Aasaimani Thamizhazhagan

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Academic Position(s)

Pondicherry University • Kalapet, Pondicherry, India — Oct 2024 – Present
Guest Faculty • *Department of Mathematics*

University of Waterloo • Waterloo, ON, Canada — Sept 2022 – May 2024
Postdoctoral Fellow and Sessional Instructor • *Department of Pure Mathematics*
Worked with: Dr. Nico Spronk, Dr. Brian E. Forrest

Conestoga College • Kitchener, ON, Canada — August 2023 – Jan 2024
Part-time Faculty • School of Business

University of Winnipeg and University of Manitoba • Winnipeg, MB, Canada — Sept 2021 – Aug 2022
Postdoctoral Fellow and Contract Academic Staff • *Department of Mathematics and Statistics*
Worked with : Dr. Ross Stokke, Dr. Matthew Wiersma, Dr. Yong Zhang, Dr. Fereidoun Ghahramani

Education

University of Waterloo • Waterloo, ON, Canada — September 2016 – August 2021
Doctor of Philosophy • *Pure Mathematics*
Thesis - On the structure of invertible elements in certain Fourier-Stieltjes algebras
Advisors: Dr. Nico Spronk, Dr. Brian E. Forrest

National Institute of Science Education and Research (NISER) • Odisha, India — July 2011 – May 2016
Integrated Masters of Science • *Mathematics*
Thesis - Fourier algebras, amenability and its relations with representation theory
Advisor: Dr. Varadharajan Muruganandam

Teaching and Research Interests

Teaching: Mathematical proofs, single- and multi-variable calculus, linear algebra, real analysis, complex analysis, functional analysis, measure theory and Lebesgue integration, harmonic analysis, topology, and group theory.
Research:*Functional analysis and its intersection with group theory.*
Non-commutative harmonic analysis, representation theory of locally compact groups

Publications

1. (with Brian E. Forrest and John Sawatzky) *Arens regularity of ideals in $A(G)$, $A_{cb}(G)$ and $A_M(G)$*, J. Iran. Math. Soc. **4** (2023), no. 1, 5–25. MR 4614855 arXiv:2302.05699
2. (with Brian E. Forrest and John Sawatzky) *Invariant subspaces in the dual of $A_{cb}(G)$ and $A_M(G)$*, Ann. Math. Sci. Appl. **8** (2023), no.2, 239—267. MR 4626916. arXiv:2304.06195
3. On the structure of invertible elements in certain Fourier-Stieltjes algebras. *Studia Mathematica*, **257** (2021), no. 3, 347–360. MR 4201439
4. (with Brian E. Forrest and John Sawatzky) *Semisimplicity of the second dual of $A_{cb}(G)$ and $A_M(G)$ and weak-amenability of certain ideals in them*- In Preparation.
5. (with Nico Spronk and Ross Stokke) *On the structure of homomorphisms between certain Fourier-Stieltjes algebras*- In Preparation
6. (with Nico Spronk and Aleksa Vujičić) *Local Fell Groups* - In Preparation.

Teaching Experience

Instructor, BTMT 171: Mathematics I for engineers (2 Classes: ECE + (CSE+ENE) = 123 students) — Sep '25 - Dec '25
Pondicherry University, Ramanujam School of Mathematical Sciences

Instructor, BTMT 172: Mathematics II for engineers (2 Classes: ECE + CS = 90 students) — Feb '25 - May '25
Pondicherry University, Ramanujam School of Mathematical Sciences

- Coordinated with another instructor regularly to build exams and align the course flow for 5 engineering cohorts
- Delivered original in-person 4 hours of weekly lectures for each class
- Following up on Mathematics I, this course covers partial differential equations, Laplace transform, its inverse transform, Fourier transform, and Fourier series with emphasis on its relevance to engineering.
- Their grades were based on two mid-term exams, three assignments, and a final exam.

Instructor, BTMT 171: Mathematics I for engineers (2 Classes: ECE + CS = 90 students) — Nov '24 - Feb '25
Pondicherry University, Ramanujam School of Mathematical Sciences

- Coordinated with another instructor regularly to build exams and align the course flow for 5 engineering cohorts
- Delivered original in-person 4 hours of weekly lectures for each class
- Tightly packed course covering linear algebra, ordinary differential equations, and multi-variable calculus, including integral theorems.

