Satyam Tiwari

PhD in Biophysics
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First-year PhD researcher focusing on CT-less PET imaging using the J-PET scanner. Aiming to develop a Physics informed DL Model specially customized for the J-PET Scanner using the specific properties of Plastic Scintillators.

Examination	University	Institute / Department	Year	CPI / %
PhD (Biophysics)	Jagiellonian University	JPET Research Group, Krakow	2028	–
MSc (Physics)	IIT Bombay	Department of Physics	2024	8.12 / 10
BSc (Hons.) Physics	University of Delhi	Kirori Mal College, Delhi	2022	9.42 / 10
Senior Secondary	CBSE	DAV Sr. Sec. School, Sirsa	2019	95%
Secondary	CBSE	DAV Sr. Sec. School, Sirsa	2017	10 / 10

SCHOLASTIC ACHIEVEMENTS

- **TD-UJ Grant Recipient** – Awarded by **TD-UJ** *June 2025*
- **PROM Grant Recipient** – Awarded by **NAWA** *Feb 2025*
- **AIR 15** – *IIT JAM (Physics)*, Conducted by **IIT Roorkee** *Mar 2022*
- **NGPE National Topper (Top 1%)** – Awarded by **IAPT** *May 2022*

RESEARCH EXPERIENCE

- **CT-less PET Imaging using the J-PET Scanner** (PhD Topic) *(Oct 2024 – Present)*
  PhD Supervisors: **Prof. Paweł Moskal & Dr. Sushil Sharma**, Jagiellonian University
  - Developing CT-less image reconstruction using **scattered and annihilation data** from the plastic-scintillator-based J-PET scanner.
  - Currently exploring deep learning for denoising and Mutual Information-based techniques for PET image alignment.
  - Aiming to improve lesion localization and image quality without anatomical priors such as CT or MRI.
- **Using Scattered Data in PET Scan Imaging** *(MSP-1)* *(July 2023 – Nov 2024)*
  Project Supervisor: **Prof. Pragya Das**, Dept. of Physics, IIT Bombay
  - Validated Dr. S. Ghosh's approach for tumor localization using energy-based scattered data with **MATLAB** GUI tools.
  - Developed a custom 2D TOF-based model and collaborated with peers to test its accuracy using artificial phantom data.
  - Employed Desmos-based visualization to qualitatively assess correctness and behavior of the mathematical model.
- **Designing a 3D Model for Scattered Data in PET Imaging** *(MSP-2)* *(Jan 2024 – Apr 2024)*
  Project Supervisor: **Prof. Pragya Das**, Dept. of Physics, IIT Bombay
  - Applied TOF method to estimate annihilation points, enhancing geometric precision in 3D PET reconstruction.
  - Used `Meshgrid` and `Fsolve` to solve sphere-line intersection problems in 3D space.
  - Proposed model improvements, identified limitations in data, and outlined future research directions in PET imaging.

CONFERENCES, SEMINARS, WORKSHOPS and SCHOOLS

- **1st Total Body J-PET – General Meeting 2024 (Presenter)**, *Jagiellonian University, Krakow* *[5–6 Oct 2024]*
  - Presented PhD project plan, leading to insightful discussions and networking opportunities.
  - Learned about recent advancements and future directions in J-PET technology.
- **SymPhy 2024 (Attendee)**, *Department of Physics, IIT Bombay* *[8–10 Mar 2024]*
  - Attended a 3-day conference featuring expert-led sessions on cutting-edge research in physics.
  - Participated in workshops and interactive sessions on advanced topics in physics.
- **AI in Medical Imaging – Summer School (Attendee)**, *Radboud University, Netherlands* *[30 Jun – 5 Jul 2025]*
  - Attended a week-long summer school on AI applications in medical imaging.
  - Gained hands-on experience with machine learning and deep learning algorithms for imaging.
- **2nd Sympo on New Trends in Nuclear and Medical Physics (Organizer & Presenter)**, *UJ & AGH [24–26 Sep 2025]*
  - Assisted in coordinating and managing the organization of the symposium.
  - Presented a research poster during the scientific sessions.

INTERNSHIP EXPERIENCE

- **Content Developer**, *Vizuara (**Startup**), Worked with Co-founder*: ***Raj Dandekar, PhD, MIT*** *(Sept 22 - Dec 22)*
  - **Developed** K-12 educational animation videos at Vizuara using **Manim**.
  - **Collaborated** with colleagues to enhance student engagement by developing high quality visuals.

