Akshat Tarun Das

atdas@math.uh.edu | https://www.math.uh.edu/∼atdas/

Education

Ph.D. in Mathematics (in progress); Advisor: Dr. Alan Haynes 2017 – Present
University of Houston *Houston, TX*

M.Sc. Mathematics 2015 – 2017
St. Stephen's College, University of Delhi *Delhi, India*

B.Sc.(Hons.) Mathematics 2012 – 2015
The Maharaja Sayajirao University of Baroda *Vadodara, India*

Research Interest

Number Theory, Ergodic Theory, Dynamical Systems

Research Publications

- A Three Gap Theorem for the Adeles (with A. Haynes), submitted (arxiv: 2107.05147)

- Bounded Remainder Sets for Rotations on Higher Dimensional Adelic Tori (with A. Haynes, J. Furno), Mosc. J. Comb. Number Theory, Vol. 10 (2021), No. 2, 111–120 (arxiv: 2002:04444)

Honors and Awards

AMS Grad Student Travel Grant Award 11/2021
American Mathematical Society

- Award in the amount of $\$1,300$
- For travel support to attend the Joint Mathematics Meeting, January $5 - 8, 2022$

Nominated twice for UH Graduate Teaching Assistant Award 2021, 2020
Department of Mathematics *Houston, TX*

- Unanimously nominated by the department awards committee
- For excellence in teaching and selected to represent the department for this university level award

Nominated for the M. Friedberg Fellowship Spring 2021
Department of Mathematics *Houston, TX*

M. Friedberg Fellowship Spring 2020
Department of Mathematics *Houston, TX*

- Awarded by the Graduate Studies Committee

- For achievements in research and teaching

Graduate Tuition Fellowship 2017–Present
Department of Mathematics *Houston, TX*

Teaching Assistantship 2017–Present
Department of Mathematics *Houston,TX*

Employment History

Graduate Research Assistant 2020 – 2021
Department of Mathematics, University of Houston *Houston, TX*

- Research Assistant for NSF grant 'Diophantine approximation and aperiodic order' under Principal Investigator Dr. Alan Haynes

Lead Teaching Assistant, MATH 1431/2413 (Calculus I) 2018 – 2022
Department of Mathematics, University of Houston *Houston, TX*

- Coordinating a team of 15+ Calculus I Teaching Assistants
- Serving as a liaison between the team of instructors and the team of TAs
- Helping with reviewing and designing homeworks and exams
- Helping with TA training which includes tasks such as holding sample labs to demonstrate teaching techniques along with various methods of handling different kinds of situations during labs
- Coordinating grading days. This involves handling the logistics of grading days like deciding the dates, room bookings and coordinating with the other TAs. It also includes making solution keys and coordinating with the instructors to decide the grading rubrics
- Making solution keys for homeworks and lab quizzes

Summer Scholars Academy (SSA) Teaching Assistant Summer '19, Summer '20
NSM, University of Houston *Houston, TX*

- SSA is a 9-week summer program designed for students with outstanding high school academic record
- Responsibilities included teaching daily labs and assisting with teaching the course

Graduate Teaching Assistant 2017 – Present
Department of Mathematics, University of Houston *Houston, TX*

- Teaching labs (i.e. supplementary sessions to lectures) with 50-60 students on an average for the past eight semesters. Responsibilities include holding labs, tutoring, grading and making lesson plans for the lab to help students learn to effectively solve problems based on the concepts taught in the course
- Graded for a variety of courses including Abstract Algebra, Probability and Statistics, and Introduction to Complex Analysis

Talks and Poster Presentations

Invited Talk, MWDS Early Career Conference 05/2022
Department of Mathematics, University of Notre Dame *Notre Dame, IN*

Speaker, Carolina Dynamics Symposium 2022 04/2022
Department of Mathematics, Furman University *Greenville, SC*

Short Talk, Workshop on Dynamical Systems and Related Topics 04/2022
Department of Mathematics, University of Maryland *C. Park, MD*

