CURRICULUM VITAE

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WORK EXPERIENCE

- **Mar 1, 2023 – Current: Post-doctoral Research Associate**, Department of Physics, University of Puerto Rico, Mayaguez.
- **Jan 20, 2022 – Dec 19, 2022: Research Associate**, Department of Physics, Panjab University, Chandigarh.
- **Aug, 2020 – December, 2021:** Self-employed, gave physics tuitions to school students.
- **Jan 15, 2017 – Dec 31, 2019:** Worked part-time as a **PHP Developer** at Seven Seas English Academy, Sector 17, Chandigarh and taught physics to school students privately.
- **August 2016 – Jan 14, 2017:** Not working due to health issues.
- **April 18, 2016 – July 26, 2016:** Worked as a **PHP Developer** at Seven Seas English Academy**,** Sector 17, Chandigarh.
- **Jan 11, 2010 – August, 2014**: Visiting scientist at Fermilab, Batavia, Illinois, USA for the MINOS experiment.

ACADEMIC BACKGROUND

- **October, 2008 – February, 2015: PhD** Experimental High Energy Physics,
  Department of Physics,
  Panjab University, Chandigarh,
  India.

- **July, 2005 – July, 2007**: **M.Sc Physics (Honors)**, Panjab University, Chandigarh.
  Special paper studied at M. Sc. level: Experimental Nuclear and Particle Physics.

  Masters Thesis: Characterisation of Imidazole and Chloranil using FTIR Spectroscopy.

- **July, 2002 – June, 2005**: **B.Sc (Non-medical)**, Government College Una, Himachal Pradesh

CERTIFICATE COURSES

- **Jan, 2020 – July, 2020: Certificate in Data Science and Analytics,** CDAC, Mohali, Panjab.
- **February 2016 - April 2016:** 2 months course in web development using PHP at WebTech-Learning Institute, Sector 34, Chandigarh.

ACADEMIC AWARDS and HONOURS

- **Junior Research Fellowship (JRF)**: Council of Scientific and Industrial Research (**CSIR**), Government of India: February 2008 to January 2010.
- Qualified the **Graduate Aptitude Test in Engineering (GATE)** in the Physics stream**,** conducted by the Ministry of Human Resource Development (MHRD), Government of India, in February 2008 with Percentile – 99.39.
- **Qualified the Joint CSIR-UGC National Eligibility Test (NET)** for Junior Research Fellowship and Eligibility for Lectureship in Physical Sciences conducted by the CSIR-UGC, India, in June 2007. Called for **Shyama Prasad Mukherjee Fellowship (SPMF)** interview.

COMPUTER SKILLS

- Programming Languages**: C++ , Python**
  PHP, HTML, CSS
- Data analysis: **ROOT, Pandas**
- Database**: MySQL, SQLite3**
- Operating Systems**: Linux**
  Windows
  MacOS.
- Machine Learning and AI**: Regression and Classification Algorithms, OpenCV, Tensorflow using Keras, Convolutional Neural Networks, Autoencoders**

SHIFTS AND SERVICE TASKS

- Between September 2024 and August 2025 I have taken 4 weeks of shifts as a shift leader. The work involved co-ordinating the shift work amongst the morning and evening shifters, investigating the problems reported by the shifters and taking steps to ensure the proper running of the CMS detector. I have also trained as a new trigger shifter and taken 2 days of trigger shifts.

- Between October 2023 and August 2024 I have taken 4 weeks of shifts as a shift leader. The work involved co-ordinating the shift work amongst the morning and evening shifters, investigating the problems reported by the shifters and taking steps to ensure the proper running of the CMS detector.

- Between March 2023 and October 2023 I have taken about 30 days of Tracker Offline Data Quality Monitoring shifts for the CMS experiment. The shift work involved certifying the data taken by the CMS detector, and notifying the experts of any problems.

- In July 2023 I took 2 weeks of shifts at the Fermilab Test Beam Facility. The work involved setting up the equipment to allow 120 GeV proton beam to be incident on a 1x2 CROC sensor and collect data. This sensor will be one of the sensors to be used in the CMS Phase 2 upgrade. The data collected during this shift was further used for characterizing the performance of the sensor.

- Between November 2010 and August 2014 I have taken about 40 days of shifts for the experiment. These were 8 hour shifts in the control room. The shift work involved monitoring various parts of the detectors, fix the issues that arose while taking shift, and notify the experts of the problems.

- I also served as a volunteer tour guide for the ND from June 2011 - August 2014. I have given a number of tours to students and general public to help them understand the MINOS experiment as well as to increase public awareness about physics.

SCHOOLS AND WORKSHOPS

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Software Basics Training (Hybrid)** event 18 - 20 Jun, 2025 at CERN.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Software Basics Training (Virtual)** events May 21-22, 2024 and July 8-9, 2024.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Python for Analysis Training (Virtual)** events June 5, 2024 and July 15, 2024.

