



NILAVA METYA

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EDUCATION

Rutgers, the State University of New Jersey - New Brunswick

Doctor of Philosophy in Mathematics | CGPA: 4.0/4.0

(passed written qualifying exams in first attempt just before program started)

Sep '22 – (expected) '27

Piscataway, New Jersey, USA

Chennai Mathematical Institute

Bachelor of Science (Honours) in Mathematics and Computer Science | CGPA: 9.72/10

Position: **Third** (out of 55 students)

(completed degree requirements in 2.5 years)

Aug '19 – May '22

Chennai, Tamil Nadu, India

Don Bosco School, Liluah

Indian School Certificate (ISC) 2019 | Percentage: 97.25%

Position: **First** in science stream (~ 55 students), **second** overall (~ 180 students)

Indian Certificate of Secondary Education (ICSE) 2017 | Percentage: 96.6%

Position: **First** in school (~ 180 students)

Apr '06 – Mar '19

Howrah, West Bengal, India

COURSEWORK

- Quantum Computation
- Matrix Computations
- (Measure theoretic) Probability
- Statistics with R
- Data Mining
- Topological Data Analysis
- Differential Equations
- Smooth Manifolds¹
- Algebraic Topology
- Basic Functional Analysis
- Complex Analysis
- Quiver Representations
- Algebraic Number Theory
- Sheaves and Schemes
- Topics in Algebraic geometry
- Homological Algebra
- Haskell
- Python
- Object Oriented Programming
- Algorithm Design and Analysis
- Discrete Mathematics
- Automata Theory
- Lambda Calculus
- Formal Security Analysis (applied pi calculus, ProVerif, CryptoVerif, F*)
- Newtonian, Lagrangian, Hamiltonian mechanics
- Relativity, Dynamical Systems
- Convex/Conic Optimization^{current}
- Learning Theory^{current}

RELEVANT DIRECTED READING

Quantum information (representation theory) | *Siddhartha Sahi* | Rutgers University

Read a part of Dr. Christandl's thesis titled 'The Structure of Bipartite Quantum States - Insights from Group Theory and Cryptography'; weekly discussions

Sep – Dec '22

Quiver representations and invariants | *Anne-Marie Aubert* | Sorbonne University

Read a paper on quivers by Daniele Faenzi, and learnt relevant topics in algebraic geometry

Jun '22

Markov Chain and Monte Carlo | *R V Ramamoorthi*

A paper on MCMC by KB Athreya, M Delampady, T Krishnan from *Resonance*, Volume 8, 2003

Aug - Sep '21

p-adic analysis | *Anup Dixit* | IMSc, Chennai

Neal Koblitz's book '*p*-adic Numbers, *p*-adic Analysis, and Zeta-Functions' and the paper 'The Derivative of *p*-adic Dirichlet Series at $s = 0$ ' by H M Stark

May - Jul '21

Representation theory of Lie algebras | *Apoorva Khare* | IISc, Bangalore

James E Humphreys's book 'Introduction to Lie Algebras and Representation Theory'

May - Jul '21

¹Gray color represents courses that are light on analysis and computer science

PUBLICATIONS/PREPRINTS

1. G DePaul, S Hoşten, N Metya, I Nometa. Degrees of the Wasserstein distance to small toric models. *Submitted.*

ATTENDANCE IN CONFERENCES/WORKSHOPS

Bayesian Statistics and Statistical Learning <i>Workshop</i> IMSI, Chicago	Dec '23
Algebraic Statistics for Ecological and Biological Systems <i>Workshop</i> IMSI, Chicago	Oct '23
Apprenticeship Week: Varieties from Statistics IMSI, Chicago	Oct '23
Invitation to Algebraic Statistics and Applications IMSI, Chicago	Sep '23
Permutation and Causal Inference: Connections and Applications IMSI, Chicago	Aug '23
Algebraic Methods in Biochemical Reaction Networks MPI, Leipzig	Jun '23
Computations and Data in Algebraic Statistics (online) BIRS, Oaxaca	May '23
Joint Mathematics Meetings Boston	Jan '23
AlGeCom-XII (Algebra Geometry and Combinatorics day) UIUC	Oct '22

TEACHING AND GRADING

Workshop leader for Calculus II Rutgers	Sep – Dec '23, Jan – Apr '24
Head Counselor at PROMYS India IISc Bangalore	May – Jun '23
Grader Rutgers University	
Algebra II	Jan – Apr '24
Linear Algebra and Applications	Sep – Dec '23
Analysis II	Jan – Apr '23
Topics in Applied Algebra	Jan – Apr '23
Topology	Sep – Dec '22
Theory of Numbers	Sep – Dec '22
Teaching Assistant Chennai Mathematical Institute	
Algebra II (Group theory) <i>BSc 1st year</i> <i>Prof Manoj Kummini</i>	Jan – May '22
Algebra I (Linear algebra) <i>BSc 1st year - head tutor</i> <i>Prof T R Ramadas</i>	Sep – Dec '21
Functional Programming in Haskell <i>BSc and MSc Comp. Sci. 1st year</i> <i>Prof S P Suresh</i>	Sep – Dec '21
Probability Theory <i>BSc 1st year</i> <i>Prof P Sankaran</i>	Apr – Jul '21
Discrete Mathematics <i>BSc 1st year</i> <i>Prof K V Subrahmanyam</i>	Apr – Jul '21
Design and Analysis of Algorithms <i>MSc Data Science 1st year</i> <i>Prof G Philip</i>	Apr – Jul '21
Algebra I (Linear algebra) <i>BSc 1st year</i> <i>Prof T R Ramadas</i>	Dec '20 – Mar '21
Functional Programming in Haskell <i>BSc and MSc Comp. Sci. 1st year</i> <i>Prof S P Suresh</i>	Dec '20 – Mar '21
Counselor at PROMYS Boston University	Jul – Aug '20, '21

