

HILLA AFARGAN- GERSTMAN, PhD

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Research Interests

Extreme weather events, numerical modeling of the atmosphere, weather and climate variability, stratosphere-troposphere coupling, atmospheric predictability on subseasonal to seasonal (S2S) timescales, extreme weather risk analysis, future climate projections, idealized models.

Education

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| Feb. 2012 – Feb. 2018 | Department of Earth and Planetary Sciences, Weizmann Institute of Science, Israel. Ph.D. in Atmospheric Dynamics.
Doctoral thesis title: The seasonal cycle of midlatitude storm track.
Advisor: Prof. Yohai Kaspi. |
| Oct. 2007 – Jan. 2010 | Department of Earth and Planetary Sciences, Weizmann Institute of Science, Israel. M.Sc. in Physical Oceanography. Thesis title: The role of the wind in driving sub-mesoscale eddies in the Gulf of Eilat/Aqaba.
Advisor: Prof. Hezi Gildor. |
| Oct. 2003 – Jan. 2007 | Tel Aviv University, Israel.
B.Sc., in Geophysics, Atmospheric and Planetary Science. |

Employment

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| March 2019 – present | Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland
Postdoctoral researcher in the group of Atmospheric Predictability. I was awarded the Marie Skłodowska-Curie Individual Fellowship. Experience working in international, EU-funded Horizon2020 research projects (Blue Action).
Advisor: Prof. Daniela I.V. Domeisen. |
| May 2018 – Feb. 2019 | Institute of Earth Sciences, Hebrew University of Jerusalem, Israel.
Graduate research assistant, Atmospheric Dynamics.
Advisor: Prof. Ori Adam. |

Prizes, Awards and Fellowships

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| 2023 | SPARC Travel grant |
| 2023 | Robert Gnehm grant |
| 2022 | SPARC Travel grant |
| 2019 | Marie Skłodowska-Curie Individual Fellowship |
| 2014 | Rieger Foundation Advanced Fellowship for Ph.D. candidates in Environmental Studies |
| 2013 | Rieger Foundation Fellowship for Ph.D. candidates in Environmental Studies |

Peer-Reviewed Journal Publications

- **Afargan-Gerstman, H.**, Büeler, B., Wulff, C.O., Sprenger M., and Domeisen, D.I.V., "Stratospheric influence on winter storms in the North Atlantic region in subseasonal reforecasts", Accepted to *Weather and Climate Dynamics*: <https://wcd.copernicus.org/preprints/wcd-2022-58/>
- Severino, L. G., Kropf C., **Afargan-Gerstman H.**, Fairless C., De Vries A., Domeisen D.I.V., and Bresch, D.N., "Projections and uncertainties of future winter windstorm damage in Europe." *EGU sphere* (2023): 1-31.
- **Afargan-Gerstman, H.**, Jimenez-Esteve, B., Domeisen, D.I.V., (2022). "On the relative importance of stratospheric and tropospheric drivers for the North Atlantic jet response to Sudden Stratospheric Warming events". *Journal of Climate*, no. 19 (2022): 2851-2865. <https://doi.org/10.1175/JCLI-D-21-0680.1>

