



DR. KYLE L. WALKER

Robotics Researcher

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SUMMARY

Passionate roboticist with expertise in modelling, control and implementation of marine and soft robotic technologies. Experience in academic research and industrial R&D, often securing funding to progress concepts into physical prototypes and positively impact the field. Keen collaborator with a desire to forge connections and fuel cross-institute innovation.

Research Interests: Design/Control of Soft Robotics, Marine Robotics, Predictive Control, Variable Stiffness Mechanisms, Dynamic Control.

SKILLS

Programming: Python, C++, MATLAB, ROS, ROS2.

**Software/
Hardware:** CAD, PCB Design, Git, Arduino, Raspberry Pi, WAMIT, Motion Capture (OptiTrack/Vicon/Qualysis), LaTeX, Microsoft

Technical: Control Theory, Dynamics, Modelling, Mechatronics, Electronics, Hydrodynamics, Programming, Manipulation

Soft/Core: Project Management, Public Speaking, Problem Solving, Flexibility, Supervision, Strategic Planning, Adaptability.

EDUCATION

9/2019 - 9/2023 **Ph.D. Robotics (Marine/Soft)** **University of Edinburgh**

- Supervisors: Dr. Francesco Giorgio-Serchi, Dr. Adam A. Stokes and Dr. Aristides Kiprakis.
- Fully Funded via EPSRC DTP Scholarship Award; aligned with ORCA Hub UK consortium.
- Thesis title: *"Preview-Based Control Methods for Ocean Wave Disturbance Mitigation for Underwater Robots"*.
- Several publications in high-impact journals and conferences.
- Established collaborations through workshop hosting and event organisation.
- Co-supervised B.Eng and M.Eng students throughout dissertation projects.

9/2014 - 6/2019 **M.Eng. Electrical and Mechanical Engineering** **University of Strathclyde**

- Grade: 1:1
- Thesis title: *"Design of a Low Cost Myoelectric Prosthetic Hand"*.
- Key Modules: Advanced Systems Engineering, Power Electronics, Signals & Systems, Instrumentation & Microcontrollers, Engineering Management.
- Contribution: Designed, manufactured and tested the internal electronics and mechatronics of the hand. Assisted debugging and implementation of code for functional operation.

EXPERIENCE

3/2023 - Present **Robotics Engineer** **The National Robotarium**

- Develop and implement robotic technologies and solutions in collaboration with industrial partners across all sectors. Projects I have contributed to have covered marine robotics, soft robotics and prosthetics.
- Project requirements are scoped based on the clients desires and subsequently refined based on engineers input; this includes project budgeting, defining deliverables, key milestones and project timelines amongst other management tasks.

5/2021 - 3/2023 **Lead Electronic Design Engineer** **Bioliberty**

- Technical lead for Bioliberty, a Med-Tech start-up, taking onus over early-stage prototyping of their initial product - a soft robotic glove for assisting and rehabilitating people who have suffered a stroke or have conditions such as Multiple Sclerosis (MS).
- Drove advancement towards a Minimum Viable Product (MVP)- designed, prototyped and validated hardware functionality including machine-learning based Electromyography (EMG) control.
- Bioliberty recently secured £2.2m funding from investors; funding round led by Archangels.

6/2017 - 9/2018 **Electronic Circuit Design Intern** **MBDA U.K.**

- Summer intern for two consecutive years designing and manufacturing PCB's for future concept products.
- Invited to return in 2018 based on performance in 2017. Offered graduate role but opted to pursue a PhD.

PROJECTS

Ph.D. **Preview-Based Control Methods for Ocean Wave Disturbance Mitigation for Underwater Robots**
Primary Supervisor: Dr. Francesco Giorgio-Serchi.
Developing improved control strategies for underwater vehicles in harsh and turbulent seas to facilitate operation around marine renewable devices.

Intl. Academic Visit	<p>Design of Variable Stiffness Soft Robotic Manipulators Primary Supervisor: Dr. Kenjiro Tadakuma. International collaboration with Tohoku University, Japan (JSPS fully funded, ≈ 5k) designing manipulators based on continuum concepts, incorporating tunable stiffness into the design.</p>
Intl. Academic Visit	<p>Predictive Wave Disturbance Mitigation for Underwater Soft Robotic Manipulators Primary Supervisor: Dr. Cosimo Della Santina. International collaboration with TU Delft (Saltire/SUPA fully funded, ≈ 5k) modelling unsteady fluid disturbances on soft robotic manipulators and implementing predictive control.</p>
Industry	<p>Continuum Manipulators for Offshore Applications Partnership with Senai Cimatec and Shell Brazil, developing highly articulated manipulators for maintenance and inspection of offshore platforms and subsea structures.</p>
Academic	<p>Shape Sensing E-Skins for Deformable Structures Primary Supervisor: Dr. Yunjie Yang. Collaboration with researchers at The University of Edinburgh, supporting experimental validations of electronic skins for touch sensing and shape estimation of deformable bodies.</p>
Industry	<p>Barclays DeepTech Launchpad Technical Support Providing engineering support to start-up companies selected for the program, which provides financial support to develop their technology further. I worked with Infinifty DPM (prosthetics) and ScrubMarine (subsea robotics).</p>

