Tharindu P. De Alwis

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Education

2017 – 2022 **Ph.D. in Mathematics, Major in Statistics** – School of Mathematics and Statistical Sciences, Southern Illinois University Carbondale, IL, USA.
Dissertation title: *Advances on Dimension Reduction for Univariate and Multivariate Time Series.* PhD advisor: Prof. S. Yaser Samadi.

2015 – 2017 **M.S. in Mathematics, Major in Statistics** – School of Mathematics and Statistical Sciences, Southern Illinois University Carbondale, IL, USA.
Thesis title: *PCA and FA Models for Matrix Valued Time Series.*
Thesis advisor: Prof. S. Yaser Samadi.

2008 – 2013 **B.Sc. in Statistics and Operations Research** – Department of Mathematics, Faculty of Science, University of Peradeniya, Sri Lanka. Major: Statistics and Operations Research. Minor: Computer Science.

2010 – 2012 **Higher Diploma in Information Technology** – University of Colombo School of Computing, Sri Lanka. Major: Programming languages, and Software designing. Minor: Mathematics.

Professional Appointments

August 2024 – Present **Assistant Professor in Mathematics and Statistics,** Department of Mathematics and Statistics, University of West Florida, Pensacola, FL.

August 2022 – August 2024 **Post-Doctoral Scholar,** Department of Mathematical Sciences, Worcester Polytechnic Institute (WPI), Worcester, MA.

August 2015 – August 2022 **Graduate Teaching Assistant,** School of Mathematical and Statistical Sciences, Southern Illinois University Carbondale, Carbondale, IL.

February 2013 - January 2015 **Temporary Lecturer,** Department of Mathematics, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka.

Honors & Awards

2021 - 2022 **John M.H. Olmsted Outstanding Doctoral Teaching Assistant Award**. School of Mathematical and Statistical Sciences, Southern Illinois University Carbondale.

2022 **GPSC Outstanding Graduate Teaching Assistant Award**. Graduate and Professional Student Council (GPSC), Southern Illinois University Carbondale.

2021 - 2022 **Dissertation Research Award**. Graduate School, Southern Illinois University Carbondale.

Research Interests

- High-dimensional Multivariate Statistics,
- Envelope Methods,
- Dimension Reduction,
- Neural Network,
- Spatial-Temporal Methods,
- Sufficient Dimension Reduction (SDR),
- Deep Learning and Machine Learning for Time Series Analysis.

Publications

Published, Under Review and Submitted Papers

De Alwis T. P., and Samadi S. Y., (2024). **Stacking-Based Deep Neural Network for Nonlinear Time Series Analysis**. *Journal of Statistical Methods and Applications (SMAP)*. https://doi.org/10.1007/s10260-024-00746-0.

Grabill N., Wang S., Olayinka H., De Alwis T. P., Khalil Y.F, and Zou J., (2024). **AI-augmented Reliability Predictions using Failure Modes, Effects, and Criticality Analysis for Industrial Applications**. *Journal of Reliability Engineering and System Safety*. https://doi.org/10.1016/j.ress.2024.110308.

De Alwis T.P., Samadi S. Y., and and Weng J., (2022). **itdr: An R Package of Integral Transformation Methods to estimate Sufficient Dimension Reduction in Regression**. Preprint. https://doi.org/10.48550/arXiv.2204.08341.

De Alwis T. P., and Samadi S. Y., (2021). **Fourier Methods for Sufficient Dimension Reduction in Time Series**. Preprint. https://doi.org/10.48550/arXiv.2312.02110.

Software Publications

De Alwis T. P., and Samadi S. Y. **sdrt: An R Package to Estimate SDR in Time Series (2024).** *The Comprehensive R Archive Network (CRAN)*. https://CRAN.R-project.org/package=sdrt.

De Alwis T. P., Samadi S. Y., and Weng J. **itdr: An R Package of Integral Transformation Methods to estimate SDR in Regression (2021)**. *The Comprehensive R Archive Network (CRAN)*. https://CRAN.R-project.org/package=itdr.

Teaching, Research, and Project Grants

2024 **Funded by the EMPOwER grant from Worcester Polytechnic Institute (WPI)**, the task is to develop a student activity book for the Applied Statistics course. $3500.

2018 - 2021 **Granted to use Extreme Science and Engineering (XSEDE) resources. Pittsburgh Super Computing Center (PSC)**. National Science Foundation (NSF).

2019 **Funded Project: Partnership and Strategies to Reduce Violent Crime**. Springfield Police Department Funding Agency. $500.

