

# TARANA RANGWALA

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## EDUCATION

Ahmedabad International School, Ahmedabad, India;

- International Baccalaureate Diploma Program, Grade 12;

- Cambridge IGCSE Board Examination, Grade 10

2012 - Present

2025 - Present

2022 - 2025

## STANDARDIZED TESTING

SAT (1st Attempt) - Total Score 1560

Math 800 | Evidence-Based Reading and Writing 760

23 Aug 2025

## ACADEMIC HONOURS AND AWARDS

• Topper of Grade 10 with 8 A\*s in IGCSE Board Examination

2024 - 2025

• IGCSE - International Certificate of Education with Distinction

2024 - 2025

• Certificate of Distinction and School Champion Award - Fermat Contest (MATH), University of Waterloo

Feb 2026

• Certificate of Distinction - Avogadro Exam Contest (CHEM), University of Waterloo

May 2026

• Gold Award Winner, Hong Kong International Math Olympiad (HKIMO)

May 2026

• Certificate of Distinction - ISE 1, Integrated Skills in English, Trinity College London

2023

• School level Gold Medalist () and Silver Medalist () in National Olympiad for English, Math and Science

## PROJECT ADOPT-A-QUEEN (PAQ) INITIATIVE AND OUTREACH

2025 - Present

PAQ is a Biodiversity-oriented Agritech startup that has helped sustain the backbone of my state, Gujarat, by providing beehives to farmers that pollinate crops, and promoting the growth of healthy food and honey. They also help monitor and track hive health and environment through their sensing technology which is integrated in these beehives. Since farmers cant afford the beehives, the company has implemented the most innovative financial model where they seek donation from individual and corporates to adopt these beehives which are then given to farmers free-of-cost. In return, donors get honey and organic produce produced through PAQ network of farms. (<https://projectaq.org/>)

*My involvement & impact:*

• Helped PAQ with strategy of raising donor funds through CSR (Corporate Social Responsibility). Worked on presentation and other collaterals needed to reach out to local corporates. Have reached out to ~15 corporates, made presentations. Targeting to raise funds for 20 beehives.

• Key member of PAQ for Youth programs to spread awareness around importance of bees for environmental preservation by conducting events in local schools.

## STEM EXPERIENCES & RESEARCH

*Innovation:*

**Project Adopt a Queen Technology Research**

2025 - 2026

B469 is a patented handheld analyser developed by PAQ that reads any solid or liquid in under a second — verifying purity, authenticity and quality without reagents or destruction. It helps recognize farmers who grow better.

I worked with PAQ technology team to expand usage of its device to marine health monitoring.

*Internships:*

**Harsha Engineers International Limited, Ahmedabad, India** ([www.harshaengineers.com](http://www.harshaengineers.com))

2025- 2026

Harsha Engineers International Limited is a distinguished manufacturer and exporter of precision bearing cages and high-precision components with a strong global presence. Worked on three design engineering projects:

- Study the development of Laser Cladding process to achieve optimal cladded surface & analysis of failure modes to achieve stable and consistent cladded surface for the wind bear box shafts.

- Study of designing automated part feeding system for high-speed machine by using pick and place arrangement — understanding design approach and mechanism to achieve automation of safe part loading at high speed.

- Designing a cam system to convert rotary to reciprocating motion and understanding design principle of motion and geometry in the process.

*Leadership:*

Editor of July '26 Edition of **Sense N' Science : Science magazine published by Ahmedabad Intl School**

2026

Led the team, contributed to topics selection and outline for the magazine, written articles, worked with given timelines

*Research:*

2025-2026

**Fourier Analysis and Prediction of Piano and Violin Overtones for use in Music Production**

Decomposed the A4 (440 Hz) tone of a piano and violin into its constituent harmonic amplitudes, using results to predict the combines overtone spectrum when both instruments are played together, treating the relative phase of each harmonic to determine constructive and destructive superposition. Compared the overtone prediction with audio of the two instruments playing together to determine the accuracy of the prediction model. Discovered further applications in music production, specifically additive synthesis and equalisation of instruments to improve the quality of music when tracks of different instruments are recorded separately.

