

# Darryl Seligman

---

## Research Interests

Minor Bodies, Exoplanets, Plasma Physics, Nonlinear Dynamics, Fluid Dynamics, Neuroscience

## Appointments

- 2023-2026 **NSF Astronomy and Astrophysics Postdoctoral Fellow**, Ithaca, NY.  
Dept. of Astronomy and Carl Sagan Institute
- 2022-2023 **Postdoctoral Researcher**, *Cornell University*, Ithaca, NY.  
Dept. of Astronomy and Carl Sagan Institute
- 2020-2022 **TC Chamberlin Postdoctoral Fellow**, *University of Chicago*, Chicago, IL.  
The Department of the Geophysical Sciences

## Education

- 2020 **Ph.D.**, *Yale University, Department of Astronomy*, New Haven, CT.  
Dissertation Title: *From The Stars: An Assessment of the Scientific Opportunities Provided by Interstellar Objects* ([Link](#))
- 2017 **M.Sc., M.Phil.**, *Yale University*, New Haven, CT.
- 2015 **B.A.**, *University of Pennsylvania*, Philadelphia, PA.  
B.A. Mathematics, B.A. Physics, Magna Cum Laude

## Honors And Awards

- 2023 NSF Simonyi-NSF Scholar, award made in recognition of significant contributions to Rubin Observatory's Legacy Survey of Space and Time.
- 2022 Yale University Dirk Brouwer Memorial Prize for Outstanding Ph.D. Thesis.
- 2019 AAS DDA Duncombe Award for Outstanding Research in the Area of Dynamical Astronomy for "On The Anomalous Acceleration of 11/2017 U1 'Oumuamua."
- 2019 Tinsley Award for Best 2018 Paper by a Yale Graduate Student for "The Feasibility and Benefits of In Situ Exploration of 'Oumuamua-like Objects."
- 2018 Kavli Fellowship, Kavli Summer Program in Galaxy Formation at the Flatiron Institute.
- 2015 Gruber Fellowship, Gruber Foundation
- 2013 NSF REU, National Solar Observatory, Tucson, Az
- 2012 UPenn Center for Undergraduate Research PURM Award

---

## Leadership and Service

- 2024-2027 Rubin Observatory Users Committee Member
- 2023-2026 SBAG Early Career Secretary/Steering Committee Member
- 2022 Cornell Postdoctoral Leadership Program
  - Referee, *Astrophysical Journal*, *Astrophysical Journal Letters*, *Planetary Science Journal*, *Astronomy and Astrophysics*, *Astronomy and Astrophysics Letters*, *Advances in Space Research*, *Journal of Aerospace Information Systems*, *Nature Scientific Reports*, *Monthly Notices of the Royal Astronomical Society*, *Planetary and Space Science*, *Journal of the British Interplanetary Society*, *Gravitation and Cosmology*, *Astronomy and Computing*.
  - NASA XRP Panelist X2
  - NASA SSW External Reviewer
  - NSF Panelist X1
- 2024 Scientific and Local Organizing Committee Member, Emerging Researchers in Exoplanet Science (ERES) Conference IX
- 2021 Colloquium Committee, University of Chicago Department of the Geophysical Sciences
- 2018 Scientific and Local Organizing Committee Member, Emerging Researchers in Exoplanet Science (ERES) Conference III
- 2016-2019 Started and organized the ongoing Exoplanet Journal Club at Yale
- 2015-2017 Open Labs Director
- 2015-2016 Yale Graduate Student Senate Senator and Community Service Representative
- 2015-2016 Member of Yale Science Diplomats
- 2015-2016 Coordinator for Talented and Gifted (TAG) weekly visits to Leitner Planetarium
- 2011 Eagle Scout

