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Summary

Mathematics researcher and educator with graduate-level teaching experience and research in combinatorics, discrete dynamical systems, algebraic/combinatorial structures, cryptography, and graph theory. Published work on Collatz-driven cryptography and symmetric encryption using snake graphs and supermagic covering. Experienced in using Python for computational experiments, visualization, and conjecture testing.

Education and Training

Clemson University

Clemson, SC, USA

Master of Science in Mathematical Sciences (Combinatorics focus) December 2025

GPA: 3.57/4.00. 18 graduate-level courses.

Relevant coursework: abstract algebra, combinatorics, graph theory, dynamical systems, optimization, cryptography, and scientific computing.

University of Peradeniya

Peradeniya, Sri Lanka

Bachelor of Science (Hons) in Mathematics

September 2022

Major in Mathematics (Pure and Applied), Minor in Physics.

Math GPA: 3.77/4.0, Overall GPA: 3.66/4.0. 4-year degree.

G.C.E. Advanced Level (Physical Science)

Sri Lanka

Mathematics A, Physics B, Chemistry C

December 2016

IELTS Academic in 2022

Overall 7.0 (Reading 8.0, Writing 6.5, Listening 7.0, Speaking 6.5).

Research Interests

Algebraic and combinatorial structures in discrete dynamical systems; orbit structure and permutation actions; labeled configurations; enumerative combinatorics; graph theory; cryptography; number theory; computational conjecture testing.

Publications

R. Ranasinghe and **V. Bandara**, “Collatz conjecture–driven cryptographic framework,” *Journal of Discrete Mathematical Sciences & Cryptography*, vol. 29, no. 7, pp. 2621–2640, 2026. [doi:10.47974/JDMSC-2232](https://doi.org/10.47974/JDMSC-2232).

P. G. R. S. Ranasinghe, **R. M. V. V. Bandara**, and A. M. S. L. K. Athapaththu, “Symmetric encryption using snake graphs and supermagic covering,” *Journal of the National Science Foundation of Sri Lanka*, vol. 52, no. 4, pp. 435–440, 2024. [doi:10.4038/jnsfsr.v52i4.12196](https://doi.org/10.4038/jnsfsr.v52i4.12196).

V. Bandara and S. Poznanović, “[Bulgarian Solitaire with distinguishable cells](#),” manuscript in preparation.

V. Bandara and R. Ranasinghe, “Novel Cryptographic Scheme Based on the Collatz Conjecture,” *RESCON Research Conference*, 2022.

Research

Research Project in Combinatorics, Clemson University Clemson, SC
[Read the complete master’s project \(PDF\)](#).

- Investigated generalizations of Bulgarian solitaire with Dr. Svetlana Poznanović.
- Used Python to visualize orbits and identified the phenomenon that a configuration can return to its original shape before individual cards return to their original positions.
- Developed a coloring algorithm on Ferrers diagrams connecting labeled-cell movement to permutation cycles and orbit sizes.
- Preparing manuscript [Bulgarian Solitaire with distinguishable cells](#) for publication.

Final-Year Research Project, University of Peradeniya Peradeniya, Sri Lanka

- Studied relationships among Collatz sequences with Dr. Rajitha Ranasinghe.
- Implemented a proposed cryptographic scheme based on Collatz sequence behavior using Python.
- Resulted in the publication “Collatz conjecture–driven cryptographic framework.”

Undergraduate Research Projects, University of Peradeniya Peradeniya, Sri Lanka

- **Cryptographic Scheme Based on Graph Theory** (Oct 2022 – 2023): Studied supermagic labeling on wheel graphs with snake vertex labeling for cryptographic applications. Resulted in the publication “Symmetric encryption using snake graphs and supermagic covering” with P. G. R. S. Ranasinghe and A. M. S. L. K. Athapaththu (2024).
- **Constructive Approach on the Collatz Conjecture** (Jun 2021 – 2023): Constructed a novel structure consisting of Collatz sequences; investigated why Collatz sequences do not become periodic; showed the constructed structure contains all odd positive integers.
- **Novel Cryptographic Scheme Based on the Collatz Conjecture** (Jun 2021 – 2023): Developed a chaos-based symmetric encryption/decryption algorithm; resulted in publication at RESCON 2022.

Experience

Graduate Teacher Of Record, Clemson University Clemson, SC
January 2025 – Current
MATH1020 – Business Calculus

Graduate Teaching Assistant, Clemson University Clemson, SC
August 2023 – December 2024
MATH 1040 - Precalculus , MATH 1080 - Calculus, MATH 2080 - PDE,
MATH 3110 - Linear Algebra

Teaching Assistant, University of Peradeniya Peradeniya, Sri Lanka
September 2022 – April 2023

Venue Coordinator/Presenter, SURS Science Undergraduate Research
Symposium 2022

Academic Coordinator/Presenter, RESCON Research Conference 2022

Skills

Programming

Proficient in: Python (computational experiments, visualization,
cryptographic implementation), $\text{\LaTeX}$.
Familiar with: RStudio, Matlab, Julia, Gurobi.

Languages

English, Sinhala.

References

Dr. P. G. R. S. Ranasinghe, Head of the Department and Senior Lecturer,
Department of Mathematics, University of Peradeniya, Sri Lanka.
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Dr. Svetlana Poznanović, Professor and Associate Director for
Mathematics, School of Mathematical and Statistical Sciences, Clemson
University, SC 29634, USA.
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