Vansh Arora

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EDUCATION

DUBAI INTERNATIONAL ACADEMY, Dubai, UAE; **2025–Present**
International Baccalaureate Diploma Programme, Grade 12;
HL: Mathematics AA, Physics, Chemistry, Business Management • SL: English Language & Literature, Spanish

DUBAI INTERNATIONAL ACADEMY, Dubai, UAE; **2023–2025**
International Baccalaureate Middle Years Programme

STANDARDIZED TESTS AND APS

- **SAT:** Composite **1600/1600** — Math **800**; Evidence-Based Reading & Writing **800** 2025
- **AP Examinations:** Computer Science A **5**; Environmental Sciences **5** 2025

ACADEMIC HONORS AND AWARDS

School:

- IB Predicted Score of **45/45** in Grade 12 2025–2026
- Academic Excellence Award for achieving **41/42 IB** points in Grade 11 2025–2026
- Subject Achievement Awards in Mathematics: Analysis and Approaches HL, Physics HL, Chemistry HL, Business HL, and Spanish ab initio SL 2025–2026
- Subject Effort Award in English: Language and Literature SL 2025–2026

National & International:

Physics:

- **Team UAE — International Physics Olympiad (IPhO): National Rank #1 / 2,100+** in the UAE Physics Olympiad; selected to represent the UAE as a **member of the national IPhO team.** 2026
- **Physics Bowl (USA): #1 in Asia**, #21 globally (39/40), and **#1 in the UAE** among 10,000+ participants worldwide. 2026
- **British Physics Olympiad:** Awarded Gold distinction and the **highest score in the country**. 2025
- **Sir Isaac Newton (SIN) Physics Competition: Country Rank #1**, World Rank #68 / 3,000+ participants. 2025

Mathematics:

- **UKMT Senior Mathematical Challenge → BMO1 → BMO2:** Scored 117/125 (Gold distinction) among 700,000+ participants; qualified for British Mathematical Olympiad Round 1 (top 1–2%), advanced to Round 2 (**top 0.02% internationally**), earned a Distinction in BMO2, and received an **invitation to Oxford University.** 2025–2026
- **Team UAE IMO Pipeline: National Rank #2 / 2,100+** in the UAE Mathematical Olympiad; selected as **1 of 10 students nationwide** for the UAE IMO training camp. 2025-2026
- **Fermat Mathematics Contest (University of Waterloo, CEMC): Perfect score 150/150**; **Global Rank #1** among 14,670 participants; Distinction Honour Roll (top 0.1%). 2026
- **World Math Invitational (WMI):** Gold Award; **World Rank #10, Country Rank #1**; invited to the WMI Global Finals in Tokyo. 2026
- **Asian Mathematics Olympiad (AIMO): Gold Award with a perfect score** and Gold Honors; **Rank #1 / 3,500+ students**. 2026
- **Singapore & Asian Schools Math Olympiad (SASMO):** Gold Award, placing within the top 8% of 66,000+ participants worldwide. 2026

Chemistry:

- **Team UAE IChO Pipeline: National Rank #3 / 2,100+** in the UAE Chemistry Olympiad; selected among the nation's top performers for IChO training and international selection preparation. 2025-2026
- **Avogadro Chemistry Examination: Country Rank #2**, World Rank #60 / 6,000+ participants. 2026

Robotics — FIRST Tech Challenge (FTC):

- **Multinational Tech Invitational (MTI),** Johns Hopkins Applied Physics Laboratory — invitation-only elite international FTC event.

- **Michiana Premier FTC Event:** selected among ~96 elite teams from around the world.
- **FTC UAE Nationals:** Inspire Award (FTC's highest overall team award) and Control Award.
- **FTC European Premier Event:** Connect Award (4th), Inspire Award (5th), and Control Award (6th).
- **FTC Kazakhstan:** Runner-Up Robot Design Award and International Excellence Award.
- **FTC Australia:** 2nd Place Robot Design Award and Compass Award.
- **FTC Powerplay:** Runner-Up Inspire Award and 1st Alliance Pick.
- **FTC Skystone:** Control Award. Dubai First Offseason: Connect Award.

RESEARCH AND INNOVATION

Independent Research - Computational Aerodynamics Research **May 2025–Present**

- Developed and optimized CFD workflows in **ANSYS Fluent** to investigate aerodynamic drag reduction using parametric rear-end vehicle geometry and spoiler optimization.
- Designed and evaluated large-scale simulation studies, performing validation, mesh-independence analysis, and data-driven optimization to identify configurations achieving a **14% reduction in aerodynamic drag**.
- Exploring the application of computational modeling, optimization, and AI-assisted engineering workflows to accelerate design-space exploration and engineering decision-making.

