**Project Resume** – Updated September 2024

**Lead Supervisor**: Professor Fabio Quondamatteo, RCSI

**Supervisor**: Dr Shane Browne, RCSI

**Student**: Ms Louise Hosty, RCSI

**Institution**: Royal College of Surgeons in Ireland

**Title**: Harnessing stem-cell derived vascular cells for the development of a pro-angiogenic ECM scaffold for the treatment of diabetic foot ulcers

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Diabetic foot ulcers (DFU) are a debilitating and life-threatening complication of Diabetes Mellitus, affecting 19-34% of diabetic patients. The current standard-of-care is clinically insufficient to promote healing for many DFU patients, ultimately leading to recurrence and limb amputation. Biomaterial dressings, particularly those derived from the extracellular matrix (ECM), have emerged as a promising approach for the treatment of DFU. Biomaterials composed of isolated ECM components, e.g. collagen, hyaluronic acid (HyA), provide structural support, but lack the required complexity of native or cell-deposited ECM to drive tissue repair. We aim to develop ECM-derived scaffolds which will stimulate wound healing, tissue regeneration and vascularisation, by functionalising hyaluronic acid hydrogels with cell derived ECM. Overall, the aim of the project is to use a novel tissue engineering approach which can lead to the development of a successful therapy for diabetic wounds, thus preventing associated complications including amputation, thus improving quality of life for diabetic patients.

In the first year of the PhD, we have begun the development and characterisation of the biomaterial, including the production and of the hydrogel and initial optimisation of the ECM component. Additionally, we had the opportunity to attend the Summer Meeting of the Anatomical Society in Edinburgh in July 2024 where the student experienced a poster presentation at a formal event for the first time, and was awarded the runner up prize for the Cave Young Investigator award. She found it an incredibly rewarding experience to discuss her research with other young scientists, and to troubleshoot with experts in the field. In the first year of the project, the student also worked on a review paper entitled ‘**Extracellular matrix-inspired biomaterials for wound healing’**, of which she is the first author, and that was publishedin Molecular Biology Reports in July (<https://doi.org/10.1007/s11033-024-09750-9>).

