

Kalpa Thudewaththage

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[Academic website](#)

Education

Southern Illinois University, Carbondale, IL, USA

Ph.D. in Mathematics, July 2021

Dissertation: Classification of Left Eigenvalues of Octonionic Hermitian Matrices.

- **Research interests:** Algebraic geometry and Topology. Mainly interested in Clifford algebras and applications of quaternions and octonions in Engineering, Computer Science, and Quantum Physics.

Southern Illinois University, Carbondale, IL, USA

M.S. in Mathematics, August 2017

Thesis: Octonions and Rotations.

University of Peradeniya, Sri Lanka

B.S. Special Degree in Mathematics, January 2013

Minor: Computer Science and Physics

Final Project: Optimality Condition for Approximate Minima in Minimax Problems.

Academic Positions

I have more than 12 years of University/College level teaching experience, both in-person and online, since 2013.

Department of Mathematics, Widener University, Chester, PA

Assistant Teaching Professor, August 2021 – Present

- Teach undergraduate mathematics courses: Mathematical Statistics, Concepts of Probability, ODE, Business Statistics, Discrete Mathematics and Calculus.
- Prepare course syllabi, lesson plans, and evaluate students' work through assignments, quizzes, and tests.
- Mentor students and support individual academic needs.
- Experienced in inclusive pedagogy, mentoring, and community engagement.
- Skilled in working with a diverse range of faculty, staff, and students to maintain an inclusive working environment.
- Proficient in learning management systems: Canvas, Pearson's MyLab, WeBWork, MyOpenMath and Banner for course management, content delivery, and online assessments.

Department of Mathematics, Southern Illinois University, Carbondale, IL

Graduate Teaching Assistant, August 2015 – July 2021

- Taught students from diverse academic backgrounds, including engineering, business, management, physics, chemistry, and mathematics for liberal arts.
- Prepared and graded tests, quizzes, and assignments, including 300- and 400-level classes.
- Provided individual tutoring and teaching interventions; maintained online grade book and course materials using D2L, Pearson's MyLab, and Banner.
- Actively engaged in departmental and university activities, seminars, and workshops.

- Facilitated collaborative and interactive learning in the classroom, including group work and math lab instruction.

Department of Mathematics, University of Peradeniya, Sri Lanka

- **Temporary Instructor, Faculty of Engineering**, August 2014 – July 2015
Conducted classroom teaching, seminars, quizzes, and tests.
- **Temporary Lecturer, Faculty of Science**, February 2014 – August 2014
Taught classes, prepared and graded assignments, quizzes, and tests.
- **Demonstrator/Tutor, Faculty of Science**, February 2013 – February 2014
Conducted tutorial classes and graded assignments.

Courses Taught

Widener University, Chester, PA, USA

- Math 241: Calculus III
- Math 273: Introduction to Probability
- Math 152: Discrete Mathematics II
- Math 151: Discrete Mathematics I
- Math 119: Elementary Statistics for Business Major
- Math 114: Concepts of Probability and Statistics
- Math 373: Mathematical Statistics
- Math 131: Calculus Review
- Math 141: Calculus I
- Math 242: Differential Equations
- Math 120: Precalculus
- Math 117: Elementary Functions

Southern Illinois University, Carbondale, IL, USA

- MATH 125: Technical Mathematics with Applications
- MATH 111: Precalculus
- MATH 108: College Algebra
- MATH 282: Introduction to Statistics
- MATH 139: Finite Mathematics
- MATH 140: Short Course in Calculus
- MATH 101: Introduction to Contemporary Mathematics

University of Peradeniya, Kandy, Sri Lanka

- MATH 104: Linear Algebra for Engineering Majors
- MATH 103: Engineering Mathematics
- MATH 105: Real Analysis
- MATH 303: Differential Geometry
- MATH 405: Functional Analysis
- MATH 209: Graph Theory

Technical Skills

- Developed a Python package for algebra in Octonions.
- Programming and software: Python, R, C/C++, SQL, MATLAB, Mathematica, Maple, Octave, Minitab, Java.
- Learning management and assessment platforms: Canvas, D2L (Brightspace), Pearson MyLab, WebAssign, WeBWorK, MyOpenMath, Banner, Gradescope, McGraw-Hill Connect.
- Typesetting and publishing: \LaTeX (Overleaf, TeXShop, MiKTeX).
- Online teaching and collaboration: Zoom, Microsoft Teams, Google Workspace.

