

Thilina S. Ambagahawaththa

Curriculum Vitae

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Thilina S. Ambagahawaththa

Education

- 2022–Present **Postgraduate Student**, *The University of Southern California, USA*, Ming Hsieh Department of Electrical and Computer Engineering – Electrophysics.
- 2017–2021 **M.Sc. by Research**, *The University of Moratuwa, Sri Lanka*,
Thesis: *Design and Implementation of a Multi-inductor DC-DC Converter*.
This thesis explored synthesizing a DC-DC converter to have a desired voltage conversion ratio. Therefore, a unified method for DC-DC converter synthesis was proposed, and a DC-DC converter having a set of stipulated attributes has synthesized using the proposed method. Finally, the synthesized converter was implemented and tested to validate its operation.
Advisors: Dr. D.R. Nayanasiri, and Dr. A.A. Pasqual
- 2007–2011 **B.Sc. Hons. Engineering**, *The University of Moratuwa, Sri Lanka*, *Second Class (Upper Division)*
3.65 of GPA. Specialized in Electronics & Telecommunication Engineering.

Publications

Journal Articles

- 1 T. S. Ambagahawaththa, D. Nayanasiri, and A. Pasqual, "A four-step method to synthesize a dc-dc converter for multi-inductor realizable arbitrary voltage conversion ratio," *IEEE Transactions on Industrial Electronics*, vol. 69, no. 6, pp. 5594–5603, 2022. DOI: 10.1109/TIE.2021.3094476.
- 2 T. S. Ambagahawaththa, D. Nayanasiri, A. Pasqual, and Y. Li, "A design methodology to synthesize first degree single-path hybrid dc-dc converters," *IEEE Transactions on Power Electronics*, vol. 37, no. 10, pp. 12336–12345, 2022. DOI: 10.1109/TPEL.2022.3176201.
- 3 T. S. Ambagahawaththa, D. Nayanasiri, A. Pasqual, and Y. Li, "Nonisolated dc-dc power converter synthesis using low-entropy equations," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 10, no. 6, pp. 6457–6469, 2022. DOI: 10.1109/JESTPE.2022.3152479.

Conference Proceedings

- 1 U. Mendis, S. Maduwantha, K. Perera, D. Wellehewage, T. Ambagahawaththa, and D. Dias, "360-degree immersive experience for indoor cycling," in *Proceedings of the 6th International Conference on Virtual and Augmented Reality Simulations*, ser. ICVARS '22, Brisbane, QLD, Australia: Association for Computing Machinery, 2022, pp. 1–8, ISBN: 9781450387330. DOI: 10.1145/3546607.3546608. [Online]. Available: <https://doi.org/10.1145/3546607.3546608>.
- 2 T. S. Ambagahawaththa, "High step-down dc-dc converter for point of load applications," in *Proc. International Symposium on Industrial Electronics (ISIE)*, Jun. 2021, pp. 1–6. DOI: 10.1109/ISIE45552.2021.9576205.
- 3 T. S. Ambagahawaththa, "Tapped inductor based high step-down dc-dc converter for point of load applications," in *Proc. International Symposium on Industrial Electronics (ISIE)*, vol. in Press, Jun. 2021. DOI: 10.1109/ISIE45552.2021.9576412.
- 4 T. S. Ambagahawaththa, D. R. Nayanasiri, and S. G. D. Jayasinghe, "Family of boost converters based on switched coupled inductor and voltage lifter cell," in *Proc. Conf. on Power and Energy Systems (ICPES)*, Dec. 2018, pp. 252–257. DOI: 10.1109/ICPESYS.2018.8626935.
- 5 T. S. Ambagahawaththa, D. R. Nayanasiri, and S. D. G. Jayasinghe, "Ultra-high step-up dc-dc converter family based on feed-forward capacitor and coupled inductor," in *Proc. International Symposium on Industrial Electronics (ISIE)*, Jun. 2018, pp. 456–461. DOI: 10.1109/ISIE.2018.8433678.
- 6 T. S. Ambagahawaththa, D. R. Nayanasiri, A. A. Pasqual, and S. D. G. Jayasinghe, "An analytical method to derive a dc-dc converter for an arbitrary voltage conversion ratio," in *Proc. IEEE Conf. on Power and Energy Systems (ICPES 2018)*, Dec. 2018, pp. 11–16. DOI: 10.1109/ICPESYS.2018.8626969.
- 7 D. R. Nayanasiri and T. S. Ambagahawaththa, "Boost converter based on coupled inductor and voltage lift cell," in *TENCON 2017 - 2017 IEEE Region 10 Conference*, 2017, pp. 291–296. DOI: 10.1109/TENCON.2017.8227878.
- 8 T. Chandrapala, L. Cabral, S. Ahangama, T. Ambagahawaththa, and J. Samarawickrama, "Hardware implementation of motion blur removal," in *Proc. Conf. on Field Programmable Logic and Applications (FPL)*, 2012, pp. 243–248. DOI: 10.1109/FPL.2012.6339188.

