S M A Nahian

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Education

Massachusetts Institute of Technology **August 2025 – May 2029**
Bachelor of Science — Undeclared *Massachusetts, USA*
Activities: HackMIT; Member of the MIT A team in Collegiate Chess League (Fall 2025)
Relevant Courses: Randomized Algorithms (6.5220/6.856J/18.416J)

Dhaka College **February 2023 – October 2024**
Higher Secondary Certificate, Science (Grade: 5.00/5.00) *Dhaka, Bangladesh*

Shamsul Hoque Khan School and College **January 2017 – November 2022**
Secondary School Certificate, Science (Grade: 5.00/5.00) *Dhaka, Bangladesh*

SDS Academy **January 2011 – December 2016**
Primary Education Completion (Grade: 5.0/5.0) *Shariatpur, Bangladesh*

Honors & Awards

Iranian Geometry Olympiad (IGO): Silver Medal (Free Level, 2024, Country Rank #1); Bronze (Advanced, 2023, Country #1, World #52); Bronze (Advanced, 2022, Country #1, World #21); Silver (Intermediate, 2021, Country #2, World #29); Silver (Intermediate, 2020, Country #1, World #20).

International Mathematical Olympiad (IMO): Bronze Medals (2024 Country #2 World #252; 2023 Country #1 World #145); Honorable Mention (2022). Represented Bangladesh 3 consecutive years.

Asia Pacific Mathematical Olympiad (APMO): Silver Medals (2022, 2023); Bronze Medal (2024); represented Bangladesh 3 consecutive years.

Iranian Combinatorics Olympiad (ICO): Bronze Medal (Advanced Category, 2021, Country Rank #1, World #30).

Bangladesh Junior Science Olympiad (BdJSO): 1st Place National Round (2021).

Science Olympiad (National Science & Technology Week): 1st Prize (2020); District Champion (2019, 2020).

Asia Pacific Informatics Olympiad (APIO): National Finalist (2024) — Ranked 5th in Bangladesh, 210th worldwide.

ICPC Asia Dhaka Regional (2023): 6th Place overall as guest high school team (Team IOI1).

Bangladesh Olympiad in Informatics (BdOI): Bronze Medals (2023 Ranked 4th nationally; 2024 Ranked 5th nationally).

Father Timm Memorial Programming Contest (FTMPC): Bronze Medals (2023, 2024).

USACO Gold Division (Promoted January 2023).

Champion of the Champions (BdMO): 2021–2024; **National Winner** (2016, 2017, 2019).

STAR Scholar – Search for Talented Ramanujans (2023) with $500 prize for excellence in problem solving.

Arena FIDE Master (AFM) title awarded October 2024 by FIDE.

Master Rank at Codeforces: Achieved Aug 2024 (Max Rating 2100+), top 1%.

Merit-Based Govt. Scholarship – SSC 2022 (Nov 2022) and PEC 2016 (Feb 2017), Talentpool category.

3rd Place – Astrophysics Contest (Gonitzoggo, Oct 2020).

Skills

Programming/Scripting Languages: Python, C++, C, Rust, PHP, Java
Technologies/Frameworks: Linux, GitHub, Flask, Verus, MongoDB

Test Scores

TOEFL iBT: 103 / 120 (October 2024)
Duolingo English Test: 130 / 160 (December 2023)
SAT: 1500 / 1600 (December 2023)

Languages

Bengali: Native or bilingual proficiency
English: Professional working proficiency
Hindi: Elementary proficiency

Experience

Cybersecurity at MIT Sloan (CAMS) **September 2025 – Current**
Undergraduate Research Assistant *Massachusetts, USA*

- Developing graph-based models to analyze and minimize risk propagation in AI supply chains.
- Designing optimization methods to identify the most critical components to harden, sign, or verify for maximum security impact.

Beneficial AI Foundation **September 2025 – Current**
Undergraduate Research Assistant *Massachusetts, USA*

- Working under Prof. Max Tegmark on formal verification.
- Contributing to Dalek-Lite, a Rust-based fork of dalek-cryptography/curve25519-dalek, aimed at the formal verification of elliptic-curve cryptography using Verus. GitHub: `Beneficial-AI-Foundation/dalek-lite`

Mercor **July 2025 – August 2025**
Mathematics Expert (Olympiad) — Contract *Remote*

UC Irvine **October 2023 – August 2025**
Research Collaborator — Graph Theory (Internship) *Irvine, California, USA (Remote)*

- Conducted research under Prof. Wayne Hayes focused on graph theory and network analysis.
- Contributed to a tool used in biological and computational network research.
- Worked on algorithm design and performance optimization.

Gonitzoggo **August 2023 – July 2025**
Internship *Bangladesh, Remote*

Engineering Team Member *September 2024 – July 2025*

- Built key features and redesigned contest UI and logic for version 3, improving usability.

Developer *August 2023 – September 2024*

- Identified a major security flaw and was recruited as a developer after reporting it.
- Built key features, including author credit system for contests and profile picture cropping.
- Simplified contest page UI and button logic for improved usability.