- Karpechko, A. Y., **Afargan-Gerstman**, H., Butler, A. H., Domeisen, D. I., Kretschmer, M., Lawrence, Z., Manzini, E., Sigmund, M., Simpson, I.R., Wu, Z. (2022). "Northern Hemisphere Stratosphere-Troposphere Circulation Change in CMIP6 Models. Part 1: Inter-Model Spread and Scenario Sensitivity". *Journal of Geophysical Research: Atmospheres*, e2022JD036992. <https://doi.org/10.1029/2022JD036992>
- Domeisen, D. I.V., White, C. J., **Afargan-Gerstman**, H., Muñoz, Á. G., Janiga, M. A., Vitart, F., ... & Tian, D. (2022). "Advances in the subseasonal prediction of extreme events: Relevant case studies across the globe". *Bulletin of the American Meteorological Society*. <https://doi.org/10.1175/BAMS-D-20-0221.1>
- Polkova, I., **Afargan-Gerstman**, H., Domeisen, D.I.V., King, M.P., Ruggieri, P., Athanasiadis, P., ... & Baehr, J. (2021). Predictors and prediction skill for marine cold-air outbreaks over the Barents Sea. *Quarterly Journal of the Royal Meteorological Society*, 147(738), 2638-2656. <https://doi.org/10.1002/qj.4038>
- **Afargan-Gerstman**, H., Polkova, I., Papritz, L., Ruggieri, P., King, M. P., Athanasiadis, P., Baehr, J., and Domeisen, D.I.V., (2020) "Stratospheric influence on marine cold air outbreaks in the North Atlantic", *Weather and Climate Dynamics*, 1(2), 541-553. <https://doi.org/10.5194/wcd-1-541-2020>
- **Afargan-Gerstman**, H., Domeisen, D.I.V., (2020). "Pacific modulation of the North Atlantic storm track response to sudden stratospheric warming events", *Geophysical Research Letters*. <https://doi.org/10.1029/2019GL085007>
- **Afargan-Gerstman** H., Adam, O., (2020). "Nonlinear damping of ITCZ migrations due to Ekman ocean energy transport". *Geophysical Research Letters*, 47(5), e2019GL086445. <https://doi.org/10.1029/2019GL086445>
- Yuval, J., **Afargan**, H., and Kaspi, Y. (2018). The relation between the seasonal changes in jet characteristics and the Pacific Midwinter Minimum in eddy activity. *Geophysical Research Letters*, 45(18), 9995-10002. <https://doi.org/10.1029/2018GL078678>.
- **Afargan**, H. and Kaspi, Y. (2017). A midwinter minimum in North Atlantic storm track intensity in years of a strong jet. *Geophysical Research Letters*, 44(24). <https://doi.org/10.1002/2017GL075136>.
- **Afargan**, H., & Gildor, H. (2015). The role of the wind in the formation of coherent eddies in the Gulf of Eilat/Aqaba. *Journal of Marine Systems*, 142, 75-95. <https://doi.org/10.1016/j.jmarsys.2014.09.006>
- Koren, I., Martins, J. V., Remer, L. A., & **Afargan**, H. (2008). Smoke invigoration versus inhibition of clouds over the Amazon. *Science*, 321(5891), 946-949. <https://doi.org/10.1126/science.1159185>

Conference Papers

- Polkova, I., **Afargan-Gerstman**, H., Domeisen, D., Ruggieri, P., Athanasiadis, P., King, M. and Baehr, J. (2019), Marine cold air outbreaks: prediction skill and preconditions, *Proceedings of the Ninth International Workshop on Climate Informatics: CI*.

Organization of Workshops

- 2022 co-lead of the ETH AI Center workshop on AI and Climate Change
- 2019, 2021 Storm track one-day workshop, Institute for Atmospheric and Climate Science, ETH Zurich.

Scientific Reviewing Activities

Reviewer for Journal of Geophysical Research - Atmosphere

Reviewer for Journal of Climate

Reviewer for Geophysical Research Letters

Invited Talks

- Sep. 2021 Invited speaker, Yale University, USA, Department of Earth and Planetary Sciences.
- Mar. 2021 Invited speaker, University of Bern, Switzerland, Colloquium in Climatology, Climate Impact and Remote Sensing.
- Feb. 2020 Invited speaker, University of Bergen, Norway, Climate Dynamics group meeting.
- Oct. 2018 Invited speaker, Hebrew University of Jerusalem, Colloquium in the Institute of Earth Sciences.

Teaching Experience

2023 – Lecturer, graduate-level course: “Weather and Climate Dynamics”, University of Lausanne, Switzerland.

2023 – Lecturer, graduate-level course: “Environmental crisis and societal change”, University of Lausanne, Switzerland.

2017 – Teaching assistant, graduate course: “Climate change debates”, Weizmann Institute of Science.

2013-2018 – Lecturer, “Introduction to Weather and Climate” for undergraduate and high-school students, Davidson Institute for Science Education.

2012 – Project supervisor and lecturer, International Summer Science Institute, Davidson Institute of Science Education.

2008-2009 - Teaching assistant, “Atmospheric and Oceanic Fluid Dynamics”, the Interuniversity Institute (IUI), Eilat, Israel.

