major, international collaborations in the near future. I'd like to take this opportunity to formally thank Prof. Wallace and his collaborators for their warm hospitality, and the OATECH+ network for cofunding the visit.

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