Valerio Lembo

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QUALIFICATIONS

Ph. D. in Climate Sciences July 2016
University of Salento *Lecce, Italy*

· Doctoral thesis "Evolution of the Energy Budget in the 20^{th} Century and its Role in the Inter-Hemispheric Temperature Contrast"
· Academic Guest (Jan 2015 - Apr 2015) at "Climate and Water Cycle" group of the Institute for Atmospheric and Climate Sciences of the Swiss Federal Institute of Technology, Zürich, Switzerland

M. Sc. in Physics of the Atmosphere and Meteorology October 2012
University of Bologna *Bologna, Italy*

· M. Sc. thesis "Surface Temperature as a Climate Index: Relations with Mid-latitude Tropospheric Baroclinicity"

B. Sc. in Physics and Astrophysics December 2009
University of Rome La Sapienza *Rome, Italy*

· B. Sc. thesis on "Influence of Atmospheric Gravity Waves on ground-based Solar Irradiance Measures"

CURRENT EMPLOYMENT

ISAC-CNR October 2020 - Present
Permanent Researcher *Bologna, Italy*

· Member of the "Global Change" unit of the Earth system science and environmental technologies Department at CNR, within the Institute for Atmospheric Sciences and Climate (ISAC).

EMPLOYMENT HISTORY

CEN, University of Hamburg November 2016 - August 2020
Postdoctoral Researcher *Hamburg, Germany*

· Project "Energy Transfers in the Atmosphere and Ocean".
· Research on diagnostics and metrics for the assessment of climate models.
· Participation to ESMValTool community diagnostics for the analysis of IPCC model ensembles.

CINFAI March 2016 - September 2016
Research Associate *Lecce, Italy*

· Research on the seasonal cycle of atmospheric baroclinic activity in mid-latitudes

ISAC-CNR June 2012 - October 2012
Internship *Bologna, Italy*

· Research activity related to the M. Sc. thesis at the University of Bologna

AWARDS AND CERTIFICATES

Seal of Excellence for MSCA-IF proposal March 2020
European Research Council

Meteorologist Certificate (WMO Qualification) July 2018
University of Bologna

Ph.D. Grant on "Ecology and Climate Change" January 2013
University of Salento - CMCC

ONGOING COLLABORATIONS

· Dr. Tamas Bodai, IBS, Busan, South Korea
· Dr. Susanna Corti, ISAC-CNR, Bologna, Italy
· Dr. Federico Fabiano, ISAC-CNR, Bologna, Italy
· Dr. Davide Faranda, LSCE-IPSL, Gif sur Yvette, France
· Prof. Rune Graversen, Arctic University of Norway, Trondheim, Norway
· Prof. Valerio Lucarini, University of Reading, United Kingdom
· Prof. Gabriele Messori, University of Uppsala, Sweden
· Dr. Lenka Novak, CalTech, Pasadena, USA

SKILLS

Computer Languages	C++, Fortran, HTML, MATLAB, NCL, Python, UNIX-Bash
Protocols	FTP, SSH
Databases	GRIB, NetCDF
Tools	CDO, GitHub, LaTeX, NCO

SELECTED CONFERENCE ATTENDANCE (FROM 2017)

Erice International School of Non-equilibrium Phenomena July 2022
Erice, Italy

Invited Talk: "Meridional energy transports, extremes and weather regimes in Northern Hemisphere midlatitudes"

European Geosciences Union (EGU) General Conference 2022 May 2022
Vienna, Austria

Talk: "Meridional energy transport extremes and the general circulation of NH mid-latitudes: dominant weather regimes and preferred zonal wavenumbers"
Convener: "Energy and dynamics in the climate system"
Short course presenter: "Thermodynamics and energetics of the oceans, atmosphere and climate"

American Geosciences Union (AGU) Fall Meeting 2021 December 2021
online

Talk: "Meridional Energy Transport Extremes and Dominant Modes of Mid-latitudinal Weather Variability in the Northern Hemisphere"

European Geosciences Union (EGU) General Conference 2021 April 2021
online

Invited PICO Talk: "Predicting Climate Change through Response Operators in a Coupled General Circulation Model"

Convener: "Energy and moisture cycles: interactions and changes with large-scale atmospheric and oceanic circulation"
Short course presenter: "Thermodynamics and energetics of the oceans, atmosphere and climate"

American Geosciences Union (AGU) Fall Meeting 2020 December 2020
online

Talk: "Beyond Forcing Scenarios: Predicting Climate Change through Response Operators in a Coupled General Circulation Model"

European Geosciences Union (EGU) General Conference 2020 May 2020
online

Talk: "Predicting Climate Change through Response Operators in a Coupled General Circulation Model"
Convener: "Global energy and water exchanges: implications for the atmospheric and oceanic circulation"

USClivar Workshop on Large Ensembles July 2019
Boulder, Colorado, USA

Poster: "Prediction of the long-term climate response in a coupled climate model using response theory"

EUCP Workshop on Climate Prediction in the Atlantic-Arctic sector June 2019
Bergen, Norway

Poster: "Prediction of the long-term climate response in a coupled climate model using response theory"

European Geosciences Union (EGU) General Conference 2019 April 2019
Vienna, Austria

- Co-convener
- Short course presenter
- Talk: "Inter-hemispheric differences in the energy budgets and its components, and its evolution during the 20th Century"

Joint Workshop: Conservation Principles, Data, and Uncertainty in Atmosphere-Ocean Modelling April 2019
Potsdam, Germany

Scientific organizer

CMIP6 Model Analysis Workshop March 2019
Barcelona, Spain

Poster: "A new diagnostic tool for the energy budgets and transports in climate models"

