

Shreyasi Acharya

Curriculum Vitae

PERSONAL DETAILS

Birth: 1990-05-20, Kolkata, India
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RESEARCH INTEREST AND EXPERTISE

Data analysis in experimental high-energy physics *Sep 2016 - present*

Experimental Collaboration: ALICE Collaboration at CERN, LHC

Area of specialization and interest: **Physics of strongly interacting matter**

- Measurements on **heavy-flavour particles** (e.g. D-mesons, J/ψ -meson etc.), such as:
 - Calculation of production cross section
 - Correlation measurements with other charged particles
 - Separation of charm and beauty origin contributions
- Event-multiplicity dependent studies on **small system** (e.g. proton-proton) **collisions**

Experience in large scale detectors (software and hardware) *2015-2016, 2023*

I was the **Run Coordinator for the MFT (Muon Forward Tracker) detector** of ALICE.

My main responsibilities were:

- Planning, testing and executing tasks necessary for data-recording, in synchronization with the dynamic conditions of LHC beams/collisions.
- Mitigating software and detector challenges, and coordinating with experts to ensure efficient data acquisition and smooth MFT operations.
- To be available as an expert support 24×7 during data-taking periods (*i.e., when LHC collides ions beams*).

I gained experience in Photon Multiplicity Detector (PMD) detector in the ALICE experiment, and the MANAS ASIC-based readout system during my Ph.D. tenure.

Phenomenological studies *Sep 2016 - Nov 2021*

- Machine learning techniques such as **Principal Component Analysis**
- Model calculations such as **Glauber Model**
- Event generators: **PYTHIA, AMPT, EPOS, UrQMD**

PROFESSIONAL EXPERIENCES

Postdoctoral Research Fellow *Dec 2023 - present*

Affiliation: Istituto Nazionale di Fisica Nucleare (INFN) - Bari, ITALY - 70126
Main activity: Analysis of pp and light-ion data in ALICE, specifically on,
Separation of prompt and non-prompt J/ψ , and J/ψ -, $\psi(2S)$ -hadron correlations

Postdoctoral Research Fellow

Dec 2021 - Nov 2023

Affiliation: Laboratoire de Physique de Clermont (LPC), FRANCE - 63177
Main activity: Subsystem run-coordinator (SRC) for MFT during the first heavy-ion run, and tracking and performance studies involving the MFT detector.

EDUCATION

Doctoral Research Fellow, Ph.D. Degree awarded on 20 December 2021 2016 - 2021

Affiliations: Variable Energy Cyclotron Centre (VECC), INDIA
Thesis Title: "Multiparticle production in proton-proton collisions at LHC energies"
Supervisor: Prof. Subhasis Chattopadhyay
CERN ID: CERN-THESIS-2021-191 (Can be found at <http://cdsweb.cern.ch/>)
Main activity: Analysis of heavy flavour particles in pp data in ALICE and phenomenological research involving machine-learning techniques and event generators

Pre-Ph.D. course work project 2015 - 2016

Affiliations: Variable Energy Cyclotron Centre (VECC), INDIA
Project Title: "Study of global observable in high energy proton-proton collisions"
Main activity: Review of global observables, such as charged particle multiplicity distributions, p_T -differential cross-sections and rapidity/pseudorapidity distributions from ISR to LHC measurements.

Master of Science in Physics, First class honors 2013–2015

Jadavpur University, Kolkata, India
→ Silver medalist for the M.Sc. Physics 2015 batch

Bachelor of Science with Honours in Physics, First class honors 2010–2013

Jadavpur University, Kolkata, India

AWARDS AND FELLOWSHIPS

INFN Fellowship 2022, in experimental physics for non-Italian citizens 2023-current

Istituto Nazionale di Fisica Nucleare, Italy
→ Selected at first position

ALICE Thesis Award 2021-2022 28-July-2022

ALICE Collaboration, CERN
→ Awarded for best doctoral thesis from ALICE collaboration for 2021–2022

INSPIRE Fellowship, for doctoral research 2015–2020

Department of Science and Technology, Government of India, India

INSPIRE Scholarship, for bachelor's and master's degree 2010–2015

Department of Science and Technology, Government of India, India
→ Awarded to the top 1% students all over India

PROFESSIONAL SERVICE

1. Reviewer for the proceedings of the ICPAQGP-2023 conference, published in the Journal of Subatomic Particles and Cosmology 2025

LEADERSHIP EXPERIENCE AND RESPONSIBILITIES

Physics Analysis Group (PAG) Coordinator for “JPsi2ee” analysis group in ALICE Jan 2025 - present

My main responsibilities are coordinating meetings, overseeing all analysis and their subsequent publication processes, and ensuring consistency in measurements involving the process of quarkonia decaying to dielectrons.

