Dr. Mostafa Kiani Shahvandi

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Career

Jan 2025—Dec 2026: Postdoctoral research associate, University of Vienna
Sep 2024—Dec 2024: Postdoctoral research associate, ETH Zurich

Qualifications

Sep 2020—Sep 2024: PhD student, ETH Zurich (degree awarded in Oct 2024)
Sep 2017—Jun 2019: MSc student, University of Tehran (degree awarded in Jul 2019)
Sep 2013—Jul 2017: BSc student, University of Tehran (degree awarded in Jul 2019)

Research

Dr. Mostafa Kiani Shahvandi is a geoscientist passionate about Earth dynamics. He develops and implements mathematical tools to investigate geodetic and geophysical problems. Topics of interest include Earth rotation variations, machine learning, Earth system modelling (climate, atmosphere, ocean, mantle and core), and geophysical fluid dynamics.

Selected awards

[1] Swiss National Science Foundation postdoctoral mobility fellowship (equivalent to ~138,000 €)
[2] ETH Zurich doctoral mobility fellowship, University of Cambridge (equivalent to ~11,000 €)
[3] ETH Zurich medal for outstanding doctoral thesis (financial award of ~2,100 €)
[4] National best MSc alumni award across all Iranian universities (financial award of ~1,000 €)
[5] University of Tehran fellowship award for outstanding achievements in BSc and MSc studies (equivalent to ~2,200 €)

Further activities

Co-chair of joint study group for machine learning in geodesy
Co-convener of the session “geodetic machine learning: theoretical challenges and opportunities for geodesy” in International Association of Geodesy scientific assembly
Member of the study group machine learning for Earth orientation parameters

Selected publications

[1] **M. Kiani Shahvandi**, B. Soja (2025). Climate-induced polar motion: 1900–2100. Geophysical Research Letters 52: e2024GL113405, https://doi.org/10.1029/2024GL113405

[2] **M. Kiani Shahvandi** (2025). Core-climate coupling: changes in the Earth's core dynamics driven by climatic processes. Physics of the Earth and Planetary Interiors 364: 107366, https://doi.org/10.1016/j.pepi.2025.107366

[3] **M. Kiani Shahvandi**, S. Adhikari, M. Dumberry, S. Modiri, R. Heinkelmann, H. Schuh, S. Mishra, B. Soja (2024). Contributions of core, mantle and climatological processes to Earth's polar motion. Nature Geoscience 17: 705-710, https://doi.org/10.1038/s41561-024-01478-2

[4] **M. Kiani Shahvandi**, S. Adhikari, M. Dumberry, S. Mishra, B. Soja (2024). The increasingly dominant role of climate change on length of day variations. Proceedings of the National Academy of Sciences 121: e2406930121, https://doi.org/10.1073/pnas.2406930121

[5] **M. Kiani Shahvandi**, J. Noir, S. Mishra, B. Soja (2024). Length of day variations explained in a Bayesian framework. Geophysical Research Letters 51: e2024GL111148, https://doi.org/10.1029/2024GL111148 (highlight paper of the American Geophysical Union, AGU)

[6] **M. Kiani Shahvandi**, S. Belda, M. Karbon, S. Mishra, B. Soja (2024). Deep ensemble geophysics-informed neural networks for the prediction of celestial pole offsets. Geophysical Journal International 236: 480-493, https://doi.org/10.1093/gji/ggad436

[7] **M. Kiani Shahvandi**, M. Schindelegger, L. Börger, S. Mishra, B. Soja (2024). Revisiting the excitation of free core nutation. Journal of Geophysical Research: Solid Earth 129: e2024JB029583, https://doi.org/10.1029/2024JB029583

[8] **M. Kiani Shahvandi**, R. Dill, H. Dobslaw, A. Kehm, M. Bloßfeld, M. Schartner, S. Mishra, B. Soja (2023). Geophysically-informed machine learning for improving rapid estimation and short-term prediction of Earth orientation parameters. Journal of Geophysical Research: Solid Earth 128: e2023JB026720, https://doi.org/10.1029/2023JB026720

[9] J. Gou, **M. Kiani Shahvandi**, R. Hohensinn, B. Soja (2023). Ultra-short-term prediction of LOD using LSTM neural networks. Journal of Geodesy 97: 52, https://doi.org/10.1007/s00190-023-01745-x

[10] **M. Kiani Shahvandi**, M. Schartner, B. Soja (2022). Neural ODE differential learning and its application in polar motion prediction. Journal of Geophysical Research: Solid Earth 127: e2022JB024775, https://doi.org/10.1029/2022JB024775