

# Mojgan Aghakhanloo

VITA-ORIGINS FELLOW · UNIVERSITY OF VIRGINIA

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## Education

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### **Florida State University**

PH.D. IN PHYSICS

- Thesis: "Constraining the Evolution of Massive Stars"

Tallahassee, FL

May 2020

### **Science and Research University**

B.S. IN ENGINEERING PHYSICS

Tehran, Iran

July 2013

## Employment

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### **VITA-Origins Fellow**

ASTRONOMY DEPARTMENT, UNIVERSITY OF VIRGINIA

Charlottesville, VA

2023-present

Multiwavelength studies of massive stars and their environments, and time-domain analysis of eruptive massive stars.

### **Postdoctoral Research Associate**

STEWARD OBSERVATORY, UNIVERSITY OF ARIZONA

Tucson, AZ

2020-2023

Studied recurring outbursts of supernova (SN) impostors using optical, and infrared data.

### **Graduate Research Assistant**

PHYSICS DEPARTMENT, FLORIDA STATE UNIVERSITY

Tallahassee, FL

2015-2020

Carried out research on late-stage evolution of massive stars using Bayesian inference and Gaia data.

### **Graduate Teaching Assistant**

PHYSICS DEPARTMENT, FLORIDA STATE UNIVERSITY

Tallahassee, FL

2014-2020

Taught mainly astronomy labs to undergraduate students.

## Research Interests

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- Massive Stars • Evolved Stars • Variable Stars • SN Impostors • SN Progenitors • Transients • Early-Type Stars • Stellar Evolution • Young Star Clusters • Binary Evolution

## Technical Skills

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### **Programming Language:** Python, Matlab, C++

**Statistics & Data Science:** Bayesian Inference, Markov chain Monte Carlo, Bootstrapping, Machine Learning using PyTorch and Keras (basic experience)

**Astronomy Software:** IRAF, TOPCAT, VOSpec, DS9

**Astronomy:** Optical Data Reduction (MMT, Bok, Magellan Clay)

## Observing Experiences

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**Kuiper Telescope:** Certified Observer, 14 Nights

**Magellan Clay Telescope:** Remote Observing, 6 Nights

## Publications (<https://orcid.org/0000-0001-8341-3940>)

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### Major contributions

14. **Aghakhanloo, M.**, et al., 2026, 'The Age of the R127 & R128 Clusters: Implications for the LBV", Submitted to ApJ: [https://drive.google.com/file/d/1wYmpctCew1SNZxOruVWiYzP8\\_KEciGF/view?usp=sharing](https://drive.google.com/file/d/1wYmpctCew1SNZxOruVWiYzP8_KEciGF/view?usp=sharing)

13. **Aghakhanloo, M.**, et al., 2025, "Spectroscopy of AT 2016blu's recurring supernova impostor outbursts", MNRAS, 539, 1317.
12. **Aghakhanloo, M.**, et al., 2023b, "Recurring outbursts of the supernova impostor AT 2016blu in NGC 4559", MNRAS, 526, 456.
11. **Aghakhanloo, M.**, et al., 2023a, "Repeating Periodic Eruptions of the Supernova Impostor SN 2000ch", MNRAS, 521, 1941.
10. **Aghakhanloo, M.**, et al., 2022, "Kinematics of Luminous Blue Variables in the Large Magellanic Cloud", MNRAS, 516, 2142.
9. **Aghakhanloo, M.**, et al., 2021, "Gaia EDR3 confirms that Westerlund 1 is closer and older than previously thought", RNAAS, 5, 14.
8. **Aghakhanloo, M.**, et al., 2019, "Inferring the distance to Westerlund 1 from Gaia DR2", MNRAS, 492, 2497.
7. Smith, N., **Aghakhanloo, M.**, et al., 2019, "On the Gaia DR2 distances for Galactic Luminous Blue Variables", MNRAS, 488, 1760.
6. **Aghakhanloo, M.**, et al., 2017, "Modelling luminous-blue-variable isolation", MNRAS, 472, 591.

