# Curriculum Vitae of Doris Folini

## Personal data

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## Current and Past Positions, Education

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| 2008 – | Senior scientist, Institute for Atmospheric and Climate Sciences, ETH Zürich; Research associate at 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, a coupled atmosphere-ocean global climate model. Porting of ocean (from MPI Hamburg to ETHZ / CSCS) and model re-calibration to join the Coupled Model Intercomparison Project, Phase 6 (CMIP6). Co-developer of A-MaZe, a tool kit for MHD, radiative transfer, and kinetics in astrophysics with adaptive mesh refinement.
- **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'
- Lecturer at ETH Zürich, Python in Geosciences, since 2022
- 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)
- Over 110 refereed articles (lead or co-author), over 3200 citations, H-index of 33 (NASA / ADS)
- 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