Subsystem Run Coordinator (SRC) for Muon Forward Tracker (MFT) detector in ALICE 2023

My main responsibilities were ensuring efficient MFT data acquisition during LHC collisions through task execution, problem-solving, and remaining as a 24×7 expert support.

SUPERVISION OF STUDENTS AND TEACHING EXPERIENCE

Teacher/Course Instructor, University of Bari (Italy): July–Nov 2025

Course: Hands-on Session on Data Analysis in Particle Physics (16 hours)

Audience: Ph.D. students in experimental high-energy physics

Content: Introduction to ROOT, Monte Carlo techniques, and event generators such as PYTHIA and AMPT, enabling students to gain hands-on experience with tools essential to experimental high-energy physics research.

Co-supervisor for a project from CERN Summer Student Programme: July-Aug 2023

Student’s name: Virgile Mahaut (University of Paris-Saclay, France)

Title: Understanding the Muon Forward Tracker’s acceptance using a Monte Carlo simulation

Teaching and training young students on the MFT detector: 2023

My official responsibility, as a run coordinator for the MFT detector, included organising regular training sessions for fresh/young students aiming to get involved in activities related to the detector

PUBLISHED PAPERS AND INTERNAL NOTES

As a member of the ALICE collaboration, I am one of the authors of more than 250 papers published in refereed journals. In addition, I am an author of 1 phenomenological paper outside of the ALICE collaboration. Details of all my articles, proceedings and published papers can be found in INSPIRE. The following is the list of publications arising directly from my work (excluding conference proceedings):

1. Phenomenological work:

- (a) **PRC 103, 034909 (2021):** Estimation of initial-state structures in high-energy heavy-ion collisions using principal component analysis

2. ALICE data analysis:

- (a) **JHEP 08 (2023) 006:** Inclusive and multiplicity-dependent production of electrons from heavy-flavour hadron decays in pp and p–Pb collisions
 - I am one of the principal analysers of this paper, and the following two internal analysis notes contain all details of the analysis:
 - Note ID 1180: p_T -differential cross section of electrons from heavy-flavour hadron decays and yield as a function of charged-particle multiplicity in pp collisions at $\sqrt{s} = 13$ TeV (TPC+EMCal)

→ Note ID 781: Production of heavy-flavour hadron decay electrons in pp collisions at $\sqrt{s} = 13$ TeV using TPC+TOF as a function of charged-particle multiplicity

3. Contributions through service tasks:

- (a) **PRC 108, (2023) 034906:** Measurement of electrons from beauty-hadron decays in pp and Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV
- (b) **PLB 829 (2022) 137065:** Observation of a multiplicity dependence in the p_T -differential charm baryon-to-meson ratios in proton-proton collisions at $\sqrt{s} = 13$ TeV
- (c) **PLB, 804, (2020) 1353776:** Measurement of electrons from semileptonic heavy-flavour hadron decays at midrapidity in pp and Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV

4. Internal Review Committee (IRC) member:

- (a) Forward J/ψ relative yield versus relative forward multiplicity in pp collisions at $\sqrt{s} = 13$ TeV, arXiv:2504.00686

5. Current work in progress:

- These results from my current analysis on the non-prompt fraction of J/ψ in Run-3 pp collisions at $\sqrt{s} = 13.6$ TeV have received preliminary approval from ALICE
- Note ID 1640: Inclusive prompt and non-prompt J/ψ separation at mid-rapidity in pp collisions at $\sqrt{s} = 13.6$ TeV
- Note ID 1749: Multiplicity dependent prompt and non-prompt J/ψ separation at mid-rapidity in pp collisions at $\sqrt{s} = 13.6$ TeV

ANALYSIS REVIEW EXPERIENCE

Analysis review committee member in ALICE for the following analyses:

- 1. D^+ , D^* and D^0 self normalized yields in pp collisions at $\sqrt{s} = 13$ TeV 2021
- 2. Heavy flavour decay- μ self-normalized yields and R_{pPb} in pPb at $\sqrt{s} = 8.16$ TeV 2022
- 3. Production of muons decaying from heavy flavour hadrons at forward rapidity in pp collisions at $\sqrt{s} = 13$ TeV with ALICE 2023
- 4. Inclusive J/ψ production cross section in OO collisions at $\sqrt{s_{NN}} = 5.36$ TeV at midrapidity 2025
- 5. J/ψ and $\psi(2S)$ production cross section in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.36$ TeV 2026