#### Other collaborative publications

5. Guzman, J., et al. (including **Aghakhanloo, M.**), 2025, "Quantifying Systematic Age Discrepancies in Very Young Star Clusters", eprint arXiv: 2512.17033.
4. Andersen, M., et al. (including **Aghakhanloo, M.**), 2025, "Low-Metallicity Star Formation Survey in Sh2-284 (LZ-STAR). II. The initial mass function", eprint arXiv: 2505.12802.
3. SDSS Collaboration (including **Aghakhanloo, M.**), 2025, "The Nineteenth Data Release of the Sloan Digital Sky Survey", eprint arXiv: 2507.07093.
2. Shrestha, M., et al. (including **Aghakhanloo, M.**), 2023, "Lack of Bright Supernova Emission in the Brightest Gamma-ray Burst, GRB 221009A", ApJL, 946, L25.
1. Jencson, J. E., et al. (including **Aghakhanloo, M.**), 2022, "Hubble Space Telescope Imaging Reveals that SN 2015bh is Much Fainter than its Progenitor", ApJL, 935, L33.

## Research Experiences

### **University of Virginia - Astronomy Department**

Charlottesville, VA

2023 - Present

#### VITA-ORIGINS FELLOW

- Time-series photometric analysis of the supernova impostor AT 2016blu.
- Optical spectroscopic study of the supernova impostors AT 2016blu and SN 2000ch.
- Age-dating the environments of Luminous Blue Variables (LBVs) in the Large Magellanic Cloud.
- Investigating the expansion velocities of stars in protoclusters using Gaia DR3, HST, and JWST data.
- Identifying Galactic O-, B-, and A-type stars in protoclusters using SDSS-V data.

### **University of Arizona - Steward Observatory**

Tucson, AZ

2020 - 2023

#### MENTOR: DR. NATHAN SMITH

- Measured the systemic radial velocities of LBVs in the Large Magellanic Cloud.
- Inferred a velocity dispersion for LBVs and Red Super Giants.
- Analyzed photometric observations of supernova impostors.
- Reduced spectroscopic data from MMT and Bok telescopes.

### **Florida State University - Physics Department**

Tallahassee, FL

2015-2020

#### PH.D. ADVISOR: DR. JEREMIAH MURPHY

- Developed analytical models for the dispersal of open clusters of O stars and the spatial distribution of LBVs.
- Inferred distances for Galactic LBVs using the Gaia data and Bayesian inference.
- Inferred a parallax of the largest star cluster in Milky Way using Gaia data and Bayesian inference.

## Teaching Experiences

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### Lead Instructor

#### PLANETS/STARS/GALAXIES LAB

Florida State University

2014-2020

- Class sizes of 20.
- Taught two 2-hour sessions weekly.
- Taught basic concepts of astronomy as well as acquainted students with telescopes and the coordinate system used to locate astronomical objects in the sky.
- Graded astronomy lab reports and final exams.

### Teaching Assistant

#### • COSMOLOGY • HIGH ENERGY PHYSICS • COLLEGE PHYSICS B LAB

Florida State University

2018-2020

### Mentored Students

#### SOFIA RIO

University of Virginia

2025-present

- Characterizing the recent (up to 30 Myr) and nearby (out to 30 pc) star formation history in G28.37 protocluster using SDSS APOGEE and BOSS spectra (including from submitted open fiber cartons). We also aim to examine LVM data when available to study ISM feedback in this region.

#### VALENTINA BONILLA

2025-present

- CASSUM-VICO 25: Investigating star formation across diverse environments in the Milky Way with SDSS-V. We began this work with the nearest protocluster in our sample, Vela C, where OBA stars were identified using SDSS DR17 and Gaia DR3 data, and their proper motions were measured.

#### MARYGRACE KANE

2024-2025

- Proper motion kinematics of a massive protocluster in formation. Using HST and JWST data, we estimated the proper motions of cluster members and measured the expansion of the central region of the protocluster G286.

#### BAO HO

2023-2024

- Senior Thesis: Dolidze 25 open cluster under the light of Gaia DR3. This project has found evidence for cluster expansion in a distant, relatively massive cluster in the outer Galaxy and helped to develop new methods for assessing the significance of expansion measurements.

