HAMID HASSANI

PhD Student in Physics at the University of Alberta, hhassani@ualberta.ca
Member of the PHANGS and MAUVE collaborations, studying the evolution of galaxies.

RESEARCH INTERESTS

Astrophysics and Radio/Infrared/Ultraviolet Astronomy, Physics of Interstellar Medium, Star Formation and Quenching, Thermal/Non-Thermal Processes, Cooling/Heating Processes.

EDUCATION

2021-Expected **Ph.D. Doctor of Philosophy in Physics, University of Alberta, Canada.**

Thesis: Star Formation Laws in the Local Universe.

Advisor: Dr. Erik Rosolowsky.

2018-2021 **M.Sc. Physics, Astronomy and Astrophysics, Shahid Beheshti University, Iran.**

Thesis: Role of Thermal and Non-Thermal Processes in Evolution of Massive Star Formation in Magellanic Clouds.

Advisers: Dr. Fatemeh Tabatabaei, Dr. Sadollah Nasiri Gheydari,

2015-2018 **B.Sc. Physics, Yazd University, Iran.**

RESEARCH EXPERIENCES

2021-Now **Research Assistant** at University of Alberta, Canada:

Studying star formation processes in nearby galaxies through collaborative efforts with the PHANGS group, utilizing AstroSat and JWST observations.
Advisor: Dr. Erik. Rosolowsky.

2021-2022 **LEAPS Summer School** (Leiden/ESA Astrophysics Program for Summer Students, selected among 300 students):

Studying star formation rate calibrations through LOFAR/MUSE observations in edge-on galaxies.

Advisor: Dr. Sarah Leslie.

2019-2021 **Research Assistant** at School of Astronomy, Institute for Research in Fundamental Sciences (IPM), Iran:

Studying the thermal/non-thermal emissions in the Magellanic Clouds through a close collaboration with Dr. Annie Hughes at IRAP.

Advisor: Dr. F. Tabatabaei

2017-2019 **Research Assistant** at Yazd University, Iran:

Studying X-ray emission of Supernova Remnants, spectral analysis of Chandra observations with CIAO Package.

Advisor: Dr. Z. Rezaei

VOLUNTEER EXPERIENCE AND COMMUNITY SERVICE

- Physics department organizer for the Astro-PH and Astro Seminar weekly meetings, University of Alberta (2022-2024).
- Outreach talks about astronomy at Edmonton TELUS World of Science and Jasper Dark Sky Festival (2024).
- Host and tutor of International ALMA Data Reduction Workshop at the University of Alberta, supported by the National Radio Astronomy Observatory (NRAO) of the United States. Conducted workshops for graduate and postdoctoral researchers on radio interferometric imaging and data reduction with CASA (2024).
- Member of the PHANGS outreach group for YouTube (2023-2024).
- **Vice President External** at the Graduate Students' Association (GSA), University of Alberta, representing more than 10,000 graduate students beyond the campus (2023-2024).
- **Co-Chair** at Alberta Graduate Provincial Advocacy Council (ab-GPAC), representing more than 20,000 graduate students across Alberta to the provincial government (2023-2024).
- **Vice-chair** at Edmonton Student Alliance (ESA), representing nearly 100,000 post-secondary students across Edmonton, Alberta, Canada (2023-2024).
- Graduate student representative at the Alumni Council of the University of Alberta (2023-2024).
- Ambassador of the Graduate Physics Student Association (GPSA) at the University of Alberta (2022-Now).
- Public talk at ESO outreach program for everyone and worldwide [Link] [Youtube] (Title: Dust at dusk, Infrared observations as a tracer of interstellar dust emission), supported by Haus der Astronomie of Germany.
- Physics student representative at the Graduate Students' Association (GSA) of the University of Alberta (2022 - Now).
- Volunteer host at EAS (European Astronomical Society Annual Meeting) 2021 Conference.
- Head of Student Astronomical Society at Yazd University and election of our forum as the best student society in both research and outreach activities (2016-2017).
- Member of Society of Physics Students at Yazd University (2015-2017).
- Teaching astronomical data analysis methods using infrared and radio observations [online course].