Patents

- 2017 *A generic device for internet of things applications*, National Patent (filed), LK/P/1/19926.
- 2013 *Multiplatform development system for microcontrollers*, National Patent (filed), LK/P/11/17953.

Work Experience

Academic Experience

2019–2022 **Lecturer**, DEPARTMENT OF ELECTRONIC AND TELECOMMUNICATION ENGINEERING, UNIVERSITY OF MORATUWA, SRI LANKA, on Study Leave.

Courses

EN2012	Analog Electronics	Semester 3	Compulsory	100 Students
EN2852	Applied Electronics	Semester 3	Compulsory	200 Students
EN2110	Electronics III	Semester 4	Compulsory	115 Students
EN4213	Power Electronics	Semester 7	Elective	20 Students

2018–2020 **Visiting Lecturer**, FACULTY OF ENGINEERING, UNIVERSITY OF SRI JAYEWARDENAPURA, SRI LANKA, Embedded Systems.

2018–2019 **Lecturer (on contract)**, DEPARTMENT OF ELECTRONIC AND TELECOMMUNICATION ENGINEERING, UNIVERSITY OF MORATUWA, SRI LANKA.

Industrial Experience

2018–2022 **Research Advisor**, PREMIUM INTERNATIONAL – UNIVERSITY OF MORATUWA, RESEARCH AND DEVELOPMENT LABORATORY FOR BIOMEDICAL TECHNOLOGIES, Sri Lanka.

2012–2018 **Research Engineer**, PREMIUM INTERNATIONAL – UNIVERSITY OF MORATUWA, RESEARCH AND DEVELOPMENT LABORATORY FOR BIOMEDICAL TECHNOLOGIES, Sri Lanka.

Products

Pulse Oximeter

Contribution: Ready for manufacturing. *System Architecture, Schematics, PCB, and Firmware Development.*

Multi-parameter Monitor

Contribution: In progress. *System Architecture and Schematic Design.*

2011–2012 **Software Engineer**, CODEGEN INTERNATIONAL PVT. LTD., Sri Lanka.

Startup Experience

2014–2021 **Founding Director**, A & T LABS, Sri Lanka, <https://thingsnode.cc>.
A & T Labs provides electronic design services and IoT hardware-software solutions.

2014–2017 **Co-founding Director**, PARAQUM TECHNOLOGIES, Sri Lanka, <https://paraqum.com>.
ParaQum Technologies provides products and solutions for network traffic analysis and control.

Internships and Trainings

Internships

2010 **Trainee Engineer (Automation)**, GREEN LEAF THRESHING PLANT, CEYLON TOBACCO COMPANY PLC, Kandy, Sri Lanka, Successfully completed an internship of 6 months at Ceylon Tobacco Company as Trainee Engineer (Automation and Embedded system design), 2010-02 to 2010-08.
Awarded “**Migara Ranathunga Trusted Award**” in 105th Annual Session of IESL as one of best industrial training projects of engineering undergraduates (the project “Barn Automation Kit”)

Training

2019 **Certificate Course in Teaching in Higher Education**, STAFF DEVELOPMENT CENTER, UNIVERSITY OF SRI JAYEWARDENAPURA, Sri Lanka, 24 day (in six month span) course on teaching in higher education, 2019-06-21 – 2019-12-27.

2018 **EMC Solutions and Passive Components**, WURTH ELEKTRONIK, One day workshop on EMC solutions and passive components held in parallel with MERCon 2018, 2018-06-01.

2016 **High Speed PCB design**, DESIGNCON 2016, SANTA CLARA, CA, Participated for High Speed PCB design workshops at DesignCon 2016, Santa Clara, CA, 2016-01-19 to 2016-01-22.

2015 **xDM Library Tools, EDA Training**, MENTORGRAPHICS, On One day training on xDM Library Tools of Mentorgraphics EDA tools, 2015-04-09.

2014 **Signal Integrity and Power Integrity**, MENTORGRAPHICS, Five day training on Signal integrity, power integrity and Mentorgraphics EDA tools, 2014-12-02 to 2014-12-08.

2014 **IP Prototyping using Synopsis Tools**, SYNOPSIS, Three day training on IP prototyping using Synopsis EDA tools, 2014-06-30 to 2014-07-02.

