Deepesh Singhal

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Educational Background

- Currently pursuing **PhD in Mathematics** at **University of California, Irvine** under Professor **Nathan Kaplan**.
- Completed **Master of Science in Mathematics** at the **University of California, Irvine,** June 2022.
- Completed **BSc in Mathematics** with **First Class Honours** at **Hong Kong University of Science and Technology**, **IRE (International Research Enrichment)- Pure Math Advance Track**, Spring 2020.
- Exchange Student at **National University of Singapore**, Spring 2019.

Employment

- Will work as **Quantitative research intern** for **Susquehanna International Group**, summer 2026.
- Worked as **assistant for undergraduate research project**, Summer 2024.
- Worked as **Associate Instructor** for MATH 2E (**Multivariable Calculus**), Summer 2023.
- Worked as a **Research Assistant** with Professor Nathan Kaplan, Spring 2023 and Spring 2024.
- Worked as a **Teaching Assistant** for **graduate courses** MATH 220A (**Complex Analysis**), MATH 220B (twice) (**Complex Analysis**), 230A (**Algebra**) and 230B (**Algebra**).
- Worked as a **Teaching Assistant** for **algebra jumpstart program** for incoming **graduate students**.
- Worked as a **Teaching Assistant** for undergraduate courses MATH 130A (**Probability** I), MATH 140A (Analysis), MATH 180B (twice) (**Number Theory** II), MATH 173A (Introduction to **Cryptology**), MATH 121B (**Linear Algebra** II), MATH 13 (Intro to **Abstract Math**), MATH 2E (**Multivariable Calculus**) MATH 2A (Single variable **Calculus**) at UC Irvine.
- Worked as a **Grader** for MATH 130A (**Probability** I) at UC Irvine.
- Worked as a **Counsellor** at **Ross Mathematics Program**, **Ohio State University**, 2017, 2018.

Published Research Papers

- **Abelian covers of $\mathbb{P}^1$ of p-ordinary Ekedahl-Oort type** (with Y. Lin, E. Martovan). **International Mathematics Research Notes**. https://doi.org/10.1093/imrn/rnae241
- **Density questions in rings of the form $\mathcal{O}_K[\gamma] \cap K$** (with Y.Lin) 2023. **International Journal of Number Theory**. https://doi.org/10.1142/S1793042124500581
- **Enumerating numerical sets associated to a numerical semigroup** (with A. Chen, N. Kaplan, C. O'Neill, L. Lawson) 2023. **Discrete Applied Mathematics**. https://doi.org/10.1016/j.dam.2023.08.010
- **Primes in denominators of algebraic numbers** (with Y. Lin) 2023. **International Journal of Number Theory**. https://doi.org/10.1142/S1793042124500167
- **The Expected Embedding Dimension, type and weight of a Numerical Semigroup** (with N. Kaplan). 2023. **Enumerative Combinatorics and Applications**. 3:2, #S2R14 https://doi.org/10.54550/ECA2023V3S2R14
- **Frobenius allowable gaps of Generalized Numerical Semigroups** (with Y. Lin). 2022. **Electronic Journal of Combinatorics**. Volume 29, Issue 4. https://doi.org/10.37236/10748
- **Distribution of genus among numerical semigroups with fixed Frobenius number**. 2022. **Semigroup Forum**. https://doi.org/10.1007/s00233-022-10282-6
- **Complementary Numerical Sets** (with M. Guhl, J. Juarez, V. Ponomarenko, R. Rechkin). 2022. **Integers Electronic Journal of Combinatorial Number Theory** 22. http://math.colgate.edu/~integers/w17/w17.pdf
- **Numerical Semigroups of small and large type**. 2021. **International Journal of Algebra and Computation** 31:05, 883-902 https://doi.org/10.1142/S0218196721500417
- **Density of Numerical sets associated to a Numerical semigroup** (with Y. Lin), (2021), **Communications in Algebra**, 10.1080/00927872.2021.1918136

