

L. THARINDU NIRMAL WICKREMASINGHE

📍 Colombo, Sri Lanka ✉ tharindu.ncr@gmail.com 📞 +94713821138 🌐 Profile 📄 Documentation

A recent graduate inspired by mathematical and statistical analysis of machine learning models. Recently, I have been interested in structured sparsity, compressive sensing, and computational imaging.

Research Interests:

Signal Processing

Compressive Sensing

Statistical Learning Theory

Machine Learning

EDUCATION

University of Moratuwa, Sri Lanka	Cumulative GPA: 4.16/4.20 (First Class Hons.)	2018-2023
B.Sc.Engineering(Hons.)	Dean's List in all Semesters 1,2,3,4,5,6,7,8	
Electronics and Telecommunications	Class rank 1/118, Gold medal	
Faculty of Engineering	Faculty rank 1/980, Gold medal	

Nalanda College, Colombo, Sri Lanka -Physical Science	Graduated: 2018
G.C.E. Advanced Level 2017 (Physical Sciences)	4As/Country rank: 24 /Z-score: 2.4985 (top 1%)
(National university entrance examination taken by more than 270,000 students)	

G.C.E. Ordinary Level 2014	9As/Country rank: 1
(National exam taken by more than 290,000 highschool students)	

EXPERIENCE

Visiting Instructor - University of Moratuwa, Sri Lanka	2022-present
Remote Undergraduate Researcher - Centre for Advanced Imaging, Harvard University	2022-2023
Research Intern -School of Computing, University of Sydney, Australia	2021-2022

RESEARCH AND PUBLICATIONS

Masked Optimisation with Selective Attention for Image Reconstruction	Nov 2022 - present
<i>Undergraduate research</i>	<i>Preprint</i> 🌐

- Deep Learning-based image reconstruction from compressive sensing. Proposed applications focus on exploiting structured sparsity in microscopic imaging systems. A collaboration with Dr.Dushan Wadduwage at the Wadduwage lab, Centre for Advanced Imaging, Harvard University. Incorporated reviews of NeurIPS 2023, targeting IEEE Transactions on Image Processing. Supervised by Dr. Chameera Edussooriya
- P. Somarathne, **T. Wickremasinghe**, A.Niwarthana, A. Thieshanthan, C. Edussooriya, D. Wadduwage; *MO-SAIC: Masked Optimization with Selective Attention for Image Reconstruction* (arxiv pre-print)
- T. Wickremasinghe**, A.Niwarthana, P. Somarathne, A. Thieshanthan, B. Weissbourd, C. Edussooriya, D. Wadduwage; *Lost in Translation: The Critical Role of Attention in Adaptive Image Reconstruction* (Extended abstract, Conference presentation), OSA Optica Imaging Congress, Cambridge, MA, 2023.

Human Motion Prediction in Virtual Reality	Dec 2021 - July 2022
<i>Research Intern</i>	

- Explore areas to improve short term prediction of human motion, as a part of the Engineering Vacation Research Internship scholarship of the University of Sydney. Work carried under the aid lab, School of Computer Science, University of Sydney. Supervised by Dr. A.Withana

Feature Generation through Graph Neural Networks	May - Dec 2021
<i>Undergraduate Research</i>	<i>ICPR 2022 publication</i> 🌐

- A. Thieshanthan, A. Niwarthana, P. Somarathne, **T. Wickremasinghe** and R. Rodrigo, "HPGNN: Using Hierarchical Graph Neural Networks for Outdoor Point Cloud Processing," in 2022 26th International Conference on Pattern Recognition (ICPR), Montreal, QC, Canada, 2022 pp. 2700-2706.

