Nishant N. Uchale

ICTS-TIFR, Bengaluru - 560 089, India.
nishant.uchale@icts.res.in • nishant-uchale • nishant-n-uchale-364a9a200

Education

Master of Science (Atmospheric Sciences) — **Pune, India**
Savitribai Phule Pune University, Jointly with the Indian Institute of Tropical Meteorology (IITM), 9.72 CGPA — *2021 – 2023*

Bachelor of Science (Mathematics) — **Pune, India**
Sir Parshurambhau College, Savitribai Phule Pune University, Overall 85.0% — *2018 – 2021*

Research Experience

Visiting Research Student — **Bangalore, India**
GFD group, International Centre for Theoretical Sciences (ICTS), — *08/2024–Present*
Tata Institute of Fundamental Research (TIFR)
Advisor: Prof. Jim Thomas

Summer Research Student — **Bangalore, India**
Centre for Applicable Mathematics (CAM), — *02/2024–07/2024*
Tata Institute of Fundamental Research (TIFR)
Advisor: Prof. Jim Thomas

Project Research Assistant — **Mumbai, India**
Monsoon Dynamics Lab, Interdisciplinary Program in Climate Studies (IDPCS), — *08/2023–01/2024*
Indian Institute of Technology (IIT), Bombay
Advisor: Prof. Vishal Dixit

Project Student — **Pune, India**
Masters Thesis, Centre for Climate Change and Research (CCCR), — *01/2023–01/2024*
Indian Institute of Tropical Meteorology (IITM)
Advisor: Dr. Bhupendra Singh

Peer-reviewed Publications

1. **Uchale, N. N.** & Singh, B. B. (2024) Characteristics and projected changes in maximum daily precipitation across the globe. *Conditionally accepted in QJRMS*

2. Singh, B. B. & **Uchale, N. N.** (2025) Changing temporal and spatial distribution of precipitation extremes over the globe in a warmer climate. ***In prep***

Conference Presentations

Oral

1. **2023** Characteristics of global precipitation extremes in CMIP6 models: Annual Monsoon Workshop and National Symposium on Challenges in Climate services for health sector in the warming environment held from 28th to 30th March 2023 at IITM Pune organized by Indian Meteorological Society: Secured 3rd prize.

2. **2023** Cloud Physics seminar on "Mesoscale Convective Systems", In-house Science Conference at Savitribai Phule Pune University, India.

Poster

1. **Nishant N. Uchale,** Bhupendra Bahadur Singh, Pradeep Kumar Pallath (2023): Characteristics of global precipitation extremes in CMIP6 models, "WCRP Open Science Conference" held in Kigali, Rwanda, on 23-27 October 2023.
2. **Nishant N. Uchale,** & Bhupendra Bahadur Singh, Pradeep Kumar Pallath (2023): Analysis of global precipitation extremes in CMIP6 models, National Symposium TROPMET-2023 on Changing Dynamics of Arid Region and Impact o Weather and Climate over Indian Sub-continent organized by Indian Meteorological Society and Birla Institute of Technology, Mesra, Jaipur, India.
3. **Nishant N. Uchale,** & Bhupendra Bahadur Singh (2024): Characteristics and projected changes in maximum daily precipitation across the globe, "Theoretical and Practical Perspectives in Geophysical Fluid Dynamics" at ICTS-TIFR, Bangalore, India.