---

## Teaching and Advising

- 2022-Current Aster Taylor, Hertz Fellow, University of Michigan Ann Arbor, Senior Thesis Primary Advisor, Project: Assessing Potential Contributions from Outgassing and Tidal Effects on the Evolving Rotational State of 1I/'Oumuamua
- 2021-2023 Devin Hoover, Undergraduate, University of Chicago, Senior Thesis Primary Advisor, Project: The Population of Interstellar Objects Detectable with the LSST and Accessible for *In Situ* Rendezvous with Various Mission Designs
- 2020-2021 Marvin Morgan, PhD Candidate, University of Texas, Austin, Senior Thesis Co-Advisor, Project: Collisional Growth Within the Solar System's Primordial Planetary Disk and the Timing of the Giant Planet Instability.
- 2016-2017 Teaching Fellow, Earth in its Cosmic Context, Frontiers and Controversies in Astrophysics, Introduction to Astronomical Observing, Yale University

---

## Selected Grants & Proposals

- 2024 *JWST* Cycle 3, PI Feinstein, KRONOS: Keys to Revealing the Origin and Nature Of sub-neptune Systems, Co-I, 130 hours
- 2024 *JWST* Cycle 3, PI Feinstein, Continuing the Legacy of AU Mic: Simultaneous FUV and NIR Observations of AU Mic b, Co-I, 50.6 hours
- 2023 NSF AAPF, \$330,000
- 2023 *JWST* Cycle 2, PI Meech, Close up samples of Exoplanetary Systems: Characterizing the next Interstellar Object, Co-I, 17.39 hours
- 2021 University of Chicago Quad Hoelt Research Grant for Undergraduate Research: The Population of Interstellar Objects Detectable with the LSST and Accessible for *In Situ* Rendezvous with Various Mission Designs
- 2019 Determine the Possible Origin of the First Interstellar Comet C/2019 Q4, ALMA, co-I, 14 hours
- 2019 A Large GBT Survey of the Chemical Composition of the First Interstellar Comet, GBT, co-I, 33.5 hours
- 2019 Comprehensive Characterization of the First Highly Active Interstellar Comet, VLT MUSE, co-PI, 11 hours
- 2016 American Physical Society Outreach Grant for Open Labs, co-PI, \$10,000

---

## Science Teams

- 2022 Team Member, KISS Fast Response Missions to NEOs, ISOs, and LPCs (PI Brown, Bell, Donitz)
- 2019-2022 Member, ISSI 'Oumuamua Team ([Link](#))
- 2022 Team Member, LSST Solar System Science Collaboration

---

## First Author Publications ([ADS Library Link](#)), ([Google Scholar](#)), ([Research Gate](#)), 770 Total Citations, 16 h-index, 17 first author, 7 advisee led, († indicates invited review)

17. **Seligman, D.**, Farnocchia, D., Micheli, M., Hainaut, O., Hsieh, H., Feinstein, A., Chesley, S., Taylor, A., Masiero, J., Meech, K., "Two Distinct, but Possibly Related, Populations of Dark Comets." Submitted, 2024.
16. **Seligman, D.**, Feinstein, A., Lai, D., Welbanks, L., Taylor, A., Becker, J., Adams, F., Morgan, M., Bergner, J., "Potential Melting of Extrasolar Planets by Tidal Dissipation." *ApJ*, 961, 22, 2024. ([Link](#).)
- †15. **Seligman, D.** and Moro-Martín, Amaya, "Interstellar Objects." Invited Review for *Contemporary Physics*, 63, 3 2023. ([Link](#))
14. **Seligman, D.**, Farnocchia, D., Micheli, M., Vokrouhlický, D., Taylor, A., Bergner, J., Chesley, S., Vereš, P., Meech, K., Hainaut, O., Devogele, M., Pravec, P., Matson, R., Deen, S., Tholen, D., Weryk, R., Rivera-Valentín, E., Sharkey, B., "Dark Comets? Unexpectedly Large Nongravitational Accelerations on a Sample of Inactive Solar System Small Bodies." *Planet. Sci. J.*, 4, 2, 35., 2023. ([Link](#)).