Services and Academic Citizenship

Committee Service and Mentorship

- Faculty Council, College of Arts & Sciences Committee representative for Student Learning and Assessment, Widener University, 2025–Present.
- Math Representative, Science Division Curriculum and Planning Committee, Widener University (2025–2026)
- Science Division representative, A&S DEI Committee, Widener University, 2024–Present.
- Member, Search Committee for Tenure-Track Assistant Professor, Department of Mathematics, Widener University, Spring 2025.
- Teaching Track representative, Science Division, A&S Committee on Promotion, Tenure, and Academic Freedom, 2023–2025.
- Faculty mentor, Peer Learning Assistant (PLA) Program, Widener University, 2023–Present.

Judging and Outreach

- Judge, SURCA Symposium, Widener University, 2021–Present.
- Resource person, MaPP (Mathematical Puzzle Program), Widener University, Spring 2023.
- Widener Day – Welcome Prospective Undergraduate Students, 2021–Present.
- Judge, Annual IJAS Region Science Fair, Southern Illinois University Carbondale, 2016–2021.
- Organizer, Math Field Day for regional high school students in Southern Illinois, 2016–2021.
- Organizer and presenter, AMS Chapter weekly meetings and Integration Bee competitions, Southern Illinois University, 2016–2021.

- Resource person, Science Resource Center, University of Peradeniya, Sri Lanka, 2012–2013.

Professional Memberships

- SIU Alumni Association, 2021–Present.
- American Mathematical Society, 2015–Present.
- Mathematical Association of America, 2015–Present.
- Graduate Assistant United, Southern Illinois University, 2015–2021.
- Secretary, Sri Lankan Students' Association, Southern Illinois University, 2018–2019.
- University of Peradeniya Alumni Association, 2013–Present.
- Captain, University of Peradeniya Cricket Team, 2009–2012.
- Member, University of Peradeniya Debate Team, 2008–2012.

Awards and Conference Talks

Awards

- Outstanding Ph.D. Teaching Assistant Award, Southern Illinois University Carbondale, April 7, 2019. The most prestigious Ph.D. graduate teaching assistant award administered by the Department of Mathematics at SIUC.

Conference Talks

- Florida Council of Teachers of Mathematics Conference (FCTM), Orlando, FL, June 12, 2025.
- MAA MathFest, Indianapolis, IN, August 9, 2024. Talk on Octonionic Quadratic Equations.
- American Mathematical Society, University at Buffalo, Buffalo, NY, September 9, 2023. Talk on Classification of Left Eigenvalues of Octonionic Hermitian Matrices (Published in conference proceedings).
- AMS Southeastern Sectional Meeting (#1181), University of Tennessee at Chattanooga, Chattanooga, TN, October 15, 2022. Talk on Octonions and rotations (Published in conference proceedings).
- AMS Western Sectional Meeting (#1153), University of California, Riverside, Riverside, CA, November 9, 2019.
- Annual Meeting of the Illinois Section of the MAA, Southern Illinois University, Carbondale, IL, March 29-30, 2019.

Research and Publications

Peer-Reviewed / Academic Works

1. Thudewaththage, K. (2021). *Classification of left eigenvalues of octonionic Hermitian matrices* (Ph.D. dissertation). Southern Illinois University, Carbondale, IL. Published at OpenSIU.
2. Thudewaththage, K. (2020). *Python code for solving quaternionic quadratic equations*. Published at OpenSIU.
3. Thudewaththage, K. (2020). *Octonionic quadratic equations*. arXiv:2012.15746.
4. Thudewaththage, K. (2017). *Octonions and rotations* (M.S. thesis). Southern Illinois University, Carbondale, IL. Published at OpenSIU.

Software Contributions

1. Thudewaththage, K. (2020). *pyoctonion: A Python library for octonions* [Python library]. PyPI. <https://pypi.org/project/pyoctonion>

Conference Proceedings

1. Thudewaththage, K. (2025, June 12), STEMulating Math: Teaching outside the Box, Florida Council of Teachers of Mathematics Conference (FCTM), Orlando, FL.
2. Thudewaththage, K.(2024, August 9), Octonionic Quadratic Equations and Its Applications, MAA MathFest, Indianapolis, IN.
3. Thudewaththage, K. (2023, September 9). Classification of left eigenvalues of octonionic Hermitian matrices. Talk presented at the American Mathematical Society Meeting, University at Buffalo, Buffalo, NY. Published in conference proceedings.
4. Thudewaththage, K. (2022, August 6). Octonions and rotations. Talk presented at the AMS Southeastern Sectional Meeting (#1181), University of Tennessee at Chattanooga, Chattanooga, TN. Published in conference proceedings.

Ongoing Research

- Thudewaththage, K. (in progress). Octonionic Möbius transformations.
- Thudewaththage, K. (in progress). Quaternionic differential equations.
- Thudewaththage, K. (in progress). Cayley-Hamilton theorem for octonionic Hermitian matrices.