Arjun B. Savel

Ph.D. Candidate, Astrophysics Researcher

asavel@umd.edu | 0000-0002-2454-768X | www.arjunsavel.com

https://www.linkedin.com/in/arjunsavel | https://github.com/arjunsavel

Education

University of Maryland, College Park — College Park, MD
Ph.D., Astronomy (expected)
M.S., Astronomy | Advisor: Prof. Eliza M.-R. Kempton — *2022*

University of California, Berkeley — Berkeley, CA
B.A., Astrophysics; B.A., Physics | Advisor: Prof. Courtney D. Dressing — *2020*

Positions

Graduate Researcher — University of Maryland, College Park — College Park, MD
Inferring spatial variation in the atmospheres of hot gas giants | Advisor: Prof. Eliza M.-R. Kempton — *2020–current*

Pre-Doctoral Program Research Analyst — Center for Computational Astrophysics, Flatiron Institute — New York, NY
The uncertainty budget of high-resolution cross-correlation spectroscopy | Advisor: Dr. Megan Bedell — *2022–2023*

Research Assistant — University of California, Berkeley — Berkeley, CA
Exoplanet occurrence rates and imaging of Kepler stars | Advisors: Prof. Courtney D. Dressing & Prof. Lea A. Hirsch — *2018–2020*

Selected & Current Research Interests

- Measuring spatial variation (wind, chemical, aerosol, and thermal structures) in exoplanet atmospheres
- Extracting maximal information from high-resolution spectroscopy with cross-correlation techniques
- Characterizing a wide range of exoplanetary systems

Publications

citations: 1403 / h-index: 22 / 7 first-author refereed

First- and second-author publications

8 Arnold, Kenneth E.; **Savel**, **Arjun**; Kempton, Eliza M.-R.; Roman, Michael T. *et al.*2025, *Out on a Limb: The Signatures of East–West Asymmetries in Transmission Spectra from General Circulation Models*, ApJ, 986, 187 (arXiv:2504.14060) [2 citations]

7 **Savel**, **Arjun**; Bedell, Megan; Kempton, Eliza M.-R.; Smith, Peter C. B. *et al.*2025, *Peering into the Black Box: Forward Modeling of the Uncertainty Budget of High-resolution Spectroscopy of Exoplanet Atmospheres*, AJ, 169, 135 (arXiv:2411.07303) [5 citations]

6 **Savel**, **Arjun**; Bedell, Megan; & Kempton, Eliza 2024, *cortecs: A Python package for compressing opacities*, JOSS, 9, 6104 (arXiv:2402.07047)

5 **Savel**, **Arjun**; Beltz, Hayley; Komacek, Thaddeus D.; Tsai, Shang-Min *et al.*2024, *A New Lever on Exoplanetary B Fields: Measuring Heavy Ion Velocities*, ApJ, 969 (arXiv:2406.12512) [6 citations]

4 **Savel**, **Arjun**; Kempton, Eliza M.-R.; Rauscher, Emily; Komacek, Thaddeus D. *et al.*2023, *Diagnosing Limb Asymmetries in Hot and Ultrahot Jupiters with High-resolution Transmission Spectroscopy*, ApJ, 944, 99 (arXiv:2301.01694) [22 citations]

3 **Savel**, **Arjun**; Hirsch, Lea A.; *Gill, Holden; Dressing, Courtney D. *et al.*2022, *SImMER: A Pipeline for Reducing and Analyzing Images of Stars*, PASP, 134, 124501 (arXiv:2212.00641) [10 citations]

2 **Savel**, **Arjun**; Kempton, Eliza M.-R.; Malik, Matej; Komacek, Thaddeus D. *et al.*2022, *No Umbrella Needed: Confronting the Hypothesis of Iron Rain on WASP-76b with Post-processed General Circulation Models*, ApJ, 926, 85 (arXiv:2109.00163) [55 citations]

1 **Savel**, **Arjun**; Dressing, Courtney D.; Hirsch, Lea A.; Ciardi, David R. *et al.*2020, *A Closer Look at Exoplanet Occurrence Rates: Considering the Multiplicity of Stars without Detected Planets*, AJ, 160, 287 (arXiv:2011.09564) [41 citations]

Other Refereed Publications

43 Yee, Samuel W.; Winn, Joshua N.; Hartman, Joel D.; Rodriguez, Joseph E. *et al.* (122 other co-authors, incl. **Savel, Arjun**) 2025, *The TESS Grand Unified Hot Jupiter Survey. III. Thirty More Giant Planets*, The Astrophysical Journal Supplement Series, 280, 30 (arXiv:2507.01855) [1 citation]

42 Soubkiou, Abderahmane; Barkaoui, Khalid; Benkhaldoun, Zouhair; Ghachoui, Mourad *et al.* (42 other co-authors, incl. **Savel, Arjun**) 2025, *TOI-1846 b: a super-Earth in the radius valley orbiting a nearby M dwarf*, MNRAS, 541, 3249 (arXiv:2506.18550)

41 Panwar, Vatsal; Brogi, Matteo; Kanumalla, Krishna; Line, Michael R. *et al.* (17 other co-authors, incl. **Savel, Arjun**) 2025, *The Roasting Marshmallows Program with IGRINS on Gemini South III: Seeing deeper into the metal depleted atmosphere of a gas-giant on the cusp of the hot to ultra-hot Jupiter transition*, MNRAS(arXiv:2507.07204)

