Vladimir Lapin

Personal Data

Nationality:	Russian | Authorized to work in the EU (Permanent Resident – Spain)
Location:	Barcelona Supercomputing Center, Barcelona, Spain
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Profiles:	GitHub | LinkedIn | Google Scholar | ORCID

Profile Summary

Senior Climate Modeller with 15 years of experience in environmental data analysis, predictive modelling, and scientific computing. Currently co-leading development of EC-Earth4 and automated ECE4 workflows supporting decadal climate prediction systems.

Expert in climate model development, ocean tuning, and data assimilation, with contributions to CMIP7 experiments and operational climate predictions (WMO and DCPP). Strong background in HPC workflows, Python and Fortran-based modelling, and coordinating scientific development across international teams.

Employment

2025 - now	**Senior Research Engineer** Role: "Co-lead development of EC-Earth4 and new prediction system" *Earth Sciences Dept.*, Barcelona Supercomputing Center, Barcelona, Spain
2019 - 2024	**Recognized Research Engineer** Project: "Model development and data assimilation in the EC-Earth model" *Earth Sciences Dept.*, Barcelona Supercomputing Center, Barcelona, Spain
2015 - 2017	**Postdoctoral Scientist** Project: "Developing the sea-ice component of the ICON climate model" *Ocean Dept.*, Max Planck Institute for Meteorology, Hamburg, Germany
2011 - 2014	**Research Fellow** Project: "High-resolution global numerical modelling of ocean tides" *Applied Mathematics Dept.*, University of Leeds, Leeds, UK

Education

2008 - 2011	**Ph.D.** in *Applied Mathematics* University of Limerick, Ireland Thesis: "Resonant over-reflection of waves by jets in a rotating ocean"
2003 - 2008	**B.Sc., M.Sc.** in *Applied Mathematics and Mechanics* Moscow State University, Russia Thesis: "On the stability of the plane flows of visco-plastic fluids" Grades: 4.85/5*, *1st Honours*

Skills

Coding	Python, Bash, Fortran and C (incl. MPI and OpenMP), YAML, JSON, Git, SVN
Software	Linux, LaTeX, CDO, Matlab, COMSOL, Autosubmit
Languages	English (fluent), Spanish (B2), German (B1), Catalan (A2), Russian (native)
Research	Ocean/climate/fluid dynamics, numerical modelling, data assimilation
Mentoring	Supervision of 2 PhD and 3 Master's students; training events
Output	25 peer-reviewed publications; 21 international presentations

Teaching / Work Experience

2012 - 2014 Teaching assistant at University of Leeds, UK
Department of Applied Mathematics
- ► Calculus of Variations (MATH2650, 2nd year) – Spring 2014
- ► Calculus and Mathematical Analysis (MATH1050, 1st year) – Autumn 2013
- ► Modelling with Differential Equations (MATH1400, 1st year) – Spring 2012, 2013

2008 - 2011 Teaching assistant at University of Limerick, Ireland
Department of Mathematics and Statistics
- ► Engineering Mathematics I/II (MA4001, 1st year) – Autumn/Spring 2009, 2010, 2011
- ► Vector Analysis (MS4613, 2nd year) – Autumn 2010
- ► Mathematical Modeling (MS4408, master's students) – Spring 2011
- ► Math Tutor in Maths Learning Center – Autumn 2008 - Spring 2011

Sum 2008 Intern at Raiffeisenbank, Russia
Risk Analysis Department
- ► Credit card portfolio analysis and management. Preparation of reports for the management.

Sum 2007 Junior Statistician at ACNielsen, Russia
Measurement Science Department
- ► Statistical analysis of consumer and marketing data. Instructions for the Field Department.

Selected Publications

2024 Silvy, Y et al. (Dec. 2024). "AERA-MIP: emission pathways, remaining budgets, and carbon cycle dynamics compatible with 1.5 and 2 °C global warming stabilization". *Earth System Dynamics* **15**, 1591–1628. ISSN: 2190-4987.

2022 Hermanson, L et al. (Apr. 2022). "WMO Global Annual to Decadal Climate Update: A Prediction for 2021–25". *Bulletin of the American Meteorological Society* **103**, E1117–E1129. ISSN: 1520-0477.

2020 Tsujino, H et al. (Aug. 2020). "Evaluation of global ocean–sea-ice model simulations based on the experimental protocols of the Ocean Model Intercomparison Project phase 2 (OMIP-2)". *Geoscientific Model Development* **13**, 3643–3708. ISSN: 1991-9603.

