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Personal Website

## Education

- Doctor of Philosophy, Astronomy, Georgia State University, Atlanta, USA (2021)
  - Ph.D. thesis: "*Chemical Properties of the Local Galactic Disk and Halo Using Low-Resolution Spectroscopy of M dwarfs and M subdwarfs*" (ScholarWorks @ Georgia State University)
  - Advisor: Dr. Sebastien Lepine
- Master of Science, Astronomy, York University, Toronto, Canada (2014)
  - Master thesis: "*Photometric Calibrations of Metallicity and Temperature for M dwarfs* (YorkSpace)
  - Advisor: Dr. Michael De Robertis
- Master of Science, Atomic and Molecular Physics, University of Isfahan, Isfahan, Iran
  - Master thesis: "*Investigation of the Presence of $C_{60}$ in the Interstellar Medium*"
  - Advisors: Dr. Azam Pourghazi and Dr. Ahmad Kiasatpour
- Bachelor of Science, Nuclear Physics, Isfahan University of Technology, Isfahan, Iran
  - Undergraduate thesis: "*Determination of the Absolute Activity of Radioactive Isotopes by the Coincidence Method*"
  - Advisor: Dr. Ahmad Shirani

## Research Experience and Positions

- Postdoctoral researcher, Astronomy, the University of Kansas, Lawrence, USA (2022-present)
  - Research focus: Developing an automatic code (AutoSpecFit) to measure the elemental abundances of JWST planet-host cool dwarfs using high-resolution spectroscopy and searching for chemical links between exoplanets and their host stars to probe the formation pathways of planetary systems
  - Advisor: Dr. Ian Crossfield
- Research assistant, Georgia State University, Atlanta, USA (2015-2021)
  - Research focus: Developing an automatic pipeline to determine the physical parameters of a large sample of M dwarfs and M subdwarfs using low-resolution spectroscopy and tracing the chemical properties of the local Galactic disk and halo
  - Advisor: Dr. Sebastien Lepine
- Research scientist, Astronomy, York University, Toronto, Canada (2014-2015)
  - Research focus: The photometric analysis of an old open cluster to estimate its age, metallicity, and distance
  - Advisor: Dr. Michael De Robertis
- Research assistant, York University, Toronto, Canada (2011-2014)
  - Research focus: Developing a photometric metallicity calibration to determine the metallicity of a large sample of M dwarfs and investigating the metallicity variation of these stars with their Galactic height in the disk as well as testing several Galactic chemical evolution models
  - Advisor: Dr. Michael De Robertis

**Prior to 2011:**

- Research assistant, University of Isfahan, Isfahan, Iran

    - Research focus: Studying the properties of the molecule $C_{60}$ and investigating the possibility of the presence of this molecule in the interstellar medium
- Research staff, Physics, Isfahan Nuclear Technology Center, the Nuclear Engineering Department, Isfahan, Iran (resigned this position after one year to pursue graduate studies)
    - Main goal: Conducting and collaborating on different physics research projects using a zero-power nuclear reactor

## Teaching Experience and Positions

- Substitute lecturer, the University of Kansas, USA
    - ASTR 391 - Two-body problem, Kepler's laws (February 2024)
    - ASTR 691 - Temperature-pressure profile in the atmosphere of stars and planets (November 2022)
- Teaching assistant, Georgia State University, USA (2015-2021)
    - ASTR 1010 - Astronomy of the Solar System
    - ASTR 1020 - Stellar and Galactic Astronomy
    - PHY 1112 - Introductory Physics II
- Teaching assistant, York University, Canada, (2011-2014)
    - NATS 1740 - Solar System and Stellar Astronomy