- Their grades were based on two mid-term exams, two assignments, and a final exam.

Sole Instructor, ECE 206/MATH 212: Advanced Calculus 2 for Electrical Engineers (33 students) Fall 2023
University of Waterloo, Faculty of Mathematics

- Delivered original in-person 2.5 hours of weekly lectures
- Provided course notes supplementary to online Mobius lessons with weekly Mobius assignments and maintained active participation in an online study discussion platform called Piazza
- Being a densely packed course of vector calculus and complex analysis, I had often gladly extended my listed two hours of weekly office hours as per the volume of students.
- Guided the TA to conduct effective weekly tutorials with a two-way feedback mechanism
- Used Crowdmark for grading assessments (quizzes, mid-term, and final) and Odyssey for seating

Instructor, MATH 71775: Business Math (20 students) Fall 2023
Conestoga College, School of Business

- Delivered an original in-person, 3-hour weekly lecture (with two short breaks) for one of the four sections of this coordinated course
- Provided (prepared) weekly lecture webpages at least three days before the lecture that are filled with Javascript-aided class participation activities. These are done in the class in manner that align with a BOPPPS lesson plan.
- Effectively maintained eConestoga(Conestoga's Learning Management System) course shell using various tools such as Intelligent Agents, Progress snapshot, and Instructional Plan dynamic builder for student's academic success
- Used Lyryx for assignments and quizzes

Instructor, Math 137: Calculus I for Honours Math (58 students) Fall 2022
University of Waterloo, Faculty of Mathematics

- Instructed one of twelve sections and delivered original in-person 2.5 hours of weekly lectures
- Maintained course notes complementary to the course book that explain the subtlety and proofs that were not in the course book emphasizing the historical evolution of certain proof common techniques.
- Lengthy office hours were kept every week to help struggling mathematics students catch up on the conceptual details, and highly perceptive students were motivated further to see connections between the concepts
- Regularly participated in Piazza and I led them on several lingering follow-up questions to work them through organically.

Sole Instructor, Math 4101 : Complex Analysis(5 students) Winter 2022
University of Winnipeg, Department of Mathematics and Statistics

- Delivered original 2.5 hours of lectures per week
- This was a hybrid mode class. The first half of the term was completely online, and the rest was live-streamed in-person delivery
- Tailored the course delivery a lot to accommodate the students from various levels of mathematical background and encouraged mathematical enthusiasm in a comfortable learning environment
- Lengthy office hours were kept weekly to help early-level mathematics students catch up on the conceptual details, and higher-level students were motivated further to see connections between the fields.
- Used Crowdmark for assignments and assessments.

Instructor, Math 1301 : Applied mathematics for Business and Administration(49 Students) Fall 2021
University of Winnipeg, Department of Mathematics and Statistics

- Coordinated with another instructor regularly to build exams and align the course flow as mine was in-person and the other was online
- Delivered original two 75 minutes lectures in-person per week for business majors
- Developed a base of examples particular to Canadian audiences using existing financial schemes
- Created hand-written lecture notes and assignments on WebAssign posted right after each lecture
- Held three hours of office hours every week to help with the lessons, assignments, and practice problems

Instructor Math 116: Calculus for Engineering for management engineers(85 students) Fall 2019
University of Waterloo,Faculty of Mathematics

- Instructed one of nine sections in this coordinated course and delivered original 2.5 hours of lectures in person per week
- Coordinated with other instructors to build exams and weekly assignments and supervised the grading for finals
- Created hand-written lecture notes featuring worked examples, exercise problems, and (often not found in relevant textbooks) conceptual explanations
- Held intensive office hours enabling one-on-one attention to help students develop conceptual understanding of the subjects and better presentation skills

Graduate Teaching Assistant Fall 2016 – August 2021
University of Waterloo, Department of Pure Mathematics

