Aryaman Maithani

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University of Utah
All the links appearing below are also available on https://aryamanmaithani.github.io/CV

Education

2022 – present **University of Utah, USA** 4.00 GPA
PhD in Mathematics

2018 – 2022 **Indian Institute of Technology Bombay, India** 9.84/10 GPA
B.S. in Mathematics with honors

Research

2021 **Computational Algebra** *Guide: Prof. A. Seceleanu | University of Nebraska-Lincoln*
Participated in the Polymath Jr. collaborative mathematical research program for undergraduates. We examined the Betti tables of quadratic ideals with three generators in the polynomial ring $\mathbb{F}_2[x, y, z]$ and resolved all these ideals using theoretical results as well as Macaulay2.
I also presented this work in the Young Mathematicians Conference organized by the Ohio State University. The video can be found here.

Reading Projects

2021 **Homological Algebra** *Guide: Prof. Dipendra Prasad | IIT Bombay*
Reading *An Introduction to Homological Algebra* by *Charles A. Weibel* and have covered topics such as Abelian categories, Chain complexes, Chain homotopies, δ-functors, Derived functors, Projective and Injective resolutions, Adjoint functors, Balancing Tor and Ext, Tor for abelian groups, Tor and Flatness, Ext and Extensions, Derived Functors of the Inverse Limit.

2021 **Algebraic Geometry** *Guide: Prof. Arvind Nair | TIFR*
Participated in the month long Visiting Students' Research Programme conducted by Tata Institute of Fundamental Research.
Read *Foundations of Algebraic Geometry* by *Ravi Vakil* and covered topics such as Sheaves, Affine schemes, Morphisms of Schemes and Chevalley's Theorem.
The final presentation can be found here.

2021 **Representation Theory** *Guide: Prof. Ananthnarayan Hariharan | IIT Bombay*
Read *Representation Theory of Finite Groups* by *Benjamin Steinberg* and covered topics such as Maschke's Theorem, the orthogonality relations, characters, permutations and regular representations, induction of representations, dimension theorem, representations of dihedral and symmetric groups and applications to group theory such as Burnside's pq-theorem.
The report can be found here.

Reading Projects (continued)

2020 **Algebraic Topology** *Guide: Prof. Rekha Santhanam | IIT Bombay*
Read homotopy theory including theorems like Van Kampert Theorem, existence of a universal covering space, Galois correspondence for covering spaces and applications to group theory. Also read homology theory and applications such as invariance of domain, degree of maps, hairy ball theorem as well as CW complexes.
The report and related presentation can be found here.

2020 **Primes is in P** *Guide: Prof. Ronnie Sebastian | IIT Bombay*
Read the paper *PRIMES is in P* by *Manindra Agrawal, Neeraj Kayal, Nitin Saxena* about the AKS Algorithm and wrote a report on that, which can be found at the end of notes here.

2019 **Posets** *Guide: Prof. Koushik Saha | IIT Bombay*
Read about posets from *Enumerative Combinatorics* by *Richard P. Stanley* and gave a presentation on it as part of extra reading in Combinatorics, which can be found here.

2019 **Topology - Classification of Surfaces** *Guide: Senior Student | IIT Bombay*
Read about Topology and made a report that contains an introduction to topology and a proof of the Classification of Surfaces, which can be found here.

Teaching

2022-2023 Teaching assistant at University of Utah for the following courses.

Semester	Course
Spring 2023	Math 2250, Differential Equations and Linear Algebra
Fall 2022	Math 2250, Differential Equations and Linear Algebra

2019-2022 Teaching assistant at IIT Bombay for the following courses.

Year	Course
2022	MA 108, Numerical Analysis
2022	MA 108, Ordinary Differential Equations
2022	MA 106, Linear Algebra
2022	MA 109, Calculus I
2021	MA 207, Partial Differential Equations
2021	MA 205, Complex Analysis
2021	MA 108, Ordinary Differential Equations
2021	MA 106, Linear Algebra
2020	MA 109, Calculus I
2020	MA 205, Complex Analysis
2020	MA 108, Ordinary Differential Equations
2020	MA 106, Linear Algebra
2019	MA 105, Calculus

Mentorship

2021 Mentored five junior students from IIT Bombay as part of the Summer of Science initiative by the Maths and Physics Club. This involved guiding the students to relevant resources and clarifying any conceptual difficulties over the course of two months. The topics covered Group Theory, Ring Theory, Galois Theory, Topology, and Algebraic Topology.

2020 Conducted nine sessions for teaching concepts of Computer Programming, Calculus, Linear Algebra, Complex Analysis and helping in solving doubts, organized by the Student Support Services, IIT Bombay.

2019 Completed 80 hours of community service by teaching in NGOs as a volunteer of National Service Scheme, IIT Bombay.

2018 Mentored a team of students at the Code Camp organized by CodePrompt, Internet Academy in association with the Web and Coding Club, IIT Bombay.

Academic Achievements

2018- Department Rank **1** in the Mathematics Department.

Awarded the **AP** grade, for excellent performance, in

- 2019 MA 403 (**Real Analysis**), awarded to 2 out of 70 students.
- 2019 MA 419 (**Basic Algebra**), awarded to 1 out of 70 students.
- 2019 CS 228 (**Logic for CS**), awarded to 2 out of 132 students.
- 2018 CS 101 (**Computer Programming**), awarded to 5 out of 663 students.

2018 Achieved All-India Rank **595** out of 1,000,000 participants in **JEE (Main) 2018**. JEE is an all India standardized computer-based test for admission to various technical undergraduate programs.

2018 Achieved All-India Rank **742** out of 165,000 participants in **JEE (Advanced) 2018**.

2018 Secured a seat in **Chennai Mathematical Institute (CMI)** on the basis of my performance in its entrance exam.

2017 Secured a seat in the **Indian Institute of Science** (IISc) by obtaining an All-India Rank of **147** out of 50,000 in the **Kishore Vaigyanik Protsahan Yojana (KVPY) 2017** scholarship exam.

2018 A recipient of the KVPY fellowship offered by IISc and attended the Vijyoshi Camp conducted in IISc.

Technical Skills

Languages LaTeX, Python, Macaulay2, Sage, Lean

Extracurricular

Convener at **Maths and Physics Club, IIT Bombay**

- Conducted activities in a team of 7 to foster enthusiasm in mathematics and physics, tending to a community of 400 - 500 in campus with an online presence of over 8000.
- Worked in conducting of Summer Of Science 2019, a novel initiative through which over 400 students got an opportunity to pursue a reading project in a topic of their interest, under the guidance of over 120 senior student mentors.
- Conducted the quizzing events such as Mathathon and Bazinga! Maths which involved hosting as well as creating the question paper for the same.
- Conducted various group discussions on topics such as set theory and cardinality, group theory, and topology.

Extracurricular (continued)

Project Euler
Project Euler is a series of challenging mathematical/computer programming problems that will require more than just mathematical insights to solve. Although mathematics will help you arrive at elegant and efficient methods, the use of a computer and programming skills will be required to solve most problems. Have solved over **200** questions on Project Euler.