Afrooz Jouzdani

PHD CANDIDATE - DUST DOCTORAL NETWORK (DUST-DN)

ICT/CREATE R&D Units of University of Évora (UÉ), Évora, Portugal

☐ (+98) 913 127 9051 | ✉ jouzdaniafrooz@gmail.com | in afrooz-jouzdani

Profile Summary

Highly motivated and analytical researcher with a Master's degree in Physics and a strong foundation in atmospheric remote sensing and data analysis. Currently enrolled as a Doctoral Candidate in the University of Évora's PhD program in Earth and Space Sciences, specializing in 'Modelling and Assessment of the Impact of Atmospheric Dust on Solar Resource for Energy Applications' within the Dust Doctoral Network (Dust-DN). Proven expertise in analyzing dust events and their impacts on temperature and radiative forcing using AERONET data and satellite products. Skilled in data analysis, coding, and scientific communication, I am passionate about advancing interdisciplinary understanding of atmospheric dust, with a focus on its role in solar energy applications and the influence of super-coarse and giant dust particles from sources to societal impacts.

Education

- **PhD Candidate (Earth and Space Sciences)**   *Évora, Portugal*

  UNIVERSITY OF ÉVORA, ICT/CREATE R&D UNITS   *Start: 2025 - Expected Comletion: 2028*
    - ○ ***Project: Modelling and assessment of the impact of atmospheric dust on solar resource for energy applications***
    - ○ *Supervisors: Prof. Paulo Canhoto, Prof. Stelios Kazadzis, and Prof. Maria João Costa*
    - ○ *Whitin the Dust Doctoral Network (Dust-DN) DC6*

- **MSc in Physics (Atmospheric Remote Sensing)**   *Zanjan, Iran*

  INSTITUTE FOR ADVANCED STUDIES IN BASIC SCIENCES (IASBS)   *Sep. 2018 - Sep. 2022*
    - ○ ***Thesis: Investigating the effect of dust on surface temperature and atmospheric radiative forcing in Zanjan, Kuwait, and Karachi using AERONET network and synoptic meteorological data***
    - ○ *Supervisor: Prof. Dr. Hamid R. Khalesifard*
    - ○ *Thesis score: 19 out of 20*

- **BSc in Physics**   *Yazd, Iran*

  YAZD UNIVERSITY   *Oct. 2012 - Feb. 2017*

Research Interests

- **Utilizing Mineral Dust Properties for Enhanced Satellite and Remote Sensing Retrievals**
- **Assessing the influence of dust on solar resource availability and renewable energy systems**
- **Optical, Physical and Radiative Properties of Mineral Dust and Aerosols**
- **Remote Sensing of Aerosol and Cloud Properties**
- **Aerosol-Cloud-Radiation Interaction**
- **Remote Sensing Data Analysis**
- **Spatiotemporal Dust Effects**

Publications

- **Investigating the Impacts of dust Events on Surface Temperature in Southwest Asia using AERONET network and Satellite Data, Synoptic Measurements, and Atmospheric Models**

  WORK IN PROGRESS, PLANNED TO SUBMIT TO THE ATMOSPHERIC CHEMISTRY AND PHYSICS JOURNAL (ACP)

  Authors: Mahsa Jahangirei, Afrooz Jouzdani, Ali Bayat, Hamid R. Khalesifard

- **Investigating the Impacts of Dust Events on Surface Temperature and Atmospheric Radiative Forcing in Zanjan, Kuwait, and Karachi** — *Karakalpak State University Nukus, Uzbekistan*

  Presented at the Second Central Asian Dust Conference (CADUC-2) — *Apr. 2024*

  Authors: Afrooz Jouzdani, Ali Bayat, Hamid R. Khalesifard

- **Investigating the Impacts of Dust Events in Northwest Iran on Atmospheric Temperature and Radiative Forcing Using Sun Photometer** — *Chamran University of Ahvaz, Khuzestan, Iran*

