

# Sreevathsa Golla

PhD Researcher • Oceanography & Climate Science  
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## RESEARCH INTERESTS

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Physical Oceanography • El Niño – Southern Oscillation (ENSO) • Large-Scale Ocean Dynamics • Ocean – Climate Interactions • Ocean – Atmosphere Coupling • Climate Variability & Change • Ocean Modelling • AI/ML Applications in Ocean & Climate Science

## EDUCATION

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### PhD in Oceanography and Climate Science

University of Southampton & National Oceanography Centre

Sep 2023 – Present

Southampton, UK

- **Thesis Title:** “Evolution of the El Niño – Southern Oscillation in a Warming Climate and its Impact on Climate Extremes”
- Combining eddy-resolving high-resolution climate model simulations with targeted sensitivity and attribution experiments to unravel mechanisms driving ENSO variability and its broader impacts
- Under INSPIRE Doctoral Training Partnership programme, funded by NERC, UK Research & Innovation
- Advisors: Dr. Joël Hirschi, Dr. Adam Blaker, Dr. Jennifer Mecking & Dr. Stephen Kelly (NOC); Prof. Robert Marsh (University of Southampton)

### BS–MS (Dual Degree) in Earth and Environmental Sciences

Indian Institute of Science Education and Research (IISER) Bhopal

Aug 2018 – May 2023

Bhopal, India

- **Minor:** Data Science and Engineering | **CPI (CGPA):** 8.81/10
- Awarded the *Proficiency Medal* for ‘Best Academic Performance’ in Earth & Environmental Sciences
- **MS Thesis:** “Western Boundary Currents: Representation in High-Resolution Ocean General Circulation Models (OGCMs) and their Relationship with Climate Modes”
- Evaluated the representation of the North Atlantic Current and Agulhas Current in high-resolution ocean models, assessing the impact of model nesting on current pathway, strength and transport accuracy against observations and reanalysis
- Advisors: Prof. Paul Myers (University of Alberta) & Dr. Pankaj Kumar (IISER Bhopal)

## RESEARCH EXPERIENCE

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### Visiting Researcher

Climate & Global Dynamics (CGD) Laboratory, NSF NCAR

Aug 2025 – Oct 2025

Boulder, CO, USA

- Evaluated resolution dependence and future reorganisation of Indo-Pacific variability in CESM MESACLIP simulations across different global warming scenarios
- Assessed projected changes in Indian Ocean Dipole (IOD), Indonesian Throughflow (ITF) characteristics and inter-basin IOD-ITF-ENSO interactions
- Analysed a suite of moderate to very high-resolution (0.1°) ocean-atmosphere coupled CESM simulations under different SSP warming scenarios, from the CESM MESACLIP Project
- Supervisors: Dr. Gökhan Danabasoglu (Head, Oceanography Section), Dr. Isla Simpson (Head, Climate Analysis Section), Dr. Fred Castruccio (Scientist IV, Oceanography Section)

### Research Intern — Mitacs Globalink Research Internship

Geophysical Fluid Dynamics & Modelling Lab, University of Alberta

May 2022 – Aug 2022

Edmonton, AB, Canada

- Analysed the representation of the North Atlantic Current (NAC) in different high-resolution NEMO model configurations and model nests at varying spatio-temporal scales
- Examined and inter-compared contours of SST and SSH from different model setups; calculated section transports in the North Atlantic domain with initial comparisons to satellite/reanalysis data
- Investigated NAC pathway, strength and transport variability; work continued into MS thesis
- Supervisor: Prof. Paul G. Myers (GFDL Lab, Dept. of Earth and Atmospheric Sciences)

## Research Intern — Deep Learning-Based Downscaling (GANs)

Aug 2021 – Mar 2022

Climate & Glacier Modelling Lab (CGMLI), IISER Bhopal

Bhopal, India

- Developed a custom Super-Resolution Generative Adversarial Network (SRGAN) to spatially downscale IMD gridded rainfall data from 1.00° to 0.25° resolution over the Indian domain
- Led the technical implementation: architecture design, coding, testing and hyperparameter tuning of the GAN model
- Work published in *Modeling Earth Systems and Environment* (Murukesh, Golla & Kumar, 2023)
- Supervisor: Dr. Pankaj Kumar, Dept. of EES, IISER Bhopal

## Research Intern — Spatial Downscaling Using CNNs

Apr 2021 – Jul 2021

Climate & Glacier Modelling Lab (CGMLI), IISER Bhopal

Bhopal, India

- Applied SRCNN and SRResNet-based image super-resolution techniques to spatially downscale IMD daily gridded rainfall data (1980–2010) from 1.00° to 0.25° resolution, benchmarking performance across multiple architectures
- Work published as a first-author comparative assessment in *SN Computer Science* (Golla, Murukesh & Kumar, 2024)
- Supervisor: Dr. Pankaj Kumar, Dept. of EES, IISER Bhopal

## PUBLICATIONS

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### First-Author

- [1] **Golla, S.**, Murukesh, M. & Kumar, P. (2024). Comparative assessment of image super-resolution techniques for spatial downscaling of gridded rainfall data. *SN Computer Science*, 5. DOI: 10.1007/s42979-024-02653-3
- [2] **Golla, S.**, Hirschi, J. J.-M., Blaker, A. T., Mecking, J., Kelly, S. & Marsh, R. (2026). Characterising surface discrepancies and vertical coherence of ocean temperature anomalies in CMIP6 HighResMIP during ENSO events. *Preprint, in revision at SN Climate Dynamics*. DOI: 10.21203/rs.3.rs-8345018/v1
- [3] **Golla, S.**, Hirschi, J. J.-M., Blaker, A. T., Mecking, J., Kelly, S. & Marsh, R. Modulation of thermocline feedback by westerly wind bursts and surface wind forcing during El Niño development in an ocean-only model. *In preparation for Journal of Geophysical Research: Oceans*.