Project Experience

- 2012–2018 **Pulse Oximeter for Clinical Use**, *Developed for* PREMIUM INTERNATIONAL–UNIVERSITY OF MORATUWA, RESEARCH AND DEVELOPMENT LABORATORY FOR BIOMEDICAL TECHNOLOGIES, The developed pulse oximeter is powered by both AC and internal battery. The 4.8 Ah battery allows the device to run continuously for 12 hours in active mode and 21 hours in low power mode without charging. The oxygen saturation and pulse rate measurement accuracies are in par with state of the art clinical pulse oximeters, Two engineer project team.
- 2015–2017 **ATmosphere – Low Cost Automatic Weather Station**, *Developed for* A & T LABS PVT. LTD, Self-sustaining weather station capable of measuring and sending weather data periodically to specified server, Three engineer project team.
Product is currently deployed in Sanasa Insurance Network, LRWHF network, Megapolis project
- 2016–2018 **ICON – IoT Gateway and Controller**, *Developed for* A & T LABS PVT. LTD, Self-sustaining IoT controller and gateway capable of acquiring and sending data to specified server as well as to activate actuators in given locations, Three engineer project team.
Product is currently deployed in ATmosphere weather stations and AGV
- 2010–2011 **Advanced Real-time Noise Removal of Video Using FPGA**, *As the final year project of B.Sc.Hons. Engineering Program of the* UNIVERSITY OF MORATUWA, *Sri Lanka*, This project attempts to remove the blur of a video at real time using only the video frame based data. The project includes the implementation of 2D blind de-convolution on FPGA, Four member, undergraduate.
A research paper with the results of this project is presented in “22nd International Conference on Field Programmable Logic and Applications 2012” held in Oslo, Norway
- 2010 **Barn Automation Kit for Tobacco Curing Barn**, *Developed for* GREEN LEAF THREASHING PLANT, CEYLON TOBACCO COMPANY PLC *as the internship project*, An automated system to maintain the temperature and humidity profile in tobacco curing process.
Awarded “Migara Ranathunga Trusted Award” in 105th Annual Session of IESL as the one of best industrial training projects of engineering undergraduates in 2009/2010
- 2015–2017 **High Speed PCB Designs**, PCB Layout designs for system running at 100MHz or Higher along with Signal Integrity and EMI.
- 2016–2021 **Independent Consultant**, Providing guidelines and verifying schematic and PCB design to avoid issues related to device robustness, reliability, DFM and EMI/EMC compliance.

Undergraduate Project Supervision

Final Year Projects

- 2021 ▶ **Smart Building Management System**, Undergraduate 2016 intake.
- 2020 ▶ **Automated Pill and Drug Dispenser**, Undergraduate 2017 intake.
- ▶ **VR Bicycle**, Undergraduate 2016 intake.
- ▶ **Embedded System for Estimating Cardiovascular Disease**, Undergraduate 2016 intake.
- 2019 ▶ **Cuffless Non-invasive Blood Pressure Monitor**, Undergraduate 2015 intake.
- ▶ **PV Energy Conversion System Design and Monitoring System**, Undergraduate 2015 intake.
- 2017 ▶ **DC Nano Grid for Mobile Applications**, Undergraduate 2013 intake.
- 2016 ▶ **Low Power, Low Noise, High Precision Laser Diode Driver for Optical Fiber Communication Applications**, Undergraduate 2012 intake.
- 2015 ▶ **3D World reconstruction and visualization**, Undergraduate 2011 intake.

Technical Skills

- » **Schematic Capture, Circuit Simulation, and PCB Design**
 - ☑ Altium, LTSpice, ADS, and Cadance.
- » **Electromagnetic Simulations**
 - ☑ Ansys HFSS.
- » **Microcontrollers and FPGA**
 - ☑ PIC16/18F, STM32F, Texas Instruments, Xilinx FPGA

- » **Software Development**
 - ☑ C, C++, C#, and OOP with Java
- » **Mechanical Drawing**
 - ☑ AutoCAD and Solidworks.
- » **Technical Writing**
 - ☑ L^AT_EX.