**Prior to 2011:**

- Full-time physics faculty, Azad University of Qom, Iran
    - In-class courses for undergraduate students:
        - General physics I, II, and III
        - Optics
        - Quantum Mechanics
        - Laser
        - Crystallography
    - Laboratories for undergraduate students:
        - General physics I, II, and III
        - Modern physics
        - Optics
    - In-class courses for graduate students:
        - Mathematical Physics
- Visiting physics lecturer, Shahid Rajaee Teacher Training University, Iran
    - In-class courses for undergraduate students:
        - General physics II
    - Laboratories for undergraduate students:
        - General physics I, II, and III
        - Modern physics
- Visiting physics lecturer, Azad University of Arak, Iran
    - In-class courses for undergraduate students:
        - General physics I and II
- Teaching assistant, University of Isfahan, Isfahan, Iran
    - Laboratories for undergraduate students:
        - General physics I and II

## Honors and Awards

- Rodger Doxsey Prize 2020 (American Astronomical Society Award), USA

- Student Travel Grant for attendance of CASCA 2019 (Canadian Astronomical Society Grant), Canada
- Outstanding Second Year Graduate Student Award, 2017-2018, Georgia State University, USA
- Outstanding Alumni Award in Physics, University of Isfahan, Iran

## Professional Services in the Scientific Community

- Referee for a CFHT proposal (2024)
- NASA reviewer panel for the Astrophysics Decadal Survey Precursor Science, 2024 (reviewed and graded 9 exoplanetary proposals)
- The principal organizer of a splinter session at the conference "Cool Stars 22", 27 June 2024, San Diego, California
- JWST external reviewer panel for cycle 3 (reviewed and graded 17 JWST stellar and exoplanetary proposals)
- Referee for Journal Papers:
    - Nature (2023)
    - ApJ (2016, 2022, 2024)
    - AJ (2020, 2024)
    - MNRAS (2023)
- Chambliss student award judge, AAS Virtual Meeting #237, 2021
- Subject Matter Expert for NASA's Universe of Learning

## Departmental Services and Activities

- Organizing weekly Astro-coffee meetings to discuss the newest astronomy papers, the Physics and Astronomy Department, the University of Kansas, USA (2023-present)
- Organizing monthly Astro-cake meetings to celebrate the birthday of astronomy members (professors, postdocs, and students) who were born in each specific month as well as to talk about the latest astronomical findings, the Physics and Astronomy Department, the University of Kansas, USA (2023-present)
- Organizing weekly KU Exolab (a team led by Prof. Crossfield) meetings to discuss the research progress made by the team members, the Physics and Astronomy Department, the University of Kansas, USA (2022-present)
- Special participant in KU Galaxies Group (a team led by Prof. Gregory Rudnick) meetings for the oral presentations of graduate students
- Organizing weekly Astronomy Journal Club to discuss the newest astronomy papers, the Physics and Astronomy Department, York University, Canada (2012-2013)

**Prior to 2011**

- The chairwoman of the Physics Department, Azad University of Qom, Iran
- Physics lab establishment (ordering and setting up the required devices and providing user-friendly handbooks for students):
    - Modern physics lab
        - Azad University of Qom, Iran
        - Shahid Rajaee Teacher Training University, Iran
    - Optics lab
        - Azad University of Qom, Iran
- Leading the optics/laser exhibition in the departmental symposium, Azad University of Qom, Iran

## Observational Experience

- High-resolution, optical ARC Echelle Spectrograph (ARCES) at the "Apache Point Observatory", Sunspot, New Mexico, USA
    - On-sight: 2 half nights, May 2017
    - Remote: 31 half nights, 2017-2021
- High-resolution 1.1-5.3 micron spectrograph, iSHELL, at the "NASA Infrared Telescope Facility", Mauna Kea, Hawaii, USA
    - On-sight: 1 half night, February 2018
    - Remote: 1 half night, July 2018
- The McAlister 0.7-m Telescope, at the Hard Labor Creek Observatory, Rutledge, USA
    - On-sight: 2 full nights (winter 2016)
    - On-sight: Assigned services for public nights (2016-2019)
    - On-sight: Head coordinator for the public night on August 3rd, 2019
- The Miller 24-inch Telescope, at the Hard Labor Creek Observatory, Rutledge, USA
    - On-sight: Assigned services for public nights (2016-2019)
    - On-sight: Head coordinator for the public night on August 3rd, 2019
- The 60-cm Cassegrain and 1-m Telescopes, at the Allan I. Carswell Astronomical Observatory, York University, Toronto, Canada
    - Occasional operations and observations (2011-2014)

