Swati

Curriculum Vitae

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Academic Job Profile:

Jan 2021 – Dec. 2025 **Ph.D. Mathematics** , *University of South Carolina (USC)*, Columbia, South Carolina.
Advisor: Dr. Matthew Boylan
Current GPA: 4.0 / 4.0
Passed Qualifying exams (Analysis - August 2021, Algebra - January 2022)
Passed Comprehensive Exams (February 2023)

June 12 – 23 June, 2023 **Rethinking Number Theory (RNT 4)**, *AIM Research Community*, 2023, Virtual.
Project: Dynamic Irreducibility

It is a research workshop wherein selected students work in groups along with project leaders. My assigned project involved investigating dynamical irreducibility over finite fields for families of polynomials of degree larger than 2. We were able to prove a specific family of polynomials to be stable. It is a work in progress.

Jan – April, 2021 **Arizona Winter Semester**, *AWS Number Theory*, 2021, Virtual.
Session 1: Modular Groups and Modular Forms
Session 2: p-adic numbers and quadratic forms

AWS 2021 was held in two, 6-week, online sessions. All the selected participants were required to attend two lecture series for each session, comprising of 6 lectures each (one per week), as well as accompanying problem sessions and moderated discussions.

Sep. 2020 – Dec. 2020 **Budapest Semesters in Mathematics (BSM)**, *Fall 2020 (Online)*, non-credit, Advanced Math Program.
Courses:

→ Real Functions and Measures (Measure Theory, Topology and Hilbert Spaces) Prof. Maga (Course Grade - **A**)
→ Complex Functions - Prof. Szilard (Course Grade - **A+**)

It's a semester-long, highly acclaimed study abroad program program that allows qualified math students to take advanced courses taught by BSM Professors in Hungary. Due to COVID-19, it turned online for the Fall as well as Spring semester.

01 May 2020 – 30 Jun 2020 **Project JRF**, *Department of Mathematics, Indian Institute of Science Education and Research (IISER), Bhopal, India*, Supervisor: Dr. Karam Deo Shankhadhar, Assistant Professor (Cancelled due to COVID).

10 Nov 2018 – 31 Mar 2019 **Visiting Researcher**, *Department of Mathematics, The Institute of Mathematical Sciences (IMSc), Chennai, India*, Supervisor: Dr. Srinivas Kotyada, Professor H.

20 Feb 2018 – 31 July 2018 **Research Assistant-I**, *Department of Mathematics, The University of Hong Kong (HKU), Pokfulam, Hong Kong*, Supervisor: Dr. Ben Kane, Associate Professor.

25 Feb 2017 – 25 Jan 2018 **Project Assistant, Development of Modules and Tools for Integer Factorization using Number Field Sieve (NFS)**, *Department of Mathematics, Harish-Chandra Research Institute (HRI), Prayagraj (Allahabad), India*, *Funded by Defence Research and Development Organisation (DRDO)*, Supervisors: Dr. Kalyan Chakraborty (Professor H), Dr. R. Thangadurai (Professor H).

Research Interests

Analytic Number Theory, Modular forms, L-functions, Partition Theory, Elliptic Curves.

Academic Details

2014 – 2016 **M.Sc. (Mathematics and Computing)**, *Thapar Institute of Engineering and Technology (TIET), Formerly Thapar University*, Punjab, India.
CGPA - 8.78 (on a 10.0 point scale) , Rank - 3rd/20
U.S. Equivalent: 3.647 (on a 4.0 point scale)

2010 – 2013 **B.Sc. (Mathematics, Statistics and Computer Science)**, *Punjabi University*, Punjab, India.
Percentage - 83.5

Master's Thesis

Jan - Aug 2016 **Class preserving automorphisms of finite p - groups**, Supervision of Dr. Deepak Kumar Gumber, Professor, School of Mathematics, TIET, Punjab (India).

→ The central focus of the thesis involves an in-depth study of the problem of finding a neat upper bound for the order of group of class preserving automorphisms of finite p-groups.

Talks/Seminars

19th April., 2023 **Talk: "Theory of half-integer weight modular forms and Shimura Lifts"**, Graduate Colloquium, Department of Mathematics, USC.

