

Achref (Ashraf) Dhahbi

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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.
- **Research Assistant, Williams College** Williamstown, MA
Williams College Summer Science program: Lyman Continuum Emission from Green Peas June 2020 - August 2020
 - Cleaned and analyzed data about Green Pea Galaxies to investigate their potential role in the Epoch of Reionization
 - Wrote a Python Jupyter Notebook to look for alternate signatures of Lyman Alpha emission by studying its correlation with different quantifiers for ionization

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