13. **Seligman, D.**, Becker, J., Adams, F., Feinstein, A., Rogers, L., "Inferring Late Stage Enrichment of Exoplanet Atmospheres from Observed Interstellar Comets." *ApJL*, 933, 1, L7, 2022. (Link) .
12. **Seligman, D.**, Rogers, L., Cabot, S., Noonan, J., Kareta, T., Mandt, K., Ciesla, F., McKay, A., Feinstein, A., Levine, W., Bean, J., Nordlander, T., Krumholz, M., Mansfield, M., Hoover, D., Van Clepper, E., "The Volatile Carbon to Oxygen Ratio as a Tracer for the Formation Locations of Interstellar Comets." *Planet. Sci. J.*, 3, 7, 150, 2022. (Link)
11. **Seligman, D.**, Rogers, L., Feinstein, A., Krumholz, M., Beattie, J., Federrath, C., Adams, F., Fatuzzo, M., Günther, M., "Theoretical and Observational Evidence for Coriolis Effects in Coronal Magnetic Fields Via Direct Current Driven Flaring Events." *ApJ*, 929, 54, 2022. (Link) .
10. **Seligman, D.**, Kratter, K., Levine, W., Jedicke, R., "A Sublime Opportunity: *In Situ* Observations of The Onset of Intense Activity in Transitioning Cometary Bodies." *Planet. Sci. J.*, 2, 234, 2021. (Link) .
9. **Seligman, D.**, Levine, W., Cabot, S., Laughlin, G., Meech, K., "On The Spin Dynamics of Elongated Minor Bodies with Applications to a Possible Solar System Analogue Composition for 'Oumuamua." *ApJ*, 920, 28, 2021. (Link)
8. **Seligman, D.**, Batygin, K. "The Onset of Chaos in Permanently Deformed Binaries from Spin-Orbit and Spin-Spin Coupling." *ApJ*, 913, 31, 2021. (Link)
7. **Seligman, D.**, Laughlin, G. "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice." *ApJL*, 896, L8, 2020. (Link)
6. **Seligman, D.**, Shariff, K. "Investigation of a Vorticity-preserving Scheme for the Euler Equations." *ApJ*, 887, 113, 2019. (Link)
5. **Seligman, D.**, Laughlin, G., Batygin, K. "On The Anomalous Acceleration of 1I/2017 U1 'Oumuamua." *ApJL*, 876, L26, 2019. (Link)
4. **Seligman, D.**, Hopkins, P. F., Squire, J. "Nonlinear Evolution of the Resonant Drag Instability in Magnetized Gas." *MNRAS*, 485, 3991, 2019. (Link)
3. **Seligman, D.**, Laughlin, G. "The Feasibility and Benefits of In Situ Exploration of 'Oumuamua-like Objects." *AJ*, 155, 5, 2018. (Link)
2. **Seligman, D.**, Laughlin, G. "A Vorticity-preserving Hydrodynamical Scheme for Modeling Accretion Disk Flows." *ApJ*, 848, 54, 2017. (Link)
1. **Seligman, D.**, Petrie, G. J. D., Komm, R. "A Combined Study of Photospheric Magnetic and Current Helicities and Subsurface Kinetic Helicities of Solar Active Regions during 2006-2013." *ApJ*, 795, 113, 2014. (Link)

---

## Other Publications (\* denotes advisee led)

27. Feinstein, A. D., **Seligman, D.**, France, K. A., Gagné, J., Kowalski, A., "Evolution of Flare Activity in GKM Stars Younger than 300 Myr over Five Years of TESS Observations." *AAS Journals*, Submitted, 2024.

