

# ADINA D. FEINSTEIN

NSF Graduate Research Fellow


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## STATS

### *Publications*

<b>First Author</b>	8
<b>Total</b>	38
<b>Total Citations</b>	654
<b>h-index</b>	14

### *Software (GitHub stars)*

<b>eleanor</b>	★ 76
<b>stella</b>	★ 20

### *Presentations*

<b>Invited seminars</b>	7
<b>Invited conference</b>	8

### *Outreach*

<b>Presentations</b>	20
<b>Pen-pals</b>	3

## RESEARCH INTERESTS

Stellar activity of young stars, Detection and characterization of young planets, Machine learning methods for automated light curve searches and young star identification, Open-source software development.

## EDUCATION

### 2018-Present: University of Chicago, Chicago, IL

Doctor of Philosophy in Astronomy & Astrophysics (expected 2023)

Title: "A Multi-wavelength Investigation of Young Stellar and Planetary Systems"

Advisor: Jacob Bean

Master of Physical Sciences (received June, 2019)

### 2014-2018: Tufts University, Medford, MA

Bachelor of Science in Astrophysics; Minor in English

High Thesis Honors: "Exploring the Low and High Mass Extremes in the Distant Universe" advised by Danilo Marchesini

## APPOINTMENTS

### 2019-Present: NSF Graduate Research Fellow, University of Chicago

### 2015-2018: Undergraduate Research Assistant, Tufts University

Advisor: Danilo Marchesini

### Summer 2017: Undergraduate Research Assistant, NASA GSFC

Advisor: Joshua Schlieder

### Summer 2013: High School Research Assistant, University of Virginia

Advisor: Phil Arras

### Summer 2012: High School Research Assistant, Cornell University

Advisor: Jonathan Lunine

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## HONORS & AWARDS

William Rainey Harper Dissertation Fellowship (\$4,300; June, 2022)  
UChicago Science as Art: Audience Favorite (\$150; March, 2022)  
Poster Honorable Mention (TESS Science Conference 2; August, 2021)  
Letters to a Pre-Scientist “Compassionate Connections” Award (June, 2021)  
McCormick Fellowship (2019-2021)  
NSF Graduate Research Fellowship (May, 2019)  
University of Chicago Three Minute Thesis competition, Winner of Master’s Thesis (\$500; May, 2019)  
Chambliss Medal for Outstanding Poster Presentation (233<sup>rd</sup> AAS meeting; January, 2019)  
Massachusetts Space Grant (Summer, 2016)

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## FIRST-AUTHOR PUBLICATIONS (8)

*AU Microscopii in the FUV: Observations in Quiescence, During Flares, and Implications for AU Mic b and c*  
**Feinstein A. D.**, France K., Youngblood A., et al. AAS Journals Under Review. [arXiv:2205.09606](https://arxiv.org/abs/2205.09606) (Citations: —)

*V1298 Tau with TESS: Updated Ephemerides, Radii, and Period Constraints from a Second Transit of V1298 Tau*  
**Feinstein A. D.**, David T. J., Montet B. T. et al. 2022, ApJL, 925, L2. [arXiv:2111.08660](https://arxiv.org/abs/2111.08660) (Citations: 1)

*Testing Self-Organized Criticality Across the Main Sequence using Stellar Flares from TESS*  
**Feinstein A. D.**, Seligman D. Z., Günther M. N., & Adams F. C. 2022, ApJL, 925, L9. [arXiv:2109.07011](https://arxiv.org/abs/2109.07011) (Citations: 4)

*H $\alpha$  and Ca II Infrared Triplet Variations During a Transit of the 23 Myr Planet V1298 Tau c*  
**Feinstein A. D.**, Montet B. T., Marshall J. C., et al. 2021, AJ, 162, 213. [arXiv:2107.01213](https://arxiv.org/abs/2107.01213) (Citations: 10)

