Burhani Taher Saifuddin

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Education

Ph.D. in Physics (expected Dec. 2026) Aug. 2021–Present
University of Oklahoma *Norman, USA*

- Ph.D. Qualification Exams: Classical & Statistical Mechanics, Quantum Mechanics and Electrodynamics 2022
- Ph.D. Candidacy Exam: "Searching for Dark Matter with the LUX-ZEPLIN (LZ) Experiment" 2023

Master of Science in Physics Aug. 2018–Dec. 2020
Aligarh Muslim University *Aligarh, India*

B.Sc. in Physics, Chemistry, and Mathematics June 2015–April 2018
Christ (Deemed to be University) *Bangalore, India*

Research Experience

Ph.D. Thesis May 2022–Present
Charming Tops: Standard Model measurement and
Beyond the Standard Model searches for single top + charm production *Norman, USA*

- One of the primary analyzers and contact editor for the SM measurement and BSM search
- Developed a BDT-based event selection for signal-to-background separation
- Produced simulated samples, performed Data-to-MC studies, and estimated backgrounds
- Finalizing the statistical fit for both the SM measurement and BSM search

Combined Performance Studies for ATLAS Oct. 2024–Present
Simultaneous calibration of b- and c-jets with GN3 *Norman, USA*

- Production of simulated samples for the GN3 flavour-tagging algorithm
- GN3 ablation model studies and estimation of systematic uncertainties
- Migration from AnalysisTop to TopCPToolkit for n-tuple production
- Migration from KLFitter to HyPER for $t\bar{t}$ event topology reconstruction

ATLAS Authorship Qualification Task Sep. 2023–Oct. 2024
Simultaneous calibration of b- and c-jets with GN2 *Norman, USA*

- MC sample production and Data-to-MC comparison studies
- Derivation of Data-to-MC scale factors for Run 2 and Run 3 dataset for GN2

Visual Inspection with Machine Learning June 2024–May 2025
Visual Inspection of ITk Pixel Detector Modules *Norman, USA*

- Contributed to an autoencoder-based machine learning algorithm for defect detection in ITk pixel hybrids
- Adapted the framework for hybrids produced by different vendors

QA and QC of Detector Modules Jan. 2022–Dec. 2024
QA and QC of RD53A and ITk Pixel detector modules *Norman, USA*

- Performed electrical and mechanical tests, masking, plasma cleaning, and parylene coating of RD53A modules
- Conducted similar tests on ITk pixel hybrids as part of the QA/QC workflow

Master's Thesis Aug. 2019–June 2020

Numerical Solution to the Balitsky-Fadin-Kuraev-Lipatov (BFKL) Evolution Equation *Aligarh, India*

- Studied Deep Inelastic Scattering (DIS) and heavy-ion collision experiments
- Obtained a numerical solution to the BFKL equation

Bachelor's Project Fall 2017–Spring 2018

Analysis of chemical compounds using spectroscopic techniques *Bangalore, India*

- Led a 5-member team to synthesize five laboratory chemical compounds
- Characterized UV-VIS spectral data of the synthesized compounds

Publications

The ATLAS Collaboration, *"Transforming jet flavour tagging at ATLAS"* **Nature Communications 17**, 541 (2026).
The ATLAS Collaboration, *"Simultaneous efficiency measurements of b- and c-jets in $t\bar{t}$ events from $\sqrt{s} = 13.6$ TeV pp collision data collected with the ATLAS detector"* e-Print: 2607.06199 [hep-ex]

Awards/Fellowships/Scholarships

George Randolph Kalbfleisch Award 2026

An award of $2500 given to an outstanding graduate student specializing in particle physics

Avenir Fellowship 2025

A fellowship providing tuition and stipend to an overperforming graduate student for two semesters

Sir Syed Global Scholar Award 2020

An award of $1000 along with mentorship support provided to outstanding Indian graduate students

Teaching Experience

Statistical Mechanics Spring 2024

Grader for PHYS-5163

Introduction to Quantum Mechanics Spring 2024

Grader for PHYS-3803

General Physics for Engineering and Science Majors Fall 2022

Instructor for PHYS-2514

General Physics Lab I Fall 2022

Instructor for PHYS-1311

General Physics for Life Science Majors Fall 2021

Grader for PHYS-2414

Skills

Machine Learning	GNNs, CNNs, Transformers, TensorFlow, XGBoost
Programming	Python, C++, Bash
Experimental	Cleanroom procedures, soldering, parylene coating, circuit design, 3D printing
Software	LaTeX, FreeCAD, Mathematica, Git
Languages	English, Hindi, Urdu, Gujarati, Lisan-ud-Da'wat (fluent); Marathi, Arabic (basic)

Talks

US ATLAS Summer Workshop July 2025

"Search for t-channel single top+charm quark production and 2HDM neutral heavy Higgs boson decays to top+charm" *Ann Arbor, USA*

ATLAS-CMS Flavour Tagging Workshop Sep. 2024
"Charm-jet Calibration of the GN2 Tagger" *Genoa, Italy*

Poster Presentations

ICHEP 2026 July 2026
"Calibration of GN2 jet-tagging algorithm using $t\bar{t}$ events from partial Run 3 pp collision data collected with the ATLAS detector" (presented by proxy) *Natal, Brazil*

Graduate and Postdoc Research and Scholarly Activity Day April 2025
"Flavour Tagging and Simultaneous Calibration of b- and c-jets using Graph Neural Networks with the ATLAS detector at LHC-CERN" *Norman, USA*

Leadership & Mentorship

ATLAS Flavour Tagging Oct. 2024–Sep. 2026
B-tagging Physics Validation Contact *Norman, USA*

- Validation of ATLAS software changes and their effect on flavour tagging algorithms and software

Sir Syed Global Scholar Award (SSGSA) 2022–Present
Mentorship, Application Review, and Outreach *Norman, USA*

- Mentored six students over four years through the graduate school application process, supporting successful admission to graduate programs
- Administered the annual review and selection process for a scholarship program receiving 250+ applications, selecting 25 awardees annually Jan. 2024–Dec. 2025
- Operated webinars on graduate applications, CV writing, and standardized test preparation (GRE, IELTS, TOEFL) Jan. 2022–Dec. 2023

OU Physics Peer Mentorship Program 2022–Present
Peer Mentor *Norman, USA*

- Advising incoming graduate students on navigating academic, research, and professional life within the department

Graduate Physics Student Interdependence (GPSI) Fall 2024–Fall 2025
Treasurer *Norman, USA*

- Managed organizational budget and financial reporting for the graduate student association

AMU Society of Physics (AMUSoP) Spring 2019–Spring 2020
Event Organization *Aligarh, India*

Physics Outreach

Annual Westmoore High School Visit
University of Oklahoma *Norman, USA*

- *"Introduction to High Energy Physics"* Nov. 2025

Annual Science Day Exhibition
Christ (Deemed to be University) *Bangalore, India*

- *"Working of a Gyroscopic Wheel"* 2018
- *"Working of a LASER"* 2017
- *"Stellar Evolution Model and the Hertzsprung-Russell diagram"* 2016