

EDUCATION

Imperial College London

October 2014 - May 2019

PhD in Robotics (In Progress), James Dyson Foundation Scholar

Summary: Development of shared control handheld robots with Augmented Reality (AR) feedback for spraying applications. Design, construction and evaluation of multiple prototype robots with different degrees of freedom.

Topics: Augmented reality, online path planning, human robot interaction, shared control, position estimation

Publications: [Augmented Reality for Feedback in a Shared Control Spraying Task](#)

2018 IEEE International Conference on Robotics and Automation (ICRA)

[Head-Mounted Augmented Reality for Explainable Robotic Wheelchair Assistance](#)

2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

[Augmented Reality Instructions for Shared Control Hand-held Robotic System](#)

2018 IEEE International Conference on Robotics and Automation (ICRA) - Workshop: Robotics in Virtual Reality

[Assisted Painting of 3D Structures Using Shared Control with a Hand-held Robot](#)

2017 IEEE International Conference on Robotics and Automation (ICRA)

More details, videos and in-progress work can be found at www.elsdon.io/research/

Supervisor: Professor Yiannis Demiris, Personal Robotics Lab.

Imperial College London

October 2010-2014

MEng in Electronic and Electrical Engineering - 1st class

Thesis project: Tool path generation for 5 axis 3D printing. Award won: Eric Laithwaite Prize for Innovation.

Key modules: Optimisation, Predictive Control, Stability and Control of Non-Linear Systems.

EXPERIENCE

Elsdon Engineering - Portfolio available at www.elsdon.io/portfolio/

December 2011 - Present

Prototyping Engineer

London, UK

- Contracts primarily consist of lab automation and aides, including designing and building robotic apparatus and custom rapid prototyping tool sets.
- Independent development of projects for education in robotics and wearable electronics for potential commercialisation.

Key clients: Polymer and Composite Engineering group (PaCE), London Centre for Nanotechnology, Rheon Labs.

Key projects: Direct from granules large format elastomer 3D printer, layer-by-layer nano-coating robot.

Bespoke Robotics Tutoring

June 2015 - September 2018

Freelance Tutor

London, UK

- Developed extensive curriculum of advanced robotics and circuit design content for highly ambitious 13-17 year olds.
- Demonstrated ability to transfer enthusiasm, client invited me to provide residential teaching while the family travelled.
- Confidence in my work was shared by Imperial College, as I was personally recommended to work with a VIP donor.

Teaching Assistant

October 2014 - September 2017

Human Centred Robotics (EE4), Machine Learning and Mobile Healthcare (EE4), Electronics Lab (EE1, EE2) London, UK

- Organised specialised tutorials in Robotic Operating System (ROS), provided practical advice to students.
- Professionalism demonstrated by being selected as examiner of end of year project, usually reserved for senior faculty staff.

Imperial College Robotics Society

October 2012 - October 2017

Positions held: President, Chief Lab Manager, Sponsorship officer.

London, UK

- Organised a small team of volunteers to oversee more than 200 members and conduct outreach activities for the public.
- Transitioned to manage the safety protocols and provide oversight for the new generation of managers.

SKILLS

Circuit Design

- Experience with fine pitch SMD packages, flexible PCBs, custom shaped electrical potting.
- Knowledge of power optimisation, including projects that operate at under $1\mu\text{A}$.
- Extensive use of STM32 parts and the associated libraries.
- A broad range of esoteric projects has let me to be an authority on circuit assembly within Imperial College.
- Proficient with Altium Designer and Altium Circuit Maker.

Key projects: Smallest in class mobile robot platform, Ultra low power timepiece in wedding ring format.

Robotic Design, Repair and Maintenance

- All my research work has taken place on custom hardware, allowing for novel concepts to be explored.
- Provided long term repair and modifications on custom robotics for clients, with the longest serving robot being used since 2011 continuously.
- Assisted with the maintenance of intricate robots, such as the 54 degree of freedom ICub humanoid robot.
- Supported post-doctoral researchers and graduate students in their research by assisting their hardware development, including robotic wheelchairs, customised grippers and low level electronic interfaces.

Software Development

- C++ (Advanced, 6 years experience) and have also used Python, assembly (ARM) and OpenCL (Intermediate, 3 years each) with success in many projects.
- Experience in the development of virtual/augmented reality applications using Unity.
- Designed hardware accelerated code for simulation-in-the-loop path planning algorithms.
- I am experienced in the use of ROS (Robotic Operating System) including integration with custom, low level hardware
- Experience with Caffe deep learning library for training semantic segmentation networks.
- Competent user of Linux operating system, comfortable with scripting and real time performance considerations.

Teaching

- Taught in a range of settings: Ticketed events, private homes, university courses and robotics society organised events.
- Travelled internationally, including advanced origami sessions delivered in Japan, and robotics sessions taught residentially in Italy.
- Developed custom robotics with students using their specifications, demonstrating flexibility and confidence in design work.
- Finalist in university wide 'Best Graduate Teaching Assistant'.

Subjects taught: Robotics, circuit design, electronics (national syllabus and custom), origami.

Rapid Prototyping / Computer Aided Design

- Highly competent user of 3D printing, CNC milling and laser cutting in a wide range of materials.
- Quick and effective design and testing have been used in my contract work and research.
- Proficient in Autodesk CAD software, some experience with Solidworks and FreeCAD.
- I have designed customised rapid prototyping equipment.

Prototyping innovations: First demonstrated 5 axis FDM 3D printer, direct from granules large format elastomer printer, low cost DLP resin printer,

REFEREES

Professor Yiannis Demiris, academic supervisor. (y.demiris@imperial.ac.uk).

Dr Daniel Plant, Recent consulting client. (dan.plant@rheonlabs.com).