40 Noti, Pascal A.; Lee, Elspeth K. H.; Kitzmann, Daniel; MacDonald, Ryan *et al.* (5 other co-authors, incl. **Savel, Arjun**) 2025, *Modelling the 3D atmospheric structure of the cold Jupiter WD1856+534b orbiting a white dwarf*, MNRAS(arXiv:2507.05422)

39 Malsky, Isaac; Rauscher, Emily; Stevenson, Kevin; **Savel**, **Arjun** *et al.* (10 other co-authors, incl. **Savel, Arjun**) 2025, *Clouds and Hazes in GJ 1214 b's Metal-rich Atmosphere*, AJ, 169, 221 (arXiv:2503.22608) [6 citations]

38 Barkaoui, K.; Korth, J.; Gaidos, E.; Agol, E. *et al.* (119 other co-authors, incl. **Savel, Arjun**) 2025, *TOI-2015 b: A sub-Neptune in strong gravitational interaction with an outer non-transiting planet*, A&A, 695 (arXiv:2502.07074) [2 citations]

37 Crossfield, Ian J. M.; Polanski, Alex S.; Robertson, Paul; Murphy, Joseph Akana *et al.* (61 other co-authors, incl. **Savel, Arjun**) 2025, *OrCAS: Origins, Compositions, and Atmospheres of Sub-Neptunes. I. Survey Definition*, AJ, 169, 89 (arXiv:2411.16836) [4 citations]

36 Bartelt, Dare; Mansfield, Megan Weiner; Line, Michael R.; Parmentier, Vivien *et al.* (8 other co-authors, incl. **Savel, Arjun**) 2025, *A Measurement of the Water Abundance in the Atmosphere of the Hot Jupiter WASP-43b with High-resolution Cross-correlation Spectroscopy*, AJ, 169, 101 (arXiv:2411.17923) [1 citation]

35 Smith, Peter C. B.; Sanchez, Jorge A.; Line, Michael R.; Rauscher, Emily *et al.* (19 other co-authors, incl. **Savel, Arjun**) 2024, *The Roasting Marshmallows Program with IGRINS on Gemini South. II. WASP-121 b has Superstellar C/O and Refractory-to-volatile Ratios*, AJ, 168, 293 (arXiv:2410.19017) [18 citations]

34 Ehrhardt, Juliana; Thomas, Luis; Kellermann, Hanna; Freitag, Christine *et al.* (57 other co-authors, incl. **Savel, Arjun**) 2024, *Confirmation of four hot Jupiters detected by TESS using follow-up spectroscopy from MaHPS at Wendelstein together with NEID and TRES*, A&A, 692 (arXiv:2501.04383) [2 citations]

33 Peláez-Torres, A.; Esparza-Borges, E.; Pallé, E.; Parviainen, H. *et al.* (62 other co-authors, incl. **Savel, Arjun**) 2024, *Validation of up to seven TESS planet candidates through multi-colour transit photometry using MuSCAT2 data*, A&A, 690 (arXiv:2409.07400) [5 citations]

32 Carleo, Ilaria; Barrágan, Oscar; Persson, Carina M.; Fridlund, Malcolm *et al.* (68 other co-authors, incl. **Savel, Arjun**) 2024, *Mass determination of two Jupiter-sized planets orbiting slightly evolved stars: TOI-2420 b and TOI-2485 b*, A&A, 690 (arXiv:2408.05612) [2 citations]

31 Espinoza, Néstor; Steinrueck, Maria E.; Kirk, James; MacDonald, Ryan J. *et al.* (40 other co-authors, incl. **Savel, Arjun**) 2024, *Inhomogeneous terminators on the exoplanet WASP-39 b*, Nature, 632, 1017 (arXiv:2407.10294) [34 citations]

30 Fu, Guangwei; Welbanks, Luis; Deming, Drake; Inglis, Julie *et al.* (15 other co-authors, incl. **Savel, Arjun**) 2024, *Hydrogen sulfide and metal-enriched atmosphere for a Jupiter-mass exoplanet*, Nature, 632, 752 (arXiv:2407.06163) [39 citations]

29 Schulte, Jack; Rodriguez, Joseph E.; Bieryla, Allyson; Quinn, Samuel N. *et al.* (72 other co-authors, incl. **Savel, Arjun**) 2024, *Migration and Evolution of giant ExoPlanets (MEEP). I. Nine Newly Confirmed Hot Jupiters from the TESS Mission*, AJ, 168, 32 (arXiv:2401.05923) [11 citations]

28 Polanski, Alex S.; Lubin, Jack; Beard, Corey; Akana Murphy, Joseph M. *et al.* (70 other co-authors, incl. **Savel, Arjun**) 2024, *The TESS-Keck Survey. XX. 15 New TESS Planets and a Uniform RV Analysis of All Survey Targets*, The Astrophysical Journal Supplement Series, 272, 32 (arXiv:2405.14786) [41 citations]

27 Parviainen, H.; Murgas, F.; Esparza-Borges, E.; Peláez-Torres, A. *et al.* (59 other co-authors, incl. **Savel, Arjun**) 2024, *TOI-2266 b: A keystone super-Earth at the edge of the M dwarf radius valley*, A&A, 683 (arXiv:2401.11879) [4 citations]