*Flare Statistics for Young Stars from a Convolutional Neural Network Analysis of TESS Data*  
**Feinstein A. D.**, Montet B. T., Ansdell M., et al. 2020, AJ, 160, 5. [arXiv:2005.07710](https://arxiv.org/abs/2005.07710) (Citations: 44)

*stella: Convolutional Neural Networks for Flare Identification in TESS*  
**Feinstein A. D.**, Montet B. T., & Ansdell M. 2020, The Journal of Open Source Software, 5, 2347. (Citations: 13)

*eleanor: An open-source tool for extracting light curves from the TESS Full-Frame Images*  
**Feinstein A. D.**, Montet B. T., Foreman-Mackey D. et al. 2019 PASP, 131, 1003. [arXiv:1903.09152](https://arxiv.org/abs/1903.09152) (Citations: 112)

*K2-288Bb: A small temperate planet in a low-mass binary system discovered by citizen scientists*  
**Feinstein A. D.**, Schlieder J. E., Livingston J. H., et al. 2019 AJ, 157, 2. [arXiv:1902.02789](https://arxiv.org/abs/1902.02789) (Citations: 13)

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## SIGNIFICANT CONTRIBUTIONS (12)

***The NASA GSFC TESS Full Frame Image Light Curve Data Set***

Powell B. P., Kruse E., Montet B. T., **Feinstein A. D.**, 2022, Res. Notes AAS, 6, 111.

***Inferring Late Stage Enrichment of Exoplanet Atmospheres from Observed Interstellar Comets***

Seligman D. Z., Adams F. C., Becker J., **Feinstein A. D.**, Rogers, L. A. ApJ, under review. [arXiv:2204.12653](https://arxiv.org/abs/2204.12653)

***Theoretical and Observational Evidence for Coriolis Effects in Coronal Magnetic Fields of Main Sequence Stars Via Direct Current Driven Flaring Events***

Seligman D. Z., Rogers, L. A., **Feinstein A. D.**, et al. 2022, ApJ, 929, 54.

***Evidence for Centrifugal Breakout around a 45 Million Year Old M Dwarf***

Palumbo E. K., Montet B. T., **Feinstein A. D.**, et al. 2022, ApJ, 925, 75.

***The TESS View of LOFAR Radio-Emitting Stars***

Pope B. J. S., Callingham J. R., **Feinstein A. D.**, et al. 2021, ApJL, 919, L10.

***H-Alpha Variability of V1298 Tau c***

Schlawin E., Ilyin I., **Feinstein A. D.**, et al. 2021, RNAAS, 5, 195. doi:10.3847/2515-5172/ac1f2f.

***Low-frequency monitoring of flare star CR Draconis: Detection of long-term electron-cyclotron maser emission***

Callingham J. R., Pope B. J. S., **Feinstein A. D.**, et al. 2021, MNRAS, 648, A13.

***TOI 122b and TOI 237b, two small warm planets orbiting inactive M dwarfs, found by TESS***

Waalkes W. C., Berta-Thompson Z. K., Collins K. A., **Feinstein A. D.**, et al. 2020, AJ, 161, 13.

***TOI-1338: TESS' First Transiting Circumbinary Planet***

Kostov V. B., Orosz J. A., **Feinstein A. D.**, et al. 2020, AJ, 159, 253.

***Differences in signal contrast and camouflage among different colour variations of a stomatopod crustacean***

Franklin A. M., Marshall J., **Feinstein, A. D.**, et al. 2020, Sci Rep 10, 1236.

***The Young Planet DS Tuc Ab has a Low Obliquity***

Montet B. T., **Feinstein A. D.**, Luger R. et al. 2020, AJ, 159, 112.

***K2-136: A binary system in the Hyades open cluster hosting a Neptune-sized planet***

Ciardi D. R., Crossfield I. J. M., **Feinstein, A. D.**, Luger R. et al. 2020, AJ, 159, 112.