Invited Talk, Special Session on Dynamical Systems 03/2022
55th Spring Topology and Dynamical Systems Conference at Baylor University *Waco, TX*

Speaker, Colloquium 02/2022
Department of Mathematics, University of Texas at Tyler *Tyler, TX*

Speaker, New England Dynamics and Number Theory Seminar 02/2022
Webpage: NEDNT *Zoom*

Recorded Talk, Junior Mathematician Research Archive (JMRA) 11/2021
Webpage: JMRA

- A platform for junior researchers in pure mathematics to share their work
- Proposal accepted for the month of November 2021
- Links: Video on website and associated YouTube channel

Invited Talk, Special Session on Topological Dynamics and Its Applications 11/2021
Held virtually at the AMS Fall Southeastern Sectional Meeting *Zoom*

Short Talk, Workshop in Dynamical Systems and Related Topics 10/2021
Mathematics Department, Penn State University *U. Park, PA*

Speaker, Dynamical Systems Seminar 10/2021
Department of Mathematics, University of Houston *Houston, TX*

Speaker, Dynamical Systems Seminar 03/2020
Department of Mathematics, University of Houston *Houston, TX*

Poster Presentation, MWDS Early Career Conference 05/2019
Department of Mathematics, The Ohio State University *Columbus, OH*

Speaker, Graduate Student Paper Presentation 2019 04/2019
Department of Mathematics, University of Houston *Houston, TX*

Speaker, Dynamical Systems Seminar 03/2019
Department of Mathematics, University of Houston *Houston, TX*

Conference and Workshop visits

Ergodic geometry, number theory and Margulis legacy 06/2022
University of Chicago *Chicago, IL*

Ergodic Theory and its Connections 05/2022
Department of Mathematics, Rice University *Houston, TX*

Houston Workshop on Hyperbolic Dynamical Systems 05/2022
Department of Mathematics, University of Houston *Houston, TX*

Homogeneous Dynamics and Related Topics Exeter 05/2022
Held virtually *Zoom*

Workshop: Flexibility and Rigidity in dynamical systems 03/2022
Simons Center for Geometry and Physics, Stony Brook University *Stony Brook, NY*

- Invited to attend the Simons Center's Workshop: Flexibility and rigidity in dynamical systems from March $7 - 11, 2022$
- Awarded full support for travel and lodging

Midwest Dynamical Systems Conference 11/2021
Department of Mathematics, Northwestern University *Evanston, IL*

International Conference on Diophantine Analysis and Related Topics 06/2021
Held virtually *Zoom*

Workshop on Dynamical Systems and Related Topics (UMD) 04/2021
Held virtually *Zoom*

Midwest Dynamical Systems Early Career Conference 11/2020
Held virtually *Zoom*

Houston Workshop on Hyperbolic Dynamical Systems 05/2020
Canceled on March 17, 2020 due to the Covid-19 pandemic *Houston, TX*

Houston Summer School on Dynamical Systems 06/2019
Department of Mathematics, University of Houston *Houston, TX*

- Short courses completed:
  - *Basics of ergodic theory* by Joanna Furno and Alan Haynes - University of Houston
  - *Statistical properties in hyperbolic dynamics* by Matthew Nicol, William Ott and Andrew Torok - University of Houston
  - *Uniformly hyperbolic systems* by Vaughn Climenhaga - University of Houston
  - *Elements of Pesin Theory* by Jana Rodriguez Hertz - Southern University of Science and Technology, Shenzhen, China
  - *Introduction to Quantum walks* by Jake Fillman - Virginia Tech University

    - *Bratteli diagrams, flat surfaces and the hierarchical structure of minimal systems* by Rodrigo Trevino - University of Maryland

- Participated in discussion/problem solving sessions and read research papers as part of a project to further explore research interests

Workshop on Dynamical Systems and Related Topics 04/2019
Department of Mathematics, University of Maryland *College Park, MD*

3rd Annual Texas Women in Mathematics Symposium (TWIMS) 11/2018
Department of Mathematics, University of Houston *Houston, TX*