2014 Stammer, D et al. (Aug. 2014). "Accuracy assessment of global barotropic ocean tide models". *Reviews of Geophysics* **52**, 243–282. ISSN: 8755-1209.

2011 Lapin, VN (Feb. 2011b). "Stability of the Couette flow of ideal rigid-plastic bodies". *Moscow University Mechanics Bulletin* **66**, 1–7. ISSN: 1934-8452.

References

Group leader: Dr. Pablo Ortega Montilla
Dept. of Earth Sciences
Barcelona Supercomputing Center
portega@bsc.es

Group leader: Dr. Johann Jungclaus
Dept. of Applied Mathematics
Max Planck Institute for Meteorology (MPI-M)
johann.jungclaus@mpimet.mpg.de

Postdoc Advisor: Dr. Stephen Griffiths
Dept. of Applied Mathematics
University of Leeds
sdg@maths.leeds.ac.uk

Ph.D. Supervisor: Prof. Eugene Benilov
Dept. of Mathematics & Statistics
University of Limerick
eugene.benilov@ul.ie

Extra

Publications

In prep	Lapin, VN & Griffiths, SD (n.d.). "Improved accuracy of finite difference ocean models with irregular boundaries." *Ocean Model.* ()
2026	Saurral, RI et al. (2026). "The key role of Mediterranean and North Atlantic sea surface temperatures on the 2024 record-breaking Valencia precipitation event". *Weather and Climate Extremes*
	Li, H et al. (Feb. 2026). "Multi-model reconstructions and predictions of the CO2 fluxes and atmospheric CO2 variations". *Bulletin of the American Meteorological Society*. ISSN: 1520-0477.
2025	Carréric, A et al. (Oct. 2025). "Comparing the seasonal predictability of the Tropical Pacific variability in EC-Earth3 at two horizontal resolutions".
	Bilbao, R et al. (2025). "The sensitivity of EC-Earth3 decadal predictions to the choice of volcanic forcing dataset: insights for the next major eruption". *Geoscientific Model Development*
	Mahmood, R et al. (Mar. 2025). "Multi-decadal initialized climate predictions using the EC-Earth3 global climate model".
	Cvijanovic, I et al. (Mar. 2025). "Arctic sea-ice loss drives a strong regional atmospheric response over the North Pacific and North Atlantic on decadal scales". *Communications Earth & Environment* **6**, ISSN: 2662-4435.
	Carreric, A, Ortega, P, Lapin, V et al. (Jan. 2025). "Comparing the seasonal predictability of Tropical Pacific variability in EC-Earth3 at two different horizontal resolutions".
2024	Silvy, Y et al. (Dec. 2024). "AERA-MIP: emission pathways, remaining budgets, and carbon cycle dynamics compatible with 1.5 and 2 °C global warming stabilization". *Earth System Dynamics* **15**, 1591–1628. ISSN: 2190-4987.
	Bernardello, R et al. (2024). "Ocean biogeochemical reconstructions to estimate historical ocean CO2 uptake". *Earth System Dynamics*
	Carreric, A, Ortega, P, Doblas-Reyes, F et al. (2024). "Comparing the seasonal predictability of ENSO and the Tropical Pacific variability in EC-Earth3 at two different horizontal resolutions"
2022	Simon, A et al. (Aug. 2022). "Pacific Decadal Oscillation modulates the Arctic sea-ice loss influence on the midlatitude atmospheric circulation in winter". *Weather and Climate Dynamics* **3**, 845–861. ISSN: 2698-4016.
	Acosta Navarro, JC et al. (May 2022). "Added value of assimilating springtime Arctic sea ice concentration in summer-fall climate predictions". *Environmental Research Letters* **17**, 064008. ISSN: 1748-9326.
	Hermanson, L et al. (Apr. 2022). "WMO Global Annual to Decadal Climate Update: A Prediction for 2021–25". *Bulletin of the American Meteorological Society* **103**, E1117–E1129. ISSN: 1520-0477.
	Tourigny, E et al. (Mar. 2022). "Near-term prediction of the global carbon cycle using EC-Earth3-CC, the Carbon Cycle version of the EC-Earth3 Earth System Model".
2020	Tsujino, H et al. (Aug. 2020). "Evaluation of global ocean–sea-ice model simulations based on the experimental protocols of the Ocean Model Intercomparison Project phase 2 (OMIP-2)". *Geoscientific Model Development* **13**, 3643–3708. ISSN: 1991-9603.
2014	Stammer, D et al. (Aug. 2014). "Accuracy assessment of global barotropic ocean tide models". *Reviews of Geophysics* **52**, 243–282. ISSN: 8755-1209.
	Benilov, ES & Lapin, VN (Dec. 2014). "An example where lubrication theory comes short: hydraulic jumps in a flow down an inclined plate". *Journal of Fluid Mechanics* **764**, 277–295. ISSN: 1469-7645.

