

Korash Assani

✉ ka8km@virginia.edu  [korashassani.github.io](https://github.com/korashassani)  [Google Scholar](#)

Quick Profile

PhD Candidate with 9+ years of experience in astrophysics research, specializing in protoplanetary disks, protostellar outflows, and large-scale data analysis. Expertise includes spectroscopy, radiative transfer, 3D simulations, and spectral synthesis. Skilled in Python, Fortran, C++, and HPC systems with extensive experience analyzing JWST and ALMA datasets. Strong record of publications, collaboration, mentoring, teaching, outreach, and presentations.

Education

Ph.D. Candidate in Astronomy

2022–Present

University of Virginia

Charlottesville, VA

M.S. in Astronomy

2020–2022

University of Virginia

Charlottesville, VA

GPA: 3.98/4.0

B.S. in Astrophysics, Physics; B.A. in Mathematics

2016–2020

University of Cincinnati

Cincinnati, OH

GPA: 3.77/4.0

Research Experience

Graduate Research Assistant (Advisor: Zhi-Yun Li)

2020–Present

University of Virginia

Charlottesville, VA

- Developed custom analysis frameworks for JWST/MIRI and NIRSpec IFU and ALMA data cubes, including calibration, spatial alignment, moment map generation, and spectral diagnostics.
- Performed LTE analysis of H₂ emission lines to build excitation diagrams and apply extinction corrections, constraining physical conditions in protostellar outflows.
- Applied spectral synthesis codes to model forbidden [Fe II] fine-structure emission, linking observed line ratios to density, temperature, and extinction.
- Conducted global 3D hydrodynamic + dust simulations of planetary growth via pebble accretion using DISPATCH, and Athena++.
- Coordinated multi-institution observing proposals (JWST Cycles 2 & 4; ALMA Cycle 10) and awarded highly competitive telescope time.
- Delivered invited talks at STScI (2025), UC (2025), Virginia Tech (2025) and presented at several international conferences and workshops.

Undergraduate Research Assistant (Advisor: Mike Sitko)

2016–2020

University of Cincinnati

Cincinnati, OH

- Investigated protoplanetary disk structure and variability using SpeX spectroscopy, photometry, and radiative transfer models (HOCHUNK3D) of young stellar systems.
- Extended studies to photometric “dippers,” hydrogen recombination calibration in Herbig Ae/Be and T Tauri stars, and variability in accretion processes.
- Presented research at the American Astronomical Society and departmental symposia winning best undergraduate presentation two years in a row.

Computational Experience

- Extensive experience in **Python**, **Fortran**, and **Mathematica**, with proficiency in **IDL**, **C++**, **MATLAB**, **HTML**, and **Java**. Comfortable adapting quickly to new programming languages as needed.
- Experienced in computationally intensive **physics simulations**, including *3D hydrodynamic + dust simulations* of planet formation (**DISPATCH**, **Athena++**); *atomic spectral synthesis modeling* of forbidden [Fe II] emission (**CLOUDY**); and *3D Monte Carlo radiative transfer modeling* of spectral energy distributions (**HOCHUNK3D**).
- Proficient in **Python**-based data analysis and visualization of large datasets, including **N-dimensional datacubes** from **JWST** and **ALMA** observations; built custom pipelines for spectral line diagnostics, extinction corrections, and Boltzmann/LTE analyses.
- Significant experience with **high-performance computing** environments, including NASA supercomputing clusters and institutional HPC systems at the University of Cincinnati and University of Virginia.
- Participant, **NASA GPU Hackathon** Sep 12–28, 2022
Remote workshop focused on GPU-based acceleration of astrophysical simulations and data analysis.
- Experienced in **Git** version control using GitHub and Bitbucket: <https://github.com/KorashAssani>

Observing Proposals

- **The Dark Side of the Force: Unraveling Protostellar Jet Asymmetry by Probing TMC1A's Fainter Red-shifted Outflow with JWST.** Assani, K. D. (Co-I). JWST Cycle 4, Proposal ID 8872, 7.5 hrs (Accepted, 11% rate). **Universe Today News Highlight!**
- **Imaging Planet Formation at Its Earliest Stages: Measuring the Extinction Level of an Enshrouded Protoplanet.** Wagner, K., Assani, K. D. (Co-I). JWST Cycle 2, Proposal ID 4010 (Accepted).
- **ALMA Meets JWST: Is There Warm Molecular Gas Near the [Fe] Jet?.** Harsono, D., Assani, K. D. (Co-I). ALMA Cycle 11, Project 2024.1.00046.S (Accepted).