26 Tsai, Shang-Min; Parmentier, Vivien; Mendonça, João M.; Tan, Xianyu *et al.* (7 other co-authors, incl. **Savel, Arjun**) 2024, *Global Chemical Transport on Hot Jupiters: Insights from the 2D VULCAN Photochemical Model*, ApJ, 963, 41 (arXiv:2310.17751) [17 citations]

25 Malsky, Isaac; Rauscher, Emily; Roman, Michael T.; Lee, Elspeth K. H. *et al.* (5 other co-authors, incl. **Savel, Arjun**) 2024, *A Direct Comparison between the Use of Double Gray and Multiwavelength Radiative Transfer in a General Circulation Model with and without Radiatively Active Clouds*, ApJ, 961, 66 (arXiv:2311.01506) [14 citations]

24 Rasmussen, Kaitlin C.; Currie, Miles H.; Hagee, Celeste; van Buchem, Christiaan *et al.* (17 other co-authors, incl. **Savel, Arjun**) 2023, *A Nondetection of Iron in the First High-resolution Emission Study of the Lava Planet 55 Cnc e*, AJ, 166, 155 (arXiv:2308.10378) [10 citations]

23 Coulombe, Louis-Philippe; Benneke, Björn; Challener, Ryan; Piette, Anjali A. A. *et al.* (73 other co-authors, incl. **Savel, Arjun**) 2023, *A broadband thermal emission spectrum of the ultra-hot Jupiter WASP-18b*, Nature, 620, 292 (arXiv:2301.08192) [125 citations]

22 Kempton, Eliza M.-R.; Zhang, Michael; Bean, Jacob L.; Steinrueck, Maria E. *et al.* (30 other co-authors, incl. **Savel, Arjun**) 2023, *A reflective, metal-rich atmosphere for GJ 1214b from its JWST phase curve*, Nature, 620, 67 (arXiv:2305.06240) [124 citations]

21 Tuson, A.; Queloz, D.; Osborn, H. P.; Wilson, T. G. *et al.* (119 other co-authors, incl. **Savel, Arjun**) 2023, *TESS and CHEOPS discover two warm sub-Neptunes transiting the bright K-dwarf HD 15906*, MNRAS, 523, 3090 (arXiv:2306.04511) [14 citations]

20 Dai, Fei; Schlaufman, Kevin C.; Reggiani, Henrique; Bouma, Luke *et al.* (48 other co-authors, incl. **Savel, Arjun**) 2023, *A Mini-Neptune*

Orbiting the Metal-poor K Dwarf BD+29 2654, AJ, 166, 49 (arXiv:2306.08179) [12 citations]

19 Gao, Peter; Piette, Anjali A. A.; Steinrueck, Maria E.; Nixon, Matthew C. *et al.* (12 other co-authors, incl. **Savel, Arjun**) 2023, *The Hazy and Metal-rich Atmosphere of GJ 1214 b Constrained by Near- and Mid-infrared Transmission Spectroscopy*, ApJ, 951, 96 (arXiv:2305.05697) [56 citations]

18 Beltz, Hayley; Rauscher, Emily; Kempton, Eliza M.-R.; Malsky, Isaac *et al.* (2 other co-authors, incl. **Savel, Arjun**) 2023, *Magnetic Effects and 3D Structure in Theoretical High-resolution Transmission Spectra of Ultrahot Jupiters: the Case of WASP-76b*, AJ, 165, 257 (arXiv:2302.13969) [22 citations]

17 Rodriguez, Joseph E.; Quinn, Samuel N.; Vanderburg, Andrew; Zhou, George *et al.* (130 other co-authors, incl. **Savel, Arjun**) 2023, *Another shipment of six short-period giant planets from TESS*, MNRAS, 521, 2765 (arXiv:2205.05709) [27 citations]

16 Lillo-Box, J.; Gandolfi, D.; Armstrong, D. J.; Collins, K. A. *et al.* (62 other co-authors, incl. **Savel, Arjun**) 2023, *TOI-969: a late-K dwarf with a hot mini-Neptune in the desert and an eccentric cold Jupiter*, A&A, 669 (arXiv:2210.08996) [21 citations]

15 Beltz, Hayley; Rauscher, Emily; Kempton, Eliza M.-R.; Malsky, Isaac *et al.* (4 other co-authors, incl. **Savel, Arjun**) 2022, *Magnetic Drag and 3D Effects in Theoretical High-resolution Emission Spectra of Ultrahot Jupiters: the Case of WASP-76b*, AJ, 164, 140 (arXiv:2204.12996) [39 citations]

14 Esparza-Borges, E.; Parviainen, H.; Murgas, F.; Pallé, E. *et al.* (45 other co-authors, incl. **Savel, Arjun**) 2022, *A hot sub-Neptune in the desert and a temperate super-Earth around faint M dwarfs. Color validation of TOI-4479b and TOI-2081b*, A&A, 666 (arXiv:2206.10643) [10 citations]

13 Newton, Elisabeth R.; Rampalli, Rayna; Kraus, Adam L.; Mann, Andrew W. *et al.* (36 other co-authors, incl. **Savel, Arjun**) 2022, *TESS Hunt for Young and Maturing Exoplanets (THYME). VII. Membership, Rotation, and Lithium in the Young Cluster Group-X and a New Young Exoplanet*, AJ, 164, 115 (arXiv:2206.06254) [26 citations]