TALKS DELIVERED

Principal Components along Quiver representations 1 talk Rutgers course: <i>Computational Topology</i>	Dec '23
Inference on growth process of a network 1 talk Rutgers course: <i>Data Mining</i>	Dec '23
Representations as sections of Line Bundles 1 talk Princeton course: <i>Topics in Algebraic Geometry</i>	Dec '23
Complexity of Optimization 1 talk Rutgers <i>Pizza Seminar</i>	Oct '23
Complexity of Computing Wasserstein Distance 1 talk <i>Apprenticeship Week</i> at IMSI, Chicago	Oct '23
Quiver Reps - geometry & invariants 1 talk Rutgers <i>Algebra 'N' Geometry Learning Seminar</i>	Apr '23
Quiver Reps - Intro 1 talk Rutgers <i>Graduate Algebra and Representation Theory Seminar</i>	Dec '22
Burnside $p^a q^b$ theorem 1 talk Rutgers <i>Graduate Number Theory Learning Seminar</i>	Nov '22
Very basic Lie Theory 1 talk Rutgers <i>Graduate Geometry and Topology Learning Seminar</i>	Oct '22
Kneser graph coloring 1 talk Rutgers <i>Graduate Combinatorics Seminar</i>	Oct '22
Well definedness of Brauer group 1 talk Rutgers <i>Algebra 'N' Geometry Learning Seminar</i>	Sep '22
Fiedler vector method 1 talk CMI course: <i>Matrix Computations</i>	May '22
Derivative of p-adic Dirichlet series at $s = 0$ (Stark) 1 talk Internship with Prof Dixit	Nov '21
Dehn's proof of Hilbert's 3rd problem 1 talk CMI <i>Student Seminar</i>	Nov '21
Markov Chain Monte Carlo 1 talk Internship with Prof Ramamoorthi	Sep '21
Lie Algebras and Representation Theory 3 talks Counselor Seminar at PROMYS	Jul – Aug '21
Introduction to Hyperbolic Geometry 1 talk Counselor Seminar at PROMYS	Jul '21
Introduction to Quantum Computing 4 talks Counselor Seminar at PROMYS	Jul – Aug '20

HONOURS AND AWARDS

Nominated by Rutgers Math department for SLMath summer school <i>Summer school at Leipzig - awarded full travel funding. Only two students from Rutgers Math were fully funded by SLMath.</i>	Jun '23
Academic Excellence Award at Rutgers <i>Received a certificate and \$100 based on performance in Written Qualifying Exams.</i>	Sep '22
Shriram Scholarship at CMI <i>Received institutional fee waiver and monthly stipend (based on entrance exam).</i>	'19 – '22
Ranked 4th nationally at the Bachelor of Statistics (B.Stat.) entrance examination <i>Indian Statistical Institute (ISI)</i>	'19
Informatics Olympiad <i>Selected among (approx) top 100-130 school students in India in Zonal Informatics Olympiad (ZIO).</i>	'17, '18, '19
Mathematical Olympiad <i>Selected for Indian National Mathematical Olympiad (INMO) Training Camp top 30 school students in West Bengal.</i>	Jan '18
Program in Mathematics for Young Scientists (PROMYS) <i>Awarded the Tara and Jasubhai Mehta Fellowship to PROMYS (among 5 Indian school students in 2018) based on a competitive process. Participated twice as a student ('18, '19) and twice as a counselor ('20, '21).</i>	'18, '19, '20, '21

Others

- Qualified for **International Collegiate Programming Contest (ICPC)** Kharagpur regionals and Amritapuri regionals in 2019 and secured rank 35 among (approx) 90 university teams at Kharagpur.
- Selected among top 30 students in India to participate in **Scholastic Test of Excellence in Mathematical Sciences (STEMS)** camp at CMI in 2018, based on a competitive exam (across grades 9 – 12 and across Math, Physics, Computer Science).
- Secured the **third position** in **Mathematics Talent Reward Programme (MTRP)** 2016, organized by ISI Kolkata, based on a competitive exam and quizzes at a camp.

SERVICE

Algebra 'N' Geometry Learning Seminar (ANGeLS) | *Organizer* | Rutgers Math Department **Jan - Apr '23**
Student Seminar | *Organizer* | Chennai Mathematical Institute **Oct - Dec '22**
ICO Camp (online) | *Combinatorics teacher* | CodeChef **Nov '20**

SKILLS

Languages Bengali (mother tongue), English (fluent), Hindi (fluent)
Programming JAVA, C++, Python, Haskell, R, HTML, SageMath, Maple, Macaulay2
Documentation L^AT_EX, Microsoft Word