Allen B. Davis

CONTACT INFORMATION

International School of Boston
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EDUCATION

Yale University, New Haven, Connecticut USA

Ph.D., Astrophysics, May 2021

- Dissertation title: *Wobbling Towards the Future: Applications of the Radial Velocity Technique to Detect Ever-Smaller Exoplanets*
- Advisor: Professor Debra A. Fischer

M.S., Astrophysics, December 2017
M.Phil., Astrophysics, December 2017

Williams College, Williamstown, Massachusetts USA

B.A., Astrophysics, May 2014

HONORS AND AWARDS

National Science Foundation: Graduate Research Fellowship, 2015 - 2019

Williams College: graduated Cum Laude with Highest Honors in Astrophysics, 2014

US Coast Guard Foundation: Rear Admiral Arnold I. Sobel Scholarship, 2010

TEACHING EXPERIENCE

Teacher at the International School of Boston **2020 - present**

Full-time physics and math teacher, primarily in the upper school. Courses indicated with * are in the French track, but I teach in English. I have taught the following courses:

- 12th grade IB Physics (SL & HL) 2020 - present
- 11th grade IB Physics (SL & HL) 2020 - present
- 10th grade MYP Physics 2020 - present
- 10th grade Math Standard 2020 - 2021 & 2022 - 2023
- 11th grade Advanced Math Topics* 2023 - present
- 10th grade Advanced Math Topics* 2022 - present
- 9th grade Advanced Math Topics* 2022 - present
- 7th grade Math Enrichment 2021 - present
- 10th grade Sciences numériques et technologie* 2021 - present
- 9th grade Advisor 2024 - present
- 7th grade Advisor 2021-2023
- Astronomy Club Advisor 2021 - present
- Coding Club Advisor 2022 - present

Invited Guest Lecturer at Williams College **2015 - present**

Have appeared as a guest lecturer as part of various undergrad astronomy classes.

- ASTR 16: Planets and Search for Life 2018 - 2020, 2022 - 2023, 2025
- ASTR 104: Milky Way Galaxy & Universe 2017
- ASTR 101 Stars: From Suns to Black Holes 2015

Private Tutor **2019 - present**

Private tutor for high school in IB physics, Chemistry I, Algebra II, SAT prep. (Math), and programming (python); and for college students in major-track physics (E&M). I've also served as a mentor for independent physics & astronomy research projects for high school students.

Astrophysics Summer Camp instructor at Education Unlimited **2021**

Taught a one-week remote summer camp for high school students, covering stellar astrophysics, cosmology, exoplanets, and relativity.

Teaching Fellow at Yale University **2015 - 2020**
5 semesters of teaching in undergraduate astronomy classes. Duties include running discussion sections, review sessions, grading, and individual tutoring.

- ASTR 130: Origins & Search for Life in the Universe — Fall 2015, Fall 2016, Spring 2020
- ASTR 135: Archaeoastronomy — Spring 2016
- ASTR 120: Galaxies and the Universe — Spring 2015

Head Teaching Assistant at Milham Planetarium at Williams College **2011 - 2014**
Presented planetarium lectures to astronomy classes, school groups (K-12), and the general public. Coordinated planetarium schedule. Trained other lecturers. Planetarium maintenance and repair.

Teaching Assistant at Hopkins Observatory at Williams College **2011 - 2014**
Guided astronomy students in using telescopes for visual and CCD observations. Tutored astronomy students.

Peer Reviewed Publications

Full library: tinyurl.com/abd-lib

First Author

1. *TOI 564 b and TOI 905 b: Grazing and Fully Transiting Hot Jupiters Discovered by TESS*
   Davis, Allen B.; Wang, Songhu; Jones, Matias & 50 co-authors
   2020, *AJ*, 160, 229
2. *Insights on the Spectral Signatures of Stellar Activity and Planets from PCA*
   Davis, Allen B.; Cisewski, Jessica; Dumusque, Xavier; Fischer, Debra A.; Ford, Eric B.
   2017, *ApJ*, 846, 59

