

# Neel Umesh Mantri

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## EDUCATION

**DAV Group of Schools (ASSF, formerly TNAES), Chennai**

*Mathematics, Computer Science, Physics, Chemistry, English*

Apr 2018 – Apr 2026

**Indian Institute of Technology, Madras**

*Research Science Initiative - Chennai Summer Program 2025, Mathematics and Sciences*

Apr 2025 – Jun 2025

**Raising A Mathematician Foundation (RAM)**

*RAM Training Program (2022-24), Math.biz (2024), Quantum Wonder 2024, ROOTS 2024*

May 2022 – Present

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## TEST SCORES

**SAT:** 1530 (Math: 800, R&W: 730)

**Cambridge:** CAE C1 Advanced (206/210), (C2 Proficiency) (A Grade)

**AP Scholar with Distinction** — Computer Science A (5), Calculus AB (5), Physics C Mechanics (5), Physics C E&M (4), Statistics (4)

**CBSE 10th:** 99% (Math: 100, Sanskrit: 100, English: 99, Science: 98, Social Science: 98)

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## EXPERIENCE

**Indian Institute of Technology Madras (IIT-M), Chennai**

Apr 2025 – Jun 2025

*Student Intern — Research Science Initiative (RSI)- Chennai Summer Program 2025*

- Selected in the top 40 among over 800 applications
- Over the course of the 6 week long residential program, I engaged in lectures from eminent scientists like [Dr V Balakrishnan](#) and [Dr Mangala Sunder Krishnan](#), laboratory experiments, and independent research project.
- [Project: Partial Differential Equation of Heat Diffusion](#)

**Cognileap Eduventures LLP — Student Intern**

- Developed a Natural Language to SQL Generator using ChatGPT API and Supabase, enabling non-technical users to query databases conversationally
- Helped enhance the project with KNN indexing to provide intelligent, semantic query suggestions based on past queries
- Assisted in developing a full-stack app with Next.js frontend, FastAPI backend and integrated with Supabase
- Helped containerize the backend using Docker and deployed in Render while frontend was hosted on Vercel

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## RESEARCH EXPERIENCE

**[Tana-prastara and Mathematics Behind It](#)**

2025

*Published in [Scientiae Mathematicae Japonicae \(Japanese Journal\) \(E-book Vol 87 2\)](#), presented at AIMER Conference 2025*

- Conducted interdisciplinary research exploring rhythmic permutations in ancient Indian music using combinatorics
- Developed novel approaches to understanding *Tana prastara* and rediscovered factorial number system through *Khanda Meru* (from *Sangita Ratnakara*)

**[Solving Optimization with Grover's Algorithm and Investigating the Oracle Phase](#)**

2025

*Presented at AIMER Conference 2025*

- This research was to analyze if Grover's Algorithm can solve various optimization problems, where Oracle was the main control variable to present the optimization problems also in the form of search problems.
- Dealt with unstructured search, Satisfiability problems (Dinner Party problem, Pathfinding problem) and Countered the claim by [Liu24] "Time Complexity of the Oracle Phase in Grover's Algorithm"

**[Recreational Mathematics in School Curriculum](#)**

2024

*Presented at AIMER Conference 2024*

- Presented benefits of recreational learning and implementation methods in Indian schools

- Demonstrated initial prototype of NUMERICO mathematical board game

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## COURSES / PROGRAMS / WORKSHOPS

- **Math.biz 2024** (Senior Mid Caps) — Under [Dr Hari Ramasubramaniam](#), [Dr Keerti Pendyal](#), [Harish Menon](#) — Introduction to regression and data analytics; Financial Derivatives; Market structures; Data Visualization using R; Mathematical modelling of risk; Introduction to Portfolio Theory; Asset management
- **RAMTP 2022-2024** (Batch D - Advanced) — 2024 - Probability by [Dr Reshma Menon](#); 2023 - Blockchains by [Aadityan Ganes](#); 2022 - Interdisciplinary cum general introduction to Mathematics and proof techniques
- **PACT** (Rutgers/Princeton) — Under [Dr Rajiv Gandhi](#) (Rutgers University Camden) — Discrete Mathematics, Proof techniques, Graph theory, Combinatorics
- **Vedic Mathrix 2024** under [Vinay Nair](#) — Introduction to ancient Indian musicology
- **Quantum Wonder** — Under [Dr Hariom Jani](#) (Oxford University) — Fundamentals of Quantum Mechanics, Expository research on "Scanning Tunneling Microscope"
- **AI in Physics Workshop** — Indian Association of Physics Teachers (IAPT)
- **Educational Games Development Workshop** — Aarhus University Denmark, European Conference on Games Based Learning (ECBGL)

