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Mitanshu Thakore

CAREER OBJECTIVE AND INTERESTS

- To undertake research in **Experimental High Energy Physics** as a career in the future.
- Also have interest in branches like **Machine Learning**, **Electronics** and to some extent in **Astrophysics**.

EDUCATIONAL QUALIFICATIONS

PhD Program **2022 - present**	**PhD in Physics**, *Advisor:* **Dr. Tulika Bose** Department of Physics, **University of Wisconsin - Madison**, USA - 53706 CGPA: **3.786 / 4.000**
Undergraduate and Master's **2016 - 2021**	**Five Years Integrated Master of Science in Physics**, **Sardar Vallabhbhai National Institute of Technology, Surat**, Gujarat, India - 395007. CGPA: **9.77 / 10.0**
12th Standard **2016**	**Higher Secondary Certificate Examination**, Conducted by Gujarat Secondary & Higher Secondary Education Board (GSEB), from **S. N. P. S. Public School, Bharuch**, Gujarat, India - 392015. Percentage: **90**% (Percentile rank - **99.17**)
10th Standard **2014**	**Secondary School Examination**, Conducted by Central Board of Secondary Education Board (CBSE), from **The Aditya Birla Public School, Kesrol**, Gujarat, India - 392130. CGPA: **9.8 / 10.0** (Percentage - **93.1** %)

INTERNSHIPS AND RESEARCH EXPERIENCE

May, 2023 - Present	Research Assistant Department of Physics, at **The University of Wisconsin - Madison**, USA Advisor: **Prof. Tulika Bose** Project Title: Study the possible increase in sensitivity brought by using a Boosted Decision Trees approach that will be then implemented in the Run3 t/ttDM analysis.
June, 2021	Remote attendee **Tri-Institute Summer School on Elementary Particles (TRISEP) 2021** Organised by Perimeter Institute for Theoretical Physics, Sudbury Neutrino Observatory (SNOLAB), and TRI-University Meson Facility (TRIUMF). **Summary:** TRISEP was a 2-week long interactive school for graduate students with lectures on theory, phenomenology and experiments by leading experts in the field of particle physics. It also featured group work, problem solving, and discussions with the speakers. As part of the group work, a problem was assigned to groups of five students. The problem assigned to my group was to design a dark matter detection experiment that can work efficiently in presence of neutrino interactions background. **Group Work Presentation:** High Mass WIMPs Below the Neutrino Floor

September, 2020 - June, 2021	Remote - based Project (For Master's Dissertation) **Istituto Nazionale di Fisica Nucleare (INFN) Sez. Pisa & University of Pisa, Italy** Advisor: **Prof. Andrea Rizzi & Dr. Silvio Donato (CMS Collaboration at CERN)** Project Title: Study and extrapolation of the $H \to \mu\bar{\mu}$ performances to full Run - 3 luminosity and to High Luminosity - LHC. **Summary:** As a part of the Snowmass studies on the 'rare decays of the Higgs boson', the performance for the future analyses of H$\to \mu\bar{\mu}$ produced through the Vector Boson Fusion mode, to the end of the LHC Run 3 (2024, 300 fb^{-1}) and High Luminosity-LHC (2040, 3000 fb^{-1}) luminosities was estimated. The fit of the original analysis was repeated after having scaled the normalization of samples to expected luminosities, using the Run 3 and HL-LHC cuts. **Links**: Dissertation Report	Code on Github for Skimming	NAIL Code
July, 2020	Remote attendee and research intern **Particle Physics Summer Student Programme - 2020** Organised by Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN), Kraków, Poland. **Summary:** The PPSS was a 4-week programme. The first week consisted of a series of lectures and hands on sessions on the basics of the Standard Model of particle physics, methodology of research in this field and statistical data analysis. The last three weeks were devoted to working on a small individual project, wherein I worked on **Search for lepton violation in $\tau^- \to \mu^- \mu^- \mu^+$ decays with Run2 of LHCb data** under the supervision of Dr. Marcin Chrzaszcz and Dr. Jihyun Bhom.
May, 2019 - July, 2019	Summer Research Intern **Indian Institute of Science, Bangalore $-$ 560012**, (Selected through Indian Science Academies' Summer Research Fellowship Programme - 2019) Advisor: Dr. **Jyothsna Rani Komaragiri (CMS Collaboration at CERN)** Project Title: Study of resonant double Higgs production in the NMSSM with $\gamma\gamma + b\bar{b}$ as the final state, using MadGraph5. **Summary:** Studied the resonant process: $gg \to H_3 \to H_2 H_1 \to \gamma\gamma b\bar{b}$ in the NMSSM by simulating it using MadGraph5. The result of the simulation was stored in a format, called an LHE (Les Houches Event) file. Anaylsing the data included studying the kinematics (p_T, η, ϕ) of different particles. Various plots for studying the kinematics of the resonance particle H_3 and all the final state particles were made and the possibility of resonant double Higgs ($H_1 H_2$ in this case) production using the NMSSM model had been studied. **Link**: Project Report
December, 2018	Attendee **Radio Astronomy Winter School - 2018** Organised by Inter-University Centre for Astronomy and Astrophysics, Pune (IUCAA) and National Centre for Radio Astrophysics - Tata Institute of Fundamental Research, Pune (NCRA-TIFR). **Summary:** The RAWSC was a 2-week programme aimed at providing exposure to the new developments in radio astrophysics as well as radio astronomy techniques, analysis and interpretation with simple hands-on experiments.
June, 2018 - July, 2018	Attendee **45 - Day Summer Training Programme on 'Experimental Techniques in High Energy Physics'** Organised by TEQIP-III, Malaviya National Institute of Technology, Jaipur Facilitator: **Dr. Kavita Lalwani (Belle and Belle II at KEK Collaboration, Japan & Electron Ion Collider at BNL, USA)** **Summary:** The STP was a 6-week programme aimed at providing exposure to the various basic concepts of Particle Physics through lectures and discussions, an introduction to Detector Simulation using TCAD Softwares and hands on training sessions of Geant4 and ROOT Software.

