MADHURIMA SARKAR

+91-7047938472 | madhurima.sarkar@cbs.ac.in |

in madhurima | ⬤ madethegreat |

Mumbai, Maharashtra-400098, India

Citizenship: Indian

OBJECTIVE

A dedicated physics student with a passion for exploring new frontiers in science. Seeking opportunities to apply my analytical skills and knowledge in a dynamic environment where I can contribute to innovative research projects and expand my expertise in the intersection of physics, programming and electronics. Highly proficient in numerical methods and scientific computing.

EDUCATION

- **UM-DAE Centre For Excellence In Basic Sciences**   *Oct 2022 - Present*
  Integrated Masters in Physics   Mumbai, India
  ◦ CGPA: 8.92/10.00, Batch topper
  ◦ most recent SGPA: 9.65/10.00

- **Nirmala Convent School**   *May 2020 - May 2022*
  ISC Board Examination   Siliguri , India
  ◦ Grade: 98.75% in Science Stream
  ◦ courses: physics, chemistry, mathematics, biology, computer science, english

- **St. Helen's Secondary School**   *Feb 2014 - May 2020*
  ICSE Board Examination   Kurseong, India
  ◦ Grade: 97%

PROJECTS

- **Development of a Poisson Solver using Fourier Mode Decomposition**   *Sept 2025 - Nov 2025*
  ◦ - UM-DAE Centre For Excellence in Basic Sciences
  ◦ -Supervisor: Prof. Bhooshan Paradkar
  ◦ -Developing a Poisson solver inspired by the Fourier mode decomposition technique of Lifschitz et al. (JCP, 2009). The project involves formulating and implementing a mode-resolved solution to the Poisson equation in cylindrical geometry, aiming to achieve high numerical accuracy with reduced computational cost.

- **Azimuthal Analysis of BECs under Light-Induced Synthetic Gauge Fields**   *June 2025 - July,2025*
  ◦ - Institute for Atomic and Molecular Sciences, Academia Sinica, Taiwan
  ◦ -Supervisor: Prof. Yu-Ju Lin
  ◦ -this project involved the azimuthal analysis of in-situ images of BECs under light-induced synthetic gauge fields.
  ◦ - I used Python and Igor Pro to automate image analysis including coordinate transformation, azimuthal averaging and radial profiling to study ring breaking, torus formation and quench dynamics.
  ◦ -learnt the basics of laser locking and laser frequency stabilization.

- **Winter School in Astronomical calculations using Python**
  tools:Python (NumPy,SciPy,AstroPy,Pandas,Matplotlib,SunPy)   Dec 2024 - Jan 2024
  ◦ -Organized by IAPT Mumbai, Wilson College and Krittika, IIT Bombay
  ◦ -developed expertise in Python programming and Astropy library for astronomical data analysis.
  ◦ -analyzed datasets related to exoplanets,black hole jets and X-ray binary systems and also worked on solar flare data analysis using SunPy and learned techniques for Cepheid-based distance calculations.

◦ -explored advanced modelling techniques for star clusters and transient events.

• **N-BODY Simulations using the Barnes Hut Algorithm**   *Dec 2023 - Jan 2024*
Tools: Python (Numpy,scipy)
◦ -UM-DAE Centre For Excellence In Basic Sciences
◦ -Supervisor: Prof. Bhooshan Paradkar
◦ Conducted N Body Simulations using the Barnes Hut algorithm gaining skills for algorithmic implementations and problem solving and large scale data processing.

• **Summer School for Women in Mathematics and Statistics**   *May 2023 - June 2023*
tools: R , K means clustering
◦ -International Centre For Theoretical Sciences (ICTS-TIFR)
◦ -Supervisors: Prof. Siva Athreya and Prof.Dootika Vats
◦ was one of the 70 students nationwide chosen to attend the summer camp. Worked on various problems in linear algebra and multivariate calculus and also learnt more about stochastic processes. Used R to visualise multidimensional scaling and K-means clustering.

SKILLS

◦ **Programming Languages:** Python(AstroPy, SunPy, Pandas , Seaborn , QuTiP, QuCAT, Qiskit, SciPY, Numpy, Matplotlib, Numba, Cython), Java, Fortran 95, LaTeX
◦ **SOFTWARE:** GNU/Linux, AWR , LabView , git, gnuplot, ORIGIN, Mathematica
◦ **Languages:** Speaking , reading and writing proficiency in English, Hindi, Bengali, Nepali
◦ **Data Analysis:** Experience with handling large datasets,spectral analysis, light curve fitting and image processing using Astropy
◦ **Hardware:** NI multisim, LOGISIM, Breadboarding, Arduino Uno, Raspberry Pi

COURSES TAKEN

Quantum Mechanics I and II, Numerical Methods and Computation Laboratory,Statistical Physics I, Condensed Matter Physics I, Mathematical Physics I and II, Classical Mechanics I and II, Statistical Methods Lab, Physics Laboratory I,II,III,IV,V,VI, Electromagnetism I and II, Atomic and Molecular Physics, Nuclear Physics, Condensed Matter Physics II(Many Body Theory), Quantum Optics, Quantum Computation and Quantum Information

HONORS AND AWARDS

◦
Recipient of IAMS-IIP Fellowship   *June 2025 - July 2025*
Institute of Atomic and Molecular Sciences, Academia Sinica ,Taiwan   [🌐]
* Awarded to students from overseas universities to do short term research at IAMS, Taiwan
* -recipient of NTD 30000 per month for a period of 2 months along with half the round trip airfare.
  Certificate

◦
Recipient of DST INSPIRE Scholarship   *2022 - present*
Department of Science and Technology , Govt. Of India   [🌐]
* Awarded to students scoring in the top 1 percentile in the board examinations pursuing basic science research in India
* -recipient of Rs. 60000 annually along with Rs. 20000 contingency fund.

◦
AIR 5 in ISC Board Examination , 2022   *Aug 2022*
-The Council of Indian School Certificate Examination
* scored 98.75 % in the ISC Board Examination and was felicitated by the Chief Minister of West Bengal

-

National Top 1% in the Indian National Biology Olympiad *March 2022*
Homi Bhabha Centre For Science Education [🌐]

* State Topper from West Bengal With a Score of 123.5
* demonstrated high level of proficiency in biological science.

-

Qualified KVPY, NEST, IISER Aptitude Test , JEE AND WBJEE *May 2022 -Jul 2022*
Various Testing Authorities of India

* - qualified a number of national level exams in INDIA with top scores and was offered admission to various top institutes within the country .