## Student Advising

- Co-advisor: David Coria, Astronomy PhD candidate at the University of Kansas, USA.
    - The relevant results have been published in ApJ (974, 151) and presented in several conferences such as AAS meeting in January 2024 and Cool Stars conference 22 https://coldestworldscs22.wordpress.com/2024/02/06/cs22-splinter-session/

**Prior to 2011**

- Two undergraduate students with projects regarding "Faraday Magneto-Optical Effect", Azad University of Qom, Iran

## Organizing/Coordinating Conference Sessions

- The principal proposer/organizer and the chair of a splinter session at the conference "Cool Stars 22", 27 June 2024, San Diego, California:
  Planet-Host Cool Dwarfs: Star-Planet Connection and Tracing Planetary Formation and Composition
    - https://cs22-splinter-cool-dwarfs.webflow.io/
    - https://coolstars22.github.io/index.html
- Substitute (invited) chair, November 4, 2023, Session 4, Mid-American Regional Astrophysics Conference, The Benedictine College, Atchison, USA

## Scientific Computing

- Author of an automatic code, AutoSpecFit (Hejazi et al. 2024), that performs an iterative, line-by-line model fitting routine to measure the individual elemental abundances of cool dwarfs. The code will become publicly available in GitHub soon.
- Long-term experience with high-performance computing systems

## Oral Talks and Poster Presentations

1. Scheduled for a contributed oral talk: ***"Atmospheric Composition of JWST Planet-Host M Dwarfs to Trace the Interior Structure of Their Rocky Planets",*** January 16, 2025, American Astronomical Society, Meeting #245, National Harbor, USA
2. Scheduled for a contributed talk: "***High-resolution Elemental Abundance Measurements of Planet-Host Cool Dwarfs to Trace Planetary Formation and Composition of Two Extremes: Gas Giant and Small Rocky Exoplanets***", December 5, 2024, Mid-American Regional Astrophysics Conference, The University of Kansas, Lawrence, USA
3. Oral talk (with invitation): **"*Chemical Properties of M dwarfs: Tracking from Galactic Archaeology to Planet Formation and Evolution***", June 25, 2024, Splinter Session - The Buddy System: Utilizing the Wealth of Host Star Data to Inform Substellar Physics, Cool Stars 22 Conference, San Diego, USA
4. Contributed oral talk: **"*Elemental Abundances of Planet-Host Cool Dwarfs: Clues on Planet Formation and Evolution",*** January 11, 2024, American Astronomical Society, Meeting #243, New Orleans, USA
5. Contributed oral talk: ***"Chemical Composition of Planet-Host Cool Dwarfs: The Interplay with Planetary Formation",*** November 3, 2023, Mid-American Regional Astrophysics Conference, The Benedictine College, Atchison, USA
6. 1-hour seminar talk: ***"Spectroscopy of Cool Dwarfs: Tracing Galactic Chemical Properties and Planet Formation"***, July 24, 2023, The Department of Astronomy, The University of Texas at Austin, Austin, USA
7. Contributed oral talk: ***"Elemental Abundances of JWST's Cool Host Stars: Searching for Planet-Star Chemical Link",*** June 8, 2023, American Astronomical Society, Meeting #242, Albuquerque, USA
8. Invited speaker, 1-hour colloquium talk, **"Cool Dwarfs: Clues on Chemical Structure of the Milky Way and Chemical Link between Host Stars and Their Planets"**, February 27, 2023, The Department of Physics and Astronomy, The Benedictine College, Atchison, USA
9. Contributed oral talk: ***"Detailed Elemental Abundances of a Super-Neptune Host Star Using High-resolution, Near-infrared Spectroscopy"***, January 12, 2023, American Astronomical Society, Meeting #241, Seattle, USA
10. 30-minute seminar talk: ***"High-resolution Stellar Spectroscopy: Searching for Chemical Link between Stars and their Planets"***, November 4, 2022, The Department of Physics and Astronomy, The University of Kansas, Lawrence, USA
11. Invited speaker, 1-hour colloquium talk, ***"Cool Dwarfs: Clues on the Chemical History of the Milky Way",*** October 31, 2022, The Department of Physics and Astronomy, The University of Kansas, Lawrence, USA
12. Contributed oral talk: ***"Elemental Abundances of a Super-Neptune Host Star Using High-resolution Near-infrared Spectroscopy"***, October 8, 2022, Mid-American Regional Astrophysics Conference, The University of Arkansas, Fayetteville, USA
13. e-Poster: ***"Chemical and Kinematic Properties of the Local Milky Way: Stellar Parameters of M dwarfs and M subdwarfs Using Low-Resolution Spectroscopy",*** June 28 - July 2, 2021, European Astronomical Society, Virtual meeting
14. iPoster: ***"An Improved Method for Estimating Chemical Parameters of M-Type Dwarfs: Prospects for Large, Low-Resolution Spectroscopic Surveys***", January 10-15, 2021, American Astronomical Society, Virtual meeting #237
15. e-Poster along with 2-minute virtual talk: ***"Chemical Distribution of ~ 35,000 M dwarfs and M subdwarfs of the Local Galactic Disk and Halo: [M/H] and [α/Fe] Determinations Using Low- to Medium-Resolution, Optical Spectroscopy",*** June 29 - July 3, 2020, European Astronomical Society, Virtual meeting

