

**September 2023/24 List of MEng Projects**

<b>Title</b>	<b>Supervisor</b>
The use of artificial intelligence in the analysis of diffraction patterns	H. Abdolvand
<b>*NEW</b> Finite element modeling of zirconium hydrides in nuclear reactor components	H. Abdolvand
<b>*NEW</b> An experimental investigation to hydrogen embrittlement of titanium alloys	H. Abdolvand
<b>*NEW</b> An experimental investigation to hydrogen embrittlement of steel alloys	H. Abdolvand
<b>*NEW</b> EBSD study for battery materials	Abdolvand/Zhao
Evaluation and Development of Novel Manufacturing Techniques for High Q Resonators	S. Asokanthan
<b>*NEW</b> Hydraulic modelling of sewer systems	C. DeGroot
Microfluidic Flow and Heat Transfer	R. Khayat
Thermal Convection of Nanofluids	R. Khayat
Numerical modeling on the multiphysics coupling of smart materials	L. Jiang
<b>*NEW</b> Development of medical and assistive devices (restricted to students enrolled in the <i>Engineering in Medicine Collaborative Specialization</i> )	G.K. Knopf
<b>*NEW</b> Degradable carbon-based printed electronic sensors	G.K. Knopf
<b>*NEW</b> Design and analysis of light-driven femto-satellites	G.K. Knopf
<b>*NEW</b> Micro-CT image segmentation and 3D reconstruction of sealed historical books	G.K. Knopf
Supersonic flow demonstrator – feasibility study, design and manufacture	P. Kurowski
Design, build and test an apparatus to demonstrate the effect of compressive and tensile pre-load on natural frequencies.	P. Kurowski
Do two wrongs make a right? Investigating the role of mal-alignment on wrist function	E. Lalone
Joint Kinematics following Wrist Fracture using 4DCT to measure Osteokinematics	E. Lalone
Analysis of Scaphoid Malunion Radiographic Migration Years Following Fracture	E. Lalone
Design of Anatomic Population-Based and Patient-Specific Radial Head Implants	E. Lalone
Applying finite element analysis (FEA) to product development, such as improving helmet design and vehicle structure	H. Mao
Applying finite element analysis (FEA) to impact biomechanics, such as understanding the effect of impact on the human body	H. Mao
Active and passive auto safety systems to improve occupant/pedestrian safety	H. Mao
Combining theoretical and computational methods to understand blast wave induced trauma	H. Mao
Experimental studies of ion transport mechanisms in electrochromic thin-films	A. Price
Enhanced model-based feedback control of a delta extrusion robot using MATLAB/SimMechanics	A. Price
Multiphysics finite element simulation of electro-chemo-mechanical actuators using COMSOL	A. Price
Mechanical characterization of 3-D printed materials	A. Price
Development of a model to describe a transient free jet	E. Savory
Scaling of thunderstorm downburst outflows using cooling source model data	E. Savory
Use of temporally and spatially varying wind data to develop a new engineering model for defining wind speed profiles in tornadoes for application to the design of structures.	E. Savory

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Title	Supervisor
*NEW Using artificial intelligence for wearable strain sensor optimization	H. Shi
*NEW Development of electrochemical biosensors for microfluidic platforms	H. Shi
*NEW Design of fiber-type electrodes for energy storage in electronic textiles	H. Shi
Nanomaterials for fuel cells	X. Sun
Nanomaterials for batteries	X. Sun
Design, finite element analysis and experimental validation of a hollow, porous 3D printed implant for shoulder replacement surgery	R. Willing
Finite element modelling of intact knee joint contact mechanics and experimental validation	R. Willing
Model-based design and experimental validation of additively-manufactured orthopaedic implants	R. Willing
Simulating knee ligament wrapping using computational rigid-body dynamics	R. Willing
Numerical study of two-phase flows in fluidized beds	C. Zhang
Numerical study of flows over airfoils	C. Zhang
Anode-free electrode for high energy density Na metal batteries	Y. Zhao
Materials design and interface engineering for next-generation solid-state Na batteries	Y. Zhao
*NEW EBSD study for battery materials	Zhao/Abdolvand

Revised: August 16, 2023