GRANTS

- 2024-2026: A JWST Census of the Local Galaxy Population: Anchoring the Physics of the Matter Cycle (PI: Adam Leroy) - **69,308$**. Awarded from Canadian Space Agency. *Role: CO-I of JWST Large GO program*.
- 2025-2026: Astrosat Resolves the Heating Mechanisms of the Molecular ISM (PI: Erik Rosolowsky) - **36,720$**. Awarded from Canadian Space Agency. Role: *PI of the AstroSat observing program*.

SOFTWARE DEVELOPMENT

Developed Neloura, an open-source platform integrating DS9, CARTA, and TOPCAT functionalities for multi-wavelength data from JWST, ALMA, HST, SKA, and MUSE/VLT. Enables interactive visualization, source finding, catalog overlay, and SED analysis in the browser, advancing open and reproducible astronomy [GitHub] [neloura.com].

AWARDS AND HONORS

- 2025: Andrew Stewart Memorial Graduate Prize - **5000$** *(University-wide recognition for research excellence; first Physics recipient in years).*
- 2024*:* ALMA Ambassador Grant from NRAO - **$10000** *(Supported to weeks of visits to Max Planck Institute and Université Côte d'Azur).*
- 2023: GSA Travel Grant - $500 *(Traveled to Stanford University to present a research talk).*
- 2023: Dr Isaac Yakoub Isaac Graduate Scholarship in Physics - **$1000**.
- 2022: Alberta Graduate Excellence Scholarship (AGES) - **$12000 (***First study of nearby galaxies with JWST).*
- IPM annual grant in Astronomy and Astrophysics for research project "Role of Thermal and Non-Thermal Processes in Evolution of Massive Star Formation in Magellanic Clouds" (From 2019-now).
- Fully-funded Ph.D. position in Physics and Astrophysics at Charles University, Czechia (**$46000**), Declined.
- Top 10% in MSc University exam entrance (2018). Top 5% among Astronomy and Astrophysics MSc students at Shahid Beheshti University.

SCIENTIFIC COLLABORATIONS

- 2021-Now: Regular member of **PHANGS (Physics at High Angular resolution in Nearby GalaxieS)** internationals collaboration. Leading multi-wavelength studies with JWST, ALMA, HST, VLA, and AstroSat to trace the lifecycle of stellar clusters and star formation across nearby galaxies.
- 2025-Now: Regular Member of the **MAUVE** (Multiphase Astrophysics to Unveil the Virgo Environment) collaboration, studying how the Virgo Cluster environment shapes galaxy evolution.

OBSERVATION TIME FOR TELESCOPES (APPROVED)

2023	**PI: AstroSat (15 Hours)**
	PHANGS AstroSat-Dwarfs: Star Formation in Low-Metallicity Medium.
2023	**PI: AstroSat (12 Hours)**
	PHANGS AstroSat-Color: Star Formation and dust attenuation properties of star-forming galaxies **(Received 36,720$ grant from CSA for my PhD).**
2025	**CO-I: ALMA (+600 Hours)**
	The 10 pc Survey of Molecular Clouds and Stellar Feedback.
2025	**CO-I: Hubble Space Telescope (HST)**
	Anatomy of a fall: Dissecting the environment-driven transformation of late-type Virgo cluster galaxies with HST UV-optical imaging of star clusters, associations, and HII regions **(145 Primary Orbits, 143 Parallel Orbits)**.
2024	**CO-I: James Webb Space Telescope (62 Hours)**
	Unveiling the physics that govern massive star-formation in extragalactic Central Molecular Zones (eCMZs).
2023	**CO-I: James Webb Space Telescope (150 Hours)**

A JWST Census of the Local Galaxy Population: Anchoring the Physics of the Matter Cycle **(Received 69,308$ grant from CSA for my PhD)**.

2023 **CO-I: HST**

1. Resolving gas, star formation and feedback in nearby galaxies with an HST+JWST+ALMA Treasury **(169 Orbits)**.

2. Zooming in on HII regions: a comprehensive view of dust attenuation and embedded star formation in local galaxies **(19 Orbits)**.

2022 **CO-PI: AstroSat (60 Hours).**

PHANGS-AstroSat: Measuring Radiative Feedback in Nearby Galaxies.