16. Dissertation oral talk: ***"Chemical Substructure in the Local Galactic Disk and Halo: Fundamental Properties of 60,000 M dwarfs and M subdwarfs from Low-to-Medium Resolution Optical Spectroscopy",*** January 6, 2020, American Astronomical Society, Meeting #235, Honolulu, USA
17. Contributed oral talk: ***"Chemical Properties of the Galactic stellar Disk and Halo: Low- and Medium-Resolution Spectroscopic Sample of M dwarfs and M subdwarfs",*** June 19, 2019, Canadian Astronomical Society, Annual meeting, Montreal, Canada
18. Poster along with 5-minute oral talk: ***"Chemical Properties of Galactic Disk and Halo: Low- and Medium-Resolution Spectroscopic Sample of M dwarfs and M subdwarfs"***, April 1-4, 2019, KITP Conference - In the Balance: Stasis and Disequilibrium in the Milky Way, University of California, Santa Barbara, USA
19. Contributed oral talk: ***"Physical Parameters of M dwarfs and M subdwarfs: An Automated Method for Low- and Medium-Resolution Spectroscopic Surveys",*** January 8, 2019, American Astronomical Society, Meeting #233, Seattle, USA
20. Poster: ***"A GAIA HR-Diagram of ~1600 High Proper Motion M dwarfs and M subdwarfs with Spectroscopic Metallicity Measurements",*** July 29 - August 3, 2018, Cool Stars 20 Conference, Boston, USA
21. Poster: ***"A Spectroscopic Catalog of Nearby, High Proper Motion M subdwarfs",*** January 8-12, 2018, American Astronomical Society, Meeting #231, Washington DC, USA
22. Poster: ***"Near-infrared Photometry of the Open Cluster NGC 2420"***, January 4-8, 2016, American Astronomical Society, Meeting #227, Kissimmee, USA
23. Poster along with 5-minute oral talk: ***"Metallicity Distribution of M dwarfs and Local Galactic Evolution"***, February 2-6, 2015, KITP Conference - The Milky Way and its Stars: Stellar Astrophysics, Galactic Archaeology, and Stellar Populations, University of California, Santa Barbara, USA
24. Contributed oral talk: ***"Photometric Calibration for Determining M dwarf Metallicity"***, June 9, 2014, Splinter Session - Touchstone Stars: Empirically Determined Parameters of Cool Stars, Cool Stars 18 Conference, Flagstaff, USA
25. Contributed oral talk: ***"New Photometric Calibrations for Determination of Fundamental Properties of M stars, Galactic Chemical Evolution and Structure"***, October 31, 2014, Physics and Astronomy Graduate Conference, York University, Toronto, Canada
26. Contributed oral talk: ***"New Photometric Calibrations of Metallicity and Temperature for M dwarfs"***, May 30, 2013, Canadian Astronomical Society, Annual meeting, Vancouver, Canada

