R. M. Sunimal Rathnayake

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Born 21 January 1990

ABSTRACT

A committed and hardworking educator possessing more than five years' experience in teaching, mentoring and administering both undergraduate and postgraduate level computer science courses. I am interested in computer systems teaching and research, especially focusing on cloud computing, computer architecture, operating systems and high performance computing.

EDUCATION

2020 **Ph.D. in Computer Science**

National University of Singapore
Thesis title: Cost Performance of Scaling Applications on the Cloud
Advisor: Associate Professor Teo Yong Meng

2014 **B.Sc. Engineering (Honours) in Computer Science and Engineering**

University of Moratuwa, Sri Lanka

TEACHING

2021 Jan – present **Senior Lecturer Grade II**

University of Moratuwa, Sri Lanka

I teach Computer Systems and Computer Security courses at Department of CSE, University of Moratuwa for both undergraduate and postgraduate students. Following is a list of courses I offer:

- CS5461 Network Security
- CS4452 Information Security and Cryptography
- CS5313 Fault Tolerant Computing
- CS5462 Embedded System Security
- CS3412 Advanced Networking
- CS4342 Advanced Computer Architecture
- CS4432 Network and System Administration
- CS2032 Principles of Computer Communication

2022 Apr – present **Visiting Lecturer**

Sri Lanka Technology Campus (SLTC)

I teach CCS308 Virtualisation and Containers module at SLTC as a Visiting Lecturer.

2019 Jan – 2020 Dec **Teaching Assistant**

National University of Singapore

I contributed in multiple Computer Systems and Programming courses as a tutor, laboratory tutor and a grader. Following is a summary of all modules I was involved in:

- CS2106 Operating Systems
- CS1010E Programming Methodology
- CS3210 Parallel Computing
- CS5224 Cloud Computing
- CS5239 Computer Systems Performance Analysis

2012 – 2014	**Visiting Instructor**
	University of Moratuwa, Sri Lanka
	I worked as a tutor and a grader for Programming Fundamentals, Computer Architecture, and Data Structures and Algorithms modules during my undergraduate studies at University of Moratuwa, Sri Lanka.

RESEARCH

2021 Jan – Present	**Research Supervisor**
	University of Moratuwa
	Cloud Computing and Its Applications
	I lead several research projects in Cloud Computing domain with MSc, MBA, and BSc final year students at the department of CSE, University of Moratuwa. Current projects include cost-time optimization of serverless computing application using transient pricing strategies, application of traditional parallel computing models on serverless cloud platforms, developing a cloud accelerator for minimizing disturbances caused due to network disruptions, and studying the challenges faced by Sri Lankan organizations when adopting cloud based technologies.

2015 Jan – 2020 Nov	**PhD Research Scholar**
	National University of Singapore
	Cost Performance of Scaling Applications on the Cloud
	Leveraging the inherent resource scalability of cloud resources and application scalability of cloud applications, we propose *fixed-cost-scaling* on cloud. We investigate fixed-cost scaling under fixed-workload and fixed-time constraints using a measurement-driven analytical modeling approach. We expose cost-performance Pareto-optimal configurations and sweet spot configurations that can be used to minimize the cost and time of application execution on the cloud. Moreover, we propose metrics for characterizing the cost-performance of cloud applications that can be used for efficient resource allocation.
	The project was supervised by A/P Teo Yong Meng.
	In addition to research contributions in my main project, I have contributed to various other projects in the computer systems group, especially as a mentor for multiple masters degree candidates and exchange students in areas including cloud computing, geo-distributed data analytics, and machine learning based medical image analysis, among others.

2014 Mar – 2014 Dec	**Research Assistant**
	University of Moratuwa, Sri Lanka
	Detecting Performance Bugs using Machine Learning
	I investigated the age-old challenge of detecting the presence of *False Sharing*, a hard-to-detect performance bug that occurs on multi-core and multi-processor computers with processor-local caches executing multi-threaded applications. We utilized decision tree models trained with performance counter data from processors to detect programs where false sharing is present.
	The project was supervised by Prof. Sanath Jayasena from University of Moratuwa in collaboration with Prof. Saman Amarasinghe from Massachusetts Institute of Technology, USA.

SELECTED PUBLICATIONS

1. *Characterizing the Cost-Accuracy Performance of Cloud Applications.* In Proceedings of the 49th International Conference on Parallel Processing (ICPP): Workshops, Edmonton, Canada, 2020, ACM.
2. *Cost-time Performance of Scaling Applications on the Cloud.* In Proceedings of the 10th International Conference on Cloud Computing Technology and Science (CloudCom), Nicosia, Cyprus, 2018, IEEE.
3. *CELIA: Cost-time Performance of Elastic Applications on the Cloud.* In Proceedings of 46th International Conference on Parallel Processing (ICPP), Bristol, UK, 2017, IEEE.
4. *Detection of false sharing using machine learning.* In Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC), CO, USA, 2013, ACM.

INTERNSHIPS

2012 Associate Software Engineer (intern)
Zone24x7 Pvt Ltd, Sri Lanka

I developed software in a variety of technologies such as Natural User Interfacing, Web Technologies, Voice Over IP (VoIP), Computer Gaming, among others. These software were deployed at leading retail industry organizations in the United States.

2012 Google Summer of Code Intern
Jboss

I was selected for Google Summer of Code 2012 where I worked with Redhat Jboss organization developing a .NET adapter for Infinispan Grid Computing platform.

Other Experience

Professional Services
- Technical Paper Reviewer: IEEE Transactions on Services Computing
- Technical Paper Reviewer: International Conference on Parallel Processing (ICPP)
- Technical Paper Reviewer: Multidisciplinary Engineering Research Conference - University of Moratuwa (MERCon)
- Panel Member: Sri Lanka Government Web Standards Committee (Led by Prof. Gihan Dias)
- Organizing Committee Member: SC22 Supercomputing Conference 2022 (Inclusivity Committee)
- Consultant for multiple Sri Lankan government institutions

Talks
- FOSSASIA Open Source Conference, Cambodia - 2014
- NUS-HCMUT Joint Workshop, Ho-Chi-Minh City, Vietnam - 2017
- PhD Student Symposium at International Conference on Parallel Processing (ICPP), Eugene OR, USA - 2018

Organizing and Management
- Assistant Treasurer, Computer Science and Engineering Society, University of Moratuwa - 2014
- Lead Organizer - IESL RoboGames 2011 - Robotics competition by Institution of Engineers Sri Lanka
- Student Representative at University of Moratuwa - 2012-2014
- Volunteer at SL2College, a Sri Lankan non-governmental organization promoting higher education - 2014 - present
- Organizing Committee Member and Poster Session Chair for NUS SoC Research Week - 2019 August

AWARDS

- NUS Research Scholarship - 2015 - 2018
- NUS Scholarship to participate in South Asia Workshop on Research Frontiers - 2014
- ACM Student Volunteer Scholarship for Supercomputing(SC) conference in 2014, 2015

Affiliations

- Institution of Engineers Sri Lanka (IESL) - Associate Member
- Member of Association of Computer Machinery (ACM)
- Member of Institute of Electrical and Electronic Engineers (IEEE)

Referees

Will be provided upon request.