- Served as a mentor in the **Training on Analysis Pipeline (Virtual)**, February 26-March 1, 2024.

- Attended and served as a mentor in the **CMS Data Analysis School (CMSDAS)**, Jan 8-12, 2024, at Fermilab, Illinois, USA.

- Attended the **2nd COFI Advanced Instrumentation and Analysis Techniques School** Dec. 9-17, 2023, San Juan, Puerto Rico.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Software Basics Training (Virtual)** events November 13-14, 2023.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Python for Analysis Training (Virtual)** events November 22, 2023.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Software Basics Training (Virtual)** events May 18-19, 2023 and July 13-14, 2023.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Python for Analysis Training (Virtual)** July 12, 2023.

- Participated in the **PyHEP.dev 2023 - "Python in HEP" Developer's Workshop** at Princeton University, 25–28 Jul 2023.

- Participated in the workshop on **Data Handling and Requisite Tools**, held at Department of Physics, Panjab University, Chandigarh, from Aug 27 – Sept 1, 2022. I delivered two lectures on the tools used in the field of Data Science and Artificial Intelligence.

- **Jan, 2020 – July, 2020, Certificate in Data Science and Analytics:** Six months course at CDAC, Mohali

- Attended the **4th International Summer School on Neutrino Physics (INSS2012)**, co-hosted by Virginia Tech and Fermilab, held at Virginia Tech's Center for Neutrino Physics in Blacksburg, Virginia, USA from July 10th to July 21st, 2012. I was jointly awarded the prize for the “Most Unexpected but Plausibly Correct Answer” in the Tutorials session.

- Attended the **Intensity Frontier workshop** at Rockville, MD, USA, Nov 30 – Dec 2, 2011.

- **7th SERC SCHOOL on Experimental High Energy Physics** at IIT, Bombay, India, February 9-27, 2009 (conducted by Department of Science and Technology, Govt. of India).

LIST OF PUBLICATIONS

- Christina Agapopoulou et al, "**The Critical Importance of Software for HEP"**, https://arxiv.org/abs/2504.01050 (2025)

- Bhumika Mehta, Richa Sharma, et. al. **"Computer Vision Tools for Tumor Segmentation"**, Springer Proc. Phys. 304, 550-554 (2024)

- The CMS collaboration, **"Search for dark QCD with emerging jets in proton-proton collisions at √s = 13 TeV",** Journal of High Energy Physics 2024, 142 (2024).

- P. Adamson et. al. (MINOS Collaboration), **"Observation of seasonal variation of atmospheric multiple-muons in the MINOS Near and Far Detectors,"** Phys. Rev. D 91, 112006 (2015).

- P. Adamson et. al. (MINOS Collaboration), **"Study of quasielastic scattering using charged-current nu_mu-iron interactions in the MINOS Near Detector,"** Phys. Rev. D 91, 112005 (2015).

- P. Adamson et. al. (MINOS Collaboration), **"Observation of muon intensity variations by season with the MINOS Near Detector,"** Phys. Rev. D 90, 012010 (2014).

- P. Adamson et. al. (MINOS Collaboration), **"Combined Analysis of ν_μ Disappearance and $\nu_\mu \rightarrow \nu_e$ Appearance in MINOS using Accelerator and Atmospheric Neutrinos,"** Phys. Rev. Lett. 112, 191801 (2014).

- P. Adamson et. al. (MINOS Collaboration), **"Measurement of Neutrino and Antineutrino Oscillation Parameters Using the Combined Beam and Atmospheric Data Sets from MINOS,"** Phys. Rev. Lett. 110, 251801 (2013).

- P. Adamson et. al. MINOS Collaboration), **"Search for flavor-changing non-standard neutrino interactions by MINOS,"** Phys. Rev. D 88, 072011 (2013).

- P. Adamson et. al. (MINOS Collaboration), **"Electron neutrino and antineutrino appearance in the full MINOS data sample,"** Phys. Rev. Lett. 110, 171801 (2013).

- P. Adamson et. al. (MINOS Collaboration), **"Comparisons of annual modulations in MINOS with the event rate modulation in CoGeNT,"** Phys. Rev. D. 87.032005 (2012).

- P. Adamson et. al. (MINOS Collaboration), **"Measurements of atmospheric neutrinos and antineutrinos in the MINOS Far Detector,"** Phys. Rev. D. 86, 052007 (2012).

- P. Adamson et. al. (MINOS Collaboration), **"An improved measurement of muon antineutrino disappearance in MINOS,"** Phys. Rev. Lett. 208, 191801 (2012).

- P. Adamson et. al. (MINOS Collaboration), **"Search for Lorentz invariance and CPT violation with muon antineutrinos in the MINOS Near Detector,"** Phys. Rev. D. 85.031101 (2012).

- P. Adamson et. al. (MINOS Collaboration), **"Improved search for muon-neutrino to electron-neutrino oscillations in MINOS,"** Phys. Rev. Lett. 107.181802 (2011).

