Curriculum Vitae of Doris Folini

Personal data

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Current and Past Positions, Education

2025 –	Senior scientist, Energy and Climate Economics, D-MTEC, ETH Zürich
2008 –	Senior scientist, Institute for Atmospheric and Climate Sciences, D-USYS, ETH Zürich Research associate, Centre de Recherche Astrophysique, ENS Lyon, France
2007 – 2008	Research associate at Laboratory for Air Pollution, EMPA Dübendorf
2003 – 2006	Ad interim head of modeling group, Laboratory for Air Pollution, EMPA Dübendorf
2002	Qualification as university lecturer by French National University Counsel
2001 - 2002	Swiss National Science Foundation scholarship at Observatoire de Strasbourg, France
1998	PhD-thesis *'Computational approaches to multidimensional radiative transfer and the physics of radiative colliding flows'*, ETH thesis No. 12606
1997 – 2000	Deputy system administrator for Unix at Institut für Astronomie, ETH Zürich
1993 – 2000	Research & teaching assistant, Institut für Astronomie, ETH Zürich
1993 – 2000	Research & teaching assistant, Seminar für Angewandte Mathematik, ETH Zürich
1988 – 1993	Studies in theoretical physics, ETH Zürich, award for best physics diploma in 1993

Professional Interests and Skills

My scientific interest is to advance our understanding of complex systems, from astrophysics to climate and beyond. My primary tool of research are high-end numerical simulations, from code development to scientific analysis of existing model data and observations. Together, they form the 'red thread' of my career at the intersect between physics, applied math, and computing. This 'life at the intersect' coincides with my strong believe that interdisciplinary collaboration provides qualitatively new insight. Associated, selected facets of my experiences and skills include the following.

- **Insight from numerical simulations:** Research on climate (internal variability, role of aerosols, link to renewable energies, economy and finance), air pollution (source appointment from concentration measurements), binary stars (flow dynamics, observable signatures), plasma physics (particle acceleration in reconnection), supersonic turbulence (driving, statistical characteristics).
- **Model development:** Co-developer of MPI-ESM-HAM, an atmosphere-ocean global climate model. Model porting and re-calibration from MPI Hamburg to ETHZ / CSCS. ICON user. Co-developer of A-MaZe, a tool kit for MHD, radiative transfer, and kinetics in astrophysics with adaptive meshes.
- **Data driven approaches / Machine Learning:** I strive to ramp up my knowledge in this rapidly evolving field, to take advantage of the opportunities and to supervise an ongoing PhD.
- **Models and observations:** While myself a modeler, I have been collaborating on a number of projects dealing with the representativeness of observations and models, in space, time, and with regard to uncertainties. This also, but not exclusively, in the context of model validation.
- **Crossing borders:** Enabling qualitatively new insight by engaging across disciplines is challenging but cool. I have ample associated experience, from project participant to co-lead, in climate (with finance or renewable energies) and astrophysics (convection in stellar atmospheres).

Supervised PhDs

- Alberto Carpentieri, 2021-2025, co-director: *'Deep learning for improved bias correction of satellite-derived solar surface radiation'*
- Lucas Ferreira Correa, 2020-2024, co-director: *'Towards an improved understanding of the global energy balance: causes of decadal changes in solar radiation - observational view'*
- Aleksandra Friedl, 2020-2023: *'Can economic policy mitigate climate change?'*
- Boriana Chtirkova, 2020-2023, co-director: *'Towards an improved understanding of the global energy balance: causes of decadal changes in solar radiation - modeling view'*
- Arthur Charlet, 2018-2021: *'Simulation de jets relativistes dans les microquasars à haute masse'*
- Matthias Schwarz, 2016-2019, co-director: *'Towards an improved understanding of the global energy balance: temporal variations of solar radiation in the climate system'*
- Tanja N. Dallafior, 2012-2016, co-director: *'Dimming over the oceans: modeling studies of the role of anthropogenic aerosols in the climate system'*
- Maria Z. Hakuba, 2011-2015, co-director: *'Solar absorption in the atmosphere: improved estimates from surface and satellite observations'*
- Mickaël Melzani, 2011-2014: *'Collisionless magnetic reconnection in relativistic plasmas with particle-in-cell simulations'*
- Adeline Bichet, 2008-2012: *'Global and European climate response to transient forcings since 1870, as simulated in an atmospheric general circulation model'*
- Daniel Schaub, 2003-2006: *'Tropospheric nitrogen dioxide from GOME and SCIAMACHY measurements over the Alpine region: strengths and limitations'*
- Sandy Ubl, 2002-2005: *'Backward Lagrangian particle dispersion modeling: applications for a high-alpine measurement site'*

Selected Research Projects as PI or Co-PI

- 'Can economic policy mitigate climate change?' (SNF), one of four PIs, 2019-2023, 1550 kFr
- 'Libera — understanding Earth's energy budget' (NASA), 2020-2032 (2027: satellite launch)
- 'Temporal variations of the global energy balance' (SNF), Co-PI, 2015-2018, 180 kFr
- 'Understanding of the global energy balance' (SNF), Co-PI, 2011-2014, 170 kFr
- 'Weather prediction & dispersion modeling' (COST 728), Co-PI, 2006-2009, 130 kFr
- 'Measurements of halogenated greenhouse gases' (Bafu), Co-PI, 2006-2009, 180 kFr
- 'Inverse modeling for European emission estimates' (EMPA internal F+E), PI, 2005, 50 kFr
- 'Measurements of halogenated greenhouse gases' (Bafu), Co-PI, 2003-2006, 200 kFr
- 'Alfvén-wave support of dwarf molecular clouds' (SNF), PI, 2001-2002, 80 kFr
- PI or Co-PI of numerous CSCS production projects on climate, air pollution, astrophysics

Community Services, Teaching, and More (selected)

- Editor for 'JGR Machine Learning & Computation' and for 'Atmosphere', since 2023
- Lecturer at ETH Zürich, Python in Geosciences, 2022 - 2025
- Lecturer at University of Zürich, MAS in Sustainable Finance, since 2020
- Lecturer at Les Houches 'International School of Computational Astrophysics', 2016
- Reviewer for journals and scientific bodies (Nature Climate Change, Geoscientific Model Development, Astronomy & Astrophysics, Dutch NSF, ESA Future Earth Observation Program)
- 120 refereed articles, 4300 / 7900 citations, H-index 36 / 49 (NASA ADS / google scholar)
- Fluent in German, English, and French, good knowledge of Italian, some knowledge of Spanish
- I like: hiking, cooking, gardening, history, languages, reading (fiction and non-fiction), and more