

ALESSANDRO RAGANATO

Georgia Institute of Technology — Atlanta, GA
(+1) 404 203-0635 — araganato3@gatech.edu
[Google Scholar](#)

PROFESSIONAL SUMMARY Ph.D. researcher in climate physics at the Georgia Institute of Technology specializing in computational climate science, ocean and atmospheric dynamics, nonlinear dynamical systems, and large-scale data analysis. Experienced in Python-based scientific computing and high-performance computing, including Linux/Slurm workflows on NERSC/Perlmutter, as well as dimensionality reduction, machine learning, and analysis of multi-terabyte geophysical datasets. Research focuses on data-driven evaluation and dynamical understanding of climate-model behavior.

EDUCATION *Ph.D. in Physics* Jan 2024 – Expected Oct 2027
School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA
Advisor: Prof. Annalisa Bracco

M.Sc. in Physics, cum laude 2020 – 2023
University of Trieste, Trieste, Italy GPA: 29.42/30
Dissertation: *Extra-tropical response to tropical forcing in the SPEEDY model compared to observations and its dependence on the modifications of the subtropical jet in boreal winter.*
Supervisor: Prof. Fred Kucharski; Co-Supervisor: Dr. Muhammad Adnan Abid

B.Sc. in Physics 2016 – 2020
Sapienza University of Rome, Rome, Italy
Dissertation: *Description of the Larmor formula in a massive field.*
Supervisor: Prof. Paolo Pani

RESEARCH EXPERIENCE *Graduate Researcher* Jan 2024 – Present
Georgia Institute of Technology, Atlanta, GA

- Develop scalable Python workflows to process, transform, and analyze large multidimensional datasets from numerical simulations and observational products.
- Use statistical learning, dimensionality reduction, manifold-learning, information-theoretic, and time-series methods to identify structure, dependencies, and dynamical differences across complex datasets.
- Design quantitative frameworks to compare numerical models, evaluate model performance, and assess the impact of model resolution and configuration on simulated behavior.
- Run data-intensive analyses on DOE high-performance computing systems, using Linux, Slurm, and parallel workflows to manage multi-terabyte datasets.
- Apply these methods to ocean and climate dynamics, including the Atlantic Meridional Overturning Circulation, freshwater transport, temperature, salinity, and large-scale ocean variability.
- Collaborate with researchers at Los Alamos National Laboratory and other institutions on DOE-supported projects.

Scientific Consultant Apr 2023 – Oct 2023
Earth System Physics Section, International Centre for Theoretical Physics, Trieste, Italy

- Analyzed large atmospheric datasets from observations, reanalyses, numerical simulations, and seasonal prediction systems.
- Applied statistical and computational methods to identify relationships among interacting components of a complex dynamical system and evaluate their representation in numerical models.
- Investigated tropical–extratropical interactions and quantified how changes in model and atmospheric conditions affected large-scale circulation responses and predictability.

PUBLICATIONS • **Raganato, A.**, Bracco, A., Van Roekel, L., & Iovino, D. (2026). *AMOC Discrepancies across Reanalyses and Models Limit Dynamical Understanding*. Journal of Climate, <https://doi.org/10.1175/JCLI-D-25-0618.s1>.

- Reale, M., **Raganato, A.**, d'Andrea, F., Abid, M. A., Hochman, A., Chowdhury, N. R., ... & Kucharski, F. (2025). *Response of early winter precipitation and storm activity in the North Atlantic–European–Mediterranean region to Indian Ocean SST variability*. *Geophysical Research Letters*, 52(20), e2025GL116732.
- **Raganato, A.**, Abid, M. A., & Kucharski, F. (2025). *The Combined Link of the Indian Ocean Dipole and ENSO with the North Atlantic–European Circulation during Early Boreal Winter in Reanalysis and the ECMWF SEAS5 Hindcast*. *Journal of Climate*, 38(2), 445–460.

TECHNICAL SKILLS

- **Programming:** Python, C/C++.
- **Scientific computing:** NumPy, SciPy, pandas, xarray, scikit-learn, Matplotlib.
- **Methods:** statistical analysis, PCA, dimensionality reduction, manifold learning, mutual information, time-series analysis, numerical methods.
- **HPC:** Linux, Bash, Slurm, NERSC/Perlmutter.

TEACHING

Teaching Assistant, Introduction to Environmental Sciences Spring 2024
 School of Earth and Atmospheric Sciences, Georgia Institute of Technology

- Prepared class activities and assessments for groups of 15–25 undergraduate students and graded student work.

SELECTED CONFERENCES

- E3SM Webinar – Online, August 2026.
- ImPACTS SciDAC All Hands Annual Meeting – Los Alamos, NM, May 2026.
- APS March Meeting 2025 – Anaheim, CA, March 2025.
- 21st Annual EAS Graduate Research Symposium – Atlanta, GA, April 2025.
- CESM Tutorial 2024 – Boulder, CO, August 2024.
- CAMAS Workshop and Early-Career School – Santa Fe, NM, February 2024.
- 4th Summer School on Theory, Mechanisms and Hierarchical Modeling of Climate Dynamics – ICTP, Trieste, Italy, August 2023.

LANGUAGES

Italian: Native — English: TOEFL iBT 100/120 — Spanish: Basic