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## HONORS & AWARDS

- **Best Outgoing Student** (DAV Boys Senior Secondary School, Gopalapuram, 2025)
- Received a letter of appreciation from **Prime Minister of India** Shri Narendra Modi ji congratulating for accomplishment in Pariksha Pe Charcha
- **Bebras Computing Challenge:** All India Rank 3 (2022), All India Rank 2 (2023, 2024)
- **Technothon by IIT Guwahati:** All India Rank 2 Prelims, 2nd place Crowned Quest Mains 2024
- **NUMERICO:** 1st place International Educational Games Competition (ECGBL, Denmark, 2024) - Only Indian student; 2nd place KVRSS Spark Innovation Ganitam Awards (All India)
- **Stanford Math Tournament 2025** (Honourable Mention)
- **World Scholar's Cup:** 24 gold medals, 10 silver medals, 5 trophies (Chennai Regionals 2022-24, Dubai Globals 2022)
- **Model UN Awards:** 5 Best Delegate awards (GMUN'24, IMUN'23/'24, PSMUN'23, SANMUN'23), 5 High Commendations, 2 Special Mentions
- **Debate:** 2nd place Rhetoric'23, Semi-finalist Tamil Nadu Debating Championship (IIT Madras), ISDC (Indian Schools Debate Competition) Selection
- **Academic Competitions & Olympiads:** Aryabhatta Math Olympiad Gold Medalist and Merit Receiver, Top 900 in India for International Mathematics Olympiad selection, Top 50 in India for International Linguistics Olympiad selection, 2nd place Science & Technology Quiz (TN Govt), PiMO Rank 1 (4000+ students), Ramanujan Math Competition (Merit Holder)
- **Creative Writing:** 3rd place Government of India Essay Writing Competition, Fever Junior Championship Best Performer in State
- **Competitions:** Quarter-finalist Climate Science Olympiad, Top 32 in G20-THINQ 2024 (The Indian Navy Quiz)

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## SOCIAL SERVICE

[Blue Cross of India](#) — *Volunteer*

*Oct 2021 – Present*

- Trained in tactical animal rescues and darting techniques; contributed to 100+ rescues
- Assisted in crematorium records, token organization, cattle shed and puppy kennel maintenance
- Volunteered for 500+ hours
- [Recognized as the Best Volunteer of the Month \(Oct'24\)](#)

[Raising A Mathematician Foundation](#) — *Student Volunteer*

- Volunteer for ROOTS Camp: aiding faculty, managing sessions, writing synopses, clearing student doubts, mentoring students *Nov 2024*
- Invited to Volunteer for All Girls Maths Nurture Camp (AGMNC) *Dec 2025*

### Reap Benefit — *Student Volunteer*

*Jun 2022 – Sep 2022*

- Conducted neighbourhood heroes' survey and COVID impact interviews with Inner Wheels Club

## LEADERSHIP & INVOLVEMENT

- **MUN Chairperson:** Co-Chair IIMUN 2024 (largest committee Niti Aayog), Chair HeartsMUN 2024, Main Chair VMEMUN 2023 (80+ delegates), Co-Chair ChinMUN 2023 (ICC), Guest Chairperson UNIO AMJMUN 2024
- **MUN Secretariat:** Head of Editorial/Content - Kartavya MUN, Ethereal MUN, Delcor MUN 2024, Ascent MUN 2025
- **Chhatra Salaahkaar Veer Badge Holder** (2024-25): Student Advisor
- **Master of Ceremony:** Annual Athletic Meet DAV Group of Schools (8 schools, 2023)
- **Club Leadership:** Math Club (organized talk shows), Quiz Club, Health Club judge, Computer Science Club Meetups Organizer, Linguistics Club (founder), Debate Club (founder), Astronomy club

## PROJECTS & INTELLECTUAL PROPERTY

- **NUMERICO Board Game**
  - Applied for Copyright (in India)— Under Review
  - Winner of International Educational Games Competition 2024 (EDGBL, Denmark)
  - Designed educational math board game teaching mathematical concepts through gameplay
- **Differential Heat Equation**
  - Done under guidance of [Prof. Dr. Venkatabalaji TE](#)
  - This report examines the derivation, solutions and various applications of the partial differential heat equation.
  - It derives the heat equation in n-dimensions, and shows solutions through two different methods- Fourier Series and Finite Difference Method.
  - There is also a Python code involving the Explicit method graphing temperature distribution over time.
  - Exploring the real life applications, using Wolfram Mathematica, we have critically simulated, modelled and analyzed heat flow in various parts of an automobile.
  - We have modified the heat equation by adding the terms of advection and vorticity heating.
- **AI Powered Vaping Detection Device:** Design Patent (in India) — Under Review
- **Mars Self Sustaining Eco System model:** 3rd in state in exhibition at Tamil Nadu Science and Technology Centre
- **Enhanced Weathering:** 2nd place in Eco Fair

## SKILLS & INTERESTS

**Programming:** Python, HTML, CSS, JavaScript — **Tools:** Mathematica, LaTeX, Git, Qiskit

**Languages:** English, Hindi (Native); Tamil (Professional); Marathi, Marwari, Sanskrit

**Music:** Self-trained flutist (performances at RAMTP, Math.biz, World Scholars Cup, school events and volunteering in Blind Schools and hospitals)

**Sanskrit:** 100% CBSE Board Exam Class 10, Distinction in Praveshaha & Parichayaha exams

**\*ALL BLUE LINKS ARE CLICKABLE\***