JOURNAL PUBLICATIONS

02/2024	<p>Nonlinear Model Predictive Dynamic Positioning of a Remotely Operated Vehicle with Wave Disturbance Preview Under Review K. L. Walker, Laura-Beth Jordan and F. Giorgio-Serchi. International Journal of Robotics Research (IJRR).</p>
12/2021	<p>Analysis of station keeping performance of an underwater legged robot M. Chellapurath, K. L. Walker, E. Donato, G. Picardi, S. Stefanni, C. Laschi, F. Giorgio-Serchi and M. Calisti. IEEE/ASME Transactions on Mechatronics.</p>
8/2021	<p>Hydrodynamic loads on a restrained ROV under waves and current R. Gabl, T. Davey, Y. Cao, Q. Li, B. Li, K. L. Walker, F. Giorgio-Serchi, S. Aracri, A. Kiprakis, A. A Stokes and D. M. Ingram. Ocean Engineering.</p>
4/2021	<p>Experimental validation of wave induced disturbances for predictive station keeping of a remotely operated vehicle K. L. Walker, R. Gabl, S. Aracri, Y. Cao, A. A. Stokes, A. Kiprakis and F. Giorgio-Serchi. IEEE Robotics and Automation Letters.</p>
6/2020	<p>Experimental Force Data of a Restrained ROV Under Waves and Current R. Gabl, T. Davey, Y. Cao, Q. Li, B. Li, K. L. Walker, F. Giorgio-Serchi, S. Aracri, A. Kiprakis, A. A Stokes and D. M. Ingram. MDPI Data.</p>

CONFERENCE PUBLICATIONS

5/2024	<p>A Modular, Tendon Driven Variable Stiffness Manipulator with Internal Routing for Improved Stability and Increased Payload Capacity In Press. IEEE International Conference on Robotics and Automation (ICRA)</p>
4/2024	<p>Model Predictive Wave Disturbance Rejection for Underwater Soft Robotic Manipulators In Press. IEEE International Conference on Soft Robotics (RoboSoft). Kyle L. Walker, Cosimo Della Santina and Francesco Giorgio-Serchi.</p>
10/2023	<p>Disturbance Preview for Non-Linear Model Predictive Trajectory Tracking of Underwater Vehicles in Wave Dominated Environments. Kyle L. Walker and Francesco Giorgio-Serchi. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).</p>
6/2023	<p>Feed-forward Disturbance Compensation for Station Keeping in Wave-dominated Environments. Kyle L. Walker, A. A. Stokes, A. Kiprakis, and Francesco Giorgio-Serchi. IEEE/MTS Oceans, Limerick.</p>

- 5/2021 **Experimental validation of unsteady wave induced loads on a stationary remotely operated vehicle.**
Kyle L. Walker, R. Gabl, S. Aracri, Y. Cao, A. A. Stokes, A. Kiprakis and F. Giorgio-Serchi.
 IEEE International Conference and Robotics Automation (ICRA), Xi'an.
- 10/2020 **Impact of thruster dynamics on the feasibility of ROV station keeping in waves.**
Kyle L. Walker, A. A. Stokes, A. Kiprakis and F. Giorgio-Serchi.
 Global Oceans 2020: Singapore-US Gulf Coast.
- 4/2020 **Investigating PID Control for Station Keeping ROVs.**
Kyle L. Walker, A. A. Stokes, A. Kiprakis and F. Giorgio-Serchi.
 3rd UK-RAS Conference for PhD Students & Early-Career Researchers on 'Robots into the Real World.'

GRANTS

- 9/2019 - 9/2023 **Doctoral Training Partnership (DTP) Scholarship (UKRI EPSRC)**
 Scholarship to support Ph.D studies. Awarded on a proposal basis after independent panel review. Funding to cover tuition fees, stipend and a consumables allowance.
- 9/2022 - 11/2022 **Summer Program Fellowship (Japanese Society for the Promotion of Science (JSPS))**
 Funding to support the opportunity for Ph.D./Postdoctoral researchers to pursue research under the guidance of host researchers at Japanese universities and research institutes over a period of two months during the summer. Applicants were required to submit a proposal upon which an independent panel selected those with high potential for impact. The award was for ~£5k to cover travel, accommodation and subsistence
- 10/2022 **Travel Grant (Institute for Engineering and Technology, IET)**
 £1k grant to support travel to a conference (IROS 2022, Kyoto). Awarded to applicants who could demonstrate significant benefit from attending the conference.
- 3/2022 - 6/2022 **Emerging Researcher Travel Grant (Saltire Scotland, SUPA)**
 Funding to support research visits abroad to partner institutions. The goal was to promote mobility between Scotland and European research partners with the aim of strengthening existing, and seeding future, research relationships. Successful candidates were selected based on the strength of their proposal with respect to innovation, impact and benefit to both the researcher and the institutions involved. The award was for ~£5k to cover travel, accommodation and subsistence.