Preprints of Research Papers

- **On a Conjecture of Ghorpade, Datta and Beelen for the Number of Points of Varieties over Finite Fields** (With Y. Lin) arXiv:2311.07702.
- **Non mu-ordinary Newton polygons in the Torelli Locus** (With D. Singhal and E. Mantovan). arXiv:2406.09632
- **The p-rank stratification of the moduli space of double covers of a fixed elliptic curve** (with Y. Lin, K. Chang, D. Dragutinovic, S. Groen). arXiv:2502.09540
- On the **asymptotic growth of the number of associated numerical sets** (with A. Chen, N. Kaplan, L. Lawson, C. O'Neill)
- On **the Smallest Partition Associated to a Numerical Semigroup** (with Nathan Kaplan, Kaylee Kim, Cole McGeorge, Fabian Ramirez).
- Largest zero-dimensional intersection of r degree d hypersurfaces in $\mathbb{P}^m$ (with Y. Lin).

Scholarly and Professional Activities

- Participating in the **Erdos Institute Deep Learning Bootcamp**, Summer 2025.
- Elected as a member of **Sigma Xi**, The **Scientific Research Honor Society**, Spring 2025.
- Completed the **Erdos Institute Data Science Bootcamp**, Spring 2025.
- Working on a **data science project** titled **Crime Patterns** as part of the bootcamp, focusing on analysing social and economic factors that predict crime rates across California counties.
- Lead a **Directed Reading Project** with three undergraduates on **Coding Theory**, Spring 2024.
- Completed **Mentoring Excellence Program**, Spring 2024.
- Reviewed a paper for **Discrete Applied Mathematics**, 2024.
- Participated in project group of Rachael Preis at **Arizona Winter School**, 2024.
- Reviewed a paper for **The electronic Journal of Combinatorics**, 2024.
- Lead a **Directed Reading Project** with two undergraduates on **Representation Theory**, Winter 2024.
- Reviewed a paper for **Journal of Algebra and its Applications**, 2022.
- Lead a **Directed Reading Project** with two undergraduates on **P-adic analysis**, Winter 2022.
- Lead a **Directed Reading Project** with two undergraduates on **Commutative Algebra**, Winter 2021.
- Passed **real analysis** and **complex analysis qualifying exams**, Winter 2021.
- Passed **algebra qualifying exam**, Fall 2020.
- Worked on a reading project on **Elliptic Curves** in **Undergraduate Research Opportunity Program**, HKUST 2020.
- Participated in the **San Diego State University REU** 2019.
- Participated in **International Exchange** to **National University of Singapore**, spring 2019.
- Represented India at the **International Math Olympiad**, Hong Kong, 2016.
- Attended **Ross Mathematics program**, Ohio State University, **USA as Junior Counsellor** in 2016.
- Represented India at the **Asia Pacific Math Olympiad**, 2015.
- Attended **Ross Mathematics program**, **Ohio State University, USA** as a student in 2015.
- Attended **International Mathematics Olympiad Training Camp** at HBCSE, Mumbai in 2016.
- Attended **International Mathematics Olympiad Training Camp** at HBCSE, Mumbai in 2015.
- Attended **International Mathematics Olympiad Training Camp** at HBCSE, Mumbai in 2014.

Honours and Accolades

- Awarded the **Von Neumann Award**, at UC Irvine, Spring 2024.
- Awarded the **Research Mentorship Certificate**, at UC Irvine, Spring 2024.
- Awarded the **Euler Outstanding Promise as a Graduate Student Award**, at UC Irvine, Spring 2022.
- Awarded the **Epsilon Fund Award** at HKUST, Spring 2020.
- Got **Honourable mention** at poster presentation at JMM 2020.
- Awarded **Stonehage Fleming/Marais Prize** in **Simon Marais Math competition**, 2019 for getting **rank 1 in my university.**
- Got **29th Rank** in **Simon Marais Math competition, 2019** with a **percentile of 92.88%**.
- Honoured for **academic excellence** by HKUST, April 2019.
- Got **13th Rank** in **Simon Marais Math competition, 2018** with a **percentile of 98.03%**.
- Selected as a **Chern Class student**, HKUST 2017.
- **Selected in the Dean's List** for the School of Science in Fall 2016 (**TGA:3.806**), Spring 2017. (**TGA:4.052**), Fall 2017 **(TGA: 3.79)**, Spring 2018 **(TGA: 3.789).**
- **Represented India** and won **Bronze medal at International Mathematics Olympiad**, 2016.
- **Represented India** and won **Honourable Mention Award at Asia Pacific Math Olympiad**, 2015.
- Secured **5th rank in Regional Mathematics Olympiad** in Maharashtra and Goa region, 2013.

