Achref (Ashraf) Dhahbi

Linkedin: https://www.linkedin.com/in/ashraf-dhahbi/
Github: https://github.com/AchrafDhahbi/

Email : achref.dhahbi@nasa.gov
Mobile : +1-413-652-9712

Summary

Post-baccalaureate exoplanet researcher with experience in modeling, fitting and visualizing protoplanetary disks and exoplanet atmospheres. Astrophysics Department Lead at the Tunisian Space Association, working on making astronomy a more accessible field in Tunisia. Looking to expand our understanding of planetary habitability and formation, and increase accessibility to the field in both Tunisia and the US.

Education

- **Williams College** — Williamstown, MA
  Bachelor of Arts with Honors in Astrophysics, Mathematics; Magna Cum Laude; GPA: 3.97 — *Sep. 2019 - Jun. 2023*
- **University of Geneva** — Geneva, Switzerland
  Study abroad semester in Physics; Graduate course on Planet Formation — *Feb. 2022 - Jun. 2022*

Research Experience

- ***CRESST Postbacc Researcher*, NASA Goddard Space Flight Center** — Greenbelt, MD
  Exoplanet Spectroscopy Simulation and Analysis with Dr. Avi Mandell — *September 2023 - Present*
  - Developed the open-source grid interpolation package GridPolator with the VSPEC (variable star model) collaboration to streamline the creation of variable stellar models.
  - Develop a model fitting pipeline that uses VSPEC and GridPolator to constrain spectral features due to stellar variability and distinguish them from planetary features.

- ***CRESST Postbacc Researcher*, NASA Goddard Space Flight Center** — Greenbelt, MD
  Science Support & Back-End for the Exoplanet Modeling and Analysis Center (EMAC) — *September 2023 - Present*
  - Curate and add exoplanet science software to a repository/catalog to solve the ongoing reproducibility problem in the field and encourage researchers to adopt an Open Science approach.
  - Automated and streamlined a contact system to facilitate reaching out to developers within the community and increase the site's reach and scalability.

- ***Research Assistant*, Harvard-Smithsonian Center for Astrophysics** — Cambridge, MA
  Origins of Life Initiative Fellowship, CSALT package with Dr. Sean Andrews — *July 2023 - September 2023*
  - Added a module that visualizes protoplanetary disk model channel maps and their residuals with respect to ALMA (Atacama Large Millimeter/submillimeter Array) data to the CSALT toolkit for protoplanetary disk model fitting.
  - Initiated the development of a Markov Chain Monte Carlo (MCMC) algorithm to fit disk models to ALMA data from protoplanetary systems and constrain properties such as turbulence, mass, temperature throughout the disk.

- ***Research Assistant (Senior Thesis)*, Williams College** — Williamstown, MA
  Spatially-Dependent Turbulence in ALMA Observations of Protoplanetary Disks; w/ Dr. Kevin Flaherty — *July 2022 - May 2023*
  - Expanded disk_model3, a widely cited protoplanetary disk modeling code, to be compatible with turbulence that varies as a function of height and radius within the disk.
  - Compared CO observations from different regimes of the varying-turbulence disk models and found diagnostics.
  - Implemented an MCMC machine learning algorithm to fit the variable turbulence model with ALMA data for the IM Lup system and test the plausibility of spatially-varying turbulence.

- ***Research Assistant*, CERN and University of Geneva** — Geneva, Switzerland
  T2K Experiment: Super-Kamiokande ND280 Upgrade, Advised by Dr. Tiziano Camporesi — *February 2022 - July 2022*
  - Designed a darkroom setup to optically stimulate SiPM detectors going into the ND280 Time Of Flight module and test the uniformity of their response.
  - Developed a Python/ROOT pipeline to analyze the collected voltage measurements and identify defective SiPM units.
  - Presented findings in biweekly plenary sessions and wrote a final report visualizing and discussing the analysis results.

Outreach Experience

- ***Department Lead*, Tunisian Space Association** — Tunis, Tunisia (Remote)
  Astronomy and Astrophysics Department — *July 2022 - Present*
  - Organized the first international space summer school in Tunisia and hosted workshops introducing 30 high-schoolers to our solar system, star formation, and exoplanets.
  - Developed astronomy workshops and introductory talks in English and Arabic to help the younger generations overcome the language barrier.
  - Conduct weekly plenary meetings with team members to discuss status reports and allocate research tasks.

- ***Planetarium Show Presenter*, Williams College** — Williamstown, MA
  Williams College Milham Planetarium — *August 2022 - May 2023*
  - Designed planetarium shows looking at the evolution of human knowledge through the lens of astronomy.
  - Presented 6 planetarium shows to the local Williamstown Community and to visiting groups of boy scouts and elementary school students.

- ***Teaching Assistant*, Williams College** — Williamstown, MA
  Williams College Observatory — *September 2020 - December 2021*
  - Conducted weekly observing sessions with a 24" telescope (CCD) and manual ones to take images for student projects.
  - Provided assistance to students in introductory astronomy classes with course material and project documentation.
  - Hosted 3 open observing sessions for the local Williamstown community and a visiting group of prospective students.

Honors and Awards

- ***Milham Prize in Astronomy**: Outstanding academics, research, and contributions to the department; Williams College 2023
- ***Origins of Life Initiative Fellowship**: Center for Astrophysics; Harvard University, 2023
- **Sigma Xi Induction**: Exceptional ability and promise for further contributions to scientific research; Williams College 2023
- **Phi Beta Kappa Induction**: Top academic success; Williams College 2023
- **Dean's List**: Williams College, Fall 2019 - Spring 2023
- ***MENA Scholarship Search Fund ($30,000)**: Awarded by Amideast; 2019 - 2023

** indicates a monetary award*

Talks and Posters

- **"Looking for Spatially-Dependent Turbulence in ALMA Observations of Protoplanetary Disks"**: Thesis Defense, Williams College (May 2023)
- **"Green's Functions & Their Applications in Quantum Mechanics"**: Math Colloquium, Williams College (Feb. 2023)
- **"Looking for Spatially-Dependent Turbulence in ALMA Observations of Protoplanetary Disks"**: Poster at the American Astronomical Society 241st meeting, Seattle WA (Jan. 2023)
- **"Basics of Stellar Formation and Evolution"**: Tunisian Space Association, Astrophysics Team, Tunisia (Sep. 2022)

Skills Summary

- **Programming Languages & Software**: Python, Git, Html, R, Java, C#, C++, MS Office, Mathematica
- **Languages**: English, Arabic, French (Native) — Spanish (Intermediate) — Japanese (Elementary)

Extracurricular Activities

- ***Asian Dance Troupe*, Williams College** — Williamstown, MA
  Williams College Dance Club — *September 2020 - May 2023*
  - Increased membership by 650% and organized 2 shows attended by > 150 students and faculty each as Co-President
  - Revived the only non-audition dance group on campus and created a space for beginners to start dancing

- ***The Williams Translation Project*, Williams College** — Williamstown, MA
  Williamstown Community Service — *2021*
  - Volunteered as a Translator/Editor to assist Arab immigrants in the Berkshires community