## Publications

### Journal Papers

1. **Hejazi, N.,** Xuan, J. W., Coria, D. R., Sawczynec, E., Crossfield, I. J. M., Cristofari, P. I., Zhang, Z., & Rhem, M., ***"Chemical Links between a Young M-type T Tauri Star and its Substellar Companion: Spectral Analysis and C/O Measurement of DH Tau A"***, Accepted for publication in ApJ, arXiv:2411.15591

2. Coria, D. R., **Hejazi, N.,** & Crossfield, I. J. M., 2024, ***"The Wanderer: Charting WASP-77 A b's Formation and Migration Using a System-Wide Inventory of Carbon and Oxygen Abundances"***, ApJ, 974, 151

3. **Hejazi, N.,** Crossfield, I. J. M., Souto, D., Brande, J., Nordlander, T., Marfil, E., Cunha, K., Coria, D. R., Mass, Z., G., Polanski, A. S., Hinkel, N. R., & Hand, J. E., 2024, ***"High-resolution Elemental Abundance Measurements of Cool JWST Planet Hosts Using AutoSpecFit: An Application to the Sub-Neptune K2-18b's Host M dwarf"***, ApJ, 973, 31

4. Melo, E., Souto, D., Cunha, K., Smith, V. V., Wanderley, F., Grilo, V., Camara, D., Murta, K., **Hejazi, N.,** Crossfield, I. J. M., Luque, R., Zhang, M., & Bean, J., 2024, ***"Stellar Characterization and Chemical Abundances of Exoplanet Hosting M dwarfs from APOGEE Spectra: Future JWST Targets"***, ApJ, 973, 90

5. Xuan, J. W., Hsu, C-C., Finnerty, L., Wang, J., Ruffio, J-B, Zhang, Y., Knutson, H. A., Mawet, D., Mamajek, E. E., Inglis, J., Wallack, N. L., Bryan, M. L., Blake, G. A., Molliere, P., **Hejazi, N.**, Baker, A., Bartos, R., Calvin, B., Cetre, S., Delorme, J-R., Doppmann, G., Echeverri, D., Fitzgerald, M. P., Jovanovic, N., Liberman, J., Lopez, R. A., Morris, E., Pezzato, J., Sappey, B., Schofield, T., Skemer, A., Wallace, J. K., Wang, J., Agrawal, S., & Horstman, K., 2024, ***"Are these planets or brown dwarfs? Broadly Solar Compositions from High-resolution Atmospheric Retrievals of ~10-30 $M_{Jup}$ Companions"***, ApJ, 970, 71

6. **Hejazi, N.,** Crossfield, I. J. M., Nordlander, T., Mansfield, M., Souto, D., Marfil, E., Coria, D. R., Brande, J., Polanski, A. S., Hand, J. E., & Wienke, K. F. 2023, ***"Elemental Abundances of the Super-Neptune WASP-107b's Host Star Using High-resolution Near-infrared Spectroscopy"***, ApJ, Volume 949, Issue 2, 79

7. Zhang, S., Zhang, H-W., Comte, G., Homeier, D., Wang, R., **Hejazi, N.,** Li, Y-B., & Lue, A-L. 2023, ***"M Subdwarf Research. III. Spectroscopic Diagnostics for Breaking Parameter Degeneracy"***, ApJ, Volume 942, Issue 1, 40

8. **Hejazi, N.,** Lepine, S., & Nordlander, T. 2022, ***"Chemical Properties of the Local Disk and Halo. II. Abundances of 3745 M dwarfs and Subdwarfs from Improved Model Fitting of Low-Resolution Spectra"***, ApJ, Volume 927, Issue 1, 122

