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Research & Education

Harvard University, John A. Paulson School of Engineering and Applied Sciences *Feb. 2024 - Present*
Postdoctoral Fellow in Bioengineering
Functional Electrical Stimulation for Gait Rehabilitation Post-Stroke
- Supervised by Professor Conor Walsh (Harvard University) and Louis Awad PT, DPT, PhD (Boston University).
- NIH Blueprint MedTech Translator Project (Grant No. 15922), focused on bringing rehabilitation technology from formative research to commercialisation.
- Key research themes: lower limb neuroprostheses, biosignal processing (EMG), human-in-the-loop optimisation, electrode design and fabrication, human perception, optimal control.
- Technical lead on cross-disciplinary, multi-institution team of a total of 20 staff, researchers, and students.
- Assistant supervisory roles of multiple graduate students.

Imperial College London, Department of Computing *Oct. 2019 - Jan. 2024*
PhD in Robotics and Machine Learning
Improving Myoelectric Prosthetic Hand Control via a Multifaceted, User-Centred Approach
- Supervised by Dr Nicolas Rojas, Dr Petar Kormushev, and Professor Fernando Bello.
- Part of the UKRI Centre for Doctoral Training in AI for Healthcare (Grant No. EP/S023283/1).
- Key research themes: prosthetic hand control, biosignal processing (EMG), human dexterity, virtual reality, haptic feedback, machine learning.
- Graduate teaching assistant and supervisory roles, resulting in multiple publications and including an IET Prize 2023 winning Masters project.

University of Leeds, School of Computing *Oct. 2022 - Dec. 2022*
Visiting Researcher
Upper Limb Prosthetics
- Supervised by Professor David Hogg (Director of UKRI CDT in AI for Medical Diagnosis and Care).
- Key research themes: prosthetic hand control, continuous EMG control, haptic feedback.

University of Cambridge, Jesus College *Oct. 2015 - Jun. 2019*
Engineering MEng, BA Hons
Final Year Project: Wearable Muscle Activity Sensors (Distinction)
- Supervised by Professor George Malliaras, Cambridge Bioelectronics Lab.
- Key themes: flexible electrodes, biosignal processing (EMG), machine learning.
- Modules: Robotics, Deep Learning, Probabilistic Machine Learning, Optimisation and Reinforcement Learning.

Publications

Doctoral advisees, masters advisees, undergraduate advisees.

Journal Publications

J12 - Choe D. K., **Chappell D.**, Lee C., Aiello A. J., Ang K., Awad L. N., Walsh C. J. "Understanding and balancing biomechanical outcomes and stakeholder preference with lower limb neuroprosthetic assistance". In: *(Under Review)* (2025) (co-first author)

J11 - Cooper M., Canete S., **Chappell D.**, Walsh C. J. "Optimization of an Axial Flux Motor-Cycloid Gear Actuator for Sizing Wearable Robots". In: *(Under Review)* (2025)

J10 - **Chappell D.**, Mulvey B., Perera S., Bello F., Kormushev P., Rojas N. "Beyond Humanoid Prosthetic Hands: Modular Terminal Devices That Improve User Performance". In: *IEEE Transactions on Neural Systems and Rehabilitation Engineering* (2025)

J9 - **Chappell D.**, Yang Z., Clark A. B., Berkovic A., Laganier C., Baxter W., Bello F., Kormushev P., Rojas N. "Examining the physical and psychological effects of combining multimodal feedback with continuous control in prosthetic hands". In: *Scientific Reports 2025 15:1* (2025)

J8 - Wang K., Hu Z. J., Tisnikar P., Helander O., **Chappell D.**, Kormushev P. "When and where to step:

Terrain-aware real-time footstep location and timing optimization for bipedal robots". In: *Robotics and Autonomous Systems* (2024)

J7 - **Chappell D.**, Bello F., Kormushev P., Rojas N. "The Hydra Hand: A Mode-Switching Underactuated Gripper with Precision and Power Grasping Modes". In: *IEEE Robotics and Automation Letters* (2023)

J6 - Zaman S., Vimalesvaran K., Howard J. P., **Chappell D.**, Varela M., Peters N. S., Francis D. P., Bharath A. A., Linton N. W. F., Cole G. D. "Efficient labelling for efficient deep learning: the benefit of a multiple-image-ranking method to generate high volume training data applied to ventricular slice level classification in cardiac MRI". in: *Journal of Medical Artificial Intelligence* (2023)

J5 - **Chappell D.**, Son H. W., Clark A. B., Yang Z., Bello F., Kormushev P., Rojas N. "Virtual Reality Pre-Prosthetic Hand Training with Physics Simulation and Robotic Force Interaction". In: *IEEE Robotics and Automation Letters* (2022)

J4 - AlAttar A., **Chappell D.**, Kormushev P. "Kinematic-Model-Free Predictive Control for Robotic Manipulator Target Reaching With Obstacle Avoidance". In: *Frontiers in Robotics and AI* (2022)