## Presentations

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### INVITED TALKS

#### Colloquium, Washington State University

Feb. 2026

#### Colloquium, University of Mary Washington

Fall 2026

#### Joint UVA NRAO Colloquium, National Radio Astronomy Observatory

Oct. 2025

#### Astronomy Lunch Talk, International Space Science Institute (ISSI)

July 2025

#### 246th AAS Special Session, Speaker and panelist, Anchorage, Alaska

June 2025

#### Astronomy Seminar, Space Telescope Science Institute (STScI)

March 2025

#### Stars and Plasma Astrophysics Meeting, Flatiron CCA

Dec. 2024

#### Astronomy Seminar, East Tennessee State University

Dec. 2024

#### Astronomy Seminar, Virginia Tech University

April 2024

#### 243th AAS Press Conference, New Orleans, Louisiana

Jan. 2024

#### Astrophysics Colloquium, Chalmers University of Technology/ University of Virginia

Aug. 2023

#### Public Evening Lecture Series, University of Arizona

Jan. 2022

#### Astronomy Seminar, Michigan State University

June 2020

#### Astronomy Seminar, Vanderbilt University

April 2019

## CONFERENCE TALKS

<b>Massive Stars Across Redshifts in the Era of Large-Scale Surveys</b> , Ensenada, Mexico	Sept. 2025
<b>SDSS-V Collaboration Meeting</b> , Heidelberg, Germany	June 2025
<b>IAU General Assembly</b> , Cape Town, South Africa	Aug. 2024
<b>241th AAS Meeting</b> , Seattle, Washington	Jan. 2023
<b>Massive Stars Near and Far</b> , IAU Symposium 361/Virtual	May 2021
<b>Early Career Scientist Talk</b> , University of Arizona/Virtual	Oct. 2020
<b>2nd Annual Arizona Postdoctoral Research Conference</b> , Virtual	Sept. 2020
<b>235th AAS Meeting-Dissertation Talk</b> , Honolulu, Hawaii	Jan. 2020
<b>F.O.E. Fifty-One Erg Supernova Conference</b> , North Carolina State University	May 2019
<b>229th AAS Meeting</b> , Grapevine, Texas	Jan. 2017
<b>Puzzles of Massive Stars and their Explosive Outcomes</b> , University of Santa Barbara	March 2017
<b>From Stars to Massive Stars Conference</b> , University of Florida	April 2016

## Awards w/ Funding

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<b>PI, 100 ks on AT 2016blu (Proposal ID 27200065)</b> , Chandra Cycle 27 ~\$77,000	2025
<b>LSST Catalyst Postdoc Alliance Member</b> , LSST-DA (exclusive funding opportunities)	2025
<b>Heising-Simons Travel Award</b> , Heising-Simons Foundation	2024
<b>International Travel Grant</b> , American Astronomical Society	2024
<b>VITA-Origins Fellowship</b> , University of Virginia	2023
<b>Major Michael J. Mills Scholarship in Astrophysics</b> , Florida State University	2020
<b>Roger Doxsey Travel Prize honorable mention</b> , American Astronomical Society	2020
<b>Clara Kibler Davis Scholarship Award</b> , Florida State University	2019
<b>John E. and Melissa D. Gray Novotny Graduate Award</b> , Florida State University	2017
<b>Evelyn and John Baugh Research Presentation Scholarship</b> , Florida State University	2017 & 2020
<b>Dean's Scholarship</b> , Florida State University	2014
<b>Travel Fund</b> , Congress of Graduate Students, Florida State University	2016 & 2019

## APPROVED PROPOSALS (PRINCIPAL INVESTIGATOR)

<b>NSF NOIRLab</b> , Southern Astrophysical Research Telescope (SOAR), half-night allocation	2026
<b>SDSS-V Open Fiber Cartons</b> , Two APOGEE and BOSS cartons targeting 13 protoclusters	2024
<b>SDSS-V LVM Open Tiles</b> , Observations of 13 protoclusters	2025

## Service & Leadership Activities

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### PROFESSIONAL SERVICES

#### **Invited Panelist**

<b>HST CYCLE 33</b>	2025
• Participated in orientation sessions on the review process and software tools, followed by four full days of discussion and ranking of over 30 proposals.	

#### **Invited Referee**

<b>AAS JOURNAL</b>	2025
• Conducted thorough evaluations of submitted manuscripts, providing detailed and constructive feedback to enhance scientific rigor and clarity.	

