Curriculum Vitae
Dr. Indranil Das

✉indranil.das2@adamasuniversity.ac.in
✉i.das@imperial.ac.uk
✉indranil.das@cern.ch
☎+WhatsApp +91 9433 497 982

The fundamental laws governing the nature is the central interest of my research activity. In Experimental High Energy Physics we plan for an experiment motivated by physics challenges of our time. Then follows a detail process of physics and detector simulations, fabrication of detectors and installations, collection and analysis of physics data, finally publication in reputed journals. I am honoured to participate and contribute in each of these steps and enjoyed working with some of the brilliant minds of corresponding fields both at the national level and around the world. I have been part of two large international collaborations namely CMS (Compact Muon Solenoid) [from 2021 till date] and ALICE (A Large Ion Collider Experiment) [from 2004 to 2020] of CERN. We have witnessed two fundamental discoveries, observation of Higgs boson and Quark-Gluon Plasma, that has changed our physics understandings and now a part of M.Sc. physics text books.

Positions

Organization	Post held	From	Till
Adamas University, India	Assistant Professor	15.01.2026	till date
Imperial College London, UK	Research Associate	28.07.2023	11.01.2026
TIFR, India	Visiting Fellow	01.02.2021	22.07.2023
SERB, DST, India	Ramanujan Fellow	08.06.2015	07.06.2020
IPN Orsay, CNRS, France	CNRS Fellow	18.10.2011	17.10.2014

Research activities

- Physics analyses of CMS (current) and ALICE (past) data of LHC of CERN, Geneva. Topics include,
  - Search for a charged Higgs using CMS data
  - Cross section measurements for charmoniums[J/ψ, $\psi(2S)$] and bottomoniums[$\Upsilon(1S)$, $\Upsilon(2S)$, $\Upsilon(3S)$]
  - Measurement of the nuclear effects in proton-lead collisions
  - Observation of quarkonium suppression and elliptic flow in heavy-ion collisions
- Development, validation and performance studies of trigger path emulation of HGCAL FE & BE of CMS.
- Validation activities of HGCAL geometry.
- Long term onsite detector operation in ALICE, CERN.
- Detector simulation with GEANT4 software toolkit.
- Setup of small scale computing cluster for data analysis of doctoral students.
- Detector instrumentation with SiPM and low cost electronics.
- National level tutorial courses on C++, ROOT (CERN analysis software), GEANT4 for Ph.D./Postdoc.
- Training Ph.D./Master/Bachelor students – Physics analysis, experiments data collections, Machine Learning.
- Oral presentations in reputed national/international conferences and symposia.

Awards

- International: Breakthrough prize in Fundamental Physics : 2025.
- International: CMS Award, CERN : 2021.
- National: Ramanujan Fellowship, India : 2015.

Performance Recognition

- Convener of HGCAL TPG Emulation and Algorithms of CMS : February 2024 to till date.
- Primary contact of a $H^{\pm}$ search in CMS : February 2021 to till date.
- CMS Analysis Review Committee Member : One analysis in 2025.
- Deputy project leader of Muon Tracker of ALICE : May 2013 to September 2020.
- Convener of $Q\bar{Q} \to \mu^+\mu^-$ Physics Analysis Group of ALICE : June 2016 to March 2020.
- System run coordinator of Muon Tracker of ALICE : October 2011 to February 2013 and all CERN visits till 2018.
- ALICE Internal Review Committee Member : Two publications of 2020.
- ALICE Run Manager : May-June 2017.
- Convener of $\Upsilon \to \mu^+\mu^-$ Physics Analysis Group of ALICE : March 2016 to February 2017.
- Convener of PWG-PP Monte Carlo group of ALICE : August 2013 to June 2016.

- Name : Ramanujan Fellowship
- Duration : 2015–2020
- Grant amount : Research grant of 35,00,000 INR an salary of 51,00,000 INR
- Outcome : 1. Doctoral co-training of 3 Ph.D. students and 1 postdoctoral researcher
  2. A total of 5 journal publications
  3. Chairing regular physics discussions in ALICE collaboration
  4. Ph.D. student training in national SERC and ALICE-India schools
  5. Setting up and managing computer clusters for analysis by students
  6. In-house detector instrumentation