2013 Benilov, ES & Lapin, VN (Nov. 2013). "Inertial instability of flows on the inside or outside of a rotating horizontal cylinder". *Journal of Fluid Mechanics* **736**, 107–129. ISSN: 1469-7645.

Benilov, E & Lapin, V (2013). "On resonant over-reflection of waves by jets". *Geophysical and Astrophysical Fluid Dynamics*

2011 Lapin, VN (2011a). "Resonant over-reflection of waves by jets". PhD thesis. URL: http://hdl.handle.net/10344/1965

Benilov, ES, Lapin, VN & O'Brien, SBG (Nov. 2011). "On rimming flows with shocks". *Journal of Engineering Mathematics* **75**, 49–62. ISSN: 1573-2703.

Benilov, E & Lapin, V (2011). "Shock waves in Stokes flows down an inclined plate". *Physical Review E - Statistical, Nonlinear, and Soft Matter Physics*

Lapin, VN (Feb. 2011b). "Stability of the Couette flow of ideal rigid-plastic bodies". *Moscow University Mechanics Bulletin* **66**, 1–7. ISSN: 1934-8452.

2009 Ward, JA, Lapin, VN & Lee, W (2009). "The Effect of Mechanical Loading on the Frequency of an Oscillator Circuit." In: *Proc. 70th Eur. Study Gr. with Ind.*

B.Sc., M.Sc. in Applied Mathematics and Mechanics, *1st Honours*

M.Sc. at the Department of **Mechanics of Composites**

Course	Hours per Term	Grade*
Mathematical Analysis I, II, III, IV	144/128/144/96	5/4/5/5
Complex Analysis I, II	72/64	5/5
Functional Analysis I, II	72/64	5/5
Abstract Algebra	108	5
Discrete Mathematics I, II	72/64	5/5
Analytic Geometry	144	5
Linear Algebra and Geometry	128	5
Differential Geometry and Topology I, II	72/64	5/5
Ordinary Differential Equations I, II	72/64	P/5
Partial Differential Equations I, II	72/64	P/4
Numerical Methods I, II	90/64	P/5
Theory of Probability and Mathematical Statistics	72	5
Theory of Random Processes	64	5
General Physics I, II	48/72	P/5
Theoretical Mechanics I, II, III	90/96/72	5/P/4
Mechanics of Continua I, II, III	96/90/80	5/5/5
Optimal Control of Mechanical Systems I, II	54/48	P/4
Statistical Physics	36	4
Laboratory Practice‡ I, II, III, III	54/48/54/48	P/5
Programming (C/C++) I-VI	54/80/90/32/36/32	P/P/5/P/P/P
History of Mathematics and Mechanics	54	P
English Language	72/64/72/64	P/P/P/5
National History I, II	54/54	P/5
Civil Defence	32	P
Economics I, II	64/54	P/5
Sociology	54	P
Philosophy I, II	54/48	P/4
Physical Training (4 years)	476	P
Modeling and distance control of robots†	36	5
Geometry in Quantum Mechanics†	36	5
Applied Optimal Control†	32	5
Averaging Methods†	36	5
Tensor analysis†	36	5
Advanced Solid Mechanics†	64	5
Composite Mechanics†	36	5
Theory of viscoelasticity†	32	5
Stability Problems in Mechanics of Continua†	32	5
Degree Thesis		5
Total Hours and Gpa	4866	**4.85/5****

* Russian universities implement a five point grading system, where "5" is "Excellent" and "2" is "Fail". Some courses are graded on "Pass/Not pass" basis and here "P" stands for "Pass".

** Equivalent US Gpa is 3.88 (when crudely converted to Gpa 4.0 scale).

† Indicates an optional course; other courses are part of the compulsory curriculum for the degree.

‡ In the laboratories of the Institute of Mechanics, MSU.