Mahela Pandukabhaya

BScEng (Hons.) (Peradeniya), MIEEE, sMIESL

Temporary Lecturer
Department of Electrical and Electronic Engineering,
University of Peradeniya,
Peradeniya 20400, Sri Lanka.

vkmpandukabhaya@gmail.com
mahela-pandukabhaya
mahela-pandukabhaya.github.io
+94 71 131 2787

Research Interests

Signal Processing	Biomedical Engineering	Artificial Intelligence	Controls
Sensors	Instrumentation	Electronics	Acoustics

Education

BScEng (Hons.) - Electrical and Electronic Engineering *Nov 2018 - Dec 2023*
Faculty of Engineering, University of Peradeniya. Peradeniya, Sri Lanka
GPA: 3.80/4.00 (95%) (First Class Honours)
Thesis: Hand Gesture Recognition and Gait Analysis via Wearable Devices
Advised by: Prof. GMRI Godaliyadda, Prof. MPB Ekanayake, Prof. HMVR Herath, Dr JV Wijayakulasooriya, Prof. RMCJ Rathnayake

Primary and Secondary Education *Jan 2003 - Sep 2017*
Trinity College, Kandy. Kandy, Sri Lanka

G.C.E. Advanced Level (University Entrance Examination) Aug 2017
- Physical Sciences (Mathematics, Physics, and Chemistry), Z-score: 1.9141
- District Rank: 49 (Kandy)

G.C.E. Ordinary Level Dec 2013

Experience

University of Peradeniya Peradeniya, Sri Lanka
Department of Electrical and Electronic Engineering, Faculty of Engineering.

▶ Temporary Lecturer *Mar 2025 - Present*
Courses Conducted:
- EE514 Data Communications

▶ Temporary Instructor *Jan 2024 - Feb 2025*
Responsibilities:
- Conducted and assessed laboratory sessions for undergraduate courses including fundamental EEE courses
- Developed and Implemented laboratories for undergraduate courses in the EEE curriculum

Synopsys, Inc. Colombo, Sri Lanka
Applications Engineering, and Research & Development branches

▶ Electronic Engineering Intern *Jan 2022 - May 2022*
Responsibilities:
- Development of a software solution for random testing of software
- Exposure: *Python, SystemVerilog, RTL Static Verification*
- Achievements: *Title Winner of LevelUp 2022: Intern Project Presentation Competition*

Honours and Awards

▶ **SLASSCOM National Ingenuity Awards 2025 (Won).**
Winner in the category "Best Innovative Product in Healthtech" - National, and Provincial (Central Province) for the project "Wearable Device and AI based Analysis for Human Motion Capture".

▶ **Manamperi Award (2024) (Nominated).**
Nominated for the Best Undergraduate Research Project award in Engineering (island-wide, Sri Lanka) by Sri Lanka Association for the Advancement of Science (SLAAS) for the research project "Hand Gesture Recognition and Gait Analysis using Wearable Devices".

- **Eng. E.W. Karunarathne Award (2022/2023) (Nominated).**
  Nominated for the Best Undergraduate Project in Electrical Engineering (island-wide, Sri Lanka) award for the research project "Hand Gesture Recognition and Gait Analysis using Wearable Devices".

- **Dr Tilak Peiris Award for the Best Performance in the General Programme in Engineering (2020) (Won).**
  Best performance in First Year at Faculty of Engineering (Batch of 2017), University of Peradeniya.
  GPA 3.95/4.00 (Ranked 1st out of 416)

Patents

- **National Patent (Sri Lanka) LK/P/122798 (Pending): "A multi-sensory fetal movement analysing device" (2023).**
  Owners: GMRI Godaliyadda, MPB Ekanayake, JV Wijayakulasooriya, RMCJ Rathnayake, UH Delay, JB Senanayake, RT Nanayakkara, DMPM Alwis, LBIP Thilakasiri, VKM Pandukabhaya.