ACCOLADES

- 2021 **IET Postgraduate Award**
 Awards intended to recognise excellence and are awarded on a competitive basis with up to three awards available across the whole of the U.K. Shortlisted candidates had to complete an interview with a panel of judges, upon which the winners were selected. Monetary prize of £2.5k.
- 2020 **Electronics Weekly Brightspark**
 Awards designed to recognise talented young engineers in the UK.

WORKSHOPS, SEMINARS, COMPETITIONS (AND SIMILAR)

- 5/2024 **(Re)designing the Tree of Robotic Life: A Game of Alternative Timelines** **Workshop**
 IEEE International Conference on Robotics and Automation (ICRA).
 A first of it's kind workshop, participants work in teams led by invited guests in a practical game-style activity. The task is to brainstorm radically different robotic concepts, provoked by different environmental/historical changes to the modern day real world. Throughout two session, participants will hear talks and panel discussions from speakers in a bid to stimulate interdisciplinary idea generation.
- 4/2024 **Democratization of Soft Robotics through Embodied Intelligence** **Workshop**
 IEEE International Conference on Soft Robotics (RoboSoft).
 The workshop's objectives were to explore the convergence of embodied intelligence and soft robotics technology, drawing insights from recent advancements to address conceptual challenges and translate them into tangible, physical solutions. Concurrently, another objective was to broaden participation by engaging soft robotics researchers from diverse communities.
- 4/2024 **The Soft Robotics on a Budget Challenge** **Competition**
 IEEE International Conference on Soft Robotics (RoboSoft).
 A global robot design competition where participants from around the world compete in designing the most ingenious solution to a specific, real-life robotics problem. The entire robot must be built on an extremely low budget, under 50, encouraging participants to showcase their creativity in using easily accessible DIY materials, tools, and equipment.

10/2023	Functional Fashion IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Co-hosted a competition inviting teams to design and demonstrate robotic clothing that not only performs well but looks good whilst doing so. The aim was to both demonstrate the possibilities enabled by this new and exciting field and to encourage teams to go beyond the state-of-the-art in terms of comfort, ease of use and performance.	Competition
6/2021	Rehab Soft Robotics Summer School Summer school covering different concepts and tools relating to soft robotics for healthcare applications.	Course
3/2020	STEM for Britain Presenter Presented a poster on my Ph.D. research in the Houses of Parliament in London, discussing my work with Members of Parliament and associates.	Competition

TEACHING EXPERIENCE

2020-2022	B.Eng. and M.Eng. Supervisor Assisted in the guidance of students during their dissertation projects, providing insights where applicable. Projects ranged from modelling of underwater robots to physical design of continuum manipulators.	University of Edinburgh
2019-2022	Teaching Assistant Tutored, demonstrated labs and marked assignments for the majority of my Ph.D. duration, gaining experience and improving my ability to teach students and present key concepts effectively. Ranged from classical mechanics theory to implementation of optimisation algorithms within software.	University of Edinburgh

SERVICE, OUTREACH

2020 - Present	Paper Reviewer Peer reviewed submissions to journals such as IEEE Robotics and Automation Letters, IEEE RoboSoft, IEEE ICRA, IEEE Access, MDPI Journal of Marine Science and Engineering amongst others.
2020 - Present	STEM U.K. Ambassador Visit schools and other educational institutes or events and attempt to encourage younger people into a career in science, technology, engineering and maths.

PROFESSIONAL MEMBERSHIPS

Institute of Electrical and Electronic Engineers (IEEE) – IEEE Robotics and Automation Society – STEM Learning UK

INTERESTS

Football, Cooking, Baking, Scuba Diving, Golf, Music.

CERTIFICATIONS

Mental Health First Aid Course, NHS Scotland – Open Water Diver, Dive RAID.

LANGUAGES

English (Native), Spanish (2 - Limited working proficiency).

REFEREES

Manager	Stewart Miller E-mail: s.miller@hw.ac.uk	CEO, The National Robotarium
Prior Supervisor	Dr. Francesco Giorgio-Serchi E-mail: F.Giorgio-Serchi@ed.ac.uk	Lecturer, The University of Edinburgh
Prior Supervisor	Prof. Adam A. Stokes E-mail: Adam.Stokes@ed.ac.uk	Professor, The University of Edinburgh
Prior Manager	Rowan Armstrong E-mail: rowan@bioliberty.co.uk	CEO, Bioliberty