Nilava Metya

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Education

Rutgers, the State University of New Jersey - New Brunswick   Sep '22 – (expected) '27
Doctor of Philosophy in Mathematics | *CGPA:* 4.0/4.0
    (passed written qualifying exams in first attempt just before program started)   *Piscataway, New Jersey, USA*

Chennai Mathematical Institute   Aug '19 – May '22
Bachelor of Science (Honours) in Mathematics and Computer Science | *CGPA:* 9.72/10
    Position: **Third** *(out of* 55 *students)*   *Chennai, Tamil Nadu, India*
    (completed degree requirements in 2.5 *years)*

Don Bosco School, Liluah   Apr '06 – Mar '19
Indian School Certificate (ISC) 2019 | *Percentage:* 97.25%
    Position: **First** *in science stream (*∼ 55 *students),* **second** *overall (*∼ 180 *students)*   *Howrah, West Bengal, India*
Indian Certificate of Secondary Education (ICSE) 2017 | *Percentage:* 96.6%
    Position: **First** *in school (*∼ 180 *students)*

Coursework

- Quantum Computation
- Matrix Computations
- Statistics with R
- Differential Equations
- Smooth Manifolds[1]
- Algebraic Topology
- Complex Analysis
- Quiver Representations
- Algebraic Number Theory
- Haskell, Python
- Object Oriented Programming

- Algorithm Design + Analysis
- Discrete Mathematics
- Automata Theory
- Lambda Calculus
- Formal Security Analysis (applied pi calculus, ProVerif, CryptoVerif, F*)
- Newtonian, Lagrangian, Hamiltonian mechanics
- Relativity, Dynamical Systems

- Lie Algebras[Rutgers]
- Sheaves and Schemes[Princeton]
- Topics in Alg. geom.[Princeton]
- Homological Algebra[Rutgers]
- Probability[Rutgers]
- Data Mining[Rutgers]
- Topological Data Analysis[Rutgers]
- Convex Optimization[Princeton]
- Learning Theory[Rutgers]

Relevant Directed Reading

Quantum information (representation theory) | *Siddhartha Sahi* | Rutgers University   Sep – Dec '22
Read a part of Dr. Christandl's thesis titled 'The Structure of Bipartite Quantum States - Insights from Group Theory and Cryptography'; weekly discussions

Quiver representations and invariants | *Anne-Marie Aubert* | Sorbonne University   Jun '22
Read a paper on quivers by Daniele Faenzi, and learnt relevant topics in algebraic geometry

Markov Chain and Monte Carlo | *R V Ramamoorthi*   Aug - Sep '21
A paper on MCMC by KB Athreya, M Delampady, T Krishnan from Resonance, Volume 8, 2003

p-adic analysis | *Anup Dixit* | IMSc, Chennai   May - Jul '21
Neal Koblitz's book 'p-adic Numbers, p-adic Analysis, and Zeta-Functions' and the paper 'The Derivative of p-adic Dirichlet Series at $s = O$' by H M Stark

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[1]Gray 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.
   Journal of Algebraic Statistics

Attendance in conferences/workshops

Princeton Machine Learning Theory Summer School | *Summer School* | Princeton	**Aug '24**
Efficient Algorithms for High Dimensional Metrics | *Workshop* | DIMACS, Rutgers, New Brunswick	**May '24**
Bayesian Statistics and Statistical Learning | *Workshop* | IMSI, Chicago	**Dec '23**
Algebraic Statistics for Ecological and Biological Systems | *Workshop* | 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)	*BSc 1st year*	*Prof Manoj Kummini*	Jan – May '22
Algebra I (Linear algebra)	*BSc 1st year - head tutor*	*Prof T R Ramadas*	Sep – Dec '21
Functional Programming in Haskell	*BSc and MSc Comp. Sci. 1st year*	*Prof S P Suresh*	Sep – Dec '21
Probability Theory	*BSc 1st year*	*Prof P Sankaran*	Apr – Jul '21
Discrete Mathematics	*BSc 1st year*	*Prof K V Subrahmanyam*	Apr – Jul '21
Design and Analysis of Algorithms	*MSc Data Science 1st year*	*Prof G Philip*	Apr – Jul '21
Algebra I (Linear algebra)	*BSc 1st year*	*Prof T R Ramadas*	Dec '20 – Mar '21
Functional Programming in Haskell	*BSc and MSc Comp. Sci. 1st year*	*Prof S P Suresh*	Dec '20 – Mar '21

Counselor at PROMYS | Boston University	**Jul – Aug '20, '21**

Talks Delivered

Principal Components along Quiver representations | 1 *talk* | Rutgers course: *Computational Topology*	**Dec '23**
Inference on growth process of a network | 1 *talk* | Rutgers course: *Data Mining*	**Dec '23**
Representations as sections of Line Bundles | 1 *talk* | Princeton course: *Topics in Algebraic Geometry*	**Dec '23**
Complexity of Optimization | 1 *talk* | Rutgers *Pizza Seminar*	**Oct '23**
Complexity of Computing Wasserstein Distance | 1 *talk* | *Apprenticeship Week* at IMSI, Chicago	**Oct '23**
Quiver Reps - geometry & invariants | 1 *talk* | Rutgers *Algebra 'N' Geometry Learning Seminar*	**Apr '23**
Quiver Reps - Intro | 1 *talk* | Rutgers *Graduate Algebra and Representation Theory Seminar*	**Dec '22**
Burnside $p^a q^b$ theorem | 1 *talk* | Rutgers *Graduate Number Theory Learning Seminar*	**Nov '22**
Very basic Lie Theory | 1 *talk* | Rutgers *Graduate Geometry and Topology Learning Seminar*	**Oct '22**
Kneser graph coloring | 1 *talk* | Rutgers *Graduate Combinatorics Seminar*	**Oct '22**
Well definedness of Brauer group | 1 *talk* | Rutgers *Algebra 'N' Geometry Learning Seminar*	**Sep '22**
Fiedler vector method | 1 *talk* | CMI course: *Matrix Computations*	**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 *Student Seminar*	**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 **Jun '23**
Summer school at Leipzig - awarded full travel funding. Only two students from Rutgers Math were fully funded by SLMath.

Academic Excellence Award at Rutgers **Sep '22**
Received a certificate and $100 based on performance in Written Qualifying Exams.

Shriram Scholarship at CMI **'19 – '22**
Received institutional fee waiver and monthly stipend (based on entrance exam).

Ranked 4th nationally at the *Bachelor of Statistics* (B.Stat.) entrance examination **'19**
Indian Statistical Institute (ISI)

Informatics Olympiad **'17, '18, '19**
*Selected among (approx) top 100-130 school students in India in **Zonal Informatics Olympiad** (ZIO).*

Mathematical Olympiad **Jan '18**
*Selected for **Indian National Mathematical Olympiad** (INMO) **Training Camp** \| top 30 school students in West Bengal.*

Program in Mathematics for Young Scientists (PROMYS) **'18, '19, '20, '21**
*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).*

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, Macaulay2, MATLAB
Documentation	LaTeX, Microsoft Word