- Led interactive tutorials, quizzes, graded assignments, and exams for undergraduate math courses (Calculus, Linear algebra) for students ranging from engineering to math
- Graded assignments (online/physical) and exams, held office hours (online/physical) for upper-year undergraduate pure math courses (real analysis, Lebesgue measure, and Fourier analysis, measure theory and integration, complex analysis) to encourage students to improve proof-writing skills

- Provided extensive written feedback for students enrolled in the online *Masters of Mathematics for Teacher* (MMT) program taking number theory, proof-writing and calculus and facilitated as an experiential learning assistant in their online study groups
- Offered weekly one-on-one and group tutorial sessions in the math faculty's Tutorial Centre to help students develop a conceptual understanding of the subjects

Professional/Academic Development

Graduate Student Instructor Training Seminar Winter 2019
University of Waterloo, Faculty of Mathematics

- Participated in interactive workshops on math teaching by offering and receiving feedback on lesson plans and course materials
- Attended presentations to improve lesson planning, assessment design, student motivation, and lecture delivery for math-specific courses
- Designed three mini-lectures on real analysis and visited several classroom teachings

Understanding Outcomes-Based Education (OBE) and Curriculum Micro-credential Aug 20 - Sep 3, 2023
Conestoga College,Teaching and Learning Department

- Participated in 2 hours of synchronous online workshops and 4 hours of asynchronous activities exploring Outcomes-Based Education (OBE), Learning Outcomes, and Course Outlines
- Discussed OBE characteristics: backward conceptualization, student-centered approach, results-oriented outcomes, and measurability.
- Conducted a course outline quality audit - aligned program learning outcomes with course learning outcomes (CLOs) and analyzed CLO elements: stem, verb, context, and criterion, using Bloom's taxonomy.
- Reviewed the evaluation structure for measurable aspects of CLOs

Active Learning Leading to Assessment Micro-credential Sep 4 – 17, 2023
Conestoga College,Teaching and Learning Department

- Engaged in 4 hours of synchronous online workshops and 2 hours of asynchronous activities covering active learning, lesson planning, classroom management, and assessment in diverse learning environments.
- Explored teaching frameworks: didactic triangle, Schema theory, BOPPPS lesson planning, and zone of proximal development.
- Discussed intercultural sensitivity strategies for creating an inclusive learning experience.
- Examined assessment concepts, academic integrity, and student accommodations. Emphasized the advantages of utilizing rubrics, marking schemes, and checklists for evaluations.
- Addressed challenges in classroom management through group discussions.

Conestoga's LMS and Technologies for Teaching Micro-credential Aug 20 - Sep 10, 2023
Conestoga College,Teaching and Learning Department

- When teaching at Conestoga, all courses are set up in eConestoga (the college's Learning Management System) and are required to have a set of essential elements. In this course, we learned how to set up our course and grades. We were introduced to other features within eConestoga that are available to support teaching including communication and assessment.

Learning Seminars Fall 2016 – present
University of Waterloo, Department of Pure Mathematics

- Organized and contributed talks in learning seminars on Fourier-Stieltjes algebra and measure algebras
- Attended and contributed talks in several learning seminars, some of them were/are C^*-algebras and Finite Dimensional Approximations, Stationary characters on lattices of semisimple Lie groups, Rigid C^* tensor categories, Fourier-Stieltjes algebra of such categories, and harmonic analysis learning seminar on Poisson-Furstenberg boundary, Figa-Talamanca Herz algebras.
- Regularly participated in departmental analysis seminars, graduate colloquium, and graduate seminar.
- Advised Undergraduate Student Research Assistant students on their projects.
- Virtual seminars: Groups, Operators, and Banach Algebras Webinar, UK Virtual Operator Algebras Seminar, 2TART Seminar series and Conference

Awards and Honours

Received at University of Waterloo, Waterloo, ON, Canada

- International Doctoral Student Award Fall 2016 – Spring 2020
- Susan and Janoes Aczel Graduate Scholarship Winter 2018 – 2020 and Fall 2018

Received at National Institute of Science Education and Research, Odisha, India

- INSPIRE Fellowship July 2011 – May 2016
- Summer Research Fellowship, Indian Academy of Sciences, Bangalore, India Summer 2013
- Cleared CSIR-UGC-NET for JRF with rank 33 June 2016

Talks

Invited:

