

Danush Shekar

✉ dsheka3@uic.edu |  danush-shekar |  CodexForster | DOB: 6th Jan 1999

Education

University of Illinois at Chicago

Chicago, USA (2022 - Present)

Ph.D. in Physics

CGPA: 4.0/4.0

Ph.D. Advisor: Dr. Corrinne Mills

National Institute of Science Education and Research (NISER)

Bhubaneswar, India (2017 - 2022)

Integrated M.Sc. - Major in Physics and minor in Mathematics

CGPA: 8.49/10.0

Best Master's thesis award in Physical Sciences

Research Experience

Instrumentation R&D for current and future collider experiments

Fermilab and UIC, IL, USA (2023 - Present)

- Performed TCAD simulations of (EIC) AC-LGAD, (CMS) pixel, and MAPS sensors towards R&D efforts.
- Experience with constructing and running testbenches for silicon sensors.
- Contributed to multiple testbeam campaigns at Fermilab.
- Smartpixels:
 - TCAD and PixelAV simulations of silicon sensors for studies by the Smartpixels group
 - Lead a co-design study assessing a filtering neural network. [2510.06588, talk @ CPAD, 2024]
 - Testing of smartpixels ASICs. [2510.07485, talk @ CPAD, 2025]
- AC-LGAD technology:
 - Lead the analysis of AC-LGAD strip-sensor data and introduced new quantity to improve our understanding of time resolution. [10.1016/j.nima.2025.170224].
 - Construction and testing of infrared laser setup for AC-LGAD sensors. [2511.14095, talk @ APS Global Physics Summit, 2025]
- MAPS:
 - Testbeam-campaign and data-analysis for prototype ALICE-ITS3 sensor design. [2510.11463, poster @ Hard Probes, 2024]

M.Sc. Thesis (Guided by Prof. Bedangadas Mohanty)

NISER, Bhubaneswar (2021 - 22)

Title: Simulations and Prototyping of an MPGD and a Wire-based detector, Duration: 12 months

- Design, construction, and characterization of a Thick-Gas Electron Multiplier (Thick-GEM) and a proportional counter
- Simulations using Garfield++ and COMSOL / nearly exact Boundary Element Method.
- Results presented in DAE Symp.Nucl.Phys. 66 (2023) 1148-1149.
- Awarded best thesis in the graduating class of the Physics department.**

Research project (Guided by Dr. Subhankar Mishra)

NISER, Bhubaneswar (2020 - 21)

Title: Study of Face Detection Algorithms for Masked Faces, Duration: 13 months

- Survey of convolutional neural network-based face detection models with Python and CUDA libraries.
- Results documented in 2305.11077.

Internship (Guided by Prof. Supratik Mukhopadhyay)

Saha Institute of Nuclear Physics (2020)

Title: Numerical Simulations of Micro-Pattern Gaseous Detectors, Duration: 3 months

- Simulated Micromegas detectors using COMSOL and the neBEM library in Garfield++.

Schools, workshops, and other achievements

- (2024) **Attendee**, [MAPS Academy](#), held at KEK, Tsukuba, Japan
- (2024) **Scholar**, [URA Fellowship](#), for work on smartpixels @ Fermilab
- (2024) **Attendee**, [CMS - Data Acquisition School](#), held at Fermilab, Batavia, IL, USA
- (2023) **Attendee**, [EDIT School](#), held at Brookhaven National Laboratory, NY, USA
- (2021) **Attendee**, Workshop on Advanced Radiation Detector and Instrumentation in Nuclear and Particle Physics, University of Jammu, IN
- (2020) **Selected**, Tata Institute of Fundamental Research's Visiting Students' Research Program
- (2019) **Finalist**, PRL's Vikram Sarabhai Innovation Competition ([VISION](#)) (One among the top 11 in the country to propose a scientific experiment for funding)
- (2017-22) **Scholar**, DAE Incentive Scheme for Holistic Science Education and Augmentation
- (2016) **Scholar**, Next Genius Foundation (One among the top 35 of the 4700+ applicants to receive a scholarship offer to study at The Wheaton College, MA, USA)
Presented talk and poster, Greening with Goethe International Environmental Youth Conference
- (2012) (One among the 130 students from 4 countries who were accorded the chance to discuss and develop a catalogue of measures towards environmental issues for a one-year implementation phase)

Skills

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|-------------------|---|
| Leadership | Representative for Undergraduate Committee of the School (Physical Sciences), NISER (2020-22).
Coordinator of Weekly Talks, NISER Astronomy Club (2018-19).
Secretary of Hostel Executive Council, Brahmaputra Hostel, NISER (2019-20). |
| Software | Silvaco/Synopsis TCAD, AutoCAD, Python, C++, ROOT, Garfield++, neBEM and COMSOL Multiphysics, Blender, Adobe Illustrator, HTML5, and CSS3. |

Courses Taken/Taught

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| Theory | Mechanics and Thermodynamics, Mathematical Methods I & II, Classical Mechanics I & II, Electronics, Electromagnetism I & II, Quantum Mechanics I & II, Statistical Mechanics, Special Theory of Relativity, Nuclei and Particles, Condensed Matter Physics, Quantum Field Theory, Particle Physics, Relativistic Nucleus-Nucleus Collision and Quark-Gluon Plasma, Experimental High Energy Physics, Group Theory, Real Analysis, Linear Algebra, Metric Spaces, Differential Equations, Programming and Data Structures I & II, and Machine Learning. |
| Laboratory | Electronics I & II, General Physics, Modern Physics I & II (TA'd at UIC), Computational Physics, Nuclear Physics and Instrumentation, Solid State Physics, and Open-Ended labs. |
| Courses Taught | Modern Experimental Physics (481 & 581), Vibrations, Waves, and Thermal Physics (245), Problem Solving Workshop (145), Physics for Life Sciences (131) |