J3 - Banerjee M., Chiew D., Patel K. T., Johns I., **Chappell D.**, Linton N., Cole G. D., Francis D. P., Szram J., Ross J., Zaman S. "The impact of artificial intelligence on clinical education: perceptions of postgraduate trainee doctors in London (UK) and recommendations for trainers". In: *BMC Medical Education* (2021)

J2 - Zaman S., Seligman H., Lloyd F. H., Patel K. T., **Chappell D.**, O'Hare D., Cole G. D., Francis D. P., Petraco R., Linton N. W. "Aerosolised fluorescein can quantify FFP mask faceseal leakage: a cost-effective adaptation to the existing point of care fit test". In: *Clinical Medicine* (2021)

J1 - Saputra R. P., Rakicevic N., **Chappell D.**, Wang K., Kormushev P. "Hierarchical Decomposed-Objective Model Predictive Control for Autonomous Casualty Extraction". In: *IEEE Access* (2021)

Conference Publications

C7 - Chen W., Lee D., **Chappell D.**, Rojas N. "Learning to Grasp Clothing Structural Regions for Garment Manipulation Tasks". In: *IEEE International Conference on Intelligent Robots and Systems* (2023)

C6 - Li K., **Chappell D.**, Rojas N. "Immersive Demonstrations are the Key to Imitation Learning". In: *IEEE International Conference on Robotics and Automation (ICRA)*. London: IEEE, 2023 (co-first author)

C5 - **Chappell D.**, Yang Z., Son H. W., Bello F., Kormushev P., Rojas N. "Towards Instant Calibration in Myoelectric Prosthetic Hands: A Highly Data-Efficient Controller Based on the Wasserstein Distance". In: *IEEE International Conference on Rehabilitation Robotics (ICORR)*. Rotterdam: IEEE, 2022 (Spotlight presentation)

C4 - Yang Z., Clark A. B., **Chappell D.**, Rojas N. "Instinctive Real-time sEMG-based Control of Prosthetic Hand with Reduced Data Acquisition and Embedded Deep Learning Training". In: *2022 International Conference on Robotics and Automation (ICRA)*. IEEE, 2022

C3 - Berkovic A., Laganier C., **Chappell D.**, Nanayakkara T., Kormushev P., Bello F., Rojas N. "A Multi-Modal Haptic Armband for Finger-Level Sensory Feedback from a Prosthetic Hand". In: *Haptics: Science, Technology, Applications, EuroHaptics*. Hamburg: Springer, 2022 (Spotlight presentation)

C2 - Cursi F., **Chappell D.**, Kormushev P. "Augmenting Loss Functions of Feedforward Neural Networks with Differential Relationships for Robot Kinematic Modelling". In: *20th International Conference on Advanced Robotics (ICAR)* (2021)

C1 - Wang K., Marsh D., Saputra R. P., **Chappell D.**, Jiang Z., Raut A., Kon B., Kormushev P. "Design and control of SLIDER: An ultra-lightweight, knee-less, low-cost bipedal walking robot". In: *IEEE International Conference on Intelligent Robots and Systems* (2020)

Teaching Experience

Guest Lectures

Harvard John A. Paulson School Of Engineering And Applied Sciences, Harvard University — *Nov. 2024*
– ENG-SCI 159 Advanced Introduction to Robotics, 30 students, 1 lecture — MSc & PhD

Module Design and Delivery

Dyson School of Design Engineering, Imperial College London — *Jan. 2020 - Jan. 2022*
– DE3 Robotics Term 2, 50 students, 5 hours/week — MEng 3rd Year

UKRI Centre for Doctoral Training in AI for Healthcare, Imperial College London — *Oct. 2019 - Mar. 2020*
– Mathematics for Machine Learning, 12 students, 2 hours/week — PhD 1st Year
– Deep Learning, 12 students, 2 hours/week — PhD 1st Year
– Reinforcement Learning, 5 students, 2 hours/week — PhD 1st Year
– Intro. to Mathematics and Programming for Machine Learning, 12 students, 2 hours/week — PhD 1st Year

Tutorials and Laboratory Sessions

Dyson School of Design Engineering, Imperial College London — *Oct. 2019 - Jan. 2024*

- DE4 Robotics Research Project, tutorials, 20 students, 2 hours/week — MEng 4th Year
- DE3 Robotics Term 1, 100 students, 2 hours/week — MSc & MEng 3rd Year
- DE1 Solid Mechanics, laboratory session, 50 students, 10 hours — MEng 1st Year

Supervision Experience

Doctoral Students

- Jie Fei (PI L. Awad PT, DPT, PhD), *PhD Thesis*, Boston University — 2025-Present
- Dabin Choe (PI Prof. C. Walsh), *PhD Thesis*, Harvard University — 2024-Present
- Claire Traweek (PI Prof. C. Walsh), *PhD Thesis*, Harvard University — 2024-Present
- Fivos Kavassalis (PI Prof. C. Walsh), *PhD Thesis*, Harvard University — 2024-Present
- Myles Cooper (PI Prof. C. Walsh), *PhD Thesis*, Harvard University — 2024-Present