15th Feb., 2023 **Talk: "Some topics on the structure and application of modular forms"**, Oral Comprehensive Exams, USC.

29th Nov., 2022 **Talk: "Homology of Noetherian and local rings (John Tate, 1957)"**, Department of Mathematics, USC.

21st March, 2018 **Talk: "Sieving Techniques in Number Field Sieve"**, Postgraduate Number Theory Seminar, University of Hong Kong (HKU).

5 - 8th July, 2017 **Two lectures: "Lattice Sieving in Number Field Sieve (Rational and Algebraic Sieving)"**, DRDO Workshop, HRI.

July-Dec, 2015 **Two seminars: "Burnside Lemma and its Applications" and "Orthogonal Transformations in 2-D"**, TIET, Fall Semester'15.

University Teaching Experience

MATH 242 Instructor of Record (Summer 2023) - Elementary Differential Equations

MATH 115 Instructor of Record (Spring 2023) - Precalculus Mathematics

MATH 170 Instructor of Record (Fall 2022) - Finite Mathematics

MATH 111 Instructor of Record (Fall 2021/Spring 2022) - College Algebra

MATH 142 Instructor of Record (Summer 2021/Summer 2022) - Calculus II

MATH 141 Teaching Assistant (Spring 2021) - Calculus I

Summer Schools/Conferences/Workshops

11 Mar - 12 Mar, 2023 Southern Regional Number Theory Conference, Louisiana State University(LSU), Baton Rouge, LA.

10 Dec - 11 Dec, 2022 Palmetto Number Theory Series (PANTS XXXV), University of South Carolina (USC), Columbia, SC.

15 Nov, 2022 Bayou Arithmetic Research Days, BARD 1, Louisiana State University (LSU) (Virtual)

24 Sep - 25 Sep, 2022 Palmetto Number Theory Series (PANTS XXXIV), University of North Carolina (UNC), Charlotte, NC.

27 June - 01 July, 2022 — Discussion Meeting on L-functions, Circle Method and Applications, International Centre for Theoretical Sciences (ICTS), Bengaluru, India. (Virtual)

06 June - 12 June, 2022 — Connecticut School in Number Theory (CTNT 2022), University of Connecticut (UCONN), Storrs, Connecticut.

(Topics: Algebraic Number Theory, Galois Representations, Local Fields, Chebotarev Density Theorem).

16 May - 20 May, 2022 — NSF/CBMS Research Conference : Ramanujan's ranks, Mock Theta Functions, and Beyond, The University of Texas Rio Grande Valley (UTRGV), Edinburg, TX.

01 April - 02 April, 2022 — First International Workshop in Analytic Number Theory, UNIST (Virtual)

05 Mar - 09 Mar, 2022 — Arizona Winter School (AWS) - Automorphic Forms Beyond GL_2, University of Arizona, Tucson AZ.

(During AWS, I was also a part of the study group for Aaron Pollack on Modular Forms on Exceptional Groups.)

02 Mar - 07 Mar, 2020 — National Workshop on "Analytic Number Theory," Kerala School of Mathematics (KSOM), Kozhikode, Kerala.

13 May - 1 Jun, 2019 — Advanced Instructional School (AIS) - Modular Forms, Indian Institute of Technology (IIT), Guwahati, Assam.

17 Dec - 18 Dec, 2018 — Intercity Number Theory Seminar, Indian Institute of Science Education and Research (IISER), Tirupati, AP.

16 Jul - 23 Jul, 2018 — HKU Number Theory Days, Institute of Mathematical Research, The University of Hong Kong (HKU), Pokfulam, Hong Kong.

07 Dec - 08 Dec, 2017 — India - Russia 70th Anniversary Celebration Workshop on "Groups and Related Structures," Department of Mathematical Sciences, IISER, Mohali, Punjab.

11 Sep - 16 Sep, 2017 — Workshop on "Operator Algebra" by National Centre of Mathematics - ATM, IMSc, Taramani, Chennai.

04 Sep - 07 Sep, 2017 — International Conference on "Class Groups of Number Fields and Related Topics," HRI, Prayagraj (Allahabad), India.