Independent Researcher – Urban Environmental Fluid Dynamics **2025 – 2026**

- Developed a Python-based lattice Boltzmann simulation framework to model urban airflow and pollutant transport, emphasizing reproducible scientific computing and modular software design.
- Implemented coupled fluid-flow and scalar-transport solvers, validated against wind-tunnel benchmarks through verification and grid-convergence analysis.
- Exploring the integration of computational modeling and AI-driven analysis to improve simulation efficiency and scientific insight; preparing the project for open-source release and peer-reviewed publication.

Smart HVAC Air-Quality & Worker-Safety Monitoring System — Passion Project **2025 – 2026**

- Designed and built an ESP32-based environmental monitoring system integrating CO_2 (SCD40), VOC / temperature / humidity (BME680), carbon monoxide (MQ-7), particulate (PMS5003), and oxygen sensors for confined HVAC and industrial spaces.
- Implemented real-time hazard detection with tiered buzzer alerts and WiFi / MQTT cloud telemetry—live dashboards, historical logging, and device-health monitoring for worker-safety use cases.
- Recognized by **Aga Khan Foundation** & **Received CREST Gold Award** for technical rigor and real-world impact.

INTERNSHIPS AND PROFESSIONAL EXPERIENCE

Ford Motor Company — Engineering Job Simulation **December 2024**

- Completed an EV-engineering simulation on battery technology and PID-controller tuning for Ford's electric-vehicle team.
- Visualized data in Excel to analyze the relationship between battery chemistries and capacity, and reviewed Python code for PID tuning to understand its role in improving control accuracy.

GE Aerospace — Engineering Job Simulation **July 2025**

- Advised on alternative energy sources for propulsion systems, comparing cost, energy density, and storage requirements and how they affect design decisions.
- Researched bypass and compression ratios and their impact on turbofan design (fan diameter, noise, materials, emissions); built a technical presentation to guide next-generation propulsion decisions.

Automation Intern — ShortHills AI **2025–2026**

- Helped build an automated parts / tyre search-and-sourcing process for an automotive company, streamlining a previously manual procurement workflow.

LEADERSHIP AND INITIATIVES

President — UAE RoboClub **2024–Present**

- Led an international robotics and STEM-education initiative impacting 4,000+ students across 52 schools in 12 countries.
- Directed operations, curriculum development, mentorship programs, and technical workshops; collaborated with six international NGOs to widen access to robotics and engineering education.
- Coordinated 6,000+ cumulative training hours in programming, robotics, and STEM; recognized with the **Diana Award** for leadership and community impact.

Apple Swift Coding Program & WWDC **2024–Present**

- Selected through a highly competitive Apple Swift coding competition (**200 / 5,000+ students**); developed iOS applications with mentorship from Prof. Fauwad and Apple software engineers.
- Invited as one of a select few students to Apple's **Worldwide Developers Conference (WWDC)**; achieved a 90% certification score and continued building as an ongoing project.

Deputy Secretary-General — DIA Model United Nations (DIAMUN) **2021–2026**

- Serving as Deputy Secretary-General for one of the largest MUN conferences in the MENA region (800+ delegates from multiple schools and countries); member since Year 7 (2021), DSG from 2025.
- Directing conference-wide operations — committee management, chair coordination, logistics, and delegate affairs — working with the Secretariat to oversee execution and improve the delegate experience.

President — Student Council, Dubai International Academy **2025–2026**

- Elected from the whole cohort to lead student governance, represent the student body, and drive school-wide initiatives.

ROBOTICS — FIRST TECH CHALLENGE (FTC)

FIRST Tech Challenge (FTC) **2023–Present**

Captain, Builder, Programmer & Outreach Lead

- Led engineering, programming, outreach, and competition strategy for an internationally competitive FTC team; designed and optimized robot systems for autonomous and driver-controlled performance.
- Competed at UAE Nationals, FTC Premier events, and international invitationals hosted at leading research institutions, including Johns Hopkins Applied Physics Laboratory.
- Managed sponsorships and outreach, raising $20,000+ in funding and leading community STEM initiatives (see Honors for the full competition award record).

COURSES

Carnegie Mellon University:

- **Matrices and Linear Transformations (21-241) —** Final grade 95%.
- **Principles of Computing (15-110) —** Grade B (88%).

University of California, Berkeley (Extension):

- **Statistics —** Grade B.

LANGUAGES

Fluent in English and Hindi; Spanish (ab initio), Arabic

SKILLS AND INTERESTS

- **Programming Languages:** Python, Swift, and Java.
- **Engineering & CAD:** Fusion 360 and SolidWorks (3D modeling and robot mechanical design), rapid prototyping, and control-systems design.
- **Robotics & Hardware:** FTC robot build and programming, autonomous systems, sensor integration, PID control, and ESP32 / IoT embedded systems.
- **Interests:** Computational fluid dynamics, environmental and mechanical engineering, and embedded systems.