Masters Students

- M. Boguslavskiy (PI Prof. T. Nanayakkara), *MEng Final Year Project*, Imperial College London (won IET Prize 2023) — 2022-2023
- Eva Cheung (PI Dr N. Rojas), *MSc Thesis*, Imperial College London — 2021-2022
- T. Ji (PI Dr N. Rojas), *MEng Final Year Project*, Imperial College London — 2021-2022
- Honn Wee Son (PI Dr P. Kormushev), *MSc Thesis*, Imperial College London — 2020-2021
- Maria Stamatopoulou (PI Dr P. Kormushev), *MSc Thesis*, Imperial College London — 2020-2021

Undergraduate Students

- T. Leferve, *Robotics Research Project 4th Year Module*, Imperial College London — 2022
- R. Allday, *Robotics Research Project 4th Year Module*, Imperial College London — 2022
- A. Berkovic, *Robotics Research Project 4th Year Module*, Imperial College London (publication **C3**) — 2021
- C. Laganier, *Robotics Research Project 4th Year Module*, Imperial College London (publication **C3**) — 2021
- F. Zainal Abidin, *Robotics Research Project 4th Year Module*, Imperial College London — 2021
- H. Lu, *Robotics Research Project 4th Year Module*, Imperial College London — 2021
- Z. Yang (PI Dr N. Rojas), *UROP*, Imperial College London (publication **C4**) — 2021

Industrial Experience

Nagwa - Freelance Physics Video Developer — *Sep. 2020 - Dec. 2021*
Fluidic Analytics - Graduate Software Engineering Intern — *Jul. 2019 - Sep. 2019*
PA Consulting - Data Science Intern — *Jul. 2018 - Sep. 2018*
TTP Labtech - Engineering Intern — *Jul. 2017 - Sep. 2017*
Fluidic Analytics - Engineering Intern — *Jul. 2016 - Sep. 2016*
TTP Labtech - Year in Industry Placement — *Sep. 2014 - Sep. 2015*

Grants & Prizes

- **Technical Contributor** (Neurodiagnostics and Behavioural Interventions) - The Comprehensive Neurorehabilitation: Navigation, Education, Care, and Technology (CoNNECT) Centre (*Under Review*), $3.75m, 2024.
- **Recipient** - Amazon Prize for Outstanding Achievement in Robotics, Late Stage PhD category, £3,000, 2023.

Awards & Achievements

- Best Presentation Award at the UKRI AI CDTs in Healthcare Conference 2022.
- Associate Fellow of the Higher Education Academy (AFHEA).
- Invited talks: IEEE Engineering in Medicine and Biology Society Boston Chapter (February 2025), The Worshipful Company of Glovers (April 2024), Harvard Biodesign Lab (July 2023), Imperial College London Prosthetics Society (October 2022), University of Leeds UKRI Centre for Doctoral Training in AI for Medical Diagnosis and Care (October 2022), Imperial College Robotics Forum (August 2022).
- Telegraph STEM Awards 2016 Design category winner.
- Arkwright Scholar 2013-2014.

Service & Outreach

- Early Career Committee Member of the ISPO Trent International Prosthetics Symposium 2025.
- Reviewer for the following conferences: ICORR, IROS, ICRA, and journals: Nature Medicine, RA-L, TNSRE, TRO, TMECH.
- Professional memberships of: IEEE, IEEE Robotics and Automation Society, IEEE Engineering in Medicine and Biology Society, Institute of Physics and Engineering in Medicine (IPEM).
- Reviewer of Imperial College London Undergraduate Research Opportunities Program (UROP) applications 2023.
- Volunteer for The Great Exhibition Road Festival 2019.

Technical Skills

- **Programming**: Python, C#, Matlab, C++
- **Robotics**: Control, Design, Visualisation, Kinematics
- **Machine Learning**: Deep Learning, Gaussian Processes, Probabilistic Methods
- **Optimisation and Control**: Model Predictive Control, Optimal Transport, Trajectory Optimisation, Bayesian Optimisation, Non-Linear Programming
- **Human-Computer Interaction**: Biosignals, Haptic Feedback, Preference Modelling
- **CAD and Simulation**: Solidworks, Unity3D, Gazebo

References

Prof. Conor Walsh, walsh@seas.harvard.edu, Relationship: Postdoctoral Supervisor
Paul A. Maeder Professor of Engineering and Applied Sciences, Harvard Biodesign Lab, Harvard University

Louis Awad, PT, DPT, PhD, louawad@bu.edu, Relationship: Postdoctoral Co-Supervisor
Associate Professor, Neuromotor Recovery Laboratory, Boston University

Dr. Nicolas Rojas, nrojas@theaiinstitute.com, Relationship: PhD Supervisor
Research Scientist, The AI Institute
(Formerly Senior Lecturer, Dyson School of Design Engineering, Imperial College London)

Further references are available upon request.