16 May - 04 Jun, 2016 — PG Training Program, "NPDE - TCA", IIT, Ropar, Punjab, India.

28 Mar - 29 Mar, 2016 — National Workshop on "Group Theory", St. Stephens College, Delhi University, Delhi, India.

16 Oct - 18 Oct, 2014 — 3rd International Conference on "Special Functions and Applications", TIET, Punjab, India

Upcoming Conferences

02 Jul - 15 Jul, 2023 — *Inclusive Paths in Explicit Number Theory*, Banff International Research Station(BIRS), University of British Columbia (UBC) Okanagan, Kelowna, BC, Canada.

The first week of IPENT consists of mini-courses on several topics in explicit number theory. The second week comprises of organized group research projects in explicit number theory.

Professional Services

Fall 2023 - Spring 2024 — President of the Association for Women in Mathematics (AWM) Chapter at USC.

April 21, 2023 — Reviewer for undergraduate (UG) poster presentations at Discover USC, Columbia Metropolitan Convention Center, Columbia, SC.

Fall 2022 — Panelist, Graduate Teaching Assistant Orientation, University of South Carolina.

Scholastic Achievements

2021 Recipient of **Arizona Winter School Stipend**

2018 - 2019 Selected for **Stipendium Hungaricum** Scholarship (from India) to pursue Master's in Mathematics at Eotvos Lorand University (ELTE), Budapest by Tempus Public Foundation, Hungary - Not Availed

March 2016 Qualified **GATE (Graduate Aptitude Test in Engineering)**, All India Rank AIR - 474, Mathematics - 92.48 Percentile score

2015 - 2016 Recipient of **Late Dr. H.S. Kasana Scholarship**

2014 - 2015 Recipient of **Thapar University Merit Scholarship**

June 2014 Qualified **ACET** - Actuarial Entrance Examination

Relevant Coursework

- Algebra - I (Group and Ring Theory), Algebra - II (Field Theory, Galois Theory, Modules, Algebraic Coding Theory), Commutative algebra, Representation Theory, Introduction to Modular forms, Analytic Number Theory, Elliptic curves and Arithmetic Geometry, Linear Algebra, Real Analysis - I (Metric Spaces, Riemann-Stieltje's Integral, Function of Several Variables), Real Analysis - II (Measure Theory and Integration, L^p-Spaces), Discrete Mathematical Structure, Complex Analysis, Functional Analysis, Topology, Elementary Number Theory, Fourier Analysis.
- Differential Equations (ODE, PDE), Numerical Analysis, Operations Research, Mathematical Methods, Mechanics.
- Probability and Statistics, Sample Surveys, Statistical Inference - I (Point and Interval Estimation, Testing of Hypothesis), Statistical Inference - II (Sampling distributions, Large sample tests), Design and Analysis of Experiments.
- Fundamentals of Computer Science and C Programming, Data Structures and Algorithms, Database Management Systems, Computer Organisation and Operating Systems, Computer Networks, Visual Programming, Object Oriented Programming, Oracle, Formalization of Mathematics (Lean Prover).
- Mathematics Pedagogy - I, Mathematics Pedagogy - II

Teaching Experience

Spring 2021 - Fall 2022 Tutor, Math Tutoring Center, University of South Carolina

1 Jul, 2019 - Present Private classes in Mathematics and Statistics for undergraduate level students in science, arts and engineering streams (B.Sc., B.Tech, BCA)

1 Jul, 2013 - 31 Dec, 2013 Worked as a part-time faculty in a coaching institute namely, "New Delhi Academy for Competitive exams". Responsibilities include teaching Mathematics to students of grades 11-12 and for entrance exams such as CA CPT, LEET etc.

1 Nov, 2013 - 30 Apr, 2014 Worked as a online tutor in Mathematics with "Futor". Responsibilities include teaching both Indian as well as International students for 9 - 12 grades.

Technical Skills

→ Programming Languages: C/C++ (Intermediate)
→ Completed the online course "Programming for Everybody (Getting Started with Python)" offered by University of Michigan on online learning platform *(Coursera Verified Certificate)*
→ Markup Language: LaTeX

References

Available on request