Chanaka D. Mapa

PhD in Applied Mathematics
Rensselaer Polytechnic Institute (RPI), Troy, NY

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Chanaka Mapa
Github/Chanaka

Overview

I develop scalable algorithms for quantum many-body problems. My PhD focuses on coupled-cluster methods, efficient tensor operations, and convergence techniques for achieving linear coupled-cluster.

Education

Rensselaer Polytechnic Institute — Troy, NY, USA
PhD in Applied Mathematics — 2025 – 2028 (expected)
Advisor: Prof. Fabian M. Faulstich

Rensselaer Polytechnic Institute — Troy, NY, USA
MS in Applied Mathematics — 2023 – 2025
Advisor: Prof. Yangyang Xu

University of Peradeniya — Peradeniya, Sri Lanka
BS in Mathematics — 2018 – 2022
Advisor: Prof. Athula A.I. Perera

Professional Experience

Rensselaer Polytechnic Institute - Troy, NY — 2023 – Present
Research assistant under Prof. Fabian M. Faulstich:

- Electronic structure theory – Develop local correlation Coupled-Cluster algorithms.
- Quantum computing – Benchmarking quantum chemistry simulations (Collaboration with IBM).

Rensselaer Polytechnic Institute - Troy, NY — 2023 – 2024
Teaching assistant for the following courses:

- MATH 1020: Calculus II
- MATH 2010: Multivariable Calculus and Matrix Algebra
- MATH 6800: Computational Linear Algebra (Graduate level)

Publications

- C. D. M. Mudiyanselage, F. M. Faulstich, and K. Li. *Investigating the robustness of the fixed-point iteration in local-correlation Coupled-Cluster algorithms.* Department of Mathematical Sciences, Rensselaer Polytechnic Institute. (**Manuscript in Preparation**)
- Dilshan, M. M. C., and Perera, A. A. I. *Radio Mean Number of Pendant Graphs.* North American Academic Research (NAAR 2023).
- Dilshan, M. M. C., and Perera, A. A. I. *Chromatic Number Based on Incidence Colouring for Ladder Graph Family.* International Conference on Business Innovation – Mathematics Section (ICOBI 2023).
- Dilshan, M. M. C., and Perera, A. A. I. *Radio Mean Number of Pendant Graphs for Even Cycles with Odd Diameter.* Faculty Annual Research Session (FARS 2022).
- Dilshan, M. M. C., and Perera, A. A. I. *Radio Mean Number for Pendant Graphs.* Science Undergraduate Research Symposium (SURS 2022).

- Dilshan, M. M. C., and Perera, A. A. I. *Radio Mean Number of Pendant Graphs for Odd Diameter.* International Conference on Applied Sciences (ICAPS).
- Dilshan, M. M. C., Kapuhennayaka, S., and Perera, A. A. I. *Odd Harmonies Labelling for Ladder Graphs.* International Conference on Mathematics and Mathematics Education (ICMME 2023).
- Dilshan, M. M. C., and Perera, A. A. I. *Incidence Coloring of Star Graphs.* International Conference on Mathematics and Mathematics Education (ICMME 2023).
- Dilshan, M. M. C., and Perera, A. A. I. *Graph Labeling and Harmonies: Odd and Even Labeling of Star Graphs.* Peradeniya University International Research Sessions (iPURSE 2023).
- Dilshan, M. M. C., and Perera, A. A. I. *Chromatic Number Based on Incidence Coloring for Cycles.* Annual Research Session (ARS 2023).
- Dilshan, M. M. C., and Perera, A. A. I. *Parity Constraints in Graph Labelings: Investigating the Incompatibility of Odd Harmonies in Graphs with Odd Loops.*Faculty Annual Research Session (FARS 2023).

Leadership and Service Activities

- Founding Chair – Math Frontier Seminar,Department of Mathematical Sciences, RPI 2025 – Present
- Graduate Representative – Society for Industrial & Applied Mathematics (SIAM), RPI Fall 2025

Awards

Founders Award of Excellence Fall 2025

- Rensselaer's highest student honor recognizing exceptional academic achievement, leadership, creativity, and community responsibility (awarded to top 1% of students).

Relevant Coursework

Department of Mathematical Sciences, Physics, and Computer Science, Rensselaer Polytechnic Institute.

- Math 6800: Computational Linear Algebra
- Math 6890: Mathematical Foundations of Modern Quantum Many-body Theory
- Math 6820: Numerical Solution of ODEs
- Math 6620: Perturbation Methods
- Matp 6610: Computational Optimization
- Matp 6600: Introduction to Optimization
- Phys 6510: Quantum Mechanics I
- CSCI 1200: Data Structures

Skills and Languages

- **Languages:** Sinhala (native), English (fluent), Tamil (intermediate).
- **Software/Tools:** PySCF, PwSCF, Psi4, Git, OpenMP, MPI, and Qiskit (IBM).
- **Programming:** Proficient in C++, Julia, Python, MATLAB, HTML, CSS, JavaScript.