12 Gandhi, Siddharth; Kesseli, Aurora; Snellen, Ignas; Brogi, Matteo *et al.* (5 other co-authors, incl. **Savel, Arjun**) 2022, *Spatially resolving the terminator: variation of Fe, temperature, and winds in WASP-76 b across planetary limbs and orbital phase*, MNRAS, 515, 749 (arXiv:2206.11268) [51 citations]

11 Yee, Samuel W.; Winn, Joshua N.; Hartman, Joel D.; Rodriguez, Joseph E. *et al.* (69 other co-authors, incl. **Savel, Arjun**) 2022, *The TESS Grand Unified Hot Jupiter Survey. I. Ten TESS Planets*, AJ, 164, 70 (arXiv:2205.09728) [22 citations]

10 Gan, Tianjun; Soubkiou, Abderahmane; Wang, Sharon X.; Benkhaldoun, Zouhair *et al.* (63 other co-authors, incl. **Savel, Arjun**) 2022, *TESS discovery of a sub-Neptune orbiting a mid-M dwarf TOI-2136*, MNRAS, 514, 4120 (arXiv:2202.10024) [20 citations]

9 Murakami, Yukei S.; Jennings, Connor; Hoffman, Andrew M.; **Savel**, **Arjun** *et al.* (7 other co-authors, incl. **Savel, Arjun**) 2022, *PIPS, an advanced platform for period detection in time series - I. Fourier-likelihood periodogram and application to RR Lyrae stars*, MNRAS, 514, 4489 (arXiv:2107.14223) [3 citations]

8 Giacalone, Steven; Dressing, Courtney D.; Hedges, Christina; Kostov, Veselin B. *et al.* (108 other co-authors, incl. **Savel, Arjun**) 2022, *Validation of 13 Hot and Potentially Terrestrial TESS Planets*, AJ, 163, 99 (arXiv:2201.12661) [30 citations]

7 Dong, Jiayin; Huang, Chelsea X.; Zhou, George; Dawson, Rebekah I. *et al.* (56 other co-authors, incl. **Savel, Arjun**) 2022, *NEID Rossiter-McLaughlin Measurement of TOI-1268b: A Young Warm Saturn Aligned with Its Cool Host Star*, ApJ, 926 (arXiv:2201.12836) [18 citations]

6 de Leon, J. P.; Livingston, J.; Endl, M.; Cochran, W. D. *et al.* (24 other co-authors, incl. **Savel, Arjun**) 2021, *37 new validated planets in overlapping K2 campaigns*, MNRAS, 508, 195 (arXiv:2108.05621) [26 citations]

5 May, Erin M.; Komacek, Thaddeus D.; Stevenson, Kevin B.; Kempton, Eliza M.-R. *et al.* (15 other co-authors, incl. **Savel, Arjun**) 2021, *Spitzer Phase-curve Observations and Circulation Models of the Inflated Ultrahot Jupiter WASP-76b*, AJ, 162, 158 (arXiv:2107.03349) [46 citations]

4 Cloutier, Ryan; Charbonneau, David; Stassun, Keivan G.; Murgas, Felipe *et al.* (63 other co-authors, incl. **Savel, Arjun**) 2021, *TOI-1634 b: An Ultra-short-period Keystone Planet Sitting inside the M-dwarf Radius Valley*, AJ, 162, 79 (arXiv:2103.12790) [30 citations]

3 Foreman-Mackey, Daniel; Luger, Rodrigo; Agol, Eric; Barclay, Thomas *et al.* (13 other co-authors, incl. **Savel, Arjun**) 2021, *exoplanet: Gradient-based probabilistic inference for exoplanet data & other astronomical time series*, JOSS, 6, 3285 (arXiv:2105.01994) [208 citations]

2 Rodriguez, Joseph E.; Quinn, Samuel N.; Zhou, George; Vanderburg, Andrew *et al.* (115 other co-authors, incl. **Savel, Arjun**) 2021, *TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full-frame Images*, AJ, 161, 194 (arXiv:2101.01726) [38 citations]

1 Demory, B.-O.; Pozuelos, F. J.; Gómez Maqueo Chew, Y.; Sabin, L. *et al.* (70 other co-authors, incl. **Savel, Arjun**) 2020, *A super-Earth and a sub-Neptune orbiting the bright, quiet M3 dwarf TOI-1266*, A&A, 642 (arXiv:2009.04317) [83 citations]

Under Review

2 Nixon, Matthew C.; Sander Somers, R.; **Savel**, **Arjun**; Ih, Jegug *et al.*2025, *Magma ocean interactions can explain JWST observations of the sub-Neptune TOI-270 d*, ArXiv (arXiv:2510.07367) [3 citations]

1 Steinrueck, Maria E.; **Savel**, **Arjun**; Christie, Duncan A.; Carone, Ludmila *et al.*2025, *Limb Asymmetries on WASP-39b: A Multi-GCM Comparison of Chemistry, Clouds, and Hazes*, ArXiv (arXiv:2509.21588) [1 citation]

Public Software

4 `cortecs`: compress your opacity functions by an order of magnitude

3 `hires-literature`: a largely complete database for ground-based high-resolution spectroscopy

2 `scope`: simulating ground-based high-resolution spectroscopy

References available upon request. Last updated: 2025-11-21. CV version tag linked here.

