AMAN BURMAN
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EDUCATION

Dubai College- Year 7 to Year 13 **Sep 2016 - June 2023**

A level: Physics, Chemistry, Mathematics, Further Mathematics (Predicted A*), AP calculus BC, AP Computer Science A and AP English Language and Composition: 5, **GCSE** (Grade 9 on all 11 subjects)
Leadership: President of Charity Committee, Astronomy Club, Mathematics Society, House Captain of Barbarossa, Founded Wolfram chapter at Dubai College, Wolfram Ambassador

Stanford Pre College Program (Intermediate Mechanics I: Physics) **Sep 2022- Dec 2022**
Harvard Summer Science Program (ASTR80**:** Planets, Moons and Their Stars) **June 2022- August 2022**
Stanford High School Summer College: MATH 51 **June 2021- August 2021**

HONORS/AWARDS

- **Rise Global Challenge Finalist and Scholarship winner (Schmidt Futures and the Rhodes Trust**) – May 2022: Top 500 out of 120,000 applicants. Received grant and resources to scale nonprofit EdTech platform Prepsaurus.com. Selected as UNICEF partner for contribution to 'Education for All' campaign.
- **ATLAS Fellowship Finalist and Scholarship** winner – March 2022: Received scholarship for working towards solving global issues such as habitability and climate change.
- Selected to the **UAE Math Olympiad Squad (**preparing for the IMO 2023**)**.
- Received Distinguished Honor Roll (**1st rank in the UAE in 2021 and 2022**) in the **AMC 10/12**. Scored 145.5 (AMC 12) in 22-23, 139.5 (AMC 12) in 2021-22 and 105, 132.5 and 136.5 (AMC 10) in 2019, 2020 and 2021 respectively. Scored 12 in the AIME 2021-22 (1st rank in the UAE and India) and attained cutoff score for USAJMO/USAMO.
- Qualified for the **British Math Olympiad Final Round** (2021-22), received Gold in the UKMT Junior, Intermediate and senior and merit in the Cayley and Maclaurin Olympiad (2018-2022), scored 105/125 in 2020 and 108/125 in 2021 in the Senior UKMT mathematics challenge and 119/125 in the Intermediate UKMT mathematics challenge (top 600 among 300,000 participants).
- Achieved merit certificate in the **Indian Mathematics Olympiad** qualifier (top 400).
- Achieved a gold in the **British Physics Olympiad** in 2021, a silver in the British Physics Olympiad Experimental Project, and a gold in the BAAO Astro Challenge.
- Represented Dubai College in the **ISMTF math competition**: **20th rank** in the individual category, **9th rank** in the team category in 2022 (among 100+ teams and 300+ top students from Asia and Europe).
- Won the '**Grade 10 Student of the Year**' Prize at Dubai College.
- Won **2nd position in the python programming** for artificial intelligence (AI) track in a Computer Science competition at American University of Sharjah.
- Won **Duke of Edinburgh Bronze Award**.

EXPERIENCE

- **Founder of Prepsaurus.com** **2019- Till Date**
  Designed a platform providing content on math & coding through NGOs in India, Africa and UNICEF (Learning Passport) to 10k+ underprivileged children.
  www.prepsaurus.com
- **World Science Scholar** **June 2021 – Till Date**
  - Accepted to the World Science Scholar program where 40 of the top young scientists are selected to take part in college level courses and projects with scientists including Brian Greene, Cumrun Vafa among many others.
  - Attended following courses as a part of WSS - Space Time and Matter by Professor Brian Greene, Vulnerable By Nature: Creating Phylogeny to understand cause of various diseases by Dr. Barbara

Natterson-Horowitz, UCLA, Aristotle's Four Forms of Causation by Dr. George F.R Eliis (Astrophysicist) and Computational Language by Stephen Wolfram (Renowned Computer Scientist).

- **Wolfram Summer School for Undergraduate Students** **June 27– July 22, 2022**
  - Researched the stability in Star-Planet-Moon three-body systems. The goal of the project was to analyze the three-body problem of various star-planet-moon configurations using mathematica.
  - The summer school is designed for undergraduate students and beyond. In this year's cohort, I was the only high school student who took part in the prestigious program.
  - Discussed my project 1:1 with Dr Stephen Wolfram and attended lectures by him and other researchers at Wolfram Research.
    https://community.wolfram.com/groups/-/m/t/2575965
    https://www.researchgate.net/publication/363832427_Stability_in_a_Star-Planet-Moon_three-body_system
- **MIT Center for System Awareness/EnRoads**: Climate Ambassador **Jul 2022 – Till Date**
  Deepened understanding of complexity of climate change through the simulator, currently collaborating with the Climate Interactive to implement a Climate Action module within Prepsaurus.com.
- **Internship at Parabole.ai** Bangalore, India **www.parabole.ai** **Nov 2021 – June 2022**
  - Implemented Ontology Data Pruning algorithms, developed analytical tools using AI, ML and NLP.
  - Worked with senior software engineers and developed solutions for financial, manufacturing and banking industry. The solutions enabled business houses to train AI models without writing any code.
- **Internship at ClassCard Inc, Dubai** **www.classcardapp.com/** **June 2021 – August 2021**
  - Worked on ClassCard, a platform developed to manage educational institutions and full life cycle of Students, teachers, Class and payment management, redesigned the interface of the website – represented various information such as leads, attendance, demographics, staff and student details in user friendly way, coded using PHP and Laravel to create more efficient reports for the company and worked extensively with large databases and queries to retrieve specific data of the clients of companies, analyzed data using statistical tools – Matplotlib, NumPy, pandas to identify customer interests on various courses and devise a sales strategy for the company.