Dynamics reading seminar on Thermodynamic Formalism Fall'18 – Spring'19
Department of Mathematics, University of Houston *Houston, TX*

- Attended weekly course highlighting techniques in thermodynamic formalism
- Discussed material from *Lecture Notes on Thermodynamic Formalism for Topological Markov Shifts* prepared by Omri Sarig at Penn State University in Spring'09

Houston Summer School on Dynamical Systems 05/2018
Department of Mathematics, University of Houston *Houston, TX*

- Short courses completed:
    - *Basics of ergodic theory* by Joanna Furno and Alan Haynes - University of Houston
    - *Statistical properties in hyperbolic dynamics* by Matthew Nicol, William Ott and Andrew Torok - University of Houston
    - *Statistical mechanics and thermodynamic formalism* by Vaughn Climenhaga - University of Houston
    - *Dynamics of Quantum Spin Systems* by Anna Vershynina - University of Houston
    - *Dynamical approaches to the spectral theory of operators* by David Damanik - Rice University
    - *Dynamics on homogeneous spaces, with applications to number theory* by Seonhee Lim - Seoul National University
- Participated in discussion/problem solving sessions and read research papers as part of a project to further explore research interests

Midwest Dynamical Systems Conference 11/2017
Department of Mathematics, Northwestern University *Evanston, IL*

Teaching and Grading Experience

Graduate Teaching Assistant Fall 2017 – Present
Department of Mathematics, University of Houston *Houston, TX*

- *Summer 2022 (teaching in hybrid/hyflex mode)*:
    - Calculus I TA

- *Spring 2022 (teaching in hybrid/hyflex mode)*:
  - Calculus I lead TA
  - TA/grader for Survey of Undergraduate Mathematics
- *Fall 2021 (teaching in hybrid/hyflex mode)*:
  - Calculus I lead TA
  - TA/grader for Survey of Undergraduate Mathematics
- *Spring 2021 (taught online using MS Teams)*: Calculus I lead TA
- *Fall 2020 (taught online using MS Teams)*: Calculus I lead TA
- *Summer 2020 (taught online using MS Teams)*:
  - Instructional TA for Summer Scholars Academy 2020 (Calculus I)
  - TA/grader for Probability
- *Spring 2020 (partially taught online using MS Teams)*: Calculus I lead TA
- *Fall 2019*: Calculus I lead TA
- *Summer 2019*:
  - Instructional TA for Summer Scholars Academy 2019 (Calculus I)
  - Grader for Engineering Mathematics
  - Grader for Discrete Mathematics
  - Substitute instructor (one week) and Tutor for PreCalculus
- *Spring 2019*:
  - Calculus I lead TA
  - Substitute instructor (one week) and grader for Probability
- *Fall 2018*: Calculus I lead TA
- *Summer 2018*:
  - TA/grader for Abstract Algebra
  - TA/grader for Probability
  - Grader for Introduction to Complex Analysis
- *Spring 2018*:
  - Calculus I lab TA
  - Calculus I grader
- *Fall 2017*: Calculus I lab TA

Relevant Graduate Courses undertaken

During Ph.D. in Mathematics (in progress) 2017-Present
University of Houston *Houston, TX*

- Modern Algebra
- Functions of Real Variable
- Topology
- Riemannian Geometry
- Analysis on Topological Groups
- Functions of Complex Variable
- Probability and Statistics
- Ergodic Theory and Thermodynamic Formalism
- Dynamical Systems
- Analytic Number Theory
- Functional Analysis
- Algebraic Number Theory

During M.Sc. Mathematics 2015-2017
Department of Mathematics, University of Delhi *Delhi, India*

- Field Theory
- Differential Equations
- Module Theory
- Fluid Dynamics
- Algebraic Topology
- Fourier Analysis
- Coding Theory
- Simplicial Homology Theory
- Abstract Harmonic Analysis
- Optimization Techniques and Control Theory

Professional and Departmental Service

President, American Mathematical Society UH Student Chapter 2020 – Present
Department of Mathematics, University of Houston *Houston, TX*