  Presented at The 28th Iranian Conference on Optics and Photonics & the 14th Iranian Conference on Photonics Engineering and Technology (ICOP & ICPT) — *Mar. 2022*

  Authors: Afrooz Jouzdani, Ali Bayat, Hamid R. Khalesifard

Research Experiences

- **Investigating the Impacts of Dust Events on Surface Temperature and Atmospheric Radiative Forcing in Zanjan, Kuwait, and Karachi in Southwest Asia (MSc Project)** — *Zanjan, Iran*

  Institute for Advanced Studies in Basic Sciences (IASBS) — *Nov. 2020 - Sep. 2022*

  I investigated the effect of presence of dust on atmospheric radiative forcing and surface temperature in three AERONET sites of Southwest Asia: Zanjan (Iran), Kuwait, and Karachi (Pakistan) during 2010 to 2020. In the first step, I extracted the physical and optical parameters of dust particles, including: AOD, AE, and ARF, and then applied filters on the data sets to identify specific dust events. I also examined the yearly, monthly, and seasonal average values of AOD, AE, and aerosol radiative forcing to determine the seasonal patterns and dominance of coarse dust particles. After that, I extracted and analyzed synoptic data such as temperature and cloud cover from meteorological organizations and weather information systems, and merged all data sets. Then, I utilized satellite data from the Aqua-MODIS sensor to complete the ground-based observations. Moreover, I employed the HYSPLIT model to track the air masses trajectories and identify dust sources. Finally, I calculated temporal correlation coefficients by applying time lags between parameters and identified time delays in the dust-temperature relationships. Lastly, I compared the temperature responses to dust events across the three AERONET stations.

- **Verification of CALIPSO Satellite Products with Ground-Based Sunphotometer Data in Some Severe Dust Events over Zanjan, Iran** — *Zanjan, Iran*

  Institute for Advanced Studies in Basic Sciences (IASBS) — *April. 2021 - Jul. 2021*

  By using MATLAB, I developed a code that first calls the Calipso satellite hdf files, reads each datasets individually (without using hdf read function), and generates plots of custom variables (Back-scatter Coefficient, Particulate Depolarization Ratio Profile, etc.) on a specified severe dust event. Moreover, I analyzed and compared the generated plots with ground based measurements.

SKILLS

- *Software and Programming Languages*
  - Python: Proficient in using Pandas, Numpy, and Matplotlib for time series, regression, correlation analysis and data visualization.
  - MATLAB: Proficient in time series and trend analysis, change point detection, and statistical methods
  - Linux: Comfortable with the overall system architecture, Linux command line interface, and bash scripting.
  - LaTeX Typesetting System: Skilled in PGF plots packages for scientific document preparation)
  - Microsoft Office Suite: Proficient in using Microsoft Office tools for documentation and analysis.
  - Adobe Tools: Proficient in designing posters, articles, and presentations using Adobe Illustrator and Photoshop.
  - Origin Pro: Experienced in data visualization using Origin Pro software.

- *Specialized Areas*
  - Extracting and Analyzing Satellite and Meteorological Datasets: Proficient in handling satellite products such as Calipso HDF files and MODIS retrievals for atmospheric analysis.
  - Remote Sensing Instruments: Experience in using sunphotometers and LiDAR for remote sensing applications.
  - NOAA-Hysplit Meteorological Model: Skilled in analyzing data from the NOAA-Hysplit meteorological model for air mass trajectory studies
  - Radiative Transfer Modeling: Familiarity with running radiative transfer models such as Santa Barbara DISORT Atmospheric Radiative Transfer for analyzing atmospheric energy budgets and satellite remote sensing applications.
  - Wind Rose Analysis: Capable of plotting and analyzing changes in wind rose patterns for meteorological assessments.