Publications

Peer-Reviewed Journals

[J_1] **Performance Benchmarking of Psychomotor Skills Using Wearable Devices: An Application in Sport.** **2025 Feb**
- *VKM Pandukabhaya, TD Fonseka, RGMS Kulathunge, GMRI Godaliyadda, MPB Ekanayake, CD Senanayake, HMVR Herath.*
- In *IEEE Access.* [DOI: 10.1109/ACCESS.2025.3536837]

International Conferences

[C_4] **LSTM based Model for Weather-based Solar Irradiance Prediction for Long-Term PV Energy Planning.** **2025 July**
- *AS Bandara, VKM Pandukabhaya, RMKL Ratnayake, GMRI Godaliyadda, MPB Ekanayake, JB Ekanayake.*
- In *IEEE 19th International Conference on Industrial and Information Systems (ICIIS) 2025.* [Under Review]

[C_3] **Estimation of Angle of Significance in Human Joint Angles Using Extended Kalman Filter and Principal Component Analysis.** **2025 Jan**
- *VKM Pandukabhaya, RMBN Rathnayaka, N Meghapathirana, RGMS Kulathunge, TD Fonseka, GMRI Godaliyadda, MPB Ekanayake, HMVR Herath.*
- In *IEEE 11th Moratuwa Engineering Research Conference (MERCon) 2025.* [Under Review]

[C_2] **Comparison of Appliance Signature Classification Methods for Non-Intrusive Load Monitoring.** **2024 Dec**
- *RMKL Ratnayake, VKM Pandukabhaya, DMUP Sumanasekara, RMUM Ratnayake, GMRI Godaliyadda, MPB Ekanayake, JB Ekanayake, HMVR Herath.*
- In *IEEE 4th Moratuwa Electrical Engineering Conference (EECon) 2024.* [DOI: 10.1109/EECon64470.2024.10841878]

[C_1] **Quality Assessment of Welding using Regression Analysis of Biomechanical Data.** **2024 Aug**
- *VKM Pandukabhaya, TD Fonseka, RGMS Kulathunge, GMRI Godaliyadda, MPB Ekanayake, CD Senanayake, P Gamage, HMVR Herath.*
- In *IEEE 10th Moratuwa Engineering Research Conference (MERCon) 2024.* [DOI: 10.1109/mercon63886.2024.10689188]
- **Best Paper Award** (Technology Management Track), Presenting Author.

Research and Projects

Postgraduate Research

- **Real-time Power Inertia and Grid Impedance Monitoring.** 2025 - Present
  - Exploration of signal processing and machine learning algorithms for real-time power inertia and grid impedance monitoring

- **Non-Intrusive Load Monitoring (NILM).** 2024 - 2025
  - Exploration of algorithms for event detection, classification of appliance signatures, and unmixing aggregate power to determine the states of appliances and energy drawn

- **Miniaturization of Wearable Devices.** 2024 - Present
  - Miniaturization of an IMU-based full-body wireless wearable device

- **Assessment of Psychomotor Skills.** 2023 - Present
  - Exploration of algorithms for the quantitative assessment of psychomotor skills based on wearable devices.

▶ **Hand Gesture Recognition and Gait Analysis via Wearable Devices.** 2022 - 2023
- Undergraduate Capstone Project
- Development of an IMU-based full-body wireless wearable device to capture human body motion
- Hand gesture classification via binary classification techniques
- Gait parameter extraction for medical applications through joint kinematics obtained via extended Kalman filtering-based sensor fusion
- Exploration of grading methods for the quantitative performance evaluation of physical tasks

▶ **Fetal Movement and Maternal Respiratory Pattern Monitoring.** 2021 - 2023
- A collaborative research project with Department of Obstetrics and Gynaecology, Faculty of Medicine, University of Peradeniya, Sri Lanka focusing on the applications related to fetal condition monitoring using IMU-based wearable devices
- Development of an IMU-based wearable device to monitor maternal abdomen movement for fetal condition evaluation
- National Patent (Sri Lanka) LK/P/122798 (pending)

Undergraduate

▶ **CalcWizard.** (UG) 2022 - 2023
- Development of an RTL-based learning aid for arithmetic teaching for primary school students
- Project for EE356 Electronic Product Design

▶ **Diode-based temperature sensor.** (UG) 2020
- Development of a temperature sensor that investigates the temperature dependence of the VI characteristic of a diode
- Project for EE251 Electronic Measurements Course

▶ **Phoenix.** (UG) 2019
- A PID-controlled line follower robot presented for a contest organized by IEEE Student Chapter of University of Peradeniya, Sri Lanka (DEEEP SPEED 2019) - 1st place of out of 84 contestants.

