Thilina H. Weerakkody, Ph.D.

Robotics Systems Integration & Control Architect
Los Angeles, CA | thilinahweerakkody@gmail.com | linkedin.com/in/thilinahw | github.com/thilinahwe

Profile

Robotics researcher and systems engineer with Ph.D. and postdoctoral experience integrating complex hardware–software ecosystems for real-time robotic control and automation. Skilled in developing **physics-based and data-driven models**, modular architectures, and control algorithms that enable intelligent, embodied robotic systems. Experienced in translating theoretical models into deployable robotic platforms through interdisciplinary collaboration.

Core Expertise

Modeling & Simulation: Nonlinear dynamics, world models, system identification, physics-informed learning.
Control & Systems Integration: Adaptive ($\mathcal{L}_1$), robust, MPC, observer design, hardware–software synchronization.
Software: Python, C/C++, MATLAB/Simulink, LabVIEW, Git, ROS.
Robotics: Mechatronic integration, trajectory tracking, sensor fusion, automation, safety-critical control.

Experience

Postdoctoral Scholar – California NanoSystems Institute, UCLA **2024–Present**

- Lead control and systems integration for a high-throughput robotic radiochemistry platform linking motion, sensing, and feedback subsystems.
- Designed and implemented **real-time world models** coupling temperature, flow, and dynamic actuation for closed-loop control.
- Architected modular pipelines connecting robotic hardware with control and perception software for autonomous operation.
- Built LABVIEW/MATLAB/Python software frameworks for adaptive regulation, calibration, and data-driven process automation.
- Collaborated across robotics, chemistry, and AI teams to develop intelligent experimental automation.

Ph.D. Research Assistant – Smart Multifunctional Material Systems Lab, University of Iowa **2019–2024**

- Developed **adaptive control algorithms** and **physics-informed models** for nonlinear soft actuators (SMA, TCAM).
- Implemented real-time control and learning-based estimation in MATLAB/Simulink and C++ (ROS).
- Integrated **vision-based tracking** and perception loops for embodied robotic muscle systems.
- Validated algorithms experimentally on robotic prototypes demonstrating robust trajectory tracking and adaptability.

Research Assistant – Bionics Laboratory, University of Moratuwa, Sri Lanka **2016–2018**

- Designed embedded control algorithms and sensor–actuator synchronization for lower-limb prosthetic prototypes using IMU, EMG, and encoder feedback.

Education

Ph.D., Mechanical Engineering, University of Iowa 2019–2024
Dissertation: *Design and Control of Artificial Muscles for Robotic Applications*
Relevant Coursework: Machine Learning • Optimization • Scientific Computing • AI in Engineering

B.Sc. (Hons.), Mechanical Engineering, University of Moratuwa, Sri Lanka 2011–2016
Relevant Coursework: Neural Networks & Fuzzy Logic • Numerical Methods • Applied Statistics

Diploma, Information Technology, British Computer Society (BCS), United Kingdom 2012–2014

Selected Publications

- **Weerakkody, T. H.**, Curcio, E. M., Carbone, G., Maletta, C., Sgambitterra, E., & Lamuta, C. (2025). *Robust Control of Shape Memory Alloys for Assistive Robotics Applications*. *Shape Memory and Superelasticity*, Springer Nature, accepted, to appear.
- Kotak, P., Maxson, S., **Weerakkody, T. H.**, & Lamuta, C. (2024). *Octopus-inspired muscular hydrostats powered by twisted and coiled artificial muscles*. *Soft Robotics*, 11(3), 432–443.
- **Weerakkody, T. H.**, Hammond, M., Cichella, V., & Lamuta, C. (2023). *Modeling and control of twisted and coiled artificial muscles*. *Meccanica*, 58(4), 643–658.
- Hammond, M., Cichella, V., **Weerakkody, T. H.**, & Lamuta, C. (2022). *Robust and adaptive sampled-data control of twisted and coiled artificial muscles*. *IEEE Control Systems Letters*, 6, 1232–1237.