*Independent Experimentations:*

2026

**Dissolved Oxygen (DO) Content in Seawater** - Quantified how the equilibrium solubility of oxygen gas in seawater changes at different salinities via Winkler's Titration. Linearised the data with the Setschenow relation and extracted the salting-out constant along with propagated uncertainties.

**Investigation and Application of a Conical Pendulum** - Discovered the linear relationship between angular speed and string length in a conical pendulum swinging with circular motion of a constant radius. Findings applied to resonance tuning in pendulum wave-energy harvesters to determine which length corresponds to the time period resonant to natural ocean wave frequency.

**Investigation and Application of a Conical Pendulum** - Modelled the forewing outline using Lagrange interpolating polynomials for the upper and lower margins, integrating to find the enclosed area and quantifying uncertainty. Discovered the connection between the calculated area model to a flapping-wing robot design and used findings to optimise the weight and cost of producing such a device

*Summer Program:*

2026

**Imperial College London** - Imperial Global Summer School & Innovation Challenge

Applied advanced and practical physics knowledge from a rigorous academic programme to solve a pressing world problem in the course's extremely unique Innovation challenge. Leading and collaborating with students of different backgrounds and discipline in order to solve sustainability and health problems through engineering design and biotechnology.

## MARINE CONSERVATION & BIODIVERSITY PURSUITS

**University of California**, San Diego, USA

2024

*Ocean Ecosystem Dynamics Course at Scripps Institute of Oceanography* -The course was a fundamental part of my realisation of my love for STEM, physics and mechanical engineering, and its broad application in the design and operation of ROVs and other forms of underwater research devices.

**Project Loggerhead**, Ahmedabad International School

2024 - 2025

*An Initiative inspired by Citizen Science to collect underwater photographs* - Building a website for where anyone can upload geotagged underwater photographs. The technology features an underwater colour conversion card that the algorithm uses as a critical reference point during user input analysis to distinguish species from one another and provide a LIVE database of new and endangered species.

**Graphic Novel on Ocean Exploration**, San Diego, USA

2024

During my time at the Scripps Institute of Oceanography, developed a graphic novel for children about the importance and excitement of ocean exploration in a way that they appreciate

## MUSICAL ACHIEVEMENTS

*Singing, Playing instruments, Music and Lyrical Composition from the age of 7*

*Instruments:* Harmonium, an Indian Classical instrument; Piano; Guitar

Learning both Indian Classical and Western forms of music has taught me to think about what's unique about my own heritage, and what we have in common with other parts of the world. It has also taught me to ask unending questions, because music is nothing if not a science parading around as an art.

## MENTORING

**Phnom Penh, Cambodia**

2025

Volunteer Mathematics Teacher for Primary school children; organised and taught curriculum to 100+ students per day and led their final showcase; Taught students of ages ranging from 6-12 with varying levels of experience & confidence.

**Family mentor**

2022 - Present

Took responsibility for the mentoring, guiding, and supporting my younger cousin before, during, and after her move to my city from the United States; using critical thinking skills, helping her adjust and adapt quickly to different views on culture, community and making friends, highlighting what may make two cultures different.

## LEADERSHIP INITIATIVES

**Harvard (HPAIR) Leadership Programme**

2025

Participated in a workshop to develop the skills to become a global leader of tomorrow

**Playtos Miniversity**

2021 - 2023

A public speech given on 'Grief', an overlooked emotion in our community that much of my family and friends has gone through; a Shark Tank pitch of an original product and business model to real investors in exchange for funds and feedback; and 2 public speeches for a completely student-led advocacy showcase designed specifically for the Ahmedabad community on Gender Inequality

## EXTRACURRICULARS

**Dance | Practicing and performing from the age of four - Ballet & Kathak**

**Friendship Foundation, Ahmedabad, India**

2022 - 2024

Initiated in memory of my late uncle to address critical medical infrastructure shortages in rural and remote regions of India. Raised 20,00,000 INR; Partnered with local administrators to fully equip a remote community hospital with essential emergency trauma gear and diagnostic medical equipment, ensuring timely treatment for critical patients.

**Citywide Walking Marathon for Energy Conservation**, Ahmedabad, India

2025

Created relevant, impactful and visually appealing design to encourage signups of 200+ people in a citywide walkathon

**LANGUAGES** - Fluent in English, French, Gujarati | Intermediate - Kutchhi, Hindi