▶ **Optical Morse Code Transceiver.** (UG) 2019
- A multi-threaded, Morse code transmitter-receiver pair based on optical signals
- Project for GP106 Computing

Professional Memberships

Institution of Electrical and Electronic Engineers (IEEE)
Member 2024 - Present
Student Member 2019 - 2023

Institution of Engineers, Sri Lanka (IESL) - Student Member
Student Member 2021 - Present

Volunteering

▶ **Member of Organizing Committee** - ACES Pre-Coders v10.0 and ACES Coders v10.0 (Sep-Oct 2023).
An algorithmic programming competition organized by Association of Computer Engineering Students (ACES), Department of Computer Engineering, University of Peradeniya, Sri Lanka.
Contribution: *Problem design and planning, Coordination of the Contest*
Exposure: *Data structures and algorithms, computational geometry*

Other Achievements

Oct 2022 **IEEEXtreme 16.0**: An international 24-hour algorithmic programming competition organized by IEEE. *[Participation]*

Jun 2022 **LevelUp 2022**: Intern project presentation competition organized by Synopsys, Inc. *[1st place]*

Oct 2021 **IEEEXtreme 15.0**: An international 24-hour algorithmic programming competition organized by IEEE. *[Participation]*

Oct 2020 **IEEEXtreme 14.0**: An international 24-hour algorithmic programming competition organized by IEEE. *[Top 40 in Sri Lanka, Top 400 in the world]*

Oct 2020 **MoraXtreme 5.0**: A national 12-hour algorithmic programming competition organized by University of Moratuwa, Sri Lanka. *[16th Place]*

Mar 2020 **ACES Coders 8**: A national 12-hour algorithmic programming competition organized by University of Peradeniya, Sri Lanka. *[15th Place]*

Feb 2020 **Google Hash Code 2020**: An international algorithmic programming competition organized by Google LLC. *[Participation]*

Dec 2019 **DEEEP SPEED 2019**: A Line Follower Robot Competition organized by the organized by IEEE Student Branch, University of Peradeniya, Sri Lanka. *[1st place out of 84]*

Oct 2019 **IEEEXtreme 13.0**: An international 24-hour algorithmic programming competition organized by IEEE. *[Top 5 in Sri Lanka, Top 150 in the world]*

Sep 2019 **ACES Hackathon 2019**: An inter-university hackathon organized by University of Peradeniya, Sri Lanka. Idea: Image processing-based detection of freshness of tomatoes. *[Participation]*

Mar 2019 **UoJ Coders v1.0**: A national 12-hour algorithmic programming competition organized by University of Jaffna, Sri Lanka. *[Participation]*

Skills

Programming	C, C++, Python, Assembly
Hardware	ESP, PIC, Arduino, Raspberry Pi, Altium Designer, Verilog HDL, SystemVerilog
Mathematical Computing	Mathematica, MATLAB, GNU Octave
Systems Simulation	PSCAD, SPICE, Proteus
CAD	Autodesk AutoCAD, Autodesk Fusion 360, DS SolidWorks
Graphic Designing	LaTeX, Adobe InDesign, Inkscape, Microsoft Office
Languages	English, Sinhala

Other Interests

Music and Acoustics, Astrophysics, Competitive Programming, Photography, Electronic Circuit Fabrication

References

Prof GMRI Godaliyadda
PhD (NUS), BScEng (Peradeniya), SMIEEE, AMIESL

Professor
Department of Electrical and Electronic Engineering,
Faculty of Engineering,
University of Peradeniya.
Sri Lanka.

Email: roshangodd@ee.pdn.ac.lk

Prof MPB Ekanayake
PhD (Texas Tech), BScEng (Peradeniya), SMIEEE, AMIESL

Professor
Department of Electrical and Electronic Engineering,
Faculty of Engineering,
University of Peradeniya.
Sri Lanka.

Email: mpb.ekanayake@ee.pdn.ac.lk

Prof HMVR Herath
Dr.-Ing (Paderborn), MS (Miami), BScEng (Peradeniya), CEng, SMIEEE, MIESL, MOSA

Professor
Department of Electrical and Electronic Engineering,
Faculty of Engineering,
University of Peradeniya.
Sri Lanka.

Email: vijitha@eng.pdn.ac.lk

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