TALKS, CONFERENCE PRESENTATIONS AND PROCEEDINGS

- 1. **Invited talk (November 2025)** at the **Quarkonium Working Group Workshop, CERN** on "Production J/ψ -hadron correlation in pp collisions at $\sqrt{s} = 13$ TeV with ALICE"
- 2. **Invited talk (August 2025)** at the **Saha Institute of Nuclear Physics (SINP), Kolkata, India** on "From Quarkonia to the Quark-Gluon Plasma: Probing the Strongest Force in Nature"
- 3. **Oral presentation (April 2025)** at the **Quark-Matter 2025 conference, Germany** on "Prompt/Non-prompt J/ψ production in pp collisions at forward and midrapidity with ALICE"
- 4. **Invited talk (August, 2024)** at the **Bose Institute, Kolkata, India** on "Recent results on heavy flavours and quarkonia from ALICE focusing on Run-3 data"

5. **Conference proceedings (July, 2024)** at the **42nd International Conference on High Energy Physics (ICHEP2024)** on "The International Workshop on Sustainable HEP"
Proceedings at PoS (ICHEP2024) 1220
6. **Oral presentation (June 2023)** at the **Initial Stages in High-Energy Nuclear Collisions (IS) conference 2023, Denmark** on "Dependence of heavy-flavour production on event activity in small systems with ALICE"
7. **Oral presentation (February 2023)** at the **International Conference on Physics and Astrophysics of Quark Gluon Plasma (ICPAQGP-2023), India** on "Heavy-flavour production measurements in pp and Pb-Pb collisions in ALICE"
8. **Oral presentation (December 2022)** at the **Kruger 2022: Discovery Physics at the LHC conference, South Africa** on "Heavy-flavour production measurements in ALICE"
9. **Invited talk (September 2021)** at the **Department of Physics, University of Jammu, India** on "Heavy-flavour decay electron production and its multiplicity dependence in pp collisions at $\sqrt{s} = 13$ TeV"
10. **Oral presentation (May 2021)** at the **Strangeness in Quark Matter (SQM 2021) conference** on "Heavy-flavour production in small systems and evolution with multiplicity with ALICE"
Proceedings at EPJ Web Conf. 259 (2022) 12012
11. **Oral presentation (September 2018)** at the **Hard Probes 2018, Aix-Les-Bains, France** on "Event-multiplicity and event-shape dependence of open heavy flavour production in pp collisions with ALICE at the LHC"
Proceedings at PoS HardProbes2018 (2019) 153
12. **Poster presentation (May 2018)** at the **LHCP conference 2018, Bologna, Italy** on "Production of electrons from heavy-flavour hadron decays in pp collisions at $\sqrt{s} = 13$ TeV as a function of charged-particle multiplicity with ALICE"
Proceedings at PoS LHCP2018 (2018) 044
13. **Poster presentation (April 2018)** at the **Quark Matter 2018 conference, Venice, Italy** on "Production of electrons from heavy-flavour hadron decays in pp collisions at $\sqrt{s} = 13$ TeV as a function of charged-particle multiplicity with ALICE"
14. **Oral presentation (December 2017)** at the **DAE-BRNS Symposium on Nuclear Physics 2017** on "Heavy flavour decay electron yield in pp collisions at $\sqrt{s} = 13$ TeV with ALICE at the LHC"
Proceedings of the DAE-BRNS Symp. on Nucl. Phys. 62 (2017)

OTHER PROJECTS

Masters' project, Jadavpur University, Kolkata, India *March-June 2015*

- Ground water radon survey using AlphaGUARD monitor in and around Bakreswar-Tantoloi region

INSA summer project, ARIES, Nainital, India *June-July 2014*

- Search for variable stars in open cluster NGC6866 using ISIS technique

CONFERENCE ORGANISATION AND OTHER INTERESTS

I am interested and committed to advancing sustainability in future high-energy physics facilities and supporting global efforts to address the climate crisis. As part of this commitment, I have served as an organizing committee member for the **3rd - 5th Sustainable-HEP conferences** held online in 2024, 2025 and 2026.

→ Summary of the 3rd conference published in the CERN-Courier Nov/Dec 2024, p24-25

I am a member of the **HECAP+ Sustainability team**, an international group, where I take an active role in advancing environmentally sustainable practices for large-scale experiments.

OTHER EXPERIENCES

Juniors' Representative for ALICE-India Juniors' group

2018–2020

→ Representing the interests of the Juniors' community in Collaboration Board, Organising group discussions for Journal club amongst young students

Invited panellist for an LHC Soft Skills Workshop:

16-May-2023

→ <https://indico.cern.ch/event/1273413/>

TECHNICAL SKILLS

Programming: C, C++, Java, Fortran, Shell scripting, Python
Frameworks: Root, AliRoot, O2Physics

LANGUAGES

English: Native, Bengali: Native, Hindi: Fluent