MSc thesis supervision

Luca Severino (ETH, Zurich)

BSc project supervision

Nora Bergner (ETH, Zurich)

Ivan Loureiro (International Science Summer Institute)

Monika Harten (International Science Summer Institute)

Outreach Activities

2019 – 2021 Organizer of the postdocs and senior scientists’ meetings at the Institute for Atmospheric and Climate Science, ETH Zurich. Representative in the Institute Council.

2014 - 2017 Co-Founder of the First Women’s Forum for Graduate students at the Weizmann Institute of Science, an initiative for career-development and networking among female graduate students. Selected for the Young Female Leaders in Science (YFLIS) workshop.

International Conferences

- **SPARC DynVar/SNAP workshop** (presentation), Munich, September 2023.
- **EGU General Assembly** (EGU2023), Vienna, Austria. Poster presentation, April 2023.
- **SPARC GA**, (remote presentation), October, 2022.
- **EGU General Assembly** (EGU2022), Vienna, Austria. Oral presentation, April 2022.
- **AMS** (American Meteorological Society) 102 Annual Meeting. Oral presentation, January 2022.
- **EGU General Assembly** (EGU2021), Vienna, Austria. PICO presentation, April 2021.
- **Arctic Science Summit Week 2021**, Lisbon, Portugal. Oral presentation, March 2021.
- **Workshop on compound weather and climate events**, Bern, Switzerland. Oral presentation, January 2021.
- **EGU General Assembly** (EGU2020), Vienna, Austria. PICO presentation, April 2020.
- **SPARC DynVar workshop**, Madrid, Spain, Oral presentation, October 2019.
- **Workshop on Climate Prediction in the Atlantic-Arctic sector**, Bergen, Norway. Oral presentation, June 2019.
- **EGU General Assembly** (EGU2019), Vienna, Austria. Oral presentation, April 2019.
- **Stormtracks Workshop**, Stockholm, Sweden. Oral presentation, August 2018.
- **Joint Assembly 2017 (IAPSO-IAMAS-IAGA)**, Cape Town, South Africa. Poster presentation, September 2017.
- **21st conference on Atmospheric and Oceanic Fluid Dynamics (AOFD)** of the American Meteorological Society (AMS), Portland, Oregon, USA. Poster presentation, June 2017.
- **20th conference on Atmospheric and Oceanic Fluid Dynamics (AOFD)** of the American Meteorological Society (AMS), Minneapolis, Minnesota, USA. Poster presentation, June 2015.
- **Workshop on “Energy transfers on atmosphere and ocean”**, University of Hamburg, Germany. Oral presentation, April 2015.
- **EGU General Assembly (EGU2015)**, Vienna, Austria. Oral presentation, April 2015.
- **Israeli Meteorological Society General Assembly**, Tel Aviv, Israel. Poster presentation, June 2014.
- **Latsis Symposium on Atmosphere and Climate Dynamics**. Zurich, Switzerland. June 2014.
- **GFD Days** (Geophysical Fluid Dynamics Symposia), Sde Boqer, Israel. Oral presentation. January, 2014.
- **NCAS Summer School on Climate Modeling**, Oxford University, UK. September 2013.
- **19th conference on Atmospheric and Oceanic Fluid Dynamics (AOFD) and the 17th Conference on Middle Atmosphere** of the American Meteorological Society (AMS), USA. Oral presentation, June 2013.

Computing skills

Programming: Python (numpy, pandas, scipy, xarray), MATLAB, R, Fortran, Unix shell-scripting, CDO/NCO (netCDF operators).

Numerical weather models:

ICON: High-resolution numerical weather model for operational and research applications.

ISCA/FMS and other GFDL dynamical core based models: configuration, modification and simulation on high-performance clusters in a wide range of parameterizations.

Forecasts on extended-range and medium-range timescales (e.g., ECMWF)

Subseasonal-to-Seasonal (S2S) prediction project

Coupled Model Intercomparison Project (CMIP)

Machine Learning: Principal Component Analysis (PCA), K-means clustering, Random Forest, and ANN.

Risk assessment models: CLIMADA.