# Nilava Metya

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## Introduction

Applied mathematician interested in borrowing tools from *convex geometry*, *random matrices*, *optimal transport*, *probability* to algorithmic problems in *machine learning*, especially those that require being robust to uncertain data.

## Education

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

**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)*
***Indian Certificate of Secondary Education (ICSE)*** *2017* | ***Percentage:*** 96.6% — *Howrah, West Bengal, India*
*Position:* ***First*** *in school (∼* 180 *students)*

## Selected Graduate-level Coursework

- Quantum Computation
- Matrix Computations
- Statistics with R
- Algebraic Topology
- Complex Analysis
- Haskell
- Algorithm Design + Analysis
- Algebraic Geometry$^{Princeton}$
- Probability$^{Rutgers}$
- Data Mining$^{Rutgers}$
- Topological Data Analysis$^{Rutgers}$
- Convex Optimization$^{Princeton}$
- Convexities in Banach Spaces$^{Princeton}$
- Random Matrices$^{Princeton}$

## Publications/Preprints

2. **N Metya**, A Sinha. Temporal robustness in discrete time linear dynamical systems. *Submitted*
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**
**Apprenticeship Week: Varieties from Statistics** | IMSI, Chicago — **Oct '23**
**Algebraic Methods in Biochemical Reaction Networks** | MPI, Leipzig — **Jun '23**
**Joint Mathematics Meetings** | Boston — **Jan '23**

## Ongoing projects

**Field size bounds for higher order MDS codes**
**Rank Aggregation problem in the streaming setting**
**Regret bounds in contextual bandits with robustness considerations**

## Academic Visits

**School of Computing, National University of Singapore** | *Prof Jonathan Scarlett* **May-Aug '25**

## Selected Talks Delivered

**An elementary proof of Pisier's inequality** | 1 *talk* | Princeton course: *Convexities* **Apr '25**
**Wasserstein degrees of small toric models** | 1 *talk* | CUNY *Mina Rees Women and Math Conference* **Mar '25**
**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**

## 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 $4^{th}$ 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).*

## Service

**Coffee Hour (departmental socializing)** | *Coordinator* | Rutgers Math Department **Jan '25 -**
**Physics of Learning Theory** (PhyLT) | *Organizer* | Rutgers Math Department **Jan - Apr '25**
**Written Qualifying Exams: Algebra** | *Instructor* | Rutgers Math Department **Jun - Aug '23**
**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