Thilina Hemaka Weerakkody

Google Scholar:	https://scholar.google.com/citations?user=zb07m3UAAAAJ
Website:	https://sites.google.com/view/thilinahw | https://www.vandamlab.org/lab-members
	https://pharmacology.ucla.edu/people/thilina-weerakkody
Address:	UCLA/CNSI–4310, 570 Westwood Plaza, Los Angeles, CA 90095.
Email:	TWeerakkody@mednet.ucla.edu | thilinahweerakkody@gmail.com

Research Interest

- **Robotics and Control for Medical Applications:** Automate medical systems, emphasizing precision, adaptability, and real-time performance.

- **Mathematical Modeling and Control Theory:** Robust and adaptive control theory, Physics-informed machine learning/deep learning approaches for time-series prediction & system optimization.

- **Robotic System Design & Analysis:** Novel robot mechanisms, focusing on kinematics & dynamics.

- **Real-time Data Acquisition and Control:** Data acquisition and feedback control implementation.

Education

2019 - 2024
PhD in Mechanical Engineering, University of Iowa, IA.
Thesis: Design and Control of Artificial Muscles for Robotic Applications
Advisors: Dr. Caterina Lamuta & Dr. Venanzio Cichella

2011 - 2016
B.Sc. (Hons.) in Mechanical Engineering, University of Moratuwa, Sri Lanka.
Seconds Class-Upper Division (top 10% in the class)
Thesis: Development and Control of a Modular Artificial Shoulder Prosthetic Device.

Employment History

2024 – now
Postdoctoral Research Scholar, CNSI, University of California Los Angeles, CA.
Advisor: Prof. R. Michael van Dam
Research focus: High-throughput radiochemistry robotic platform development and optimization, In situ radioactivity measurements in high-throughput radiochemistry.

2019 - 2024
PhD Graduate Research Assistant, SMMS Lab, University of Iowa, IA.
Research focus: Novel mechanism design and development, Mathematical and control system modeling, Underwater, rehabilitation, and medical robotic system development and real-time control.

Graduate Teaching Assistant, Mechanical Engineering, University of Iowa, IA.
ME6130: Novel Artificial Muscles & Sensors, *Tutorial/Lab session on MATLAB/Simulink for mathematical modeling in graduate-level research.* **(Spring 2023-2024)**

Research Engineer, Juggernaut Life Sciences (Funded by NIH), Iowa City, IA.
External collaborator with the PhD advisor; SOLIDWORKS/Fusion 360 CAD, novel mechanism, mechanical and control system designing for medical robot designing. **(2019-2023)**

2018 - 2019	**Assistant Lecturer, Mechanical Engineering, SLIIT, Malabe, Sri Lanka.** ME2021: Mechanics of Machines, ME2031: Engineering Drawing, ME3531: Solid Mechanics & Mechanical Design, ME3620: Control Systems, ME2541/ME3640: Mechatronics System.
	Mechatronics Lab Manager, Mechanical Engineering, SLIIT, Malabe, Sri Lanka. *Projects:* Developed lab setups for undergraduate Mechanical/Mechatronics courses.
2016 - 2018	**Research Assistant, Bionics Lab, Mechanical Eng., University of Moratuwa, Sri Lanka.** *Research focus:* Designing lower–limb prostheses and an adaptive foot device considering kinematics, dynamics, and 3D print prototyping (Funded by National Research Council grant 15-068).
	Graduate Teaching Assistant, Mechanical Eng., University of Moratuwa, Sri Lanka. ME4700/ME4310: COMSOL multi-physics structural modeling for MEMS/NEMS, ME1802: Introduction to Manufacturing Engineering, ME2160: Automotive transmission system & brake system, ME2040: Fundamentals of Mechatronics, ME2023: Manufacturing Engineering I, ME4462: Automation Systems, TT4162: Control Systems & Applications, ME5124: Automation and Control of Manufacturing Systems (Graduate-level course).
2014 - 2015	**Engineering Internship (6 months), Shin Nippon Air Technologies Co. Ltd., Sri Lanka.** Refrigeration & Air system designing. On-site MEP Supervision at Aitken Spence Resort Project.