RESEARCH

www.amanburman.com/img/ResearchPortfolio.htm

- Researched **'On the habitability of Exomoons**' under the supervision of Dr Tansu Daylan, LSSTC Catalyst Fellow, Princeton University **Jan 2022 - Till Date**
  - Researched about the various energy sources that moons outside our solar system are exposed to. Mainly, stellar irradiance, tidal heating, and remnant energy have been explored. The goal of the project is to evaluate the equations for these heat sinks and perform forward modelling using Python on a realistic distribution of exomoons based on the properties of moons in our solar system such as semi-major axis, eccentricity, albedo, etc. This will allow us to determine if an exomoon with specified physical and orbital parameters can sustain life.
  - Presented my research and findings during an Astro-coffee session at Princeton University in 2022 summer. This research paper will be submitted for publication in Nature Astronomy in 2023.

  https://bit.ly/habitability_exomoon

- **Meteorite Calcium-Aluminum inclusions:** Researched under the supervision of Dr. Emilie Dunham, Pegasi b Postdoctoral Fellow at UCLA, The research abstract has been submitted to **Lunar and Planetary Science Conference**. **June 2022 – Till Date**
  - Analyzed data on isotopic measurements of Calcium-Aluminum inclusions. Went through numerous research papers and recorded aluminum-magnesium data. Specifically looked at initial 26 aluminum and 27 aluminum ratios and how abundant each of the ratios were.

    https://bit.ly/Data_Analysis_of_CAIs
- **Conducted** research **on cosmology** under the supervision of Mr. Sandip Roy – PHD student at Princeton University **Title: Will the current rate of expansion of the universe result in a Big Freeze, Big Crunch or Big Rip?** **May 2021 – Dec 2021**

- Looked closely at the homogeneity and isotropic universe, derived the Friedmann equations using Newtonian physics and worked with differential equations to solve the Friedmann equations, used NumPy and Python to simulate physical systems and the rate of acceleration of the universe. https://www.researchgate.net/publication/362246659_Will_the_current_rate_of_expansion_of_the_universe_res ult_in_a_Big_Freeze_Big_Crunch_or_Big_Rip

- **Conducted** research on **Natural Language Processing Text Summarization for Legal Documents** using NLP models: T5, BERT, GPT**,** created an app using Streamlit to accept the legal documents as input and generated summarized texts for these documents. **June 2022 – Aug 2022** https://bit.ly/Aman_NLP_Research

PROJECTS

- **Gravitational Waves Workshop** Organized by Caltech in May 2022 - Learned GW data analysis and detection techniques via libraries – GWPy, PyCBC, GSTLal, Bilby etc., completed GW data challenge successfully. https://bit.ly/Gravitational_Wave
- **Breakthrough Junior Challenge**: June 2021 - Produced a 3-minute video titled 'Time Travel: Science Fiction or Reality?'. June 2022: Produced a 1.5-miniute video titled 'Habitability of planetary bodies'. Time Travel: Science Fiction or Reality? | Breakthrough Junior Challenge 2021 - YouTube Habitability in Planetary Systems | Breakthrough Junior Challenge 2022 - YouTube

- **CERN Beamline for Schools** - Collaborated with eight other students and designed an experiment to verify the Lorentz Transform by analyzing muon time dilation.
- Derived the Basel problem: summation of the reciprocals of the squares of the natural numbers.
- **TED X speaking engagement:** Spoke in TED Talk titled, 'Where is everybody', discussed in depth about the fermi's paradox, the drake equation and the different methods to contact extra-terrestrial life.
- **Dubai Association of Varsity Sports** - Collaborated with a team of students from my class and developed a website to store statistics for players and scores of u19 basketball matches in Dubai.
- **Learned** Exoplanets and Variable Star detection techniques **(July 2020 – Till Date)** as a member of **American Association of Variable Star Observers.**

ADDITIONAL COURSES

- MITx 6.86x: 'Machine learning using python' EdX course, ed X course on 'Astrophysics: Cosmology': space and time and how they interact with each other, dynamics and geometry of our universe, observational cosmology, dark energy and dark matter and the future of Astrophysics.

VOLUNTEERING

Engaged actively with UWS (United World School) charitable program to build schools and promote awareness for the educational needs of underprivileged children from Nepal. Raised $200k+ for the cause.
Organized educational enrichment camp in India with Udaan Foundation and raised funds for underprivileged students in India.
Organized and hosted Dubai STEM Olympiad competition and mentored students.
Taught AP Physics and Computer Science to junior, middle and high school students in Dubai.

SPORTS:
Played football from the age of 8 to 16, was on the school football squad every year since 2016 and won many inter-school competitions for the school. **Started** playing basketball at the age of 11 and have been playing regularly since. Won the World School Games competition at NYU, Abu Dhabi and the UAE Championship in 2021.
Part of the school's cross-country team since grade 5.

Skills: Python, Java, C ++, Mathematica, PHP, SQL, Javascript, HTML, CSS, CAD, Latex, Android Studio, JPL Horizon library, AI and ML libraries – Matplotlib, NumPy, SciPy etc