## Proposal Reviewer

EUROPEAN SOUTHERN OBSERVATORY, GEMINI FAST TURNAROUND, CHANDRA

2024

- Reviewed proposals submitted to multiple different telescopes for observing time allocation. Contributed to the evaluation of scientific merit, technical feasibility, and observational strategy.

## OUTREACH AND COMMUNITY ENGAGEMENT

### **AAVSO Observing Campaigns on SN 2000ch and AT 2016blu**

INITIATOR AND COORDINATOR

2024–present

- Initiated and coordinated two AAVSO observing campaigns to involve the amateur astronomers in monitoring eruptive massive stars SN 2000ch and AT 2016blu.
- Successfully engaged more than 13 amateur astronomers worldwide, who obtained photometric observations of AT 2016blu and confirmed its February 2024 eruption.

### **Steward Observatory Diversity and Inclusiveness Committee**

Tucson, AZ

POSTDOC REPRESENTATIVE, UNIVERSITY OF ARIZONA

2022- 2023

- Made a survey to gather information from postdoctoral researchers about their interactions with faculty members to identify areas for improvement in postdoc-faculty interactions and develop strategies to enhance the postdoc experience in the department.
- Organized discussions, programs, and activities in the department to improve the departmental culture surrounding diversity, equity, and inclusion.
- Assessed the demographic composition of entering cohorts using single variables (gender, race, first generation, Pell-eligible) and tracked those student groups to determine their retention rates and graduation rates.

### **International Scholars Task Force**

Tucson, AZ

POSTDOC REPRESENTATIVE, UNIVERSITY OF ARIZONA

2021- 2023

- Supported international students and postdocs in their transition to Tucson and create a network to guide them to thrive.
- Contributed to the "Allyship program" that partners incoming scholars with local ones (domestic and international) to provide tangible help.
- Organized events to showcase the cultures in the department to connect our community.

## LEADERSHIPS

### **Iranian Student Association**

Tallahassee, FL

VICE PRESIDENT, FLORIDA STATE UNIVERSITY

2019

- A group of ~100 Iranian scholars.
- Organized events and gatherings to support Iranian students and postdocs, and share the Iranian culture with others.

### **Astronomy Magazine**

Tehran, Iran

MANAGER AND EDITOR, SCIENCE AND RESEARCH UNIVERSITY

2010-2013

- Published science news and articles.
- Approved the publication's layout, design, style, and tone.
- Fact-checked information in articles and stories.
- Wrote articles to contribute to the publication.

### **Physics Association**

Tehran, Iran

PRESIDENT, SCIENCE AND RESEARCH UNIVERSITY

2012

- Organized and led weekly meetings to arrange activities to support undergraduate students with an interest in physics and astronomy.

## WORKSHOPS AND TRAININGS

### **LSST-DA Catalyst Symposium**

LSST DISCOVERY ALLIANCE

Tucson, AZ

November 2025

- Second annual Catalyst Symposium, focused on learning about alert brokers, the Rubin platform, and strengthening connections within the Rubin/LSST community.

### **Gaia Sprint Meeting**

UNIVERSITY OF WASHINGTON

Seattle, WA

June 2018

- Participated in a collaborative sprint focused on timely scientific investigation and use of the Gaia data. The event was structured to support the refinement and execution of mature scientific ideas. Through this collaboration, new partnerships were formed, leading to publications.

### **Summer School in Statistics**

PENNSYLVANIA STATE UNIVERSITY

State College, PA

June 2016

- Participated in a summer school providing a foundation in statistical inference and methodology. Topics included maximum likelihood and Bayesian modeling, bootstrap resampling, regression and model selection, multivariate clustering and classification, spatial statistics, and time series analysis.

## Memberships

- LSST : Transients and variable stars, Crowded stellar field, LSST-DA catalyst postdoc alliance
- Sloan : Multiple science groups related to OB stars
- ROMAN : RSC explosive transients
- American Astronomical Society

## References

### **NATHAN SMITH**

Steward Observatory, University of Arizona

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### **JEREMIAH MURPHY**

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### **SHAZRENE MOHAMED**

Department of Astronomy, University of Virginia

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### **KEIVAN STASSUN**

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