

CURRICULUM VITAE

AKILA ELANGASINGHE

M.Sc. researcher in robust control and state estimation

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EDUCATION

2023 - 2025	Master of Science (Research) (Computational Mechanics of Materials and Structures) University of Stuttgart, Germany
Thesis Topic:	Real – time Possibilistic Filtering and Control of a Highly Dynamic Mechanical System in the Presence of Polymorphic Uncertainty
CGPA	1.7/5.0 (German Scale), 4.0/4.0 (US Scale)
Details	Two-year program (full-time). Thesis length 12, 000 words. <ul style="list-style-type: none">• Developing online state estimation methods for systems with imprecisely defined probabilistic noise with deterministic uncertainties• Developing robust model-based control schemes to stabilize such systems. Implementation done in real-time on a physical apparatus.
Supervisor	Keywords: Possibilistic filtering, Sensor fusion, Hardware Experiment, Robust Control Prof. Dr.-Ing. Michael Hanss, Tom Könecke, Mario Rosenfelder, Jan Schneider
2017- 2022	Bachelor of Science (Mechanical Engineering) University of Moratuwa, Sri Lanka
CGPA	3.56/4.2 (19 th out of 124)
Supervisor	Dr. Lihil Subasinghe, Mr. Shehara Perera

RESEARCH EXPERIENCE

November 2023 - Present	Research Assistant to Prof Michael Hanss Institute of Engineering and Computational Mechanics (ITM) University of Stuttgart
Responsibilities:	Primarily involved in the uncertainty quantification and robotics branches at ITM <ul style="list-style-type: none">• Implemented MATLAB toolboxes to propagate fuzzy/interval uncertainty through FFT-based modal analysis, in addition to analysis of ANN's with fuzzy valued parameters• Contributed to the development and maintenance of the internal software repository for uncertainty quantification (FAMOUS)• Designed, manufactured and implemented embedded software and hardware fully 3D-printed small-scale mobile robots, which is then used to Possibilistic mobile robot localization using visual landmarks

PROFESSIONAL EXPERIENCE

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| October 2022 – November 2022 | Mechanical Engineer - Battery Research and Development, VEGA Innovations, Colombo, Sri Lanka |
| | <ul style="list-style-type: none">Battery pack mechanical design pack design for combustion to electric vehicle conversions |
| September 2020 – May 2021 | Mechanical Engineer, ThermalR Industries, Moratuwa, Sri Lanka |
| Responsibilities: | Internship in an automotive startup |
| | <ul style="list-style-type: none">Directly involved in the designing and manufacturing of the frame and suspension setup for electric bike "Peregrifone" |

PROJECT EXPERIENCE

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| January 2020 – July 2022 | Chief Technical Officer, FalconE Racing Team, University of Moratuwa, Sri Lanka |
| Responsibilities: | Sri Lanka's first and only active electric FSAE project, which is aimed at the design and development of a single-seater race car for Formula Student Competitions |
| | <ul style="list-style-type: none">Chassis, Suspension and Steering system mechanical designFEA for structural components, CFD thermal analysis to evaluate battery cooling feasibility |

SKILLS AND COMPETENCIES

- Control Systems: Design and implementation of optimal and robust control systems (MPC, Min-max MPC, LQR, H-infinity)
- State Estimation and Localization: Probabilistic filters (EKF, UKF), Possibilistic filters (RPPF), Sensor fusion.
- Solid Mechanics: Strong theoretical foundation and Experienced in implementing structural simulations for mechanical and thermomechanically coupled load cases using custom codes and open-source libraries
- Mechanical Design & Manufacturing: Application awareness in multiple CAD and CAM software (SolidWorks, SolidCAM, Solid Edge, Creo)
- Structured Programming: competency in MATLAB, Simulink, Python, C++, PLC, Linux tool-chain, Docker, CI/CD (GitHub Actions), Multithreaded & real-time coding (FreeRTOS)
- Application Awareness: ANSYS Structural & Fluent, EDEM, ADAMS

LICENSES & CERTIFICATIONS

- Self-Driving Cars Specialization (University of Toronto: Coursera MOOC), July 2023
- Robotics: Aerial Robotics (University of Pennsylvania: Coursera MOOC), July 2023
- Applied Control Systems 1 and 2 (UDEMY MOOC), March 2023

RESEARCH PUBLICATIONS

A.I. Elangasinghe, P. Fernando, J. Colombage, S. Perera, and L. U. Subasinghe, "A Theoretical Model to Analyze the Draft Force and Power Requirement of a Tillage Implement Consisting of Both a Disc Plough and a Subsoiler," Moratuwa Engineering Research Conference (MERCon) 2022, Jul. 2022, pp. 1–6.

CONFERENCES / WORKSHOPS

- Talk at ITM Statusseminar 2024, Monbachtal, Germany, July 15, 2024, Title: Using Possibility Theory to Design a Robust Optimal Control Scheme for a Highly Dynamic System

- Talk at COMMAS Summer School, University of Stuttgart, Germany, October 9, 2024, Poster Presentation,
Title: Ellipticity of Gradient Poroelasticity

REFEREES

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|---|--|
| <ul style="list-style-type: none">• Prof. Dr.-Ing. Prof. E.h. Peter Eberhard
Director and Full Professor
Institute of Engineering and Computational
Mechanics
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