TECHNICAL SKILLS

Programming	C, C++, Python3, Linux Shell Scripting, Matlab, FORTRAN.
Analysis Tools	ROOT (CERN)
Experimental simulation	Elementary knowledge of using Geant4
Monte Carlo Events generator	MadGraph5
Operating Systems	MS Windows, Linux distributions (Ubuntu, Scientific Linux).
Others	LaTeX, MS/Libre Office, gnuplot, GNU Octave, HTML, Graphic Designing (Adobe Photoshop, Canva).
Electronics	Capable of designing analog and digital circuits for most practical uses.

PROFESSIONAL MEMBERSHIP

May 2023, Present	Doctoral Student, **Compact Muon Solenoid (CMS)** Collaboration, CERN, Geneva, Switzerland.
September, 2020 - June, 2021	Non−Doctoral Student, **Compact Muon Solenoid (CMS)** Collaboration, CERN, Geneva, Switzerland.

SCHOLARSHIPS/AWARDS

September, 2022 - Present	**The Wonders of Physics Outreach Fellows Program 2022-23** Training and mentoring by the University's Physics Outreach Staff was provided to me through the Fellows program. Also, I participated in outreach programs like Grandparents University and the PEOPLE Program. I also got an opportunity to perform at the Wonders of Physics Shows.
June, 2021	**Institute Gold Medal** For being the topper of the 5 Years Integrated Master of Science (Physics), for the batch of 2021 at S.V.N.I.T.
July, 2016 - June, 2021	**INSPIRE Scholarship for Higher Education (SHE)** Awarded by Department of Science & Technology (DST), Government of India.
May, 2020	**Selected for Working Internships in Science and Engineering (WISE) Scholarship** Awarded by German Academic Exchange Service (DAAD). Wasn't able to pursue summer internship due to COVID-19 Pandemic.
May, 2019 - July, 2019	**Science Academies' Summer Research Fellowship Programme - 2019** Conducted jointly by Indian Academy of Sciences, Indian National Science Academy and The National Academy of Sciences, India.

TEST SCORES

2020	**IELTS:** Overall Band Score − 7.5/9, CEFR Level − C1 (Listening − 8/9, Reading − 8.5/9, Writing − 7/9, Speaking − 7/9)

VOLUNTEER EXPERIENCE

January 2019 - May 2021	Member Secretary, **Departmental Library Committee, Department of Physics, SVNIT.** Co-founded the student made Departmental Library and was also the member secretary of the departmental library committee that ensured its smooth functioning.

February, 2018 - **April, 2019**	Co-Convener, Part-time graphic designer and content writer **Society for Cultivation of Sciences and Humanities (SCOSH)** `https://www.facebook.com/scosh.svnit` SCOSH is the quintessential science club at SVNIT. It provides an opportunity to students with high inclination towards scientific research to meet, discuss ideas, share knowledge, and inculcate scientific aptitude amongst people of all generations. For this, it conducts workshops, seminars, lectures, fun competitions, organize night-sky gazing on important astronomical events and screen movies centered on a scientific theme.
September, 2016 - **April, 2019**	Volunteer **Society for Promotion of Indian Classical Music and Culture Amongst** **Youth (SPICMACAY)** `https://spicmacay.org` | `https://www.facebook.com/spicmacaysvnit` The Society for the Promotion of Indian Classical Music and Culture Amongst Youth (SPICMACAY) is a voluntary youth movement which promotes intangible aspects of Indian cultural heritage by promoting Indian classical music, classical dance, folk music, yoga, meditation, crafts and other aspects of Indian culture; it is a movement with chapters in over 300 towns all over the world.

PERSONAL INFORMATION

Date of Birth	15th January, 1998
Nationality	Indian
Permanent Address	Bharuch, Gujarat, INDIA

MISCELLANOUS

- Bilingual proficiency in English and Gujarati, and full professional proficiency in Hindi.
- Interested in history of science and pedagogy.
- Curated and successfully organised a 10 - hour long Researchathon at the institute level.
- Curated and organised a science outreach event at the district level for school students.
- Loves to read fiction, non - fiction books, and graphic novels.
- Interested in movies and also making movies for science communication.
- Follows cricket sport and Formula 1 racing.
- Loves cycling, hiking, cricket and basketball.