### Co-Authored

- [4] Murukesh, M., **Golla, S.** & Kumar, P. (2023). Downscaling and reconstruction of high-resolution gridded rainfall data over India using deep learning-based generative adversarial network. *Modeling Earth Systems and Environment*, 10, 2221–2237. DOI: 10.1007/s40808-023-01899-9
- [5] Joseph, L., Dey, D., Skliris, N., Sanchez-Franks, A., Marsh, R., Hirschi, J. & **Golla, S.** (2025). Warming trend in the western Indian Ocean driven by oceanic transport. *Journal of Geophysical Research: Oceans*, 131(1). DOI: 10.1029/2025JC022762

## CONFERENCES & PRESENTATIONS

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- [1] Golla, S., Hirschi, J., Mecking, J., Blaker, A., Kelly, S. & Marsh, R. (2026). Wind modulation of thermocline feedback during development of El Niño. *Ocean Sciences Meeting 2026*, Glasgow, United Kingdom
- [2] Golla, S., Hirschi, J., Mecking, J., Blaker, A. & Marsh, R. (2024). Characterising surface discrepancies and vertical coherence of ocean temperature anomalies in CMIP6 HighResMIP during ENSO events. *AGU Fall Meeting 2024*, Washington D.C., United States of America
- [3] Golla, S., Hirschi, J., Mecking, J., Blaker, A., Kelly, S. & Marsh, R. (2024). Dynamical evolution of ENSO in a warming background: A review of recent trends & future projections. *EGU General Assembly 2024*, Vienna, Austria. DOI: 10.5194/egusphere-egu24-626
- [4] Golla, S., Murukesh, M. & Kumar, P. (2023). Spatial downscaling of IMD gridded rainfall data using SRCNN and SRResNet: A comparative study. *Frontiers in Geosciences Research (FGRC) 2023, Physical Research Laboratory*, Ahmedabad, India

## AWARDS & FUNDING

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- Proficiency Medal for Best Academic Performance in Earth and Environmental Sciences, IISER Bhopal
- INSPIRE Doctoral Training Partnership Studentship (NERC-funded), University of Southampton, 2023 – Present
- Mitacs Globalink Research Internship Fellowship, University of Alberta, 2022

## WORKSHOPS & TRAINING

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- NSM GPU Hackathon, organised by NSM, CDAC & NVIDIA at IIT Bombay (Sep 2022)
- TROPMET-2022 National Symposium, Indian Meteorological Society, hosted by IISER Bhopal (Nov 2022)
- M.P. State Youth Policy Consultation Workshop on “The Role of Youth in Environmental Sustainability”, EPCO, Govt. of Madhya Pradesh (Dec 2022)
- AI Shiksha: Introduction to Deep Learning, NSM & CDAC, Govt. of India (Jun 2021)
- Workshop on Internet of Things (IoT) using Raspberry Pi, Technex'20 IIT (BHU) at IISER Bhopal (Aug 2019)

## TEACHING & LEADERSHIP

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- Module Demonstrator, SOES3010 (Spring '26), SOES2025 & SOES3042 (Fall '24), SOES6037 (Fall '23), School of Ocean and Earth Science, University of Southampton
- Teaching Assistant, ECS101: Introduction to Programming (Spring '20), IISER Bhopal
- Vice-Secretary, Computing and Networking Council (CNC), IISER Bhopal (2021–2022)
- Core Committee Member, CNC, IISER Bhopal (2019–2020)
- Club Coordinator, Earth and Environmental Sciences (EES) Club, IISER Bhopal (2020–2021)
- Event Management & Design Team Lead, ORB 2021, Annual Departmental Symposium, Dept. of EES
- Student Volunteer, Conference Events Management Committee, TROPMET-2022 National Symposium

## TECHNICAL SKILLS

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**Programming:** Python, MATLAB, Mathematica, LaTeX, Shell scripting

**Ocean/Climate Models:** NEMO, CESM (MESACLIP), CMIP6/HighResMIP model analysis

**GIS & Data Tools:** ArcGIS, QGIS, CDO (Climate Data Operators), CDAT

**AI/ML:** Deep Learning, Machine Learning, Image Super-Resolution for Climate Data

**Computing:** High Performance Computing (HPC) clusters, CPU & GPU environments

**Languages:** English (Proficient; TOEFL 108/120), Hindi (Fluent), Telugu (Native)

## REFERENCES

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**Dr. Joël Hirschi** — Associate Head of Marine Systems Modelling, National Oceanography Centre, UK

**Dr. Adam Blaker** — Senior Scientist, Marine Systems Modelling, National Oceanography Centre, UK

**Dr. Gökhan Danabasoglu** — Senior Scientist, Climate & Global Dynamics Lab, NSF NCAR, USA

**Prof. Paul Myers** — Professor, Dept. of Earth and Atmospheric Sciences, University of Alberta, Canada

**Dr. Pankaj Kumar** — Associate Professor, Dept. of Earth and Environmental Sciences, IISER Bhopal, India