Real-time Configuration of Intelligent Reflecting Surfaces

Research competition- ICASSP 2021

Feb - June 2021

[Video](#) 

[Report](#) 

[Announcement](#) 

- Mathematical Modelling and Data Analyst among an 8-person undergraduate team, in the IEEE Signals Processing Cup 2021. We designed fast and personalized reconfiguration algorithms of Intelligent Reflecting Surfaces in a setting of OFDM transmission of 5G signals. Our solution was **awarded 1st** place, after being invited to present at **IEEE ICASSP 2021-Toronto, Canada**. Supervised by Dr. P. Dharmawansa

Real-time object detection

Fall 2020 - 2021

Undergraduate Research

- O. Jayasinghe, S. Hemachandra, D.Anhettigama, S. Kariyawasam, **T. Wickremasinghe**, C. Ekanayaka, R. Rodrigo, P.Jayasekara, "Towards Real-time Traffic Sign and Traffic Light Detection on Embedded Systems," 2022 IEEE Intelligent Vehicles Symposium (IV), Aachen, Germany, 2022, pp. 723-728.

PROJECTS

Smart Breadboard for remote lab experiments

October 2020 - Feb 2021






Self supervised Research and Innovation

[Video and Report](#) 

- Part of the Hardware team designing a Remote Access Breadboard to assist electronics laboratory work during lockdowns in the Pandemic. Recognitions: **1st place** at IEEE **PES** national design competition, Selected from IEE **CAS** student design competition 2020-2021, to represent Sri Lanka in the IEEE region 10 (Australia-Asia-Pacific level).

Undergraduate projects

2018 - 2022

- Fall detection for elders  (*Electronic Design Realization module: May 2022*)
- FPGA based processor design  (*Circuits and Systems Design module: May 2022*)
- Object avoidance, Colour detection, Line and Wall following, Ramp navigating robot.
(*Robotics Design module: June 2021*)
- FIR bandpass filter design  (*Digital Signals and Processing module: February 2021*)
- AM transmission Walkie Talkie  (*Electronics II module: October 2020*)
- PID controlled line following robot  (*Electronics I module: December 2019*)

SELECTED PROGRAMS, UNDERGRADUATE AWARDS

Gold medal The most outstanding graduand in the faculty of Engineering, University of Moratuwa, Sri Lanka. For overall excellence in academics, extra curriculars, leadership, and civic service. 2023

Pre-doctoral invitee, Cornell-Maryland Max Planck Research School (**CMMRS**), Germany. August 2023

SGI 2023 Selected to audit the workshops of the Summer Geometry Initiative at MIT- MA,USA. August 2023







Fathima Fellow 2023/24, mentored by Mohammed El Banani on analysis in ML models. Fall 2023

Engineering Vacation Research Scholarhsip, under Anusha Withana at University of Sydney 2021/2022

ScholarX Fellow 2021/22, mentored by Vinoj Jayasundara, on ML concepts related to VAEs. 2021-2022

Mahapola Merit scholarship for Engineering undergraduates from the goverment of Sri Lanka for the top performers of university entrance examination 2018

COMPETITIONS AND HACKATHONS

Runners up	Datathon 2023 - Inter University Data science competition <i>An anomaly detection of suspicious activities on a website</i> 	SLIIT
Champions	Datathon 2022 - Inter University Data science competition <i>A recommending system for a telecommunications company using Next Best Action.</i> 	SLIIT
Champions	Data storm 2021- All island open Data science and analytics hackathon <i>Predict customer status and recommend the most suitable product.</i> 	RCUOM
Runners up	Datathon 2020- Inter-University Data science competition <i>Forecast Coronavirus case counts and sector impact</i> 	SLIIT
Champions	Belt and Road Electricity simulation competition 2020 <i>Economical and energy efficient power distribution</i> 	Shanghai University of Power
Champions	Decrypt 2019- Product Innovation Ideathon <i>Heart disease and emergency alerting app for drivers</i> 	University of Moratuwa
Finalists	Mora Xtreme 2019,2020 - Algorithmic coding competitions	IEEE SB UOM
Finalists	Futurecast ideathon 2021 - for IOT products	Arimac Lanka

TEACHING AND PEER REVIEW EXPERIENCE

Visiting Instructor

EN4553 Machine Vision, UoM, Sri Lanka	Fall 2023
EN3551 Digital Signal Processing, UoM, Sri Lanka	Fall 2023
EN3160 Fundamentals of Image Processing and Machine Vision, UoM, Sri Lanka	Fall 2023
EN2412 Electronic Control Systems, UoM, Sri Lanka	Fall 2022
EN2091 Laboratory practise and projects, UoM, Sri Lanka	Fall 2022