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## OTHER REFEREED PUBLICATIONS (16)

***The Volatile Carbon to Oxygen Ratio as a Tracer for the Formation Locations of Interstellar Comets***

Seligman D. Z., Rogers L. A., Cabot S. H. C., et al. PSJ, under review.. [arXiv:2204.13211](https://arxiv.org/abs/2204.13211)

***Complex Modulation of Rapidly Rotating Young M Dwarfs: Adding Pieces to the Puzzle***

Günther M. N., Berardo D. A., Ducrot E. et al. 2022, AJ, 163, 144.

***Extending the evolution of the stellar mass-size relation at  $z \leq 2$  to low stellar mass galaxies from HFF and CANDELS***

Nedkova K. V., Häußler B., Marchesini D., et al., 2021, MNRAS. doi:10.1093/mnras/s1744.

***Enhanced and Persistent Flare Driven Bio-indicating Chemistry on Synchronously-Rotating Rocky Worlds***

Chen H., Zhan Z., Youngblood A. et al. Nature Astronomy, 2021, 5, 298.

***TOI-954b and K2-329b: Short-Period Saturn-Mass Planets that Test Whether Irradiation Leads to Inflation***

Sha L., Huang C. X., Shporer A., et al. 2021, AJ, 161, 82.

***Revisiting the HD 21749 Planetary System with Stellar Activity Modeling***

Gan T., Wang S. X., Teske J. K. et al. 2020, MNRAS, 501, 6042.

***TOI-824 b: A New Planet on the Lower Edge of the Hot Neptune Desert***

Burt J. A., Nielsen L. D., Quinn S. N., et al. 2020, AJ 160, 153.

***TESS-Point: High precision TESS pointing tool***

Burke C. J., Levine A., Fausnaugh M. et al. 2020, Astrophysics Source Code Library.

***Planet Hunters TESS I: TOI 813, a subgiant hosting a transiting Saturn-sized planet on an 84-day orbit***

Eisner N. L., Barragán O., Aigrain S., et al. 2020, MNRAS, 148.

***THOR 42: A touchstone ~24 Myr-old eclipsing binary spanning the fully-convective boundary***

Murphy S. J., Lawson W. A., Onken C. A., et al. 2019, MNRAS, 2794.

***A super-Earth and two sub-Neptunes transiting the bright nearby, and quite M-dwarf TOI-270***

Günther M. N., Pozuelos F. J., Dittmann J. A., et al. 2019, Nature Astronomy, 3, 1099.

***The L 98-59 System: Three transiting terrestrial-size planets orbiting a nearby M dwarf***

Kostov V. B., Schlieder J. E., Barclay T., et al. 2019, AJ, 158, 32.

***Characterizing K2 candidate planetary systems orbiting low-mass stars IV: Updated properties for 86 cool dwarfs observed during campaigns 1-17***

Dressing C. D., Hardegree-Ullman K., Schlieder J. E., et al. 2019, AJ, 158, 87.

***A TESS Dress Rehearsal: Planetary Candidates and Variables from K2 Campaign 17***

Crossfield I. J. M., Guerrero N., David T., et al. 2018 AJ, 239, 1.

***HFF-Deepspace photometric catalogs of the twelve Hubble Frontier Fields , clusters, and parallels: Photometry, photometric redshifts, and stellar masses***

Shiple H., Lange-Vagle D., Marchesini D., et al. 2018 ApJS, 235, 14.

***Planetary Candidates from K2 Campaign 16***

Yu, L. Crossfield I. J. M., Schlieder J. E., et al. 2018 AJ, 156, 22.

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## TALK & POSTERS

Selected presentation slides are available on [SpeakerDeck : @afeinstein20](#)

***Seminars ( \* denotes invited)***

\* University of Illinois at Urbana-Champaign Center for AstroPhysical Surveys (May, 2022)

- \* Carnegie Earth & Planets Laboratory Astronomy Seminar (May, 2022; virtual)
- University of Chicago Chalk Talk (November, 2021)
- \* Yale Exoplanets/Stars Seminar Series (November, 2021; virtual)
- \* Kansas University Learning Machine Learning club seminar (October, 2021; virtual)
- \* [Harvard-Smithsonian CfA Exoplanet Seminar Series](#) (October, 2021; virtual)
- Kansas University Astronomy & Space Physics Seminar (September, 2021; virtual)
- \* California Institute of Technology, Knutson Group Meeting (July, 2021; virtual)
- \* University of Maryland, College Park, Exoplanet Journal Club (August, 2019)