Research Projects

Energy Transfers in the Internal wave continuum in oceans:

Used the non-hydrostatic Boussenisq equations to simulate the flow fields in a wave dominant regime to study the poorly understood energy flow pathways in wave turbulence which play an important role in the ocean kinetic energy budget. *Currently preparing findings for publication in an academic journal.*

Climate risk analysis to infer near surface temperature:

As one unique outcome, our project highlighted the importance of humidity variables in predicting seasonal changes in near surface temperatures. Humidity plays a crucial role in modulating near-surface temperature dynamics, influencing heat stress, thermal comfort, and the intensity of temperature extremes. *Currently preparing findings for publication in an academic journal.*

Characteristics and projected changes in daily maximum precipitation across the globe:

This research evaluates the statistical characteristics of extreme precipitation globally in observations and CMIP6 model projections. mainly focusing on maximum daily precipitation on an annual, seasonal, and monthly scale globally for both historical and future climate in the 21st century. *Manuscript conditionally accepted in QJRMS*

Cyclone Mandous: a case study:

Used the WRF ARW model to simulate the cyclone with the NCAR reanalysis data as the initial condition and study its genesis, characteristics and trajectory. The analysis was also compared with the actual observed features of the cyclone which was found to be a comparable match. *Part of Term Project*

Relevant Coursework

Geophysical Fluid Dynamics, Atmospheric Dynamics, Ocean Dynamics, Physical Oceanography, Atmospheric Thermodynamics, Wave Dynamics, Atmospheric Radiation, Numerical Weather Prediction, Synoptic Meteorology, Atmospheric Boundary Layer, Climate Modelling (introductory level).

Technical Skills

Programming

Python [MPI4Py, Dask Parallel, netCDF, metpy, xarray], LaTeX, FORTRAN 90/95

Visualization and Statistics: Matplotlib, Xarray, Numpy, Scikit-learn, Ferret, Climate Data Operators (CDO), Origin

Experience with

Ground observations: IMD AWS station datasets, Ceilometer, Disdrometer, Aethalometer

Satellite Observations: TRMM, GPM (L2, L3, IMERG), GPCP, MODIS

Reanalysis & Model datasets: NCAR Reanalysis, ERA5, ERA-INTERIM, WRF, CMIP5, CMIP6, Numerical simulation datasets

Other

HPC, Linux, Windows OS

Extracurricular Courses/Certifications

Sep 2024: Geophysical Fluid Dynamics by TIFR-CAM, Bangalore, India

Aug 2024: Introduction to Atmospheric Dynamics by CAOS, IISc, Bangalore, India

Jan 2024: Attended the "Geophysical Flows: From the Field to the Lab" discussion meeting organized by IIT Madras, India

Aug 2023: Application Oriented School on WRF Modeling System by C-DAC and IMD Pune, India

Sep 2023: Attended the online lecture series "Atmospheric and Climate Dynamics" and "The Art of Climate Modelling" by Paul A. Ullrich, University of California, Davis.

Awards and Fellowships

Long-Term Visiting Student Research Fellowship (2024): Awarded by the Tata Institute of Fundamental Research's International Centre for Thereotical Sciences for a year long research under Prof. Jim Thomas on energy transfers in the internal wave continuum in oceans.

Summer Student Research Program Fellowship (2024): Awarded by the Tata Institute of Fundamental Research's Centre for Applicable Mathematics for summer research under Prof. Jim Thomas on numerical methods and parallel computing.

Junior Research Fellowship (2023): Awarded by the Interdisciplinary Program in Climate Studies, Indian Institute of Technology, Bombay for a research project under Prof. Vishal Dixit on temperature extremes.

Language Skills

English, Marathi, Hindi, Konkani(Malvani) (reading and writing)

Referees

Prof. Jim Thomas: Joint faculty

International Centre for Theoretical Sciences (ICTS) and Centre for Applicable Mathematics (CAM),
Tata Institute of Fundamental Research (TIFR), Bangalore, India.
Email ID: jimthomas@tifrbng.res.in

Dr. Bhupendra B. Singh: Scientist E

Centre for Climate Change and Research (CCCR),
Indian Institute of Tropical Meteorology (IITM), Pune, India.
Email ID: bhupendra.cat@tropmet.res.in

Prof. Anandakumar Karipot: Former Head of the Department

Department of Atmospheric and Space Sciences (DASS),
Savitribai Phule Pune University (SPPU), Pune, India.
Email ID: akaripot@unipune.ac.in