Technical Skills

Mathematical Modeling:	Control System Design, Physics-based Modeling, Machine/Deep Learning.
3D Modelling & Simulation:	SOLIDWORKS, Fusion 360, AutoCAD, COMSOL, ABAQUS (FEA).
Programming & Tools:	MATLAB/Simulink, LabVIEW, ROS, C++, Python, Julia, Linux, Git, Embedded Systems (Microcontrollers, Microprocessors), IoT.
Hardware & Data Acquisition:	Arduino, Raspberry Pi, Teensy, National Instruments, OpenBCI (EMG & EEG), Delsys, Sensor Integration, Signal Processing, Data Logging.
Control Systems & Robotics:	Robust-Adaptive Control, Model-based Control, Robot Kinematics & Dynamics, Motion Planning, Actuator & Sensor Integration, Gazebo, V-Rep.
Fabrication & Manufacturing:	Soldering, 3D Printing (FDM & SLA), Molding, Machining, Prototyping.
PCB Design:	EasyEDA, Altium.
Documentation & Graphics:	LATEX, Microsoft Office, Inkscape, Blender.

Awards

2016	Research assistant fellowship, National Research Council, SL. (Grant (15-068))
2016	Dean's List–Semester 8, Undergraduate studies, University of Moratuwa, Sri Lanka.
2009	Higher Distinction, Sri Lankan Mathematics Olympiad High-School Competition.
2008	Higher Distinction, Australian Chemistry High-School Quiz Competition, Sri Lanka.

Diploma and Certificates

1. Diploma in Information Technology, British Computer Society, UK (2012–2014).

2. Certificate in Teaching Methodology in Higher Education conducted by Sri Lanka Institute of Information Technology (SLIIT) (August - December 2018).

Professional Membership

2012 – now	Institute of Electrical and Electronic Engineers (IEEE)–92445858
2016 – now	Associate Engineer, Institute of Engineers in Sri Lanka, (IESL)
2015 – now	IEEE Robotics and Automation Society
2018 – now	IEEE Control Systems Society
2019 – now	Registered Practitioner, Engineering Council Sri Lanka, (ECSL)–206823
2024 – now	American Society of Mechanical Engineers, (ASME)–000103812978
2024 – now	American Institute of Aeronautics and Astronautics, (AIAA)
2024 – now	Society of Industrial and Applied Mathematics, (SIAM)

Peer-review Publications

Journals

1. Rabiu Mamman, Tatum Johnson, **Thilina H. Weerakkody**, and Caterina Lamuta. Fouling Release Mechanism of an Octopus-Inspired Smart Skin. *Advanced Functional Materials*, p. 2406405, 2024.

2. Sean Maxson, Parth Kotak, **Thilina H. Weerakkody**, and Caterina Lamuta. Manufacturing and underwater cyclic behavior of different types of twisted and coiled artificial muscles (TCAMs). *Manufacturing Letters, Elsevier*, 2024.

3. Parth Kotak, Sean Maxson, **Thilina H. Weerakkody**, Venanzio Cichella, and Caterina Lamuta. Octopus-Inspired Muscular Hydrostats Powered By Twisted and Coiled Artificial Muscles. *Soft robotics*, 2023.

4. Rabiu Mamman, Parth Kotak, **Thilina H. Weerakkody**, Tatum Johnson, Austin Krebill, James Buchholz, and Caterina Lamuta. Deployable vortex generators for low Reynolds numbers applications powered by cephalopods-inspired artificial muscles. *Iscience*, 26(12), 2023.

5. **Thilina H. Weerakkody**, Maxwell Hammond, James H Neilan, Venanzio Cichella, and Caterina Lamuta. Modeling and control of twisted and coiled artificial muscles for soft robotics. *Meccanica*, 58(4):643–658, 2023.

6. Carlo Greco, **Thilina H. Weerakkody**, Venanzio Cichella, Leonardo Pagnotta, and Caterina Lamuta. Lightweight Bioinspired Exoskeleton for Wrist Rehabilitation Powered by Twisted and Coiled Artificial Muscles. *Robotics*, 12(1):27, 2023.