### **Conference Talks ( \* denotes invited)**

- AAS 240, Transiting Exoplanets III, Pasadena, CA USA (Thursday, June 16, 2022)
- [CHAMPs Exoplanet ECR Highlight Seminar](#) (January 13-14, 2022; virtual)
- \* [NASA ExoPAG 25](#) (January 10 & 12, 2022; virtual)
- Great Lakes Exoplanet Area Meeting (November 11-12, 2021)
- TESS Science Conference II (August, 2021; virtual)
  - \* [Data Analysis panelist](#)
  - \* [Machine Learning Splinter Session panelist](#)
  - \* [FFI Splinter Session speaker](#)
- Emerging Researchers in Exoplanet Science (May, 2021; virtual)
- \* AAS 237, TESS Machine Learning Special Session (January, 2021; virtual)
- \* Earth 2.0 Workshop I, Tsung-Dao Lee Institute, Shanghai (December 7-11, 2020; virtual)
- TESS Science Team Meeting #22 (September, 2020; virtual)
- [online.tess.science Working Meeting](#) (September, 2020; virtual)
- Extreme Solar Systems IV, Reykjavik, Iceland (August, 2019)
- \* 5<sup>th</sup> TESS Asteroseismic Science Consortium (TASC) Workshop, Cambridge, MA USA (July, 2019)
- TESS Science Conference I, Splinter Session, Cambridge, MA USA (July, 2019)
- \* TESS Data Workshop, Space Telescope Science Institute, Baltimore, MD USA (February, 2019)
- AAS 233, TESS Special Session, Seattle, WA USA (January, 2019)
- Lake Michigan Area Exoplanet Meeting (November, 2019)
- AAS 231, Session 104. Detection of Extrasolar Planets I, National Harbor, MD USA (January, 2018)

### **Conference Posters**

- Cool Stars 21, Toulouse, France (July, 2022)
- [TESS Science Conference II](#) (August, 2021; virtual)
- Sagan Exoplanet Summer Virtual Workshop (July, 2021; virtual)
- [Cool Stars 20.5](#) (February, 2021; virtual)

[Exoplanets III](#) (July, 2020; virtual)

TESS Science Conference I, Boston, MA USA (July, 2019)

AAS 233, Poster 140.14, Seattle, WA USA (January, 2019)

AAS 233, Poster 467.04, Seattle, WA USA (January, 2019)

2017 NASA Goddard Space Flight Center summer intern poster session (July, 2017)

The 4<sup>th</sup> AstroCon DC Meeting, George Washington University (August, 2017)

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## PROPOSALS & GRANTS

### *TESS Guest Investigator Proposals*

Uniform Light Curves Across the Entire Sky from TESS FFIs with *eleanor*

Awarded \$150,000, 2019 (PI Benjamin Montet)

Measuring Long Rotation Periods from TESS's Short Light Curves

Awarded \$200,000, 2018 (PI Ruth Angus)

Searching for Planets in the Continuous viewing Zone with TESS Full Frame Image Data

Awarded \$50,000, 2018 (PI Elisa Quintana)

Awarded \$50,000, 2019 (PI Veselin Kostov)

1,050 Flaring Stars: A Comprehensive Survey Of Flares And Exoplanets

Mini program G04234, 2021 (PI Maximilian Günther)

### *Competitive Telescope Time Awarded (as PI unless noted)*

Gemini-North, GRACES

6 hours awarded through Gemini Fast-Turnaround Program, 2020

Gemini-South, IGRINS

6 hours awarded through Gemini Fast-Turnaround Program, 2022

Magellan Telescopes, awarded through University of Chicago

2 nights on LDSS-3C, 2021

2 nights on MIKE, 2019

1 night on PFS, 2019 (PI Benjamin Montet)