Research

BLANT Project (Under Prof. Wayne Hayes, UCI) **October 2023 – August 2025**

- Developed a method to estimate absolute graphlet counts from relative concentrations using star-motifs
- Derived normalization formulas for two existing sampling methods: NBE (Node-Based Expansion) and EBE (Edge-Based Expansion), making them usable in practice with reduced statistical noise
- Improved the α-computation algorithm in MCMC sampling, reducing runtime from hours to seconds for k=8

Publications

The Unseen Connections: Link Prediction via Pattern Matching in Large Networks | *Cell Press Patterns* (under review)

- Worked with Prof. Wayne Hayes to develop BLANT-Predict, a topology-based link prediction model using higher-order graphlet structures that outperforms 13 state-of-the-art methods on large real-world networks.
- Introduced a novel "time-travel" evaluation framework for realistic forecasting.

Projects

dalek-lite | *Rust, Verus* **September 2025 – Present**

- Contributing to a formally verifiable Rust fork of curve25519-dalek by specifying and verifying scalar/field operations, enforcing limb-boundedness and modular invariants, and ensuring constant-time behavior for end-to-end ECC verification. GitHub: `Beneficial-AI-Foundation/dalek-lite`

BeatVote | *Python, Flask, MongoDB, Chrome/Brave Ext* **September 2025**

- Built a collaborative karaoke/party music room platform at HackMIT 2025 with secure login/guest access and real-time queue updates to keep every room in sync. GitHub: `SMANahian/BeatVote`
- Implemented a YouTube Data API proxy and a companion browser extension that pins the host room, drives playback in dedicated tabs, and adds an in-page player toggle.

BLANT: Basic Local Alignment of Network Topology | *C, C++, Python* **October 2023 – August 2025**

- Improved graphlet-sampling methods and performance under Prof. Wayne Hayes; details in Research. GitHub: `waynebhayes/BLANT`

Chess Analyzer | *Python, Chess* **June 2025**

- Analyzes a player's PGN game history to detect recurring opening mistakes and automatically generates replayable practice positions for those errors. GitHub: `SMANahian/chess-analyzer`

ssehC | *C, Chess* **September 2024 – April 2025**

- Built a chess engine from scratch in C with move generation, evaluation, and minimax with alpha-beta; deployed as a Lichess bot that achieved a 2000+ rating. GitHub: `SMANahian/ssehC`

Spotify Addon (Synced Lyrics for Spotify) | *Java* **February 2024**

- Expanded a Java-based lyrics widget by integrating the lrclib.net synced-lyrics API, formatting output for the app's UI/timing engine, and contributing changes upstream. GitHub: `LabyStudio/spotify-addon`

CP Calendar | *Python, Flask* **February 2022**

- Customizable calendar that aggregates 120+ competitive programming contest feeds via Clist API; supports keyword/platform filters and personal .ics generation for Google Calendar sync. Live: `cpcalendar.pythonanywhere.com` GitHub: `SMANahian/cp-calendar`

Extracurricular Activities

Bangladesh Mathematical Olympiad (BdMO) **February 2022 – November 2025**

Academic Team Member & Mentor *Bangladesh*

- Volunteer mentor for national and junior math Olympiad camps.
- Conducted advanced classes and discussion sessions; mentored students in algebra, geometry, and combinatorics.
- Prepared problem sets and handwritten lecture notes; coached students who qualified for national teams and higher rounds.

Gonitkonya — Bangladesh Girls' Mathematics Foundation **March 2022 – May 2025**

Academic Team Member *Bangladesh*

- Taught and mentored female Olympiad participants in national and EGMO-focused camps.
- Trained Bangladesh's EGMO teams in 2022, 2023, and 2024; conducted live sessions and mock tests.
- Authored 10+ original problems; worked to increase female representation in high-level math competitions.

Thonk & Code **September 2024 – March 2025**

Co-Founder & Mentor *Bangladesh*

- Launched an initiative to support beginner and intermediate students in the Bangladesh Olympiad in Informatics (BdOI).
- Created structured curriculum and content; promoted a mentorship culture within the BdOI community.

NEMOP **August 2024 – August 2025**

Founder *Bangladesh*

- Year-long online mathematics training program inspired by India's OMC to prepare Bangladeshi students for IMO.
- Designed weekly problem sets and biweekly exams; taught advanced topics and Olympiad strategies.

Somantoral Magazine **September 2023 – December 2024**

Web Developer & Content Writer *Bangladesh*

- Contributed articles and web features to a student-run math magazine focused on accessible advanced topics.

Gonitzoggo **May 2022 – August 2024**

Academic Team Member & Tutor *Bangladesh*

- Created Olympiad-level problems and taught in online courses and practice programs for national Olympiad students.

Shamsul Hoque Khan School & College Scout Group **January 2017 – January 2018**

Scout *Dhaka, Bangladesh*

- Participated in school scout camps and community volunteering; developed teamwork and leadership skills.