2022 **CO-PI: MeerKat (60 Hours).**

A Complete Picture of Atomic Gas, Molecular Gas, and Star Formation in Ten of the Best-Studied MeerKAT-Visible Galaxies.

2022 **CO-I: HST (24 Orbits)**

A panoramic study of low-density star formation in XUV disk galaxy NGC 3621: Testing for environmental dependency of clusters, OB associations, and the stellar hierarchy.

PUBLICATIONS

Total: 32 refereed papers; 940+ citations; h-index=20 (see ADS library).

2025 **Star Cluster Life Cycles: From Dusty Birth to Cosmic Ray Emergence in Nearby Galaxies with VLA and JWST**

H. Hassani, E. Rosolowsky, E. Koch, A. Leory, et al. (In prep. 2025).

Presented sub-arcsecond (<1") 3 GHz VLA A + B + C array maps of nearby galaxies, combining JWST mid-IR data to study the infrared–radio correlation at cluster scales and to trace, for the first time, observational trends of non-thermal synchrotron emission with cluster age.

2025 **The Hidden Life of Stars: Embedded Beginnings to AGB Endings in the PHANGS-JWST Sample. I. Catalog of Mid-IR Sources**

H. Hassani, E. Rosolowsky, A. Leory, et al. (Submitted to APJS, arXiv, 2025).

For the first time, produced a JWST mid-infrared catalog of compact sources across nearby galaxies, revealing evolved stars (AGB and RSGs) out to ~20 Mpc and deriving luminosity functions that connect mid-IR emission to galaxy-scale star formation. (Developed a public software tool to visualize and interact with FITS images and catalogs, Neloura)

2023 **PHANGS-JWST First Results: The 21 μm Compact Source Population**

H. Hassani, E. Rosolowsky, A. Leory, et al. (APJL, 2023).

We found that embedded, dusty star-forming regions are rare among the star-forming regions of nearby galaxies observed with JWST, indicating a short lifetime for this phase.

2023 **The PHANGS-AstroSat Atlas of Nearby Star Forming Galaxies**

H. Hassani, E. Rosolowsky, J. Postma, et al. (APJS, 2024). *This Presented the the first high-resolution (~1") ultraviolet survey of 31 nearby galaxies with AstroSat/UVIT. Identified extended UV disks, quantified UV clumping relative to molecular gas, and linked FUV/Hα variations to dust attenuation and star-formation history. (*Public Data Release*)*

2022 **The role of thermal and non-thermal processes in the ISM of the Magellanic Clouds**

H. Hassani, F. Tabatabaei, A. Hughes, et al. (MNRAS Journal, 2022). *Mapping the strength of the magnetic fields in these galaxies with the highest resolution for the first time.*

2025 **The Universal Relation Between PAH Band and Optical Line Ratios Across Nearby Star-forming Galaxies**

Baron, D., Sandstrom, K.M., Sutter, J., **Hassani, H.**, Groves, B., Leroy, A.K., et al. (APJ, 2025)

2025 **Star Clusters in the Near-ultraviolet-optical-near-infrared: Spectral Energy Distribution Modeling with Direct Markers of Gas and Dust Emission**

K Henny et al. (including H.Hassani) (APJ, 2025).

2024 **Hidden Gems on a Ring: Infant Massive Clusters and Their Formation Timeline Unveiled by ALMA, HST, and JWST in NGC 3351**

Sun, J., He, H., Batschkun, K., Levy, R.C., Emig, K., Rodríguez, M.J., Hassani, H., et al. (APJ, 2024).

2024 **Calibrating mid-infrared emission as a tracer of obscured star formation on H II-region scales in the era of JWST**

F Belfiore et al. (including H.Hassani) (A&A, 2024).

2023 **PHANGS-JWST Treasury Survey: Star Formation, Feedback, and Dust Physics at High Angular Resolution in Nearby Galaxies.**

J Lee et al. (including H.Hassani) (APJL, 2023).

