David Hardman

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EDUCATION

Engineering PhD, Bio-Inspired Robotics Laboratory, University of Cambridge, 2020 – 2024

Researching the development and applications of sensorised skins for soft robots. These skins must respond to strain, pressure, temperature, and damages whilst remaining flexible and resilient. This requires: development and optimisation of smart healable materials; design, fabrication, and characterisation of sensor morphologies; and filtering/processing of responses using machine learning.

- First author of 5 journal + 2 conference papers.
- Undergraduate teaching/supervising responsibilities include mechanics, dimensional analysis, machine tools, Python, and 3D printing.
- Strongly involved in NHS collaborations, aiming to automate the processes which cause backlogs in histopathology diagnoses. Product development requires machine design, CAD, rapid prototyping, and computer vision.

Technical skills/languages: *MATLAB, Python, Arduino, LaTeX, Fusion 360, Solidworks, Creo Parametric, 3D Printing, Laser Cutting, Silicone Casting, (some) Machining, (some) C++, (some) Git.*

Engineering B.A.(Hons)/M.Eng, Corpus Christi College, University of Cambridge, 2016 – 2020
IET Diamond Jubilee Scholarship Specialisation: Mechanics, Materials, and Design

M.Eng Project: 3D Printing Vinyl Records: First Class 2019-2020
- Explored the potentials and practicalities of additively manufacturing customisable records, particularly material extrusion, material jetting, and stereolithography.
- Simulated turntable dynamics: how printed imperfections affect the audio output.

Modules: *Robotics, Continuum Mechanics, Designing with Composites, Partial Differential Equations & Variational Methods, Advanced Linear Vibrations, Random & Non-linear Vibrations, Vehicle Dynamics, Dynamics in Civil Engineering*

Part IIA: First Class 2018-2019
David Maull Prize for engineering, Dewhurst Award for academic achievement
Modules: *Materials Processing & Design, Finite Element Methods, Mechanics of Solids, Fracture Mechanics, Vibration, Dynamics, Machine Design, Structural Materials & Design, Structural Analysis & Stability, Mathematical Methods*

Part IB: First Class, Dewhurst Award for academic achievement 2017-2018
Part IA: First Class, Latymer Award for academic achievement 2016-2017

The Judd School, Tonbridge 2009-2016
Arkwright Scholarship for "*outstanding potential as a future leader in engineering*"
5 A Level A*s in Mathematics, Further Mathematics, Physics, Chemistry, Product Design
11 GCSE A*s including Mathematics, Further Mathematics, English
Awarded the Harvard Book Award, leaving exhibition, prizes for Mathematics and Chemistry

WORK EXPERIENCE

Teacher, Cambridge Centre for International Research June 2021 – July 2022

- Supervised high school and undergraduate students as part of the *Future Scholar Program* in Bio-Inspired Robotics: Machine Learning, Design, and Control.
- Over the 13-week courses, taught engineering fundamentals and guided the students in writing and submitting conference papers.

Undergraduate Researcher, Bio-Inspired Robotics Laboratory July 2019 – September 2019

- Wrote a MATLAB graphical simulator to be used in the teaching of robotics, including demonstrations of key concepts such as inverse kinematics and Kalman filtering.
- Conceived, researched, wrote, and submitted a first author conference paper concerning the adaptation of robotic controllers to changes in morphology.

Engineering Intern, Densitron Technologies Ltd July 2017 – September 2017, December 2017

- Worked with the engineering team to prepare Arduino-based automation demonstrations for an upcoming broadcasting exhibition.
- Created and tested graphical interfaces using Qt software, C++ haptic code, and single-board computers running Linux.

Tutor, Kumon UK March 2013 – September 2016

- Taught, marked and organised Maths and English work for children aged 4-16 who visited the study centre twice weekly.
- Developed the skills necessary to communicate and explain these new ideas and concepts.

SKILLS, INTERESTS, AND ACTIVITIES

PRESENTATION: Member of the Magic Circle

- Winner of multiple awards, including the Home Counties Trophy for Stage Magic, Pete McCahon Trophy for Originality, and 2nd place in the Magic Circle's Young Magician of the Year.

COMMUNICATION: Outreach Activities

- Regular involvement with university outreach and open days: giving tours, presenting research and engineering masterclasses.
- Organised and led two widely watched public livestream events showcasing robotics research.

TEAMWORK: Logistics Officer, Corpus Christi May Ball 2019

- Responsible for the 1000-guest ball's layout, structures – such as stages and tents – and their safety, conforming to the council's deadlines and regulations for the overnight event.
- Safely planned the entire setup/takedown process without interrupting the running of the College.
- Individually managed a £20,000 team budget, working closely with the 16-person committee.

LEADERSHIP: Sport

- Captained Corpus Christi College's badminton team for 3 years, and tennis team for 2 years.
- Organised regular club nights, matches, and personalised kit for the teams.
- Playing in a local badminton league's 1st division and part of the university's development squad.

MOTIVATION: Awards and Achievements

- Grade 8 classical guitar.
- Bronze, Silver, and Gold Duke of Edinburgh's Awards.
- British Record holder in long course finswimming.

REFEREES

Professor Fumiya Iida
PhD Supervisor
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Dr Jonathan Cullen
Master's Project Supervisor
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