7. Samantha Bell, Arnold Bangel, **Thilina Weerakkody**, Xuan Song, and Caterina Lamuta. Automated manufacturing system for carbon fiber-based twisted and coiled artificial muscles (TCAMs). *Manufacturing Letters*, 33:19–23, 2022.

8. Maxwell Hammond, Venanzio Cichella, **Thilina H. Weerakkody**, and Caterina Lamuta. Robust and adaptive sampled-data control of twisted and coiled artificial muscles. *IEEE Control Systems Letters*, 6:1232–1237, 2021.

9. Parth Kotak, **Thilina H. Weerakkody**, and Caterina Lamuta. Physics-based dynamic model for the electro-thermal actuation of bio-inspired twisted spiral artificial muscles (TSAMs). *Polymer*, 222:123642, 2021.

10. **Thilina H. Weerakkody**, Thilina Dulantha Lalitharatne, and R.A.R.C. Gopura. Adaptive foot in lower-limb prostheses. *Journal of Robotics*, 2017.

Conference Full–paper Proceedings

1. **Thilina H. Weerakkody**, N.N. Liyanaarachchi , H.M.C. Herath , R.A.R.C.Gopura , and Thilina Dulantha Lalitharatne . Development of an Active Shoulder Prosthesis with Low-Level Control Validation. In *Proceedings of the IASTED International Conference Modeling, Identification and Control*, volume 848, pages 194–199, 2017, ACTA Press.

Conference Abstract Proceedings

1. S. Maxson, P. Kotak, **T.H. Weerakkody**, and C. Lamuta, "Soft Tentacles for Underwater Robotics Powered by Twisted and Coiled Artificial Muscles (TCAMs)," in *ASME 2023 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, 2024.

2. S. Maxson, P. Kotak, **T.H. Weerakkody**, and C. Lamuta, "Soft Tentacles for Underwater Robotics Powered by Twisted and Coiled Artificial Muscles (TCAMs)," in *ASME 2023 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, 2023.

3. **T.H. Weerakkody**, M. Hammond, J. Neilan, V. Cichella, and C. Lamuta, "Modeling and Control of Twisted and Coiled Artificial Muscles for Soft Robotics," in *ASME 2022 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, 2022.

4. M. Hammond, V. Cichella, **T.H. Weerakkody**, and C. Lamuta, "Robust and Adaptive Sampled-Data Control of Twisted and Coiled Artificial Muscles," in *2021 IEEE Conference on Decision and Control*, Dec. 2021.

5. **T.H. Weerakkody**, P. Kotak, M. A. Shakib, and C. Lamuta, "Squid-Inspired Muscular Hydrostats From Twisted and Coiled Artificial Muscles (TCAMs)," in *ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, 2020.

6. **T.H. Weerakkody**, P. Kotak, and C. Lamuta, "Artificial papillae for self-morphing skin: A Dynamic Model," in *Society of Engineering Science*, 2020.

7. P. Kotak, **T.H. Weerakkody**, C. Harwood, J. Buchholz, and C. Lamuta, "Boundary Layer Transition Induced by Twisted Spiral Artificial Muscles (TSAMs)," in *ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, 2020.

8. C. Greco, **T.H. Weerakkody**, C. Kielas-Jensen, V. Cichella, L. Pagnotta, and C. Lamuta "Rehabilitation Glove powered by Twisted and Coiled Artificial Muscles," in *Smart Materials, Adaptive Structure and Intelligent System*, 2020.

Poster Presentations

1. George Elias, Braeden Harrell, **Thilina H. Weerakkody**, Kirsten M. Anderson, Jason Wilken, Caterina Lamuta, Deema Totah, "Adaptive ankle foot orthoses stiffness powered by artificial muscles", American Society of Biomechanics, Madison, Wisconsin, Aug 5–8, 2024.

2. Sean Maxson, **Thilina H. Weerakkody**, Caterina Lamuta, "Design of a low-cost continuum soft robotic tentacle powered by Twisted and Coiled Artificial Muscles (TCAMs)", Research Open House, CoE UIowa, April 25, 2024.