`SImMER`: modular data reduction for ground-based imaging

Selected Honors, Prizes, & Awards

Andrew S. Wilson Prize for Excellence in Research, Department of Astronomy, UMD, College Park (2025)
Service Award, Department of Astronomy, UMD, College Park (2025)
Outstanding Graduate Assistant Award, UMD, College Park (2025)
International Conference Student Support Award, UMD, College Park (2024)
Winner, Three-Minute Thesis Pre-Candidacy Competition, College of Computer, Mathematical, and Natural Sciences, UMD, College Park (2023)
Winner, Best Poster, Burgers Research Symposium, UMD, College Park (2023)
Outstanding Graduate TA Award, Department of Astronomy, UMD, College Park (2023)
CCA Pre-Doctoral Program Fellow, Flatiron Institute Center for Computational Astrophysics (2022)
Gregor and Donat Wentzel Scholarship, Department of Astronomy, UMD, College Park (2020)
ARCS fellowship (2020; declined)
University Fellowship, Michigan State University (2020; declined)
IfA Director's Research Excellence Award (2020; declined)
Student commencement speaker, Astronomy Department, UC Berkeley (2020)
Outstanding Graduate Student Instructor Award, Astronomy Department, UC Berkeley (2020)
Chambliss Astronomy Achievement Student Award, AAS 235 (2020)
1st place, Astronomy Poster Summer Intern Symposium, Astronomy Department, UC Berkeley (2019)
Student Technology Fund grant for ULAB, UC Berkeley (2018)
Ongoing Physics Department funding for ULAB, UC Berkeley (2018)

Observing Programs

contributions: 4 PI / 1 Co-PI / 8 Co-I

JWST

Co-PI. *The only known atmosphere on a rocky exoplanet? (19.8 hours; PI: Zhang)*
Co-I. *The Warm Jupiter Opportunity for Understanding Giant Exoplanet Evolution (59.6 hours; PI: Gao)*
Co-I. *Resolving Atmospheric Uncertainties and Building a Legacy Dataset for WASP-39b (18.5 hours; PI: Welbanks)*
Co-I. *Detecting ongoing gas-to-solid nucleation on the ultra-hot planet WASP-76 b (10.5 hours; PI: Baeyens)*
Co-I. *From Dawn to Dusk: Diagnosing Asymmetric Limbs in Exoplanet Transmission Spectra (archival; PI: Kempton)*
Co-I. *A Deep Molecular Survey of HD 189733b (39.8 hours; PI: Deming)*

8-meter Unit Telescope, VLT (ESPRESSO, CRIRES$^+$)

PI. *Bridging stars and planets: the atmosphere of TOI-2109b with ESPRESSO (11 hours)*
PI. *Surveying the desert from the ridge: constraining hot Neptune evolution with WASP-166b (19.2 hours)*

4.3-meter Lowell Discovery Telescope (EXPRES)

PI. *Measuring an exoplanet's magnetic field through its variable circulation (27.6 hours across 2 semesters)*
PI. *Unveiling the atmosphere of the highly irradiated ultra-hot Jupiter TOI-2109b (7.6 hours)*
Co-I. *Atmospheric characterization of the inflated hot Jupiter KELT-4 A b (11.3 hours, PI: Nixon)*

3-meter Shane Telescope (ShARCS)

Co-I. *Looking for Close Stellar Companions to Potential Targets for Future Searches for Life with the Habitable Worlds Observatory (PI: Dressing)* (5 nights)
Observer. Assisted with 14.5 nights *(PI: Dressing)*

2.7 meter Harlan J. Smith Telescope (IGRINS)

Co-I. *Revealing the impact of telluric variability on high-resolution spectroscopy with IGRINS (PI: Morley)*

10-meter Keck Telescope (NIRC2)

Observer. Assisted with 1/2 night *(PI: Dressing)*

Science Talks

Invited talks

Arjun Savel, Megan Bedell, et al. 2024. Exoplanets, Star, and Planet formation seminar, Space Telescope Science Institute, Baltimore, MD.
Arjun Savel, Eliza M.-R. Kempton, et al. 2023. College of Mathematical and Natural Sciences Board of Visitors. University of Maryland, College Park, MD.
Arjun Savel, Megan Bedell, et al. 2023. "Knowing when to know: bridging data-driven and physics-driven modeling for exoplanet atmospheres." Center for Theory and Computation Lunch Talk, Department of Astronomy, University of Maryland, College Park, MD.

1 **Arjun Savel**, Eliza M.-R. Kempton, et al. 2021. “No umbrella needed: Confronting the hypothesis of iron rain on WASP-76b with post-processed general circulation models”, ExoCoffee, MPIA Heidelberg.

