

Kartik Ramachandrula

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Education

Brookfield Central High School **Fall 2021 – present**
High School Diploma *GPA 4.88/4.0*

UW-Oshkosh, MSOE, Marquette, UWM-Milwaukee, UMN Twin Cities **Spring 2022 – present**
Dual Enrollment (Early College Credit Program) *GPA 4.00/4.00*

(Coursework and certifications: <https://kartikramachandrula.github.io/files/coursework.pdf>)

Programming Experience

Java, Python (+PyTorch, TensorFlow), Julia, MATLAB, Octave, HTML/CSS, JavaScript, L^AT_EX

Achievements

Selected Achievements

U.S. Physics Team: qualified April 2023

USA Physics Olympiad Gold Medal: awarded May 2024, Bronze in 2022

USA Math Olympiad Bronze Medal: awarded March 2024

USA Junior Math Olympiad Winner: awarded May 2023, HM in 2022, qualified 2021–2023

International Physics Brawl Online 2nd (USA), 5th (International): awarded November 2023

FIRST Tech Challenge WORLDS Championship: qualified April 2022

USA Computer Science Olympiad: Silver Medal: awarded in March 2022

National Science Bowl Finalist: awarded 2019, 2020, 2021, ranks 2nd, 3rd, 16th

1st Degree Blackbelt Taekwondo: awarded by Martial Arts United, August 2018

Grants & Scholarships

Emergent Ventures \$5,000 Grant: awarded by Mercatus Center, spring 2024

Scores

SAT: 1600, ACT: 36.

Selected Experiences

Research and Internships

CEE Research Summer Institute: Particle Physics Research *June – August 2024*

MIT PRIMES-USA: Mathematics Research Track *January 2024 – present*

Physics-Informed Neural Networks in complex biological system modeling. Directed by Prof. Lu Lu.

Skills: Python (PyTorch, TensorFlow), ML (Various NNs), Identifiability Analysis, MATLAB, Julia, L^AT_EX

Wisconsin IceCube Particle and Astrophysics Center: Research *September 2021 – May 2023*

Signal and event reconstruction of Neutrino interactions using Stochastic Resonance. Directed by Dr. Jim Madsen.

Skills: Linux, Excel, Python (PyTorch), Machine Learning (GNNs), Mathematical Modeling, Neutrino Physics

Code the Way Inc.: Software Engineering Internship *June – August 2022*

Full-stack SW intern, building an application for non-profit organization Lead2Change.

Skills: HTML/CSS, JavaScript (React.js, node.js), Agile Methodology, SQL, UI/UX Design, Source Control.

Programs

Program in Mathematics for Young Scientists (PROMYS): Boston University *summer 2023*

Focused on Abstract Algebra, Analytic Number Theory, Algebraic Number Theory. Attended numerous advanced seminars (e.g Riemann Mapping, Category Theory, Topology) and completed project on "Enumeration of Rational Tuples".

Directed Reading Program (DRP): University of Wisconsin Madison *fall 2022*

Spent 16-weeks learning about Symmetric Functions and Combinatorics under Ian Seong. Presented readings.

Putnam Problem Solving Team: Marquette University *fall 2022*

AMSP Student: AwesomeMath Summer Program *summer 2022, 2021*

Courses: Algebra 3.5, Combinatorial Arguments, Number Theory 3, and Computational Geometry.

IceCube Collaboration: Research Experience for High School Students *spring 2022*

Participated in 8-week seminar series on Neutrino physics and computation. Developed a Python simulation and GUI of a simplified IceCube detector system with neutrino cascade detection and reconstruction.

Teaching and Outreach

NorthSouth Foundation: Youth Team Lead, Event Head, Instructor, Proctor *2019 – present*

Taught Math, Science, Python (~ 150 students, 4 years, over 400 hours). Organized workshop, seminars, and contests (more than 600 attendees, over 75 hours). Leader in the National Bee Book creation.

Online Physics Olympiad: Problem Writer *2024 – present*

Create difficult problems (on the International Physics Olympiad level) for advanced high schoolers and undergraduate students with over 5000 students across 50 countries in the largest online physics contest.

Freelance: Science Bowl Problem Writer *2023 – present*

Write difficult Science Bowl questions in Math, Physics, and Energy for 2023 MOSFET Science Bowl.

FTC Team GEARheads: Computer Outreach Project *2021 – 2023*

Collected over 130 old computers and refurbished/donated 40 to local teams, a hospital in Honduras, and schools in Kenya.

Wisconsin Hills Middle School: Math Team Coach *2021 – 2022*

Coached ~ 40 students competitive math. Team placed 3rd at state MATHCOUNTS, 1 National Finalist, 2 State Top 10 finishes. Multiple awards in MathLeague, AMCs, and Purple Comet as well.

Activities and Hobbies

Robotics: First Tech Challenge, Team 16460 GEARheads, Software Lead *2017 – 2023*

I served as the Software Lead, Robot Driver Coach, Game Strategist, and Computer Outreach Co-lead.

Science Bowl: Brookfield Central Club President and A Team Co-captain *2021 – present*

I serve as the BCHS Science Bowl club President, co-captain of the team, and lead in Math, Physics, and Computer Science. Our achievements as a team/club are: National Science Bowl Finalist 2nd, 3rd, and 16th (2019 - 2022), MIT Science Bowl 4th (19), Prometheus Science Bowl National 3rd, 5th (22, 23), Local 1st (23), Lake Sturgeon Ocean Bowl 1st (23), ESBOT Science Bowl Top 8 (22), SMH Invitational 2nd (23), National Science Bowl Association Top 8 (22, 23).

Tennis: Brookfield Central High School Varsity Reserve Team *spring 2022 – present*

Languages: Telugu, Sanskrit, Latin, Hindi

Fluent in Telugu. Proficient in Sanskrit and Latin. Elementary knowledge of Hindi.