9. Placco, V. M., Sneden, C., Roederer, I. U., Lawler, J. E. Den Hartog, E. A., **Hejazi, N.,** Maas, Z., & Bernath, P. 2021, ***"Linemake: An Atomic and Molecular Line List Generator"***, RNAAS, Volume 5, Issue 4, 92

10. **Hejazi, N.,** Lepine, S., Homeier, D., Rich, R. M., & Shara, M. M. 2020, ***"Chemical Properties of the Local Galactic Disk and Halo. I. Fundamental Properties of 1,544 Nearby, High Proper-Motion M dwarfs and subdwarfs"***, AJ, Volume 159, Issue 1, 30

11. **Hejazi, N.,** De Robertis, M. M., & Dawson, P. C. 2015, ***"Optical-Near Infrared Photometric Calibration of M Dwarf Metallicity and Its Application"***, AJ, Volume 149, Issue 4, 14

## Conference Proceedings

1. **Hejazi, N.,** Crossfield, I., Souto, D., Nordlander, T., & Coria, D.,***"Chemical Properties of M dwarfs: Tracking from Galactic Archaeology to Planet Formation",*** The22nd Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (Cool Stars 22), June 24 – June 28, San Diego, California, zenodo.org

2. **Hejazi, N.,** Lepine, S., & Homeier, D., ***"A GAIA HR-Diagram of ~1600 High Proper Motion M dwarfs and M subdwarfs with Spectroscopic Metallicity Measurements"***, The 20th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, Proceedings of the conference held at Boston, MA, July 29 – August 3, 2018, Online at http://coolstars20.cfa.harvard.edu/, cs20, id.91

3. Mann, A. W., Kraus, A., Boyajian, T., Gaidos, E., von Braun, K., Feiden, G. A., Metcalfe, T., Swift, J. J., Curtis, J. L., Deacon, N. R., Filippazzo, J. C., Gillen, E., **Hejazi, N.,** & Newton, E. R. June 8-14, 2014, ***"Touchstone Stars: Highlights from the Cool Stars 18 Splinter Session"***, The18th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, Proceedings of the conference held at Lowell Observatory, Edited by G. van Belle and H.C. Harris., pp. 80-10

**Books**

- Fardad, A. & **Hejazi, N.** 2009, ***"A Description to Quantum Mechanics"***, Shahid Rajaee Teacher Training University Press (Two-volume book, written in Farsi, Sharif University Library)

## Accepted Peer-Reviewed Observing Proposals

- Co-I: NIRSpec/JWST, Cycle 2, ***"Panchromatic Phase Curve of the Highest-S/N Hot Neptune"***, ID. #3231, PI: Ian Crossfield
- Co-I: IGRINS/Gemini-South, ***"Elemental Abundances of JWST's Exoplanet Host Stars"***, ID. GS-2023A-Q-203, PI: Ian Crossfield
- Co-I: IGRINS/Gemini-South, ***"Exo-EASY: Elemental Abundances via SpectroscopY of Exoplanet-hosting Cool Dwarfs"***, Large & Long Program, ID. GS-2023B/2024A-LP-108, PI: Ian Crossfield
- Co-I: IGRINS/Gemini-South, ***"Elemental Abundances of the Coolest HWO Targets"***, ID. GS-2023B-Q-414, PI: David Coria
- PI: iSHELL/NASA IRTF, ***"High-Resolution Spectroscopy of M dwarfs and M subdwarfs"***, ID. 2018A118

## Media

- Interviewed by BBC (Persian) Radio, February 12, 2021
- Invited to the program ***"100 Women in Science and Technology"***, run by BBC (Persian) Television, November 28, 2020

## Membership

- American Astronomical Society (AAS)
- American Geophysical Union (AGU), Advancing Earth and Space Science
- Canadian Astronomical Society (CASCA)
- European Astronomical Society (EAS)