Contributed Talks

20 **Arjun Savel**, et al., 2026. Carnegie EPL, Washington, D.C. (upcoming)
19 **Arjun Savel**, et al., 2025. “Maximizing constraints from JWST transmission spectra with cross-correlation retrievals”. CHEXO 12, STScI, Baltimore, MD (upcoming)
18 **Arjun Savel**, et al., 2025. “Leaving Flatland: Toward inferring the 3D structure of exoplanet atmospheres”. FLASH Talk, UCSC, Santa Cruz, CA
17 **Arjun Savel**, et al., 2025. “Leaving Flatland: Toward inferring the 3D structure of exoplanet atmospheres”. PALS Group Meeting, Berkeley, CA
16 **Arjun Savel**, et al., 2025. “Leaving Flatland: Toward inferring the 3D structure of exoplanet atmospheres”. KIPAC Tea Talk, Stanford, Los Angeles, CA
15 **Arjun Savel**, et al., 2025. “Seeing in 3D: extracting spatial differences in exoplanet atmospheres with spectroscopy”. Knutson Group, Caltech, Los Angeles, CA
14 **Arjun Savel**, Hayley Beltz, Thaddeus D. Komacek, Shang-Min Tsai, Eliza M.-R. Kempton, 2024. “A new lever on exoplanetary B fields: measuring heavy ion velocities”. Stony Brook University Astronomy Seminar
13 **Arjun Savel**, Eliza M.-R. Kempton, Hayley Beltz, Thaddeus D. Komacek, 2024. “1D on 3D: Simulating the Impact of 3D Atmospheric Structure on 1D High-Resolution Inferences of Transmission Spectra”. UMB’s 46th Annual Graduate Research Conference, Baltimore
12 **Arjun Savel**, Eliza M.-R. Kempton, Hayley Beltz, Thaddeus D. Komacek, 2024. “1D on 3D: Simulating the Impact of 3D Atmospheric Structure on 1D High-Resolution Inferences of Transmission Spectra”. UMD’s 46th Annual Graduate Research Conference, University of Maryland, College Park
11 **Arjun Savel**, Eliza M.-R. Kempton, Hayley Beltz, Thaddeus D. Komacek, “1D on 3D: Simulating the Impact of 3D Atmospheric Structure on 1D High-Resolution Inferences of Transmission Spectra”, 2024. Two HoRSEs, Berlin.
10 **Arjun Savel**, Megan Bedell, et al. 2024. "Lowering the memory cost of radiative transfer with *cortecs*." exoVAST seminar series.
9 **Arjun Savel**, Megan Bedell, et al. 2023. "Peering into the black box: the uncertainty budget of high-resolution spectroscopy of exoplanet atmospheres." Flatiron CCA Pre-doctoral Symposium, New York, NY.
8 **Arjun Savel**, Eliza M.-R. Kempton, et al. 2022. “Phase-resolved asymmetries of (ultra)hot Jupiters in high-resolution transmission: drivers and diagnostics”, Flatiron Exoplanet Atmospheres Symposium, New York, NY.
7 **Arjun Savel**, Thaddeus Komacek, et al. 2022. “Modeling Lorentz drag in an ultra-hot Jupiter over a range of atmospheric parameters”, Burgers Program Research Symposium on Environmental and Applied Fluid Dynamics, The George Washington University.
6 **Arjun Savel**, Eliza M.-R. Kempton, et al. 2022. “Phase-resolved asymmetries of (ultra)hot Jupiters in high-resolution transmission: drivers and diagnostics”, Exoplanets IV, Las Vegas, CA.
5 **Arjun Savel**, Eliza M.-R. Kempton, et al. 2022. “Phase-resolved asymmetries of (ultra)hot Jupiters in high-resolution transmission: drivers and diagnostics”, Bay Area Exoplanet Meeting #40, NASA Ames.
4 **Arjun Savel**, Eliza M.-R. Kempton, et al. 2021. “No umbrella needed: Confronting the hypothesis of iron rain on WASP-76b with post-processed general circulation models”, Astronomy and Space Physics Seminar, University of Kansas.
3 **Arjun Savel**, Courtney D. Dressing, Lea Hirsch, David Ciardi, Jordan P.C. Fleming, Steven Giacalone, Andrew W. Mayo, Jessie L. Christiansen, 2019. “A Closer Look at Exoplanet Occurrence Rates: Considering the Multiplicity of Stars without Detected Planets”, Bay Area Exoplanet Meeting #31, NASA Ames
2 **Arjun Savel**, Courtney D. Dressing, Lea Hirsch, David Ciardi, Jordan P.C. Fleming, Steven Giacalone, Andrew W. Mayo, Jessie L. Christiansen, 2019. “A Closer Look at Exoplanet Occurrence Rates: The Impact of Stars Without Exoplanets”, Bay Area Planetary Sciences Meeting, Stanford University.
1 **Arjun Savel**, 2019. “Earth: Rare or Regular?”, Undergraduate Seminars, UC Berkeley.

Misc. Technical Talks

10 **Arjun Savel**, 2025 (upcoming). Lecturer: Hi-res in the Desert. Tempe, Arizona.
9 **Arjun Savel**, 2024. "Ethical use of AI in astronomy," UMD, College Park.
8 **Arjun Savel**, 2024. "Scientific Writing," UMD, College Park.
7 **Arjun Savel**, 2023. "Preparing a CV," UMD, College Park.
6 **Arjun Savel**, 2023. "Scientific Writing," UMD, College Park.
5 **Arjun Savel**, 2023. "Undergraduate mentoring training," UMD, College Park.
4 **Arjun Savel**, 2022. “CI / CD,” UMD, College Park.
3 **Arjun Savel**, 2022. "Giving a good presentation," UMD, College Park.
2 **Arjun Savel**, 2021. “Parallel Computing,” UMD, College Park.
1 **Arjun Savel**, 2020. “CI / CD,” UC Berkeley.