Peer reviewer

ACM Interactive Surfaces and Systems (ACM ISS)	July 2022
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Peer review assistance

CVPR 2023 in the Machine Learning track for Dr. R.Rodrigo	January 2023
ICPR 2022 in the Graph Networks category for Dr. R.Rodrigo	March 2022

TECHNICAL SKILLS

Languages	Python, MATLAB, C++, L ^A T _E X
Frameworks	Pytorch, Tensorflow
Software	Solidworks, Multisim, LTSpice, Webots
MOOCs	
Mathematics for Machine Learning- Imperial College London- (<i>Coursera</i>)	August 2020
Neural Networks and Deep Learning- Deeplearning.AI (<i>Coursera</i>)	July 2020
Computational Thinking and Datascience- MIT 6.00.2 (<i>EdX</i>)	June 2020
Machine Learning- Stanford University (<i>Coursera</i>)	May 2020

VOLUNTEERING, LEADERSHIP AND EXTRA-CURRICULARS

Lecturing, Instructing and Community service

- Co-founder-Danuma Yathra Foundation, volunteering in rural schools of Sri Lanka, teaching highschool Mathematics and Science in schools with severe shortage of STEM teachers 2018-2020.
- Volunteer lecturer and instructor at astronomical society events 2018-2022.
- Assistant Manager, Knowledge Hub of ENTC 2021-2022.
- Member of the Rotaract Club - University of Moratuwa 2018-2023.
- Physics Laboratory Instructor for Advance-Level students at Lyceum International School- Colombo 2017-2018.

Featured Talks, Presentations, and Articles

- Moderator on the panel “*Future of AI in Engineering*” at EXMO-2023 Flagship Public Engineering Exhibition of the University of Moratuwa, August 2023.
- Poster Presentation at the International Conference on Communicating Astronomy with the Public (CAP) 2022.
- Article by Emil Bjornson, Lucio Marcerano; *Configuring an Intelligent Reflecting Surface for Wireless Communications: Highlights from the 2021 IEEE Signal Processing Cup student competition*, IEEE Signal Processing Magazine, January 2022, pp 126-131.

HIGHLIGHTS PRIOR TO UNIVERSITY

Awards

- The **Most Outstanding Student** award in both Junior and Senior categories for the graduating class at Nalanda College, for overall excellence in academics and extra curriculars. 2011, 2017
- The **Best performance in Academics** award for Physical Sciences, 2017
Overall Best in Academics in Nalanda College for the graduating class of 2017 2017
- **3 Bronze** medals - International Mathematics Competition (Individual and team), Indonesia 2011
- **2 Bronze** medals - International Mathematics and Science Olympiad (Individual), Indonesia 2009, 2010
- **2 Bronze** medals - International Earth Science Olympiad (Individual and Field project), Brazil 2015
- **Gold** medalist in the National Physics Olympiad *2017*, Bronze medalist in *2016*
2 Gold, 1 Silver, and 1 Bronze medal in the National Astronomy and Astro-Physics Olympiads in Junior (2012/13) and Senior categories (2014/15) 2012/13/14/15
- High distinction with national rank 3 in the Royal Australian Chemical Institute Junior Quiz 2014
Class excellence with national rank 1 in the Royal Australian Chemical Institute Senior Quiz 2016

Activities

2008-2017

- Junior Prefect for the term 2013/14.
- Patrol leader of the Scout Group, Represent Sri Lanka in the 23rd World Scout Jamboree in Kirara-Hama, Japan (2015), and the Asia Pacific Jamboree- Dambulla (2011).
- Captain of the debating team, Best Orator in inter-house and inter-school debates in 2014, President of the debating society in 2016/17.
- Treasurer of the Astronomical Society: conducting nightcamps, lectures and workshops in schools islandwide.
- Chess: Colours award, (FIDE Elo rating 1660), Leader of the team winning the National Championship in 2010.
- Badminton: Colours award, member of division A champion and runner-up teams.
- Music: Member of the Choir and the orchestra (violin).