World Climate Research Program (WCRP) workshop: The Earth's Energy Imbalance and its implications November 2018
Toulouse, France

Poster: "A New Diagnostic Tool for Water, Energy and Entropy Budgets in Climate Models"

1st Congress of the Italian Association for Atmospheric Sciences and Meteorology (AISAM) September 2018
Bologna, Italy

Talk: "A Novel Diagnostic Tool for Thermodynamics of Climate Models"

CliMathNet Conference 2018 September 2018
Reading, United Kingdom

Talk: "Annual and Semiannual Cycles of Near-surface Temperature and Baroclinic Activity in Midlatitudes"

European Geosciences Union (EGU) General Conference 2018 April 2018
Vienna, Austria

Poster: "Wavenumber Decomposition of Midlatitude Meridional Energy Transports and Extremes"

5th International Conference on Reanalysis November 2017
Rome, Italy

Poster: "Annual and Semiannual Cycles of Midlatitude Near-surface Temperature and Tropospheric Baroclinicity: Reanalysis Data and AOGCM Simulations"

CliMathNet Conference 2017 September 2017
Reading, United Kingdom

Talk: "A Flexible Tool for Diagnosing Energy, Water and Material Entropy Production in Climate Models"

European Geosciences Union (EGU) General Conference 2017 April 2017
Vienna, Austria

Poster: "Inter-hemispheric Differences in Energy Budgets and Surface Temperature Anomalies during the 20th Century: the Role of Cross-equatorial Transport Anomalies"

MISCELLANEOUS

Projects	OptimESM (Horizon Europe, 2023-)
	CN-HPC, Spoke 4 "Earth and Climate" (PNRR-MUR, 2023-)
	Destination Earth (EU-ESA-ECMWF, 2022-)
	Roadmap (JPI, 2021-)
	TRR181 (DFG, 2016-2020)
Editor	Nonlinear Processes in Geophysics
Reviewer	Earth System Dynamics,
	Geophysical Research Letters,
	Meteorology and Atmospheric Physics
	Journal of Climate
	Weather and Climate Dynamics
Memberships	European Geosciences Union (2013-2022)
	Associazione Italiana per le Scienze dell'Atmosfera e Meteorologia (2016-2018)
	Centro Euro-Mediterraneo per i Cambiamenti Climatici (2013-2016)

PUBLICATION LIST

- **Lembo, V.**, Fabiano, F., Galfi, V.M., Graversen, R., Lucarini, V., and G. Messori, 2022, Meridional energy transport extremes and the general circulation of NH mid-latitudes: dominant weather regimes and preferred zonal wavenumbers, Weather Clim. Dyn., 3(3), 1037-1062
- Franzke, Christian LE, Franzke, C. L., Blender, R., O'Kane, T. J., and **V. Lembo**, 2022, Stochastic Methods and Complexity Science in Climate Research and Modeling, Frontiers in Physics, 521
- Ragone, C., **Lembo, V.**, Lucarini, V., Vérard, C., Kasparian, J., and M. Brunetti, 2022, Robustness of competing climatic states, J Atm Sciences, 35(9), 2769-2784
- Faranda, D., Alberti, T., Arutkin, M., **Lembo, V.**, and V. Lucarini, 2021, Interrupting vaccination policies can greatly spread SARS-CoV-2 and enhance mortality from COVID-19 disease: The AstraZeneca case for France and Italy, Chaos, 31(4), 041105
- Qiyun, M., **Lembo, V.**, and C.L.E. Franzke, 2021, The Lorenz energy cycle: trends and the impact of modes of climate variability, Tellus A: Dyn Met and Oc, 73:1, 1-15
- Vissio, G., **Lembo, V.**, Lucarini V., and M. Ghil, 2020, Evaluating the Performance of Climate Models Based on Wasserstein Distance, Geophys. Res. Lett., 47, e2020GL089385.
- **Lembo, V.**, Ragone F., and V. Lucarini, 2020, Beyond Forcing Scenarios: Predicting Climate Change through Response Operators in a Coupled General Circulation Model, Sci Rep 10, 8668.
- Eyring, V. et al., 2020, Earth System Model Evaluation Tool (ESMValTool) v2.0 – an extended set of large-scale diagnostics for quasi-operational and comprehensive evaluation of Earth system models in CMIP, Geosci. Model Dev., 13, 3383–3438.
- **Lembo V.**, Lunkeit F., and V. Lucarini, 2019, TheDiaTo (v1.0) – A new diagnostic tool for diagnosing water, energy and entropy budgets in climate models, Geosci. Model Dev., 12, 3805–3834
- **Lembo V.**, Messori G., Graversen R., and V. Lucarini, 2019, Spectral decomposition and extremes of atmospheric meridional energy transport in the Northern Hemisphere midlatitudes, Geophys. Res. Lett., 46, 7602-7613
- **Lembo V.**, Folini D., Wild M., and P. Lionello, 2019, Inter-hemispheric differences in energy budgets and cross-equatorial transport anomalies during the 20th Century, Clim. Dyn., 53: 115
- Faranda D., **Lembo V.**, Kuzzay D., Daviaud F. and B. Dubrulle, 2017, Computation and characterization of local energy transfers in atmospheric flows, J. Atm. Sciences, 75, 2175–2186
- **Lembo V.**, Bordi I., and A. Speranza, 2017, Annual and semiannual cycles of midlatitude surface temperature and baroclinicity: reanalysis data and AOGCMs simulations, Earth Sys. Dyn., 8, 295-312
- **Lembo V.**, Folini D., Wild M. and P. Lionello, 2016, Energy budgets and transports: global evolution and spatial patterns during the 20th Century in two AMIP-like experiments, Clim. Dyn., 48, 1793-1812