2023 **PHANGS-JWST First Results: Mid-infrared emission traces both gas column density and heating at 100pc scales**

A. Leroy et al. (including H.Hassani) (APJL, 2023).

ACADEMIC VISITS

- Max Planck Institute for Astronomy, Heidelberg (Germany), Host: Dr. Eva Schinnerer. Université Côte d'Azur (France), Host: Dr. Mederic Boquien (2025).
- Infrared Processing and Analysis Center (IPAC), The Ohio State University, Host: Dr. Adam Leroy, University of Maryland, Host: Dr. Alberto Bolatto, Johns Hopkins University, Host: Dr. David Thilker, Space Telescope Science Institute - STScI (US), Host: Dr. Janice Lee (2023).
- Universidad Complutense de Madrid, host: Dr. Patricia Sánchez-Blázquez, Royal Observatory of Madrid (Spain), host: Dr. Miguel Querejeta (2023).

TALKS AND PRESENTATIONS

2025 **The Hidden Life of Stars: Embedded Beginnings to AGB Endings with Mid-IR Peaks in the PHANGS-JWST Sample**

Talk at Max Planck Institute for Astronomy, Heidelberg.

2025 **Unveiling Hidden Stars & Star-Forming Regions with JWST**

Invited Talk at University of California, Riverside, [link]

2024 **The PHANGS-AstroSat Atlas of Nearby Star Forming Galaxies**

Talk at Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), Stanford University [link].

2024 **Galactic Genesis to Twilight: Charting Stellar Evolution in Nearby Galaxies with PHANGS-JWST Mid-IR Observations**

Contributed Talk at CASCA 2024 Annual General Meeting, Canada [link].

2023 **PHANGS-JWST First Results: The 21 μm Compact Source Population**

Contributed talk at Olympian Symposium – Star formation in the era of JWST, Greece [link].

2023 **The PHANGS-AstroSat Atlas of Nearby Star Forming Galaxies**

Contributed talk at CASCA 2023 Annual General Meeting The Broad Spectrum of Canadian Astronomy, Canada [Link].

2020 **Role of Thermal and Non-thermal Processes in the ISM of Magellanic Clouds.**

H. Hassani, F. Tabatabaei, A. Hughes, J. Chastenet, S. Nasiri;
Contributed talk at Annual Meeting of the Astronomische Gesellschaft 2020 (AG) [Link].

2020 **Role of Thermal and Non-thermal Processes in Evolution of Massive Star Formation in Magellanic Clouds.**

H. Hassani, F. Tabatabaei, A. Hughes, J. Chastenet, S. Nasiri;
Contributed talk at Radio2020 & Glow Assembly [Link].

2020 **Role of Thermal and Non-thermal Processes in the ISM of Magellanic Clouds.**

H. Hassani, F. Tabatabaei, A. Hughes, J. Chastenet, S. Nasiri;
27th Physics Spring Conference at Institute for Research in Fundamental Sciences (IPM) [Link].

CONFERENCE POSTERS

2021 **Star formation and magnetic field in the Magellanic Clouds.**

H. Hassani, F. Tabatabaei, A. Hughes, et al.

EAS (European Astronomical Society Annual Meeting) 2021 Conference [Link].

2021 **Star formation and magnetic field in the Magellanic Clouds.**

H. Hassani, F. Tabatabaei, A. Hughes, et al.

A precursor view of the SKA Sky, SKA 2021 Conference [Link].

2020 **Mixing of the thermal dust and gas in the ISM of Magellanic Clouds.**

H. Hassani, F. Tabatabaei, A. Hughes, et al.

ESO Ground-based thermal infrared astronomy – past, present and future [Link] [Youtube].

2020 **Role of Thermal and Non-Thermal Processes in Evolution Massive Star Formation in Magellanic Clouds based on Low- Frequency Radio Observations.**

H. Hassani, F. Tabatabaei, A. Hughes, et al.

23rd Meeting on Research in Astronomy at IASBS [Conference Page].

COMPUTER SKILLS

Operating Systems	MacOS, Windows, Linux.
Analysis	AIPS, DS9, OpenCV, ROOT, CIAO, CASA, GEANT4.
Programming	Python, Gfortran, BASH, MYSQL, PHP, HTML, JavaScript, AngularJS, Typescript, Hybrid Mobile App Development, IONIC (iOS & Android).