Co-Author

3. *Spinning up a Daze: TESS Uncovers a Hot Jupiter orbiting the Rapid-Rotator TOI-778*
   Clark, J. & 71 co-authors including **Davis, Allen B.**
   2023, *AJ*, 165, 5
4. *TOI-858 B b: A hot Jupiter on a polar orbit in a loose binary*
   Hagelberg, J. & 33 co-authors including **Davis, Allen B.**
   2023, *A&A*, 679, 70
5. *TOI-257b (HD 19916b): A Warm sub-Saturn on a Moderately Eccentric Orbit Around an Evolved F-type Star*
   Addison, Brett C. & 86 co-authors including **Davis, Allen B.**
   2021, *MNRAS*
6. *TOI-481 b & TOI-892 b: Two long period hot Jupiters from the Transiting Exoplanet Survey Satellite*
   Brahm, Rafael & 76 co-authors including **Davis, Allen B.**
   2020, *ApJ*, 160, 235
7. *High-resolution transmission spectroscopy of MASCARA-2 b with EXPRES*
   Hoeijmakers, H. Jens & 13 co-authors including **Davis, Allen B.**
   2020, *A&A*, 641, 120
8. *EXPRES. I. HD 3651 an Ideal RV Benchmark*
   Brewer, J. M. & 12 co-authors including **Davis, Allen B.**
   2020, *AJ*, 160, 67

9. *An Extreme-precision Radial-velocity Pipeline: First Radial Velocities from EXPRES*
   Petersburg, Ryan R. & 15 co-authors including **Davis, Allen B.**
   2020, *ApJ*, 159, 187
10. *TOI-677 b: A Warm Jupiter (P=11.2d) on an eccentric orbit transiting a late F-type star*
    Jordán, Andrés & 48 co-authors including **Davis, Allen**
    2020, *AJ*, 159, 145
11. *Modeling the Echelle Spectra Continuum with Alpha Shapes and Local Regression Fitting*
    Xin, Xu; Cisewski-Kehe, Jessi; **Davis, Allen B.**; Fischer, Debra A.; Brewer, John M.
    2019, *ApJ*, 157, 243
12. *HD 202772A B: A Transiting Hot Jupiter Around A Bright, Mildly Evolved Star In A Visual Binary Discovered By TESS*
    Wang, Songhu & 54 co-authors including **Davis, Allen B.**
    2019, *ApJ*, 157, 51
13. *Transiting Exoplanet Monitoring Project (TEMP). V. Transit Follow-Up for the HAT-P-9b, HAT-P-32b, and HAT-P-36b*
    Wang, Yong-Hao & 15 co-authors including **Davis, Allen B.**
    2019 *ApJ*, 157, 82
14. *EXPRES: a next generation RV spectrograph in the search for earth-like worlds*
    Jurgenson, C.; Fischer, D.; McCracken, T.; Sawyer, D.; Szymkowiak, A.; **Davis, A.**; Muller, G.; Santoro, F.
    2016 *SPIE*, 99086T
15. *Structure and Dynamics of the 2012 November 13/14 Eclipse White-light Corona*
    Pasachoff, Jay M. & 11 co-authors including **Davis, Allen B.**
    2015 *ApJ*, 800, 90
16. *The state of Pluto's atmosphere in 2012-2013*
    Bosh, Amanda S.; Person, Michael J. & 24 co-authors including **Davis, Allen B.**
    2015 *Icarus*, 246, 237
17. *Measurement of net electric charge and dipole moment of dust aggregates in a complex plasma*
    Yousefi, Razieh; **Davis, Allen B.**; Carmona-Reyes, Jorge; Matthews, Lorin S.; Hyde, Truell W.
    2014, *Phys. Rev. E*, 90, 3

Non-Peer Reviewed Scientific Publications

1. *Wobbling Towards the Future: Applications of the Radial Velocity Technique to Detect Ever-Smaller Exoplanets*
   Davis, Allen B.
   2021, Doctor of Philosophy dissertation in Astronomy, Yale University (library reference)
2. *A Study in Syzygy: Observations and Analyses of Stellar Occultations and the 2013 Total Solar Eclipse*
   Davis, Allen B.
   2014, Undergraduate honors thesis in Astrophysics, Williams College (library reference)
3. *Dynamics of Dust Aggregates in a Complex Plasma*
   Davis, Allen B.
   2012, CASPER online archives.