Selected Publications

- **Mid-infrared extinction curve for protostellar envelopes from JWST-detected embedded jet emission: the case of TMC1A.** Assani, K. D. et al. (2025). *A&A*, 701, A175.
- **The asymmetric bipolar [Fe II] jet and H₂ outflow of TMC1A resolved with the JWST NIRSpec IFU.** Assani, K. D. et al. (2024). *A&A*, 688, A26.
- **Direct images and spectroscopy of a giant protoplanet driving spiral arms in MWC 758.** Wagner, K., ..., Assani, K. D. et al. (2023). *Nat. Astron.*, 7, 1208–1217.
- **Wavelength-dependent extinction and grain sizes in “Dippers.** Sitko, M. L., ..., Assani, K. D. et al. (2023). *AJ*, 166, 24.
- **Dracula's Chivito: Discovery of a large edge-on protoplanetary disk with Pan-STARRS.** Berghea, C. T., ..., Assani, K. D. et al. (2024). *ApJL*, 967, L3.
- **Variability of disk emission ... HD 163296.** Pikhartova, M., ..., Assani, K. D. et al. (2021). *ApJ*, 919, 64.
- **Differences in the gas and dust distribution in the transitional disk of PDS 70.** Long, Z. C., ..., Assani, K. D. et al. (2018). *ApJ*, 858, 112.

Invited Talks

- **Stellar Fountains: Probing Star Formation and Dust with JWST Observations of Protostellar Outflows**
University of Cincinnati Astronomy Seminar Series
Cincinnati, OH
Sep 2025
- **Protostellar Outflows with JWST: From Line Diagnostics to Dust Attenuation**
Space Telescope Science Institute – Dust/ISM Group
Baltimore, MD
Sep 2025
- **The Birth of Stars: JWST Insights into Protostellar Outflows and Dust in Star-Forming Regions**
Mar 2025
Virginia Tech Astronomy Series
Blacksburg, VA

Selected Presentations

- **[Fe II] & H₂ Excitation Conditions of the TMC1A Protostellar Outflow** – Specola Vaticana, Castel Gandolfo, Italy (Sep 2024)
- **Global Simulations of Planetary Growth via Pebble Accretion** – Gordon Research Conference, Mount Holyoke, MA (Jun 2023); Bob Rood Symposium, Charlottesville, VA (Apr 2023); VICO-CICO Workshop, Charlottesville, VA (Nov 2021); Sagan Exoplanet Summer Workshop, Poster #54 (Jun 2021)
- **Variability in the Gas and Dust Emission of the UX Orionis Star CQ Tau** – 235th AAS Meeting, Honolulu, HI, Poster #451.01 (Jan 2020)
- **Modeling the Circumstellar Disk of HD 166191** – 233rd AAS Meeting, Seattle, WA, Poster #163.19 (Jan 2019); UC MUSE Fellowship Presentation, Cincinnati, OH (Nov 2018)

Teaching & Mentorship

- UVA Center for Teaching Excellence: *Tomorrows Professor Today* (TPT), (2025 – Present) *Teaching as a Graduate Student* (TAGS), (2021)
- Graduate Teaching Assistant, Univ. of Virginia Astronomy Dept. (2020, 2022).
- Undergraduate Mentor, UVA Astronomy Mentoring Program (2021–2022).
- Peer Tutor/Leader & Supplemental Instructor, Univ. of Cincinnati Learning Commons (2017–2019): News Highlight

Service & Outreach

- Judge, Virginia Piedmont Regional Science Fair (2023, 2025)
- Coordinator, UVA Astro Grad Lunch (2023–2024); Journal Club (2021–2023)
- Telescope Operator, McCormick Observatory (2021–Present)
- Public outreach: Astronomy on Tap (Speaker, 2022), Dark Sky Bright Kids (2021–22), Cincinnati Observatory (2016–17)