- "Invariant subspaces in the Dual of $A_{cb}(G)$ and $A_M(G)$",
  CAHAS 2023, University of St. Boniface — June 15–16, 2023
- "On the structure of invertible elements in certain Fourier-Stieltjes Algebra",
  National Seminar on Algebra and Graph Theory, Pondicherry University — Feb 22, 2025
  Canadian Abstract Harmonic Analysis Symposium,Banff International Research Station — June 17 – 19, 2022
  Department Seminar Series,University of Winnipeg — September 24, 2021
  Groups, Operators, and Banach Algebras Webinar,Online — August 18, 2020
  Virtual Math Fest,Institute of Mathematical Sciences, Chennai (Online) — July 24, 2020
  Banach Algebras and Applications,University of Manitoba — July 18, 2019
- "On the interplay of harmonic analysis, combinatorics, additive number theory, and ergodic theory",
  Joint PM/CO Grad Colloquium, University of Waterloo — December 3, 2020
- "Uncertainty principles and Fourier analysis",
  Grad Student Colloquium, University of Waterloo — November 27, 2018

Presentations:

- "On the structure of invertible elements in certain Fourier-Stieltjes Algebra",
  Analysis Seminar in Pure Mathematics, University of Waterloo — September 18, 2019
  Grad Seminar in Pure Mathematics,University of Waterloo — May 15, 2019
- "Analytic discs in the maximal ideal space of H^∞",
  Grad course talks on Hardy spaces, University of Waterloo — December, 2017
- "Perturbations of approximately finite-dimensional C^*-algebras",
  Grad course talks on K-theory of C^*-algebras, University of Waterloo — April, 2017
- "Amenability and its relation with representation theory",
  Term Presentation, National Institute of Science Education and Research — December, 2015
- "Sharkovsky's Theorem",
  Term Presentation, National Institute of Science Education and Research — April, 2015

Conferences/Workshops/Seminars Participation

- National Workshop on Python for Scientific Computing and Applications (PSCA-2025)
  Maulana Azad National Institute of Technology (MANIT), Bhopal (Online) — June 16–20, 2025
- National Seminar on Algebra and Graph Theory, Pondicherry University, Puducherry — Feb 19–22, 2025
- Canadian Abstract Harmonic Analysis Symposium(CAHAS), University of St. Boniface, Winnipeg — June 15–16, 2023
- A Celebration of Great Math Education Initiatives, FYMSiC Online Meet Up — Feb 28, 2023
- Canadian Abstract Harmonic Analysis Symposium(CAHAS) 2020, BIRS, Banff — June 17–19, 2022
- Virtual Math Fest, Institute of Mathematical Sciences, Chennai (Online) — July 20–26, 2020
- Canadian Operator Symposium (COSy), Fields Institute, Online — May 25–29, 2020
- Banach Algebras and Applications, University of Manitoba, Winnepeg — July 11–18, 2019
- Canadian Abstract Harmonic Analysis Symposium(CAHAS), Carleton University, Ottawa — May 31–June 2, 2018
- Canadian Abstract Harmonic Analysis Symposium(CAHAS), University of Manitoba, Winnepeg — May 23–25, 2017
- Canadian Operator Symposium(COSy), Lakehead University, Thunder Bay — May 29–June 2, 2017
- Workshop on Fourier and signal analysis by G. B. Folland, NISER, Bhubaneswar — December 2015

Technical Skills

- Programming languages: C++, Shell, Gnuplot.
- Efficient typesetting with LaTeX, Microsoft Office Suite, D2L
- Languages: Tamil (Native), English and Hindi (Fluent), Odia, Spanish and French (Basic)

Extra Curricular Activities

- Attended UWaterloo Gamelan Ensemble courses. Performed several pieces (Gilak, Penarik Becak, Sekar Jepun, Puspa Mekar) at the Humanities Theatre - University of Waterloo, Canadian Mathematical Society 2019 Winter Meeting Inaguration - Chelsea Hotel Toronto, Engineering International Fair - University of Waterloo
- Trekking, Hiking. Successfully completed 6-day SAR Pass trek, Parvati Valley, Kullu, Himachal Pradesh.