TANAY BHADRA

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EDUCATION

University of California, Berkeley, USA **Expected Date of Graduation**: May 2025
Intended Majors: Physics & Computer Science
Relevant Coursework: Structure & Interpretation of Computer Programs; Introductory Mechanics & Relativity

SKILLS

Programming Languages: Python, Scheme, Structured Query Language, Backus Naur Form, HTML
Certifications: Blockchain A-Z™: Learn How To Build Your First Blockchain (*Udemy*), Bitcoin and Cryptocurrencies (*BerkeleyX CS198.1x)*

PROJECTS & RESEARCH EXPERIENCE

- **Researcher at Undergraduate Lab, UC Berkeley** *Sep-2021 – May-2022*
  - Analyzed the correlation between anomalous transport of energetic particles and interplanetary shocks using Mittag-Leffler function.
  - Collected and graphed data from SWEPAM and EPAM for the shock date of November 19, 2001.
  - Programmed using Python libraries: Matplotlib, NumPy, SciPy and Pandas for data processing and data visualization of an energy flux density versus position plot.
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- **Academic Intern for CS 61A (Structure & Interpretation of Computer Programs) curriculum at UC Berkeley** *Jan-2022 – May-2022*
  - Facilitated weekly lab sections to help students understand concepts in trees, linked lists, recursions, object-oriented programming, and scheme through an inquiry-focused teaching approach.
  - Developed a resource guide organizing past papers, course resources, and helpful tips in order of usefulness to help students on their midterms and finals.

- **Gravity-based electricity generator** *Apr 2020 – Mar 2021*
  - Designed a renewable energy solution to generate clean electricity.
  - Pitched the design to stakeholders at PoInTs Edulabs and built a simulation model of the apparatus.
  - Received the 'Young Innovator Award' by VIDURNEETI for displaying 'scientific temper, humanism, spirit of enquiry and reform' through this Initiative.

- **Research Intern under Dr. Tejinder Pal Sigh, Tata Institute of Fundamental Research, Mumbai** *Mar 2020 - Sep 2020*
  - Authored a review paper: 'Distinguishing naked singularities from black holes.'
  - Presented the research to Dr. Tejinder Pal Singh and PhD students.

- **Research Intern under Dr. Anand Narayan, Indian Institute of Space Science & Technology, Thiruvananthapuram** *July 2018*
  - Estimated the expansion rate of the universe by determining the Hubble parameter using spectroscopic redshift data of galaxies); calculated the dynamical mass of a galaxy cluster from redshift information of member galaxies of the cluster; wrote Python routines to calculate the galaxy redshift data and plotted the results to interpret the findings.

PUBLICATIONS

- **Author of Swooning Over Relativity** (ASIN B08KYJYN61) *Apr 2020 - Oct 2020*
  - Created an engaging academic resource to provide support to high schoolers interested in relativistic physics.
  - Simplified the mathematical equations of Einstein's General Theory of Relativity to bridge the gap between high school math and advanced math.

- **Author of young adult science-fiction novel 'Devils'** (ISBN 978-1-64919-590-6) *June 2018 - Aug 2020*
  - Featured in The Times of India, a leading national newspaper, and recommended as 'Must Read Sci-Fi Novel' by Powai Planet, a local newspaper.

- **'COSMOS' – my blog on astrophysics** *Sep 2018 - Mar 2020*
  - Led an active physics community of 10,000 followers.
  - Evaluated scientific articles and research papers and consolidated my learnings as blog articles.
  - Blog article 'Case against Black Hole' has been mentioned by an eminent astrophysicist, Dr. Abhas Mitra (Professor at Homi Bhabha National Institute), in one of his articles.

SCIENTIFIC PURSUITS

- **International Workshop on Astrophysics and Cosmology** at International Centre for Cosmology, Charotar University of Science & Technology *Dec 2019*
  - The only high-school student from India invited to attend the 6-day workshop designed for PhD students.
  - Participated in seminars, plenary talks, presentations to discuss the sources of gravitational waves, shadows of black holes and naked singularity, gravitational collapse, gravitational lensing, pulsars, and dark matter.

- **Explorations in Physics: Special Relativity at Columbia University, New York, USA** *July 2019 - Aug 2019*
  - Under Dr. Yuri Deshko, examined the experimental basis for Einstein's theory of special relativity and general relativity.
  - Authored the essays 'My Learnings on Relativistic invariants' and 'What Happens and What is Observed'

- **Certificate course on Astronomy by Khagol Mandal** *June 2018 - Sep 2018*
  - Researched, studied, solved assignments, and actively participated in lectures and discussions on: Solar System, Astronomical Events, Positional Astronomy, Time and Coordinates, Stellar Properties, Stellar Evolution, Binary and Variable Stars, Origin and fate of Universe, Life in Universe and Optics and Astro-Imaging.

AWARDS & HONOURS

- **Chairman's Excellence Scholarship Award** *June 2020*
  Singapore International School, Level: School
  - Awarded for outstanding academic performance (4/105 to receive Honors in both semesters of Grade 11 & Semester 1 of Grade 12; subject topper in Physics, French & English Language & Literature in Grade 11), significant extracurricular achievements and displaying outstanding leadership skills over 2 years of IBDP.

- **Finalist – Infinity 2020 Math Competition** *Jan 2020*
  Aditya Birla World Academy in association with BITS Pilani; Level: International
  - Led a team of 3 that was adjudged 'Top 5 Teams' across 56 competing teams from India, Dubai and Singapore based on overall performance of the team in 5 rounds (Clash of Mathematicians, Math Challengers, Pass the Baton, Bulb your ideas, Quizzitch) of a 2-day long Math Competition.

- **Platinum Certificate of Merit in TIMES SPARK scholarship exam** *Dec 2017*
  Times Group, Level: National
  - Awarded for being in the top 10% of all examinees demonstrating outstanding awareness, reasoning skills & knowledge in current global affairs, science and technology, sports, social issues, and politics.