Achievements

- 2021 **Graduate School Fellowship**, UNIVERSITY OF SOUTHERN CALIFORNIA, CA, USA, for post-graduate studies towards a Ph.D. degree.
- 2019 **Two gold awards**, NATIONAL EXHIBITION FOR INVENTIONS AND INNOVATIONS 2019, Sri Lanka.
- 2018 **Best Paper Award**, INTERNATIONAL CONFERENCE ON POWER AND ENERGY SYSTEMS 2018.
- 2015 **Certificate of Appreciation**, TI INNOVATION CHALLENGE.
- 2014 **Special Recognition**, AWARDS CEREMONY, THE UNIVERSITY OF MORATUWA, Sri Lanka.
- 2014 **World Rank 3, Sri Lanka Rank 1**, IEEEEXTREME 8.0 PROGRAMMING COMPETITION.
- 2013 **World Rank 12, Sri Lanka Rank 1**, IEEEEXTREME 7.0 PROGRAMMING COMPETITION
- 2012 **World Rank 3, Sri Lanka Rank 1**, IEEEEXTREME 6.0 PROGRAMMING COMPETITION
- 2010 **Migara Ranathunga Trusted Award**, 105th ANNUAL SESSION, Institution of Engineers, Sri Lanka

Grants

- 2021 **Finalist, The Climate Innovation Challenge 2021**, An innovation competition for a grant of USD 150,000 organized as a sub-component of INNOVATION FOR CLIMATE ADAPTATION AND RESILIENCE which is implemented as part of the World Bank's Program for Asia Resilience to CLIMATE CHANGE MULTI DONOR TRUST FUND (PARCC TF GRANT) with funding support from the United Kingdom's The Foreign, Commonwealth & Development Office, **Team Member**
- 2013 **National Science Foundation - Technology Grants 2013**, TG/2013/TECH-D/11 grant for the project titled MEDICAL DEVICE DEVELOPMENT FOR COMMERCIALIZATION awarded by NATIONAL SCIENCE FOUNDATION, SRI LANKA, **Team Member**

Other Activities

- 2020–2021 Actively contributed to the major curriculum revision carried out at the Department of Electronic and Telecommunication Engineering, University of Moratuwa.
I individually prepared the following modules.
 - EN1803** Basic Electronics for Engineering Applications
 - EN4214** Power Electronics
 - EN4480** Advanced Power Electronic Design
 I was one of the main contributors for the following module development.
 - EN1020** Circuits, Signals, and Systems
 - EN3533** Electronic Instrumentation
 - BM4112** Medical Electronics and Instrumentation
 - EN4460** Communication Circuit Design
 I was actively involved in the development of following modules.
 - EN1014** Electronic Engineering
 - EN2014** Electronic Circuits and Analysis
 - EN2111** Electronic Circuit Design
 - EN3013** Analog Circuit Design
- 2020–2021 Contributed as an **advisor** to *ISC 2021 Moratuwa - IEEE EMBS International Student Conference*.
- 2020–2021 Appointed as an **Ex-Com member** of *IEEE PELS Sri Lanka Chapter*.
- 2019–2021 Appointed as an **Working committee member** of *Center for Biomedical Innovation, University of Moratuwa, Sri Lanka*.
- 2021 Contributed as a **reviewer** of *IEEE ISIE 2021, MERCon 2021, and GUCON 2021*.

- 2020 Appointed as an **Ex-Com member** of *IEEE EMBS Sri Lanka Chapter*.
- 2020 Appointed as a **question setter** for *General Qualifying Examinations for AMIESL (Associate Member, Institute of Engineers Sri Lanka)* on the Electronics and Telecommunication Engineering discipline.
- 2020 Contributed as a **reviewer** on *IEEE Access, IEEE IECON 2020, and IEEE PEMC 2020*.
- 2019 Contributed as a **reviewer** on *IEEE Access, International Conf. on Power and Energy Systems (ICPES) 2019, and MERCon 2019*.
- 2018 Contributed as a **reviewer** on *ICPES 2018 and R10-HTC 2018*.

Academic and Research Interests

▣ Research Interests

- 🔍 RF Electronics – Low Noise Amplifier Design, Oscillators, and Noise
- 🔍 Analog and Mixed Signals – Analog Front-ends for biomedical and IoT applications, Signal Integrity, and EMC/EMI
- 🔍 Analog and Power – Low Dropout Regulators, Low Power Amplifiers
- 🔍 Power Electronics – DC-DC Converter Synthesis, PoL Converters

▣ Teaching Interests

- 🎓 Analog Electronics – Analog Circuit Design, Circuits and Systems
- 🎓 Power Electronics – DC-DC Converters

Personal Details

- Full Name Ambagahawaththe Gedara **Thilina Sameera Ambagahawaththa**
- Nationality Sri Lankan
- Memberships
- 🔍 Graduate Student Member, IEEE: CAS, MTT, SSCS.
 - 🔍 Associate Member, Institute of Engineers, Sri Lanka.
 - 🔍 Associate Engineer, Engineering Council Sri Lanka (ECSL).