



PhD Project Opportunity

Biofabrication & Tissue Morphology Group

27 August 2020

Project Supervisors: Professor Mia Woodruff (Principal), Naomi Paxton (Associate)

Project Title: Design and manufacture of personalised face filtration respirators using 3D printing

Required skillset: Mechanical and/or medical engineering, CAD/CAM, 3D printing

Project Scope: The scale of the COVID-19 pandemic and subsequent disruption to global supply chains has led to an acute shortage of personal protective equipment (PPE) for Queensland healthcare workers. In response, a state-wide taskforce was established in March 2020 to investigate alternative supplies of essential PPE such as face filtration respirators (FFRs), typically N95/P2 face masks which are in high demand for frontline healthcare workers treating respiratory illnesses such as COVID-19.

This project aims to establish rapid manufacturing approaches to design and fabricate personalised FFRs with N95-compliant filters to provide Queensland healthcare workers with necessary PPE for treating COVID-19 patients. This PhD project will build on existing proprietary face scanning technology to incorporate personalisation into mask designs which can be prototyped using 3D printing and fitted with disposable filtration materials that can be rapidly interchanged. This project is supported by strong industry partnerships with 3D Systems, CSIRO and philanthropy and commercialisation support by Edale Capital, to develop novel reusable patient and clinician specific-face masks which can be decontaminated.



Research Team: Biofabrication is 3D printing applied to medicine. In the Biofabrication & Tissue Morphology (BTM) Group, our research involves developing 3D printing technology to enable the fabrication of personalised 3D constructs to repair lost or damaged tissue. We design and build specialised 3D printers and electrospinning machines capable of fabricating customised 3D porous structures out of advance biomaterials for applications in healthcare, medicine and surgery.

This project is supported by an [Advance Queensland Industry Research Fellowship](#) (3 years) that supports COVID-19 research, including the social, economic and health impacts, and preparedness research for possible future pandemic or similar scale events.

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