

Dinesh Karthik Mulumudi

5th-Year BS-MS, Mathematics, IISER Pune | Visiting Master's Thesis
Student, IISc Bangalore

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I am a 5th-year BS-MS student at IISER Pune and a Visiting Master's Thesis Student at IISc, Bangalore. I have a strong interest in the mathematical foundations of theoretical Machine Learning and AI, and am passionate about exploring mathematically rigorous problems in Deep Learning and Optimization.

Research Interests

Theoretical Machine Learning & Generalization Theory · Robustness & Adversarial Purification · Optimization for Deep Learning · Applied Probability & Concentration Inequalities · Stochastic Approximation Theory

Education

2022–2027 **BS-MS Dual Degree in Mathematics**, Indian Institute of Science Education and Research (IISER), Pune, CGPA: 8.5/10

2022 **Class 12 (CBSE)**, Kendriya Vidyalaya, Nellore, AP, India, 96.2%

2020 **Class 10 (CBSE)**, Kendriya Vidyalaya, Nellore, AP, India, 93.0%

Publications

2026 Dinesh Karthik Mulumudi, Piyushi Manupriya, Gholamali Aminian, Anant Raj. *On the Generalization and Robustness in Conditional Value-at-Risk*. Under Peer Review. arXiv:2602.18053

Research Experience

May **Visiting Master's Thesis Student**, Indian Institute of Science (IISc), Bangalore

2026–Present Supervisors: Prof. Anant Raj (IISc) & Prof. Siva Theja Maguluri (Georgia Institute of Technology)
Working on **High-Dimensional Stochastic Approximation**.

May **Research Intern**, Indian Institute of Science (IISc), Bangalore

2025–Present Supervisor: Prof. Anant Raj

○ Investigated CVaR generalization bounds for risk-sensitive learning under heavy-tailed losses. Developed proofs for fixed-hypothesis bounds, uniform bounds, and Rademacher complexity extensions. [Under Peer Review: arXiv:2602.18053]

○ Currently working on robustness of MoM KSD goodness-of-fit test.

Aug **Research Collaborator**, IISER Pune

2025–Present Supervisor: Prof. Bedartha Goswami

○ Adversarial purification in deep learning with focus on theoretical guarantees and robustness analysis. [View Poster]

Academic Projects

Jan–May **Finite Field Geometry**

2025 Supervisor: Prof. Krishna Kaipa, IISER Pune

Explored combinatorial structures in finite field geometry. [Project Report]

May–Jul 2024 **Numerical Linear Algebra & Visual Cryptography**

Supervisor: Prof. Ayan Mahalanobis, IISER Pune

Implemented numerical algorithms for matrix computations and explored visual secret sharing schemes.

Dec 2023 **Elementary Number Theory**

Supervisor: Prof. Rabeya Basu, IISER Pune

Relevant Coursework

*A+ grade (10/10), #A grade (9/10)

Analysis Real Analysis I[#] & II^{*}, Complex Analysis, Measure Theory, Calculus on Manifolds[#], Probability Theory

Algebra Group Theory^{*}, Rings and Modules[#], Discrete Structures^{*}

Topology Point Set Topology^{*}, Algebraic Topology, Differential Geometry

Applied Math Advanced Linear Algebra^{*}, Graph Theory^{*}, ODEs^{*}, Probability, Stochastic Processes, Mathematical & Statistical Optimization

CS & AI/ML Deep Learning[#], Algorithms*, Data Analysis, Introduction to Computing[#], Natural Language Processing, Data Science Practice

Technical Skills

Programming Python (Proficient), SageMath, L^AT_EX

Honours & Service

2022–Present **INSPIRE Scholarship for Higher Education (SHE)**, *DST, Government of India*

2022–Present **Volunteer**, *Math Club, IISER Pune*

2013–2020 **The Bharat Scouts and Guides**

Languages

English, Telugu, Hindi (*Fluent and Professionally Proficient in All*)

References

Available upon request.