Conference Grants

2023 **Accommodation grant to attend Mathematical and Scientific Machine Learning-ICERM. Brown University, Providence, RI, USA**. National Science Foundation (NSF). $600.

2022 **Accommodation grant to attend Langenhoop Lectures and Mathematical Conference-LLMC. Southern Illinois University Carbondale, Carbondale, IL, USA**. $500.

2021 **Travel grant to attend Gaussian Random Fields, Fractals, SPDE's, and Extremes (NSF/CBMS-2021) Conference. University of Alabama, Huntsville, AL, USA**. National Science Foundation (NSF). $800.

2020 **Travel grant o attend Seminar on Stochastic Processes (SSP-2020) workshop. Michigan State University, Lansing, MI, USA**. National Science Foundation (NSF). $500.

2019 **Travel grant to attend Statistical Methods for Atmospheric and Oceanic Sciences (STATMOS-2019) Workshop. University of Iowa, IA, USA**. National Science Foundation (NSF). $1100.

Teaching Experience

at University of West Florida, as the main instructor

Fall 2024 MAS 3105: **Linear Algebra** (Enrollment: 25).

Fall 2024 MAC 1147: **Precalculus with Trigonometry** (Enrollment: 150).

at Worcester Polytechnic Institute, as the main instructor

Summer 2024 MATH 1021: **Applied Statistics II** (Enrollment: 22).

Fall 2023 MATH 1021: **Calculus I** (Enrollment: 95, Evaluation: 4.0 out of 5) .

Spring 2023 MATH 2611: **Applied Statistics I** (Enrollment: 54, Evaluation: 4.3 out of 5).

Spring 2022 MATH 2621: **Probability for Applications** (Enrollment: 108, Evaluation: 4.5 out of 5).

Fall 2021

at Southern Illinois University Carbondale, as the main instructor.

MATH 102: **Basics of Data Science** (Enrollment: 17, Evaluation: 4.5 out of 5).

Spring 2021 MATH 282: **Introduction to Statistics** (Enrollment: 27, Evaluation: 4.4 out of 5).

Fall 2020 MATH 106: **College Algebra Enhance** (Enrollment: 27, Evaluation: 4.2 out of 5).

Fall 2019 MATH 111: **Pre-Calculus** (Enrollment: 20).

Spring 2019 MATH 140: **Short Course in Calculus** (Enrollment: 32, Evaluation: 4.5 out of 5).

Fall 2018 MATH 125: **Technical Mathematics with Application** (Enrollment: 18).

Fall 2017 MATH 108: **College Algebra** (Enrollment: 17, Evaluation: 4.3 out of 5).

Spring 2017 MATH 139: **Finite Mathematics** (Enrollment: 17, Evaluation: 4.1 out of 5).

Fall 2016 MATH 101: **Intro. to Contemporary Mathematics** (Enrollment: 28, Evaluation: 4.3/5).

at the University of Peradeniya, Sri Lanka, as the main instructor.

2013-2015 Introduction to Statistics, Network Optimization, Numerical Analysis, and Linear Models.

Outreach & Professional Development

Service and Outreach

Fall 2023-Summer 2024 **Program Organizer** of the department Statistical Seminar event at the Worcester Polytechnic Institute (WPI).

Summer 2023, Summer 2024 **Co-advisor** for the Research Experience for Undergraduate (REU) Summer 2023 program at the WPI. REU 2023 Students: Nicholas Grabill & Stephanie Wang.

2022 - Present **Reviewer** of the Journal of Statistics and Its Interface. (Number of papers are reviewed: 1)

2020, 2021, 2022 **Science Fair (Volunteer Judge)** – Southern Illinois University Carbondale, IL, USA.

Development

2023 **Mathematical and Scientific Machine Learning (MSML) at Brown University Institute for Computational and Experimental Research in Mathematics, Providence, RI**.
The objective was to highlight the importance of advancing the exploration of mathematical principles and algorithms in the realm of machine learning, along with their practical applications in scientific computing and various engineering domains. This conference seeks to unite the communities of machine learning, applied mathematics, and computational science and engineering, fostering the exchange of ideas and advancements in the rapidly evolving field of scientific machine learning (SciML).

2021 **TRIPODS Winter School and Workshop on Graph Learning and Deep Learning at Johns Hopkins Mathematical Institute of Data Science, Baltimore, MD**.
The goal was to bring together experts in machine learning, statistical inference and learning on graphs, and optimization to share basic principles, recent research results, and practical ideas, on the foundations of graph and deep learning. During this workshop, I improve my skills in Python computer language and practice to use d2l python package in regression and neural network problems.