Public Talks

5 **Arjun Savel**. Maryland Science Cafe, Spring 2023 **(invited)**.
4 **Arjun Savel**. STAR astronomy club, October 2022 **(invited)**.
3 **Arjun Savel**. Gloucester Area Astronomy Club, January 2021 **(invited)**.
2 **Arjun Savel**. Amateur Astronomers, Inc. December Meeting, 2020.
1 Courtney D. Dressing, Steven Giacalone, Andrew W. Mayo, **Arjun Savel**. Evening with the Stars, UC Berkeley, 2020.

Posters

14 **Arjun Savel**, Eliza M.-R. Kempton, et al. Cross-correlation for JWST, Exoclimes VII, 2025
13 **Arjun Savel**, Eliza M.-R. Kempton, Hayley Beltz, Thaddeus D. Komacek. Tracking fluid motions in exoplanet atmospheres with high-resolution spectroscopy, Brin MRC Tracer Mixing Summer School, 2024
12 **Arjun Savel**, Megan Bedell, Eliza M.-R. Kempton, Peter Smith, Jacob L. Bean, Michael R. Line, Kaze W.K. Wong, Lily Zhao. Peering into the black box: the uncertainty budget of high-resolution spectroscopy. Two HoRSEs, Berlin. 2024
11 Kenny Arnold, **Arjun Savel**, Eliza M.-R. Kempton, Michael Roman, Emily Rauscher, Isaac Malsky, Hayley Beltz. Diagnosing limb asymmetries in JWST transmission spectra: Insights from GCMs across the hot Jupiter population. Exoplanets V, Leiden, NL. 2024 **(presented on behalf of mentee)**
10 Kelle Cruz, David Rodriguez, William J. Cooper, **Savel, Arjun**. "The SIMPLE Archive: A collaboratively-curated database and website of low mass stars, brown dwarfs, and exoplanets". Extreme Solar Systems V, 2024.
9 **Arjun Savel** et al. Burgers Symposium, University of Maryland, College Park. 2023.
8 **Arjun Savel** et al. GMT Community Science Meeting, Washington, D.C., 2023.
7 **Arjun Savel** et al. Exoclimes VI, Exeter, UK. 2023.
6 Mayo, Andrew W.; Harada, Caleb; Dressing, Courtney; et al. (5 other coauthors, including **Arjun Savel**). "Enriching Our View of Multiplanet Systems Using TESS". Exoplanets IV, 2022.
5 Rasmussen, Kaitlin C. ; Rahman, Fahin ; Beltz, Hayley ; Savel, Arjun ; et al. "Simulating the Exoplanet Atmosphere Detections of Today and Tomorrow with the All-Purpose Carrie Spectrograph Simulator". Exoplanets IV, 2022.
4 **Arjun Savel**, Courtney D. Dressing, Lea Hirsch, David Ciardi, Jordan P.C. Fleming, Steven Giacalone, Andrew W. Mayo, Jessie L. Christiansen, 2020. "A closer look at planet occurrence rates: AO follow-up of 71 stars in the Kepler field", AAS 235, Honolulu.
3 **Arjun Savel**, Courtney D. Dressing, Lea Hirsch, David Ciardi, Jordan P.C. Fleming, Jessie L. Christiansen, 2019. "A closer look: AO follow-up of 109 stars in the Kepler and K2 fields", APSIS Poster Session, UC Berkeley.
2 Courtney D. Dressing, **Arjun Savel** *et al*. 2019. "Characterizing Planetary Systems Orbiting TESS Cool Dwarfs", TESS Science Conference I, MIT.
1 Steven Giacalone, Courtney Dressing, **Arjun Savel**, 2019. "Validation of TESS Exoplanet Candidates", 3rd Advanced School on Exoplanetary Science, Vietri sul Mare.

Research Mentoring

Skye Joegriner (primarily advised by Dr. Will DeRocco), 2025
1-week workshop. Topic: the Ising model

Kenneth Ellis Arnold III, UMD, College Park (with Prof. Eliza M.-R. Kempton), now graduate student at UW Madison, 2022–2025
Modeling limb asymmetries of cloudy hot Jupiters

Holden Gill, UC Berkeley (with Prof. Courtney D. Dressing), 2020–2022
Ground-based imaging follow-up of K2 planet hosts

Peer Mentoring

Yash Gursahani, UMD, College Park, via Astro Grad Buddy Program, 2023
Serena Cronin, UMD, College Park, via Astro Grad Buddy Program, 2021
Lawrence Edmond IV, UC Berkeley, via Astronomy Buddy Program, 2019

Teaching Experience

- **Instructor of Record, Astronomy 288I (Introduction to the Astronomy Major)** *UMD College Park (Spring 2023)*
  Designed lectures on career options in the field of astronomy, preparing websites, writing CVs, and networking. Organized panels on graduate school and industry.
- **Teaching Assistant, Astronomy 320 (Theoretical Astrophysics)** *UMD College Park, with Prof. Eliza Kempton (Spring 2023)*
  Prepared review sessions and discussion problems. Topics spanned gravitation, fluids, and radiation.
- **Undergraduate Student Instructor, Astronomy C12 (The Planets)** *UC Berkeley, with Prof. Courtney D. Dressing and Prof. Raymond Jeanloz (Spring 2020)*
  Created review sessions for class with hundreds of students, created discussion problems and quizzes. Topics spanned geology and the Solar System.