- P. Adamson et. al. (MINOS Collaboration), **"Active to Sterile Neutrino Mixing Limits from Neutral-Current Interactions in MINOS,"** Phys. Rev. Lett. 107, 011802 (2011).

- P. Adamson et. al. (MINOS Collaboration), **"Search for the disappearance of muon antineutrinos in the NuMI neutrino beam,"** Phys. Rev. D 84, 071103(R) (2011).

TALKS/POSTERS PRESENTED

- Presented a **talk** titled **"Test Beam Results with TFPX 1x2 Planar Module for CMS Phase 2 Inner Tracker Upgrade"** at the APS Global Physics Summit 2025, at Anaheim, CA, March 16-21, 2025.

- Presented a **poster** titled **"Test Beam Results of Planar Pixel Sensor for the CMS Phase 2 Inner Tracker Upgrade"** at the 57th Fermilab Users Meeting, Illinois, USA, July 9-12, 2024.

- Presented a **talk** titled **"New-Age Tools: Artificial Intelligence, Machine Learning, and Deep Learning"** at the Annual Cooperation Meeting of the Indian Institutes and Fermilab Collaboration, held at Central University of South Bihar, Gaya (Bihar), September 3-6, 2022

- Presented a **talk** titled **"Three-flavor Oscillation Results for the NOvA Experiment"** at NuFact 2022: The 23rd International Workshop on Neutrinos from Accelerators, held at Salt Lake City, Utah, United States, July 31 – Aug 6, 2022.

- Presented a **talk** titled "**Search for Time-independent Lorentz Violation in MINOS**" at the XXI DAE-BRNS High Energy Physics Symposium, held at IIT Guwahati, India, December 8-12, 2014.

- Presented a **poster** titled "**Searching for Neutrino to Antineutrino Oscillations in MINOS**" at the 46th Fermilab Users' Meeting, held at Fermilab, Illinois, USA, June 12-13, 2013.

- Presented a **talk** titled **"Study of Antineutrino Oscillations and Neutrino-Antineutrino Transitions in MINOS"** at the IIFC Meeting, held at IIT Guwahati, India, February 7 – 10, 2013.

- Presented a **talk** titled **"Study of Neutrino-Antineutrino Transitions in MINOS"** at the IIFC Meeting, held at Fermilab, Illinois, USA, November 26 – 27, 2012.

- Presented a **poster** titled **"The Long Term Performance of the MINOS Calibration Procedure"** at the 45th Fermilab Annual Users' Meeting, Illinois, USA, June 12 – 13, 2012.

- Presented a **poster** titled **"The Long Term Performance of the MINOS Calibration Procedure"** by Sarah Phan-Budd (Argonne National Lab), Jeff de Jong (Oxford University), Luke Corwin (Indiana University), Mark Mathis (College of Willian and Mary), Richa Sharma (Fermilab), Nathaniel Tagg (Otterbein University) at the Neutrino 2012, held at Kyoto, Japan, June 3 – 9, 2012.

- Presented a **talk** titled **"Study of Neutrino-Antineutrino Transitions in MINOS"** at the APS Meeting, held at Atlanta, Georgia, USA, March 31 – April 3, 2012.

- Presented a **poster** titled **"Searching for Antineutrino Oscillations in a NuMI Neutrino Beam at MINOS"** at the 44th Fermilab Annual Users' Meeting, Illinois, USA, June 1-2, 2011.

- Presented a **talk** titled **"Measuring Antineutrino Oscillations in MINOS"** at the APS Meeting, held at Anaheim, California, USA, April 30 – May 3, 2011.

- Presented a **talk** titled **"Comparison of Bayesian Neural Networks with TMVA"** at the India-CMS meeting held at University of Delhi, India, March 27-28, 2009.

- Presented a **talk** titled **"Multivariate Analysis and Bayesian Neural Networks"** at SERC SCHOOL in IIT Bombay, India, February 9-27, 2009.

TEACHING EXPERIENCE

- Served as a mentor and prepared the teaching material for the CI/CD GitLab Section in the **Training on Analysis Pipeline (Virtual)**, February 26-March 1, 2024.

- Served as a mentor in the **CMS Data Analysis School (CMSDAS)**, Jan 8-12, 2024, at Fermilab, Illinois, USA.

- Served as a mentor in the **HSF/IRIS-HEP Software Basics Training (Virtual)** events November 13-14, 2023, May 18-19, 2023, July 13-14, 2023, May, 2024 and July 2024.

- Co-organized and served as a mentor in the **HSF/IRIS-HEP Python for Analysis Training (Virtual)** events November 22, 2023, July 12, 2023, June 2024, and July 2024.

- **Quantum Mechanics and Applications**: BSc 4th Semester, 2022

- **Computer Practicals Lab, C++**: MSc 2nd Semester, 2022

REFERENCES

- **Prof. Sudhir Malik,**
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