3. Rabiu Mamman, Tatum Johnson, **Thilina H. Weerakkody**, Caterina Lamuta, "Theoretical model for antifouling performance of bio-inspired smart skin", Research Open House, CoE UIowa, April 25, 2024.

4. George Elias, Marissa McFadden, **Thilina H. Weerakkody**, Braeden Harrell, Kirsten M. Anderson, Jason Wilken, Caterina Lamuta, Deema Totah, "Ankle Foot Orthoses Powered Using Artificial Muscles", Research Open House, CoE UIowa, April 25, 2024.

5. Sean Maxson, Parth Kotak, **Thilina H. Weerakkody**, Caterina Lamuta, "Octopus-inspired Soft tentacles", Research Open House, CoE UIowa, April 20, 2023.

6. **Thilina H. Weerakkody**, Maxwell Hammond, Venanzio Cichella, Caterina Lamuta, "Twisted and Coiled Artificial Muscles Modeling and Control", Research Open House, CoE UIowa, April 15, 2022.

7. **Thilina H. Weerakkody**, Carlo Greco, Venanzio Cichella, Leonardo Pagnotta, Caterina Lamuta, "Wearable rehabilitation glove powered by Twisted and Coiled Artificial Muscles (TCAMs)" in Research Open House 2020.

Talks

1. "Design and Control of Artificial Muscles for Robotic Applications", at the Mechanical Engineering Graduate Seminar at the University of Iowa, February 29, 2024.

2. "Limitless Horizon - Graduate studies in USA", (virtual) organized by Rotaract club of Alumni of University of Moratuwa, April 01, 2022.

Review Experience

1. IEEE International Conference on Systems, Man, and Cybernetics (SMC), Oct 05- 08, 2017, Banff, Canada. Reviewed 2 manuscripts.

2. 6th IEEE Region 10 Humanitarian Technology Conference 2018 (R10 HTC'18), Dec. 06 - 08, 2018, Sri Lanka. Reviewed 1 manuscript.

Pending Patent Disclosures

1. Semi-Automated Immunolabeling Systems (SAILS). *The design of this innovation was conducted in collaboration with the Department of Otolaryngology at the University of Iowa to automate the Immunolabeling process. (with the University of Iowa Research Foundation (UIRF))*

2. Automated Sample Preparation Device (ASAP Device).*This innovation was designed in collaboration with the Department of Otolaryngology at the University of Iowa to automate the sample preparation process for Immunolabeling. (with the University of Iowa Research Foundation (UIRF))*

News Coverage

1. Rehabilitation glove, The University of Iowa: The Daily Iowan, UIowa–engineering news.

2. Robot Battle 2018–Uwa Wellassa University, Sri Lanka: UWU Link, YouTube Link.

3. SAKURA Science Exchange Program participation (2018), Sri Lanka. Daily Mirror, UOM Link

Conferences and

1. Representing Sri Lanka for Japan-Asia Youth Exchange Program in Science (SAKURA) held in January/February 2018, Miyazaki, Japan. Attended the International Conference on Artificial Life and Robotics 2018, held in Beppu, Oita, Japan, from February 1-4, 2018.

Volunteering Experience

2018	Adjudicator-Panelist, **Robot Battle 2018, Uwa Wellassa University, Sri Lanka.**
2017	Exhibitor, **ExMo 2017, University of Moratuwa, Sri Lanka.**
2016	Exhibitor, **Techno 2016, Organized by IESL Sri Lanka.**
2015 – 2015	Treasury Assistant, **IMechE (UK) Student Chapter, University of Moratuwa, SL.**
2016 – 2022	**Rotaract Club of Alumni of University of Moratuwa, Sri Lanka.**
	2017/18: Vice President.
	2016/17: Community Service Director.
2012 – 2015	**Rotaract Club of University of Moratuwa, Sri Lanka.**

Personal Information

1. Citizenship: Sri Lankan.

2. Languages: English (Fluent), Sinhala (Native).

Last Updated – January 6, 2025.