- *Soft Skills*
  - Attention to Detail: Ability to catch and correct errors or inconsistencies in data analysis, presentations, or academic assignments
  - Problem-solving: Skill in identifying and breaking down complex problems; rapid learning and utilizing new methods
  - Team working: Organized weekly Lidar group sessions, effectively managing participant engagement and presentation schedules, and facilitated team collaboration.

Languages

- **Persian: Native**
- **English: C1 (Advanced)**

PARTICIPATIONS & CERTIFICATIONS

- **Second Central Asian DUst Conference (CADUC-2)**

  Karakalpak State University (KSU), Uzbekistan
  Apr. 2024

- **The 28th Iranian Conference on Optics and Photonics & the 14th Iranian Conference on Photonics Engineering and Technology (ICOP & ICPT)**

  Khuzestan ,Iran
  Mar. 2022

- **The 2^{nd}International Conference on Light and Light-based Technologies (ICLLT)**

  Ankara ,Turkey
  May. 2021

- **A Three days Online Workshop on LiDAR and its Applications in Atmospheric Remote Sensing**
  INSTRUCTED BY DR. JENS REICHARDT (DLR) AND DR.KHALESIFARD

  IASBS, Iran
  Apr. 2021

- **The 22nd Physics School at the Institute for Advanced Studies in Basic Sciences (IASBS)**

  IASBS, Iran
  Jan. 2018

Related Courses Attended

- **Atmospheric Remote Sensing**

  Instructed by Prof. Hamid R. Khalesifard, Score: 17.50 / 20

  EFREMENKO, DMITRY, AND ALEXANDER KOKHANOVSKY. "FOUNDATIONS OF ATMOSPHERIC REMOTE SENSING". CHAM, SWITZERLAND: SPRINGER, 2021.

- **Climate Change and Future Energy Sources**

  Instructed by Prof. Yusef Sobouti, Score: 17.75 / 20

  YUSEF SOBOUTI. "THE WARM EARTH". TEHRAN: INSTITUTE OF GEOGRAPHICAL AND CARTOGRAPHIC GITAOLOGY, 2011.

- **Nanophotonics**

  Instructed by Dr. Jafar Mostafavi Amjad, Score: 17.00/20

  NOVOTNY, LUKAS, AND BERT HECHT. "PRINCIPLES OF NANO-OPTICS". CAMBRIDGE UNIVERSITY PRESS, 2012.

- **English for Academic Purposes**

  Instructed by Dr. Shahrokh Rahmani, Score: 19.00/20

  THE COURSE FOCUSED ON DEVELOPING ACADEMIC WRITING, READING, PRESENTATION, AND RESEARCH SKILLS.

- **Global Warming I: The Science and Modeling of Climate Change**
  UNIVERSITY OF CHICAGO, (ONLINE COURSE - COURSERA).

  Instructed by David Archer.

- **Global Warming II: Create Your Own Models in Python**
  UNIVERSITY OF CHICAGO, (ONLINE COURSE - COURSERA).

  Instructed by David Archer.

Job Experiences

- **Research Assistant** *Zanjan, Iran*

Institute for Advanced Studies in Basic Sciences (IASBS) *Jan. 2023 - May. 2024*

- **Organizing Remote Sensing Group's Weekly Meetings** *Zanjan, Iran*

Institute for Advanced Studies in Basic Sciences (IASBS) *Nov. 2020 - May. 2021 (Volunteer)*

- **Education Counselor & Tutoring Physics and Math** *Isfahan, Iran*

Institution: Dr.Gazor's Private Girls' Academy *Jun. 2019 - Mar. 2021*

References

- **Prof. Dr. Hamid R. Khalesifard (*MSc Supervisor*)**

Full Professor at the Institute for Advanced Studies in Basic Sciences (IASBS)
- Email: khalesi@iasbs.ac.ir
- Phone: +98 24 3315 2123

- **Dr. Ali Bayat (*MSc Advisor*)**

Assistant Professor at the Department of Physics, Faculty of Sciences, University of Zanjan
- Email: abayat@znu.ac.ir
- Phone: +98 24 3305 2539