# Nilava Metya

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## Education

**Rutgers, The State University of New Jersey - New Brunswick** — **September '22 – (expected) '27**
***Doctor of Philosophy in Mathematics*** — *New Brunswick, New Jersey, USA*
*(passed through written qualifying exams in first attempt just before program started)*

**Chennai Mathematical Institute** — **August '19 – (expected) April '22**
***Bachelor of Science (Honours) in Mathematics and Computer Science*** | ***CGPA:*** $9.72/10$ — *Chennai, Tamil Nadu, India*
*Position:* ***Third*** *(out of* $55$ *students)*

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

## Graduate Coursework

### Mathematics

- Quantum computation, Matrix Computations, Representations of algebras and quivers, Algebraic Number Theory, Representation theory (reading + research), Algebraic Geometry 2, Homological Algebra
- Complex Analysis, Measure theory and functional analysis
- Probability Theory, Statistics with R
- Differential Equations, Smooth Manifolds, Algebraic Topology

### Computer Science

- Functional Programming (Haskell), Advanced Programming (Python), Object Oriented Programming
- Design and Analysis of Algorithms, Discrete Mathematics, Theory of Computation, Lambda Calculus
- Formal Security Analysis (applied pi calculus, ProVerif, CryptoVerif, F*)

## Relevant Reading Projects

**Quiver representations and invariants** | ***Prof Anne-Marie Aubert*** | Sorbonne University — **June '22**
*Read a paper on quivers by Daniele Faenzi, and learnt relevant topics*

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

**$p$-adic analysis** | ***Prof Anup Dixit*** | IMSc, Chennai — **May - July '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*

**Representation theory of Lie algebras** | ***Prof Apoorva Khare*** | IISc, Bangalore — **May - July '21**
*James E Humphreys's book 'Introduction to Lie Algebras and Representation Theory' (till section 7)*

## Talks Delivered

**Schur-Weyl duality (high-level)** | 1 *talk* | Rutgers *Algebra 'N' GEometry Learning Seminar* — **November '22**
**Burnside $p^aq^b$ theorem** | 1 *talk* | Rutgers *Graduate Number Theory Learning Seminar* — **November '22**
**Very basic Lie Theory** | 1 *talk* | Rutgers *Graduate Geometry and Topology Learning Seminar* — **October '22**
**Knaser graph coloring** | 1 *talk* | Rutgers *Graduate Combinatorics Seminar* — **October '22**
**Well definedness of Brauer group** | 1 *talk* | Rutgers *Algebra 'N' GEometry Learning Seminar* — **September '22**
**Fiedler vector method** | 1 *talk* | Project in a course on matrix computations — **May '22**
**Derivative of $p$-adic Dirichlet series at $s = 0$ (Stark)** | 1 *talk* | Internship with *Prof Dixit* — **November '21**
**Dehn's proof of Hilbert's $3^{rd}$ problem** | 1 *talk* | CMI Student Seminar — **November '21**
**Markov Chain Monte Carlo** | 1 *talk* | Internship with *Prof Ramamoorthi* — **September '21**
**Lie Algebras and Representation Theory** | 3 *talks* | Counselor Seminar at *PROMYS* — **July - August '21**
**Introduction to Hyperbolic Geometry** | 1 *talk* | Counselor Seminar at *PROMYS* — **July '21**
**Introduction to Quantum Computing** | 4 *talk* | Counselor Seminar at *PROMYS* — **July - August '20**

## Teaching and Grading

**Grader** | Rutgers University

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| **Topology** | Sep–Dec '22 |
| **Theory of Numbers** | Sep–Dec '22 |

**Teaching Assistant** | Chennai Mathematical Institute

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| **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 '21**

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## Skills

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| **Languages** | Bengali (mother tongue), English (fluent), Hindi (fluent), German (beginner) |
| **Programming** | JAVA, C++, Python, Haskell, R, HTML |
| **Documentation** | LaTeX |

## Honours and Awards

**Ranked $4^{th}$ nationally at the *Bachelor of Statistics* (B.Stat.) entrance examination** **2019**
*Indian Statistical Institute (ISI)*

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

**Informatics Olympiad** **2017, '18, '19**
*Selected among (approx) top 100-130 school students in India in **Zonal Informatics Olympiad** (ZIO).*

**Shriram Scholarship** **2019 – '22**
*Recipient of Shriram Scholarship at CMI - institutional fee waiver and monthly stipend.*

**Program in Mathematics for Young Scientists (PROMYS)** **2018, '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.
- 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.

## Outreach/Activities

Organized a student seminar at CMI. **October - December '21**

Volunteered to teach Combinatorics at (online) ICO Camp, organized by Codechef. **November '20**

Interacted with students of Don Bosco School, Liluah to spread scientific awareness. **December '19**