

# Akshat Tarun Das

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## EDUCATION

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<b>Ph.D. in Mathematics (in progress); Advisor: Dr. Alan Haynes</b> <i>University of Houston</i>	2017 – Present <i>Houston, TX</i>
<b>M.Sc. Mathematics</b> <i>St. Stephen's College, University of Delhi</i>	2015 – 2017 <i>Delhi, India</i>
<b>B.Sc.(Hons.) Mathematics</b> <i>The Maharaja Sayajirao University of Baroda</i>	2012 – 2015 <i>Vadodara, India</i>

## EMPLOYMENT HISTORY

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<b>Graduate Research Assistant</b> <i>Department of Mathematics, University of Houston</i>	2020 – 2021 <i>Houston, TX</i>
<ul style="list-style-type: none"><li>• Research Assistant for NSF grant ‘Diophantine approximation and aperiodic order’ under Principal Investigator Dr. Alan Haynes</li></ul>	
<b>Lead Teaching Assistant, MATH 1431/2413 (Calculus I)</b> <i>Department of Mathematics, University of Houston</i>	2018 – 2022 <i>Houston, TX</i>
<ul style="list-style-type: none"><li>• Coordinating a team of 15+ Calculus I Teaching Assistants</li><li>• Serving as a liaison between the team of instructors and the team of TAs</li><li>• Helping with reviewing and designing homeworks and exams</li><li>• 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</li><li>• 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</li><li>• Making solution keys for homeworks and lab quizzes</li></ul>	
<b>Summer Scholars Academy (SSA) Instructional TA</b> <i>NSM, University of Houston</i>	Summer '19, Summer '20 <i>Houston, TX</i>
<ul style="list-style-type: none"><li>• SSA is a 9-week summer program designed for students with outstanding high school academic record</li><li>• Responsibilities included teaching daily labs and assisting with teaching the course</li></ul>	
<b>Graduate Teaching Assistant</b> <i>Department of Mathematics, University of Houston</i>	2017 – Present <i>Houston, TX</i>

- 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

## HONORS AND AWARDS

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**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*

## TEACHING AND GRADING EXPERIENCE

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**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

## PROFESSIONAL AND DEPARTMENTAL SERVICE

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**President, American Mathematical Society UH Student Chapter**

*Department of Mathematics, University of Houston*

2020 – Present

*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*

## **RESEARCH INTEREST**

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Number Theory, Ergodic Theory, Dynamical Systems

## **RESEARCH PUBLICATIONS**

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- 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)

## **TALKS AND POSTER PRESENTATIONS**

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### **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

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**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**  
*Department of Mathematics, Northwestern University*

11/2017  
*Evanston, IL*

## RELEVANT GRADUATE COURSES UNDERTAKEN

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**During Ph.D. in Mathematics (in progress)**  
*University of Houston*

2017-Present  
*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**  
*Department of Mathematics, University of Delhi*

2015-2017  
*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

## OUTREACH AND VOLUNTEERING ACTIVITIES

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### **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 Mathematics"
- 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 activities 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

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- Dr. Alan Haynes  
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University of Houston, USA  
haynes@math.uh.edu
- Dr. Jiwen He  
Department Chair and Professor, Department of Mathematics  
University of Houston, USA  
jhe4@central.uh.edu
- Dr. David Blecher  
Professor, Department of Mathematics  
University of Houston, USA  
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- Ms. Irina Perepelitsa  
Director for Instructional Support and Coordination, Department of Mathematics  
University of Houston, USA  
iperepel@central.uh.edu
- Dr. Vaughn Climenhaga  
Associate Professor, Department of Mathematics  
University of Houston, USA  
climenha@math.uh.edu
- Dr. Joanna Furno  
Assistant Professor, Department of Mathematics and Statistics  
University of South Alabama, USA  
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