- Coordinate with the faculty advisor and team of officers for organising events to accomplish the goals set for the academic year

- A few of the highlighted events hosted include: an orientation for the incoming graduate students every year to talk about various topics including what a tentative five year plan should look like, Graduate student paper presentation competition to give graduate students an opportunity to talk about their research, Pi Day celebrations, social events, etc
- Supervising and ensuring that everything is running smoothly as events are conceived, organised, and executed
- Issuing formal invitations to speakers from outside the department

Graduate Student Representative 2019 – Present
Department of Mathematics, University of Houston *Houston, TX*

- Serving as a liaison between the students and the Department Chair, Director of Graduate Studies and other members of the Graduate Student Committee
- Organising town halls to discuss any issues the graduate students have and then giving a report to graduate student Committee, with actionable ideas to resolve the issues
- Organising seminars and workshops for student enrichment

Vice-President, American Mathematical Society UH Student Chapter 2018 – 2020
Department of Mathematics, University of Houston *Houston, TX*

Secretary, American Mathematical Society UH Student Chapter 2017 – 2018
Department of Mathematics, University of Houston *Houston, TX*

Outreach and Volunteering Activities

Houston Workshop on Hyperbolic Dynamical Systems 05/2022
Department of Mathematics, University of Houston *Houston, TX*

- Helped out with various logistical details and overall organisation including setting up of all the material required by participants for undertaking projects

Grad School Panel 09/2021
Held virtually *Zoom*

- Organized by the UH chapter of the Association of Women in Mathematics (UH-AWM), in collaboration with the undergraduate mathematics club "Cougar Mathletics"
- Served as one of the graduate student panelists
- Aimed to help undergraduate students by answering questions they have about applying to graduate school, graduate school life, etc.

UH Math Contest January'21, '20, '19 and '18
Department of Mathematics, University of Houston *Houston, TX*

- Proofreading questions and answer keys of exams

- Invigilation during exams
- Grading of exams and finalising results
- Helping with overall organisation and logistics

Graduate Student Seminar - Department Technology Resources 10/2019
Department of Mathematics, University of Houston *Houston, TX*

- Gave a presentation about the various technological resources that the department provides
- Discussed TA grading, online class management, website design, and how to use the scientific computing servers

Houston Summer School on Dynamical Systems 06/2019 and 05/2018
Department of Mathematics, University of Houston *Houston, TX*

- Helped out with various logistical details and overall organisation including setting up of all the material required by participants for undertaking projects

2019 Chevron Girls Engineering: The Future STEM Day 03/2019
Cullen College of Engineering, University of Houston *Houston, TX*

- Volunteered on behalf of the AWM chapter of UH
- Performed activites such as making paper snowflakes, solving the Tower of Hanoi problem, etc., with participating school students and made an attempt to explain some of the mathematical concepts involved in these activities

Creating website called *Repository of Operator Algebra Resources* Summer'18
Department of Mathematics, University of Houston *Houston, TX*

- The purpose of the website was to provide a directory of operator algebraists around the world, as well as other resources like journal rankings, job opportunities, and information about conferences
- Helped with entering data for the directory and list of academic journals

References

- Dr. Alan Haynes
  Associate Professor, Department of Mathematics
  University of Houston, USA
  haynes@math.uh.edu

- Dr. Vaughn Climenhaga
  Associate Professor, Department of Mathematics
  University of Houston, USA
  climenha@math.uh.edu

- Dr. Jiwen He
  Department Chair and Professor, Department of Mathematics
  University of Houston, USA
  jhe4@central.uh.edu

- Dr. Joanna Furno
  Assistant Professor, Department of Mathematics and Statistics
  University of South Alabama, USA
  jfurno@southalabama.edu

- Dr. David Blecher
  Professor, Department of Mathematics
  University of Houston, USA
  dpbleche@central.uh.edu

- Ms. Irina Perepelitsa
  Director for Instructional Support and Coordination, Department of Mathematics
  University of Houston, USA
  iperepel@central.uh.edu