Curriculum Vitae

Arjun Savel

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Education

Astrophysics BA, Physics BA, May 2020 (expected), Departments of Astronomy and Physics, University of California, Berkeley. GPA: 3.689 cumulative, 3.675 in major (3.895 upper division)

Research

2019-current **Forecasting Atmospheric Retrievals** *advisor: Dan Weisz*

Using machine learning methods, I am working to forecast the best-case precision of exoplanet atmospheric retrievals. Thus far, my neural net model can emulate radiative transfer models with methane and water abundances down to 0.1% residuals. Additionally, I have constructed a Fisher information matrix that will compute minimum 1σ contours for these abundances and atmospheric temperatures at varying signal-to-noise ratios.

2018-current **Exoplanet Occurrence Rates** *advisor: Courtney Dressing*

I have taken and reduced data on the ShARCS system on the Shane 3-meter telescope of K2 target stars known to host exoplanet candidates and *Kepler* stars not currently known to host exoplanet candidates as part of a larger follow-up program. For both samples, I have established a bound fraction of observed stellar companions that were unresolved in data products derived from *Kepler* spacecraft data, in addition to calculating radius corrections for planets that have been or may be discovered in these data sets. For the latter sample, I have also investigated the effects of the observed stellar companions on the occurrence rate of habitable exoplanets around Sunlike stars.

Papers in Prep

2. **Arjun Savel**, Lea Hirsch, Courtney Dressing, David Ciardi. "An open-source data reduction pipeline", in preparation for submission to Publications of the Astronomical Society of the Pacific.

1. **Arjun Savel**, Courtney Dressing, Lea Hirsch, David Ciardi, Jordan P.C. Fleming, Steven Giacalone, Andrew W. Mayo, Jessie Christiansen. "A closer look at exoplanet occurrence rates: the impact of stars without planets", in preparation for submission to The Astronomical Journal.

Talks/Posters

8. Courtney D. Dressing, Steven Giacalone, Ellianna S. Abrahams & 7 coauthors including **Arjun Savel**, 2020. "Using TESS to Investigate the Frequency of Planetary Systems Orbiting Cool Dwarfs", AAS 235, Honolulu, Hawai'i

7. **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, Hawai'i

6. **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

5. **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.

4. **Arjun Savel**, 2019."Earth: Rare or Regular?", Undergraduate Seminars, UC Berkeley Physics Department.

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.

Observing experience

3-m Shane telescope (ShARCS), Mt. Hamilton, CA: assisted with 10 nights
10-meter Keck Telescope (NIRC2), Mauna Kea, HI: assisted with 1/2 night
10-meter Keck Telescope (NIRSPEC), Mauna Kea, HI: assisted with 1/2 night

Teaching

Fall 2018, 2019 — **Undergraduate Student Instructor** *Astronomy C10, UC Berkeley*
Teaching two sections, developing worksheets and quizzes, and holding office hours for Introduction to Astronomy for non-majors (Prof. Alex Filippenko)

Relevant coursework

Astrophysics	Solar System Astrophysics (graduate); Stellar Dynamics and Galactic Structure (graduate, current); Astronomy Data Science Laboratory; Relativistic Astrophysics and Cosmology; Introduction to Astrophysics I
Physics	Quantum Mechanics I & II; Analytic Mechanics; Instrumentation Laboratory (current); Introductory Mechanics and Relativity; Introductory Electromagnetism, Waves, and Optics; Introduction to Experimental Physics I; Physics for Scientists and Engineers III
Mathematics	Linear Algebra I & II; Multivariable calculus; Introduction to Mathematical Physics (current)

Community involvement

2019-current **Reading Room Working Group**

- Meets with representatives of the UC Berkeley Physics Department to discuss ways to make the Physics Reading Room a more welcoming environment for students from underrepresented backgrounds

2019-current **Undergraduate Representative, Astronomy Department**

- Meets with faculty to discuss issues relevant to undergraduate astrophysics majors
- Established weekly office hours to address student concerns

2017-current **Undergraduate Lab at Berkeley (ULAB)**

- On founding leadership team of Physics and Astronomy ULAB
- Manages portfolio of freshmen-driven research projects
- Creates workshops and curricula (basic data analysis/visualization, statistics) geared toward early research education
- Increases campus impact, including doubling of Physics and Astronomy ULAB size in second year

Other experience

2016-2017 **The Daily Californian**

- Edited newspaper copy for grammar
- Was promoted every semester within Night Department
- In final role, assumed 3rd-highest editorial authority in newspaper and served on senior editorial board in organization composed of hundreds of student employees
- Led 15-member department in production cycle both in and out of office in 30-40 hr/week position
- Founded Diversity Committee

Honors/awards

- *****1st place at Astronomy Poster Summer Intern Symposium (APSIS), UC Berkeley, 2019
- Awarded $15,000 from Student Technology Fund for quantum computing initiative involving ULAB, UC Berkeley, 2018
- Awarded $1,000 from the UC Berkeley Physics Department for ULAB purposes, 2018

Technical skills

- Python, MCMC, adaptive optics image reduction

Last edited: December 2019