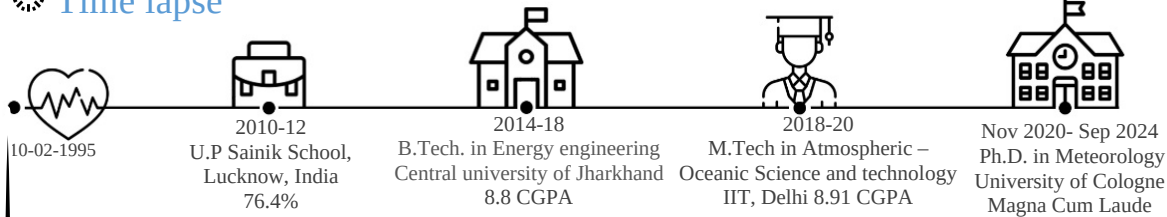# Dwaipayan Chatterjee

Solving challenges in dynamics and predictability at the interface of meteorology, mathematics, and computer science

## ⏱ Time lapse

| 10-02-1995 | 2010-12 U.P Sainik School, Lucknow, India 76.4% | 2014-18 B.Tech. in Energy engineering Central university of Jharkhand 8.8 CGPA | 2018-20 M.Tech in Atmospheric – Oceanic Science and technology IIT, Delhi 8.91 CGPA | Nov 2020- Sep 2024 Ph.D. in Meteorology University of Cologne Magna Cum Laude |

## 💼 Work experience

**European Centre for Medium Range Weather Forecast**          August 2025 – December 2026
- **Scientific Coordinator for Machine Learning Course**
  - ✔ Course curriculum design, expert selection
  - ✔ Content preparation and quality control

**Institute for Meteorology and Climate Research, KIT**          December 2024 to present ♥ Karlsruhe
- **Atmospheric – Machine Learning Scientist**
  - ✓ Building deep learning architectures suitable to exploit multi-scale Earth system observations

**European Centre for Medium Range Weather Forecast**          January to April 2023 ♥ Online
- **Technical moderator in Machine Learning for Weather and Climate (MOOC)**
  - ✓ Involved in responding to technical questions from participants directly on topics related to machine learning, weather and climate
  - ✓ Debugging their coding problems & fostering a community by simulating discussions

**Tensor Dynamics**          July 2020 to Oct 2020 ♥ New Delhi
- **Energy forecaster (solar)**
  - ✓ Involved in developing models for solar energy forecasting by using Satellite INSAT 3D and 3DR cloud images
  - ✓ Developing machine learning regression models for power forecasting
  - ✓ Developing automated guided user interface python codes for product development

## Education 🎓

**Institute of Geophysics and Meteorology, UoCologne & Helmholtz Data Science School for Life, Earth and Energy**          November 2020 to Sep 2024 ♥ Cologne
- **Doctoral research in AI strategy for Earth system data**
  - ✓ Involved in developing self-supervised deep learning architectures for spatiotemporal investigation of cloud systems
  - ✓ Developing contents related to AI applications in Earth system science for e-learning platform

**Indian Institute of Technology Delhi**          June 2018 to June 2020 ♥ New Delhi
- **Masters of Technology**
  - ✓ M.Tech in Atmospheric-Oceanic Science and Technology (CGPA – 8.91/10)
  - ✓ M.Tech thesis - Estimation of the oceanic wave energy potential along the Indian coastal waters
  - ✓ Outcome –thesis selected for ocean society of India, PG dissertation award

**Central University of Jharkhand**          June 2014 to May 2018 ♥ Ranchi
- **Bachelors of Technology**
  - ✓ B.Tech in Energy engineering (CGPA – 8.88/10)
  - ✓ All India rank 184 in graduate aptitude test in engineering, 2018

**Journal publications:**

- **Chatterjee, D.**, Acquistapace, C., Deneke, H., & Crewell, S. (2023). Understanding Cloud Systems' Structure and Organization Using a Machine's Self-Learning Approach. Artificial Intelligence for the Earth Systems, 2(4), e220096. https://doi.org/10.1175/AIES-D-22-0096.1
- **Chatterjee, D.**, Schnitt, S., Bigalke, P., Acquistapace, C., & Crewell, S. (2024). Capturing the diversity of mesoscale trade wind cumuli using complementary approaches from self-supervised deep learning. Geophysical Research Letters, https://doi.org/10.1029/2024GL108889
- Crewell, S., Driemel, A., Phillips, J. M., & **Chatterjee, D.** (2024). Computational Geometry of Earth System Analysis (Dagstuhl Seminar 23342). *Dagstuhl Reports, 13*(8), 91-105. Schloss Dagstuhl – Leibniz-Zentrum für Informatik. https://doi.org/10.4230/DagRep.13.8.91

**Under review:**

- **Chatterjee, D.**, Raabe N., & Crewell, S. (2025). Listening to the Murmurs of Embeddings: Uncovering Low-Level Cloud Processes' Impact on Solar Energy Applications, Journal of Energy and AI
- Minghze, L., and **Chatterjee, D.**, Glassmeier, F., Senf, F., & Wang, B., (2025). Tracking Low-Level Cloud Systems with Topology. (Submitted to Eurographics conference on visualization 2025)
- Acquistapace, C., Schnitt, S., Risse, N., Ori, D., Krause, S., **Chatterjee, D.**, Lange, D., Späth, F., Mc Coy, I., & Seelig, T. (2025). Characterization of precipitation life cycle in the trades across different regimes of shallow convection. Quarterly Journal of the Royal Meteorological Society

**Community service:**

- Associate Editor: Journal of Meteorological Applications, Royal Meteorological Society
- Reviewer: Artificial Intelligence for Earth System

**Conferences (past one year):**

- **Chatterjee D.**, Deneke H., Crewell S.: Capturing boundary layer cloud variability using regularized self-supervision for short-term solar energy applications, EUMETSAT Conference
- **Chatterjee D.**, Schnitt S., Bigalke P., Acquistapace C., Crewell S.: Investigating cloud organizations using complementary approaches in self-supervision and geostationary satellite observations, EUMETSAT Conference
- **Chatterjee D.**, Schnitt S., Bigalke P., Acquistapace C., Crewell S.: Capturing the diversity of trade wind cumuli using complementary approaches from self-supervision, 3rd Workshop on Cloud Organization and Precipitation
- **Chatterjee D.**, Schnitt S., Bigalke P., Acquistapace C., Crewell S.: Investigating mesoscale cloud organizations from geostationary satellite observations and Eurec4A measurements using complementary approaches from self-supervision, EGU 2023
- **Chatterjee D.**, Schnitt, S., P. Bigalke, Acquistapace C., Crewell S.: Representation learning of mesoscale cloud systems using energy-based deep neural networks, ECMWF Machine Learning Workshop 2022

**Supervised Master thesis:**

- Becker, Björn (2022). Spectral clustering for self-supervised learning of cloud patterns, Master thesis in Universität zu Köln
- Zaun, Sebastian (2022). Graph-Based Clustering of Cloud Images, Master thesis in Universität zu Köln
- Horstmann Simone (2024). Using graph neural networks to predict solar irradiance using geostationary observations. (ongoing)

**Science communications:**

- Delivered thirteen AI-Earth science lectures focused on remote sensing of clouds: https://kiste.webflow.io/courses/ai-for-cloud-classification
- In YouTube:
  AI and convection: over land: link: 1 , 2 , 3 , 4 , 5 , 6 , 7 over ocean: link: 1 , 2 , 3 , 4 , 5 , 6