1 night on FIRE, 2018 (PI Jacob Bean)

XMM-Newton

118000 seconds, 2020 (PI Katija Poppenhaeger)

### *Student-Advised Funding (per project)*

*Measuring Stellar Cycles of Young Stars with K2 and TESS*

University of Chicago Quad Summer Undergraduate Research Scholars (\$5,500; May, 2022)

Illinois Space Grant Consortium for Undergraduate Research Scholarship (\$3,000; March, 2022)

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## ACADEMIC SERVICE

### *Referee (for 6 articles total)*

NeurIPS 2021 Workshop on Machine Learning and the Physical Sciences — 1

Journal of Open Source Software (JOSS; 2020-) — 1

Monthly Notices of the Royal Astronomical Society (2020-) — 1

The Astronomical Journal (2020-) — 3

### **High Level Science Products on MAST**

NASA [GSFC-eleanor-lite light curves](#)

stella [convolutional neural network models](#)

eleanor [light curves](#)

### **Available Catalogs**

HFFDeepSpace: [Hubble Frontier Fields Catalogs](#)

### **Department Service**

2021-2022: Co-organizer for UChicago Exoplanet Journal Club

2020, 2021: Lead organizer for the UChicago [Virtual Graduate School Information Session](#)

September, 2021: NSF Graduate Research Fellowship Panelist for UChicagoGRAD

2020 - Present: Member and Website Creator, [Inclusion, Diversity and Equity in Astronomy](#) (IDEA)

2020-Present: Website Committee, University of Chicago, Student Representative

2019, 2020, 2021: Graduate Women in Astronomy event coordinator

2019-2020: ERC Space Committee, University of Chicago, Student Representative

### **Conference Service**

January, 2022: CHAMPs Exoplanet ECR Highlight Seminar session chair

2019: LOC Member, "Building early science with TESS" Meeting, Chicago

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## **TEACHING**

### **Graduate Teaching Assistant, University of Chicago**

Spring 2022: Astronomy 48900: Undergraduate Research Seminar (guest lecture)

Spring 2021: Astronomy 12720: Exoplanets

Fall 2020: Astronomy 12700: Stars

### **Undergraduate Teaching Assistant, Tufts University**

Spring 2018: Women Gender and Sexuality Studies 85: The Universe: Illuminated By Women

Spring 2017: Astronomy 9: Concepts of the Cosmos

Fall 2017: Astronomy 31: Stellar Structure & Evolution

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## **OUTREACH**

Letters to a Pre-Scientist pen-pal (2018-Present; 3 pen-pals to-date)

Skype a Scientist volunteer (2018-Present; 17 classrooms to-date)

Lifelong Learning guest lecturer (October 8, 2021; virtual)

[Real Scientists Curator](#) (January 17-24, 2021)

University of Chicago Physics Mentorship Program mentor (2019, 2021)

Soapbox Science Chicago speaker (2019)

HerStory volunteer (2019)

Adler After Dark speaker (2019)

Naperville Astronomical Association lecture (invited; 2019)

Chicago Astronomical monthly lecture (invited; 2019)

Hyde Park Neighborhood Club after-care program volunteer in the Maker Lab (2018)

@astrotweeps guest host (2018)

WMFO Heard Mentality guest speaker (2018)

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## MEDIA APPEARANCES

The Flares of AU Mic — Press release at 240<sup>th</sup> AAS meeting

December 21 Christmas Star — [ABC7 Chicago](#); [Chicago Tribune](#)

[UChicago scientists teach a neural net to find baby star flares](#)

[The Young DS Tuc Ab is Aligned](#)

[Discovery of TOI 1338b](#)

[Discovery of TOI 270](#)

Discovery of K2-288Bb — Press release at 233<sup>rd</sup> AAS meeting; [JPL press release](#); [NBC News](#); [WGN radio](#); [Chicago Sun-Times](#)

Last updated: June 9, 2022