COURSE PROJECTS

- **Forced Harmonic and Anharmonic Oscillator System** – *Computational Physics* *[Group Project – Mar 2024]* Solved non-linear differential equations using Euler, RK2, and RK4 methods; simulated various oscillator models under diverse conditions under the mentorship of **Prof. Aftab Alam**, IIT Bombay.
- **Wireless Notice Board via Bluetooth** – *Digital Electronics* *[Group Project – Aug 2022]* Designed and implemented a Bluetooth-controlled notice board using Arduino; collaborated on circuit design and programming under **Prof. T. Kundu**, IIT Bombay.

AREAS OF INTERESTS

- **Radiation Detector:** Development and optimization of detectors.
- **Image Reconstruction:** Techniques and algorithms for reconstructing images from data.
- **Data Analysis and Programming:** Handling and interpretation of data and algorithm development.

ONLINE CERTIFICATIONS

- **Machine Learning Specialization** *(Prof Andrew Ng)* *(Coursera)*
- **Neural Networks and Deep Learning** *(DeepLearning.AI)* *(Coursera)*
- **Natural Language Processing** *(Summer of Science)* *(Maths and Physics Club)*
- **Excel and SQL for Big Data Handling** *(Learners Space)* *(WnCC Club)*

TECHNICAL SKILLS

- **Programming:** Python, SQL, C++
- **Data Analysis:** Pandas, NumPy, ROOT

- **Visualization:** Matplotlib, Seaborn
- **Machine Learning:** Scikit-Learn, Tensorflow
- **Data Tools:** Advanced Excel, Power BI, Tableau
- **Simulations:** Toy Monte Carlo, GATE (Geant4)

TECHNICAL COURSES UNDERTAKEN

- **Programming Using Python** *(Python)* *(Graduation, Sem-1)*
- **Database Management System** *(SQL)* *(Graduation, Sem-2)*
- **Computational Physics Skills**, *(Latex, Gnuplot)* *(Graduation, Sem-3)*
- **Numerical Analysis** *(C++)* *(Graduation, Sem-4)*
- **Programming Lab** *(Python)* *(Post Graduation, Sem-1)*
- **Advanced Simulation Techniques** *(FORTRAN)* *(Post Graduation, Sem-4)*

KEY COURSES UNDERTAKEN

Theoretical Foundations:

- Quantum Mechanics
- Classical Mechanics
- Mathematical Physics
- Statistical Physics
- Electromagnetic Theory
- Programming and Simulation

Specialized Fields:

- Condensed Matter Physics
- Nuclear and Particle Physics
- Atomic and Molecular Physics
- Light Matter Interaction
- Solid State and Nuclear Physics
- Nanoscience: Fundamentals to Fabrication

POSITION OF RESPONSIBILITIES

- **Doctoral Representative**: Representing Biophysics PhD students in the Doctoral Council. *(2025-present)*
- **TD-UJ Member**: Organizing Research Salons and leading the academic seminars. *(2025-present)*
- **Class Representative**: Represented class interests, bridged student-faculty communication. *(MSc 1st and 2nd Year)*
- **Editorial Team Member**: Contributed to departmental publications. *(MSc 1st Year)*
- **Department Coordinator**, ***ISCP*** *(MSc 2nd Year)*
  - **Coordinated** Institute's PG Orientation for **1500+ newcomers**.
  - **Mentored** 7 juniors, fostering leadership and teamwork.
  - **Spearheaded** 8 ISCP dept members & conducting several seminars & workshops.

VOLUNTEERING EXPERIENCE

- **Event Co-ordinator** *(TedXIITBombay)* *(MSc 2nd Year)*
- **College Representative Mentor** *(Abhyuday)* *(MSc 2nd Year)*

INTERESTS & HOBBIES

- **Writing & Publishing:** Orchestrated a team for **SIT Publication**, curating diverse articles; academic commitments post-lockdown prompted a permanent hiatus.

- **Spiritual Reading & Listening:** Explore spiritual concepts with books like **Bhagavad Gita**, **Death** by Sadhguru, and **Ashtavakra Gita**; enjoy **Swami Sarvpriyananda's** "*Advait Vedanta*" lectures on YouTube.
- **Machine Learning and Deep Learning:** Reading about Machine Learning Algorithms and exploring new AI tools as they constantly evolve in the market.