2020 - 2021 **Statistical and Applied Mathematical Sciences Institute (SAMSI)- Workshop and Workgroup V, Durham, NC**.
The goal was to explore research themes determined in the opening workshop and collaborate with the group members. I have explored and shared my knowledge on several related subject areas like sufficient dimension reduction for multivariate time series, Bayesian methods to estimate the central mean subspace, principal component analysis, factor models, and envelope methods. Moreover, the weekly meeting enables me to improve my communication skills and network with other researchers in the same field.

2019 **Big Data Summit at the University of Illinois Research Park, Champaign, IL**.
The goal was to explore research themes determined in the opening workshop and collaborate with the group members. I have explored and shared my knowledge on several related subject areas like sufficient dimension reduction for multivariate time series, Bayesian methods to estimate the central mean subspace, principal component analysis, factor models, and envelope methods. Moreover, the weekly meeting enables me to improve my communication skills and network with other researchers in the same field.

2019 **Statistical Methods for Atmospheric and Oceanic Science (STATMOS-2019) Workshop, hosted by National Sciences Foundation (NFS) in Iowa City, IA.**
The goal was to bring young researchers into the field of Spatial Statistics and develop collaborations. This workshop enables me to explore a new research field and understand the key features in spatial-temporal data analysis.

Computer & Software Skills

Computer Language: **C, Java,** and **Android Studio.**
Statistical Software: **R, Python, Julia, SAS, Octave, MATLAB**, and **Minitab.**

Professional Memberships

2022 – Present New England Statistics Society

2019 – Present Institute of Mathematical Statistics (IMS)

2018 – Present American Mathematical Association Graduate Students' Chapter

Conference Talks & Presentation

⋆ presented author

December 2023 S. Yaser Samadi⋆, Rukayya Ibrahim and Tharindu Priyan De Alwis (**invited talk**). Spatio-temporal High-Dimensional Matrix Autoregressive Models via Tensor Decomposition.*16th International Conference of the ERCIM WG on Computational and Methodological Statistics (CM-Statistics 2023), Berlin, Germany.*

June 2023 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**invited poster presentation**). Stacking-Based Deep Neural Network for Nonlinear Time Series Analysis. *Mathematical and Scientific Machine Learning (MSML). Institute for Computational and Experimental Research in Mathematics at Brown University, Providence, RI.*

June 2023 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**invited talk**). Convolution Transformation Method to Estimate SDR subspaces in Time series. *New England Statistics Symposium (NESS). Boston University, MA.*

October 2022 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**invited talk**). Dimension Reduction in Multivariate Time series. *Langenhoop Lectures and Mathematical Conference (LLMC). Southern Illinois University Carbondale, IL.*

August 2021 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**invited talk**). Fourier Method of Estimation Sufficient Dimension Reduction Subspaces in Time Series. *Gaussian Random Fields, Fractals, SPDEs, and Extremes (CBMS-2021) at the University of Alabama, Huntsville, AL.*

April 2021 Tharindu Priyan De Alwis⋆ (**invited talk**). Envelopes in Multivariate Regression Models with Non-linearity and Heteroscedasticity. *Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham, NC.*

May 2021 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**invited talk**). Fourier Method of Estimation Sufficient Dimension Reduction Subspaces in Time Series. *Numerical Analysis in Data Science Transition Virtual Workshop. Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham, NC.*

March 2020 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**contributed talk and poster**). Fourier Method of Estimation of Time Series Central Subspaces. *Seminar on Stochastic Process at Michigan State University (SSP-2020), Lansing, MI.*

August 2019 Tharindu Priyan De Alwis and S. Yaser Samadi⋆ (**contributed talk**). Fourier Methods for Estimating the Central Mean Subspace in Time Series. *Statistical Meetings (JSM), Colorado Convention Center, Denver, CO.*

April 2019 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**contributed talk**). Dimension Reduction in Time Series Data. *Illinois Section Mathematical Association of America (ISMAA). Southern Illinois University Carbondale, IL.*

November 2019 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**contributed talk**). Sufficient Dimension Reduction in Regression and Time Series Data. *ILMO Undergraduate and Master students Mathematics Conference (ILMO). Southern Illinois University Carbondale, IL.*

April 2019 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**poster**). Fourier Methods for Estimating the Central Mean Subspace in Time Series. *Undergraduate and Graduate Research Forum at Southern Illinois University Carbondale, IL.*

May 2018 Tharindu Priyan De Alwis⋆ and S. Yaser Samadi (**contributed talk**). Sufficient Dimension Redaction in Regression and Time Series Data. *Langenhoop Lectures and Mathematical Conference (LLMC). Southern Illinois University Carbondale, IL.*