Conference Presentations

First Author

1. *TOI 564 b and TOI 905 b: Grazing and Fully Transiting Hot Jupiters Discovered by TESS*
   Davis, Allen B.; Wang, Songhu; Jones, Matias
   2020, AAS Meeting #235, 116.03 (iPoster)
2. *Improving the radial velocity precision of CHIRON with telluric line masking*
   Davis, Allen B.; Leet, Christopher; Fischer, Debra A.
   2019, AAS Meeting #233, 303.02 (talk)

3. *The EXPRES G-Dwarf Planet Search*
   Davis, Allen B.; Fischer, Debra A.; The EXPRES Team
   2018, ERES IV Meeting at The Pennsylvania State University (talk)
4. *Insights on the Spectral Signatures of RV Jitter from PCA*
   Davis, Allen B.; Cisewski, Jessica; Dumusque, Xavier; Fischer, Debra A.; Ford, Eric B.
   2017, ERES III Meeting at Yale (talk)
5. *Towards breaking the meter-per-second barrier*
   Davis, Allen B.; Fischer, Debra A.; Cisewski, Jessica
   2017, CT Exoplanet Picnic (talk)
6. *Insights on the Spectral Signatures of RV Jitter from PCA*
   Davis, Allen B.; Cisewski, Jessica; Dumusque, Xavier; Fischer, Debra A.; Ford, Eric B.
   2017, AAS Meeting #229, 425.04 (poster)
7. *Assessing the Information Content of Spectra with PCA*
   Davis, Allen B.; Cisewski, Jessica; Fischer, Debra A.; Dumusque, Xavier
   2016, Sagan Workshop at Caltech (poster)
8. *Assessing the Information Content of Spectra with PCA*
   Davis, Allen B.; Cisewski, Jessica; Fischer, Debra A.; Dumusque, Xavier
   2016, ERES II meeting at Cornell, P1 (poster)
9. *Observation and Analysis of a Single-Chord Stellar Occultation by Kuiper Belt Object (50000) Quaoar*
   Davis, Allen B.; Pasachoff, Jay M.; Babcock, Bryce A.; Person, Michael J.; Zuluaga, Carlos A.; Bosh, Amanda S.; Levine, Stephen E.; Naranjo, Orlando A.; Navas, Giuliat R.; Gulbis, Amanda A. S.; Winters, Jennifer G.; Bianco, Federica
   2014, AAS Meeting #223, 247.08 (poster)
10. *Single-Chord Stellar Occultation by 50000 Quaoar*
    Davis, Allen B.
    2013, Keck Northeast Astronomy Consortium Student Research Symposium at Vassar College (talk & proceedings paper)
11. *Single-Chord Stellar Occultation by 50000 Quaoar*
    Davis, Allen B.
    2013, Williams College Summer Science Symposium (poster)
12. *Dynamics of Dust Aggregates in a Complex Plasma*
    Davis, Allen B.; Carmona-Reyes, Jorge; Matthews, Lorin; Hyde, Truell
    2012, New England Section of the APS / AAPT Regional meeting (poster & talk)
13. *Dynamics of Dust Aggregates in a Complex Plasma*
    Davis, Allen B.; Carmona-Reyes, Jorge; Matthews, Lorin; Hyde, Truell
    2012, APS Division of Plasma Physics #54, BP8.019 (poster)
14. *Dynamics of Dust Aggregates in a Complex Plasma*
    Davis, Allen B.
    2012, Keck Northeast Astronomy Consortium Student Research Symposium at Middlebury College (talk & proceedings paper)
15. *Monitoring Hα Emission-Line Stars in Open Clusters*
    Davis, Allen B.*; Teich, Yaron*
    2011, Keck Northeast Astronomy Consortium Student Research Symposium at Wellesley College (talk & proceedings paper)
16. *Monitoring Hα Emission-Line Stars in Open Clusters*
    Davis, Allen B.*; Teich, Yaron*
    2011, Williams College Summer Science Symposium (poster)