CMS activities

- **Physics Analysis**
  - **Search for a low mass charged Higgs boson:** I have implemented the following analysis procedures and carried the analysis forward through all CMS internal approvals. A standalone kinematic fitting procedure has been newly added to this analysis which has improved the signal sensitivity compared to earlier searches.
    - Skimming data and MC samples for analysis
    - Run and event selection
    - Object selection
    - Scale factor application
    - Data/MC comparison
    - Kinematic fitting
    - QCD background estimation
    - Evaluation of systematic uncertainties
    - Calculation of upper limits
    - Obtain approvals during object and analysis review
  - **Search for a heavy Majorana neutrino:** I have been recently selected as a member of Analysis Review Committee for this search.
- **CMS Upgrade**
  - **Emulation for backend (BE) and frontend (FE) components of HGCAL:** I have developed, implemented and validated emulation procedures for the trigger primitive generation (TPG) of HGCAL. The FE readout consists of two ASICS, namely HGCROC and ECONT, for sequentially processing the detector signals. The HGCAL BE performs a two stage processing of the digitized data from FE, named as Stage1 and Stage2 processing.
    - Development of a standalone emulation framework for TPG
    - Development of emulation for HGCROC and ECONT frontend chips
    - Validation of HGCROC and ECONT emulations using test-beam data
    - Emulation validation for lpGBT, readout link between FE and BE, using test-beam data
    - Validation of BE Stage2 tower sum emulation with the hardware/firmware output
    - Validation of BE Stage2 cluster property calculation with the hardware/firmware output
    - Physics performance study of new Stage2 clustering algorithm of hexagonal mesh
    - Implementation of emulation of Stage1 tower processor inside the standalone framework
    - TPG performance plots using test-beam data
  - **HGCAL geometry validation:** I have developed a muon tomography framework to validate the HGCAL geometry. This was crucial to spot several geometry inconsistencies, some of them are mentioned below. I have been awarded the CMS award in 2021 for this development.
    - Issues in energy loss distributions due to incorrect definition of active thickness
    - Spotting the missing GEANT hits in partial wafers
    - Rotation of the detector layers in the opposite direction than expected
    - Issues with the rotation of detector modules
    - Reporting issues with the hits in SiPM-on-tile due to incorrect mm $\rightarrow$ cm scaling implementations
    - Spotting the detector hits at unexpected locations
    - Inconsistencies in cassette translation and rotations

Ph.D. Thesis

Title : Development, Implementation and Performance Report of Dimuon High Level Trigger of ALICE.
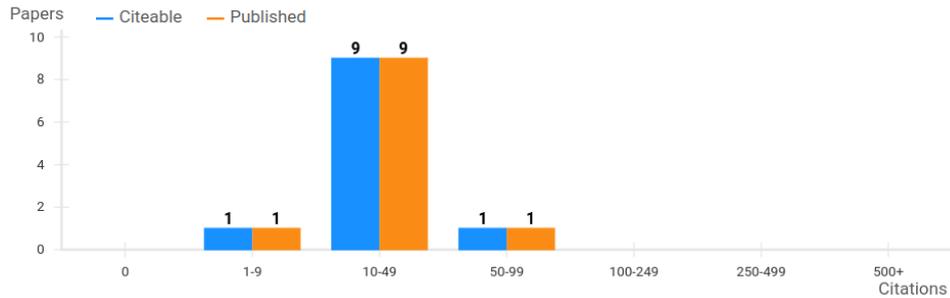Thesis Link : CERN Document Server $\rightarrow$ https://cds.cern.ch/record/1453457?ln=en

- The citation summary corresponding 11 publications [of "Principal (co-)author" and "Reviewer responsibility"] as obtained from http://inspirehep.net/.

Citation Summary

☑ Exclude self-citations ⓘ

	Citeable ⓘ	Published ⓘ
Papers	11	11
Citations	279	279
h-index ⓘ	10	10
Citations/paper (avg)	25.4	25.4

A complete list of publication is available at
https://idas.web.cern.ch/CV/ListOfPublications_IndranilDas.pdf

Degree	University	Subject	From	To	Type
Ph.D.	Homi Bhabha National Institute	Physics	2003	2011	Full time
M.Sc.	Visva-Bharati	Physics	2001	2003	Regular
B.Sc.	Visva-Bharati	Physics	1998	2001	Regular
Pre-Degree	Visva-Bharati	Various	1996	1998	Regular
School Certificate	Visva-Bharati	Various	1987	1996	Regular

A detail description of CMS, ALICE and other research activities can be found at
https://idas.web.cern.ch/CV/ResearchActivity_IndranilDas.pdf