Presentations

- Presented my paper, On a Conjecture of Ghorpade, Datta and Beelen for the Number of Points of Varieties over Finite Fields at the **Fragment seminar** at the **Colorado state University**.
- Presented my paper, Abelian covers of $\mathbb{P}^1$ of p-ordinary Ekedahl-Oort type at **Building Bridges 6th EU/US Summer School and Workshop on Automorphic Forms** and Related Topics, **CIRM**.
- Presented my paper, On a Conjecture of Ghorpade, Datta and Beelen for the Number of Points of Varieties over Finite Fields at the **Western Sectional Meeting Spring 2024.**
- Presented my paper, On a Conjecture of Ghorpade, Datta and Beelen for the Number of Points of Varieties over Finite Fields at the **Southern Regional Number Theory Conference** 2024.
- Presented our project, p-rank stratification of the moduli space of double covers of an Elliptic curve, **Arizona Winter School** 2024.

- Presented my paper, Primes in denominators of algebraic numbers at the **Joint Math Meeting** 2024.
- Presented my **paper**, Frobenius allowable gaps of Generalized Numerical Semigroups at the **AMS spring western virtual sectional meeting**, 2022.
- Gave a presentation on **Class number formula for quadratic imaginary fields**, UC Irvine 2022.
- Gave a presentation on **Artithmetic geometry**, UC Irvine 2022.
- Presented my **paper**, Distribution of genus among numerical semigroups with a fixed Frobenius number at the **AMS spring central virtual sectional meeting**, 2021.
- Presented my **paper,** Enumerating the associated numerical sets of a numerical semigroup at the **Joint Math Meeting** poster session, 2020.
- Gave a presentation on my two papers **Enumerating the associated numerical sets of a numerical semigroup** and On the **asymptotic growth of the number of associated numerical sets** at SDSU and at HKUST, 2019.
- Gave a presentation on the **manifold and group structure of elliptic curves**, NUS 2019.
- Gave a presentation on my independent study on **Algebraic Number Theory**, HKUST 2018.
- Gave a presentation on **Applications of the Baire Category Theorem**, HKUST 2018.
- Gave a presentation on **Schwarz-Christoffel formula** for curvilinear (triangles) polygons, HKUST 2017.
- Gave an oral and a poster presentation on **rational approximations, golden ratio and Fibonacci numbers**, HKUST 2017.

Scholarships

- Awarded **Department Fellowship**, UC Irvine, Winter 2022.
- Received **Howard Tucker Scholarship**, UC Irvine, 2020.
- Received **Epsilon Award**, HKUST, 2020.
- Received **Research Travel Grant** for participating in **Joint Math Meeting 2020.**
- Received **Chern Class Talent Scholarship**, Fall 2019.
- Received **Lee Hysan Overseas Scholarship for International Research Enrichment (IRE) Students** for participating in the San Diego State University REU, Summer 2019.
- Received **Chern Class Exchange Scholarship** for San Diego State University REU, Summer 2019.
- Received the **Reaching Out Award** for participation in the San Diego State University REU, Summer 2019.
- Received **University Scholarship** for **exchange to National University of Singapore**, Spring 2019.
- Received **Chern Class Talent Scholarship**, Fall 2018.
- Received **Chern Class Scholarship** Fall 2017 and Spring 2018.
- Awarded **University Scholarship**, waving the tuition fee, HKUST 2016.
- Awarded Rs100,000 by Sri Chaitanya institute for excellent performance in the IMO, 2016.
- Received facilitation by Infosys for representing India in the IMO and awarded Rs15000, 2016.
- Awarded with the Mehta Scholarship during Ross Mathematics Program, 2015.