*co-first authors

Co-Author

17. *Configuration of and Motions in the Solar Corona at the 2017 Total Solar Eclipse*
Pasachoff, Jay M. & 39 co-authors including **Davis, Allen B.**
2018, AAS Meeting #232, 325.10 (poster)
18. *Early Science Results from the Williams College Eclipse Expedition*
Pasachoff, Jay M. & 23 co-authors including **Davis, Allen B.**
2018, AAS Meeting #231, 220.06 (talk)
19. *First 2017-total-eclipse results from the Williams College team*
Pasachoff, Jay M. & 11 co-authors including **Davis, Allen B.**
2017, AGU Fall Meeting, SH13B-2476 (poster)
20. *Coronal Dynamics at Recent Total Solar Eclipses*
Pasachoff, Jay M.; Lu, Muzhou; **Davis, Allen B.** & 11 additional co-authors
2014, AGU Fall Meeting, SH41B-4144 (poster)
21. *Imaging and Spectra of the Chromosphere and Corona at the 2013 Total Eclipse in Gabon*
Pasachoff, Jay M.; **Davis, Allen B.** & 10 additional co-authors
2014, AAS Meeting #224, 323.16 (poster)
22. *Solar Activity and Motions in the Solar Chromosphere and Corona at the 2012 and 2013 Total and Annular Eclipses in the U.S., Australia, and Africa*
Pasachoff, Jay M.; Babcock, Bryce A.; **Davis, Allen B.** & 12 additional co-authors
2014, AAS Meeting #223, 118.01 (talk)
23. *Recent KBO (Pluto/Charon and beyond, including Quaoar) Occultation Observations by the Williams College Team as part of the Williams-MIT Collaboration*
Pasachoff, Jay M.; Babcock, Bryce A.; **Davis, Allen B.** & 15 additional co-authors
2013, DPS meeting #45, 310.01 (poster)
24. *Variability in Be Stars in NGC659 and NGC663*
Souza, Steven P.; **Davis, Allen B.**; Teich, Yaron
2013, AAS Meeting #221, 354.22 (poster)

Invited Research Talks

TOI 564 b: A Rare Grazing hot Jupiter discovered by TESS 2020
Harvard Center for Astrophysics: Exoplanet lunch

Towards breaking the meter-per-second barrier 2018
UC Santa Barbara: Astro Lunch speaker

Insights on the spectral signatures of RV jitter from PCA 2017
Harvard Center for Astrophysics: Exoplanet lunch

Public Education & Outreach

Planetarium work and selected public observing

Estimated ∼700 hours working at planetaria or conducting public observing since 2005.

Leitner Family Observatory & Planetarium, New Haven, CT **2014 - 2020**
Lectures for school groups and the general public. Guide public observing.

Milham Planetarium & Hopkins Observatory, Williamstown, MA **2011 - 2014**
Lectures for school groups and the general public. Guided public observing.

Tanoto Planetarium, Deerfield, MA **2009 - 2010**
Created and presented digital planetarium shows to students and the general public.

Treworgy Planetarium, Mystic, CT **2005 - 2009**
Interpreted exhibits about celestial navigation for museum visitors. Helped with public observing.

Astronomy on Tap **2014 - 2019**

Astronomy talks for the general public over pizza and beer. I have volunteered since 2014, and I gave one public talk in 2019. Venues include BAR (New Haven, CT) and M8RX (Santa Barbara, CA)

Elementary school outreach **2009 - 2015**

Astronomy and general science outreach at elementary schools in CT, MA, and VT. Highlights include:

2015, three months as a Science Fair Mentor for a fifth grade class at Benjamin Jepson Magnet School (New Haven, CT)

2010, Evening Speaker Series talk for students and the general public

2009 & 2010, led stargazing and telescope use for Global Youth Leadership Institute campers

Media and online materials

2017, appeared on WTNH News: Good Morning CT at 9 to talk about the 2017 solar eclipse.

2017, eclipse photo featured as cover of 2017 AAS wall calendar

2014, "Visiting a Distant Comet", *Science Matters: News in Education*

2013, appeared in online film "Colors and Motions of the Sun" by Jay Pasachoff

2013, eclipse photo featured as *Astronomy Picture of the Day* with Dan B. Seaton & Jay Pasachoff

PROFESSIONAL MEMBERSHIPS

American Astronomical Society, American Association for the Advancement of Science