- **Undergraduate Student Instructor, Astronomy C10 (Introduction to General Astronomy)** *UC Berkeley, with Alex Filippenko (Fall 2018, Fall 2019)*
  Designed review sessions for class with hundreds of students, created discussion problems and quizzes. Topics spanned the fundamentals of astronomy, stellar classification, exoplanets, and cosmology.

Community Involvement

- Pen Pal, Letters to a Pre-Scientist (**2025–present**)
- Judge, Long Island Science Fair Round 1 (2025)
- Reviewer, Astronomy and Astrophysics (2024–**present**)
- Distributed Peer Reviewer, ESO (2024–**present**)
- Reviewer, AAS Journals (2024–**present**)
- BANG! Seminar Organizing Committee, University of Maryland, College Park (2021, 2022, 2024)
- Graduate Prospective Visit Flash Talks Organizing Committee (2024)
- The Department Web Pages Committee, University of Maryland, College Park (2023–2025)
- Work-life balance panel, ASTR 680, University of Maryland, College Park (2023)
- Graduate Student Panel, ASTR 288I, University of Maryland, College Park (2023-2024)
- AstroTerps Graduate Student Research Panel, University of Maryland, College Park (2023)
- Astronomy Department Graduate Admissions Interviewer, University of Maryland, College Park (2023–2025)
- Graduate student website committee member, University of Maryland, College Park (2023–**present**)
- Lead author / maintainer: High-resolution literature database (2022–**present**)
- Graduation Gift Organizer, University of Maryland, College Park (2022–2023)
- GRAD-MAP Team Co-Lead, University of Maryland, College Park (2022–2025)
- Panelist: Carnegie EPL Summer Undergraduate Research Internship (SURI) Program's graduate school workshop, University of Maryland, College Park (2022)
- Graduate Prospective Visit Meals Planning (2022-2023)
- "Hot Papers" journal club organizer, University of Maryland, College Park (2020–2022)
- Reviewer, Journal of Open Source Software (7 projects reviewed) (2020–**present**)
- Equity, Diversity, and Inclusion Committee, University of Maryland, College Park (2020–2022)
- GRAD-MAP Team Member, University of Maryland, College Park (2020–2022)
- Public Liaison for Prof. Alex Filippenko (2019–2022)
- Undergraduate Representative, Astronomy Department, UC Berkeley (2019-2020)
- Mentor, Berkeley Astronomy Scholars Program (2019-20)
- Director of Physics and Astronomy, Undergraduate Lab at Berkeley (ULAB) (2018-2019)
- Night Editor, The Daily Californian (2017)

Workshops & Conferences

- Hi-res in the Desert. Tempe, Arizona (2025, upcoming)
- Exoclimes VII, Montreal, Canada (2025)
- AGU, Washington, D.C. (2024)
- Brin MRC Tracer Mixing Summer School (first three days)
- UMB's 46th Annual Graduate Research Conference, Baltimore (2024)
- Two HoRSEs, Berlin, DE (2024)
- Exoplanets V, Leiden, NL (2024)
- GMT Community Science Meeting, Washington, D.C. (2023)
- Exoclimes VI, Exeter, UK (2023)
- Flatiron-wide Algorithms and Mathematics, New York (2022)
- Building Bridges Across Planet-Related Science, Baltimore (2022, 2023)
- Flatiron Exoplanet Atmospheres Symposium, New York (2022)
- Burgers Program Research Symposium on Environmental and Applied Fluid Dynamics (2022, 2023)
- Exoplanets IV, Las Vegas (2022)
- Chesapeake Bay Area Exoplanet Meeting, virtual (Spring 2021)
- Exoplanet atmosphere characterization: from HST and Spitzer to JWST (2021)
- JWST Master Class Workshop, Stanford University (2020)
- AAS Winter Meeting, Honolulu (2020)
- Bay Area Exoplanet Meeting, NASA Ames (Spring 2019, Winter 2019, Spring 2020, Spring 2022)
- Bay Area Planetary Science Meeting, Stanford University (2019)

References available upon request. Last updated: 2025-11-21. CV version tag linked here.

Professional Affiliations

American Astronomical Society
The AEThER Collaboration
The JWST Transiting Exoplanet Collaboration ERS program (JTEC)

Skills & Assets

- **Programming / Markup Languages**: Python, ADQL/SQL, R, C, HTML, JavaScript, Swift, LaTeX
- **Supercomputing Clusters**: *deepthought2* and *zaratan* at UMD, College Park; *moria* at MSU; *rusty* at Flatiron CCA; TIKE at MAST
- **Frameworks / Tools**: git, Slurm, Numba, JAX, SciPy, Pandas, React, Dask
- **Misc. Skills**: Radiative transfer, open-source code management, optimization, web development / automation, copy editing
- **Languages**: English (fluent), Spanish (moderate written, basic spoken), Hindi (basic written, basic spoken)