26. Stern, S. A., Protopapa, S. A., Freeman, M., Parker, J. Wm., Tapley, M., **Seligman, D.**, Anderson, C., "A Study of an Interstellar Object Explorer (IOE) Mission." *Planetary and Space Science*, 241, 2024. (Link)
- \*25. Taylor, A., Steckloff, J., **Seligman, D.**, Farnocchia, D., Dones, L., Vokrouhlický, D., Nesvorný, D., and Micheli, M., "A Proposed Dark Comet Evolutionary Track From the Jupiter Family to the Near-Earth Populations." *Icarus*, Submitted, 2024.
- †24. Mandt, K., Ivanova, O., Pinto, O. H., Roth, Nathan, and **Seligman, D.**, "Volatiles." *Review chapter to appear in CENTAURS book*, Submitted, 2023.
- \*23. Hoover, D., Payne, M., **Seligman, D.**, "The Population of Interstellar Objects Detectable with the LSST and *NEO Surveyor*." *Planet. Sci. J.*, Submitted, 2023.
- \*22. Taylor, A., Farnocchia, D., Vokrouhlický, D., **Seligman, D.**, Steckloff, J., and Micheli, M., "Seasonally Varying Outgassing as an Explanation for Dark Comet Accelerations." *Icarus*, 408, 2024. (Link.)
21. Marčeta, D., **Seligman, D.**, "Synthetic Detections of Interstellar Objects with The Rubin Observatory Legacy Survey of Space and Time." *Planet. Sci. J.*, 4, 230, 2023. (Link.)
20. O'Connor, C., Lai, D., **Seligman, D.**, "On the pollution of white dwarfs by exo-Oort cloud comets." *MNRAS*, 524, 4, 6181-6197, 2023. (Link.)
- \*19. Taylor, A., **Seligman, D.**, Hainaut, O., and Meech, K., "Fitting the Light Curve of 1I/'Oumuamua with a Nonprincipal Axis Rotational Model and Outgassing Torques." *Planet. Sci. J.*, 4, 186, 2023. (Link.)
18. Fatuzzo, M., Adams, F., Feinstein, A. and **Seligman, D.**, "Avalanches and the Distribution of Reconnection Events in Magnetized Circumstellar Disks." *ApJ*, 954, 15, 2023. (Link.)
17. Levine, G., Taylor, A., **Seligman, D.**, Hoover, D., Jedicke, R., Bergner, J., Laughlin, G., "Interstellar Comets from Post-Main Sequence Systems as Tracers of Extrasolar Oort Clouds." *Planet. Sci. J.*, 4, 7, 124, 2023. (Link.)
16. Bergner, J. and **Seligman, D.**, "Acceleration of 1I/'Oumuamua from radiolytically produced H<sub>2</sub> in H<sub>2</sub>O ice." *Nature*, 615, 610–613, 2023 (Link) .
15. Farnocchia, D., **Seligman, D.**, Granvik, M., Hainaut, O., Meech, K. Micheli, M., Weryk, R., Chesley, S., Christensen, E., Koschny, D., Lazzaro, D., Mommert, M., Wainscoat, R., "(523599) 2003 RM: The asteroid that wanted to be a comet." *Planet. Sci. J.*, 4, 2, 29, 2023. (Link.)
14. Becker, J., **Seligman, D.**, Adams, F., Styczinski, M., "The Influence of Tidal Heating on the Habitability of Planets Orbiting White Dwarfs" *ApJL*, 945, 2, L24, 2023. (Link).
- \*13. Taylor, A., **Seligman, D.**, MacAyeal, D., Hainaut, O., and Meech, K., "Numerical Simulations of Tidal Deformation and Resulting Light Curves of Small Bodies: Material Constraints of 99942 Apophis and 1I/'Oumuamua." *Planet. Sci. J.*, 4, 79, 2023. (Link)
- †12. Jewitt, D. and **Seligman, D.**, "Interstellar Interlopers." *Annual Reviews of Astronomy and Astrophysics*, Vol. 61, 2023. (Link)

11. Cabot, S., Wang, Q., and **Seligman, D.** "X-rays Trace the Volatile Content of Interstellar Objects." *ApJ*, 956, 121, 2023.
10. Feinstein, A., France, K., Youngblood, A., and 13 coauthors including **Seligman, D.** "AU Microscopii in the FUV: Observations in Quiescence, During Flares, and Implications for AU Mic b and c." *AJ*, 164, 3, 110, 2022. (Link)
- \*9. Hoover, D., **Seligman, D.**, Payne, M., "The Population of Interstellar Objects Detectable with the LSST and Accessible for *In Situ* Rendezvous with Various Mission Designs " *Planet. Sci. J.*, 3, 71, 2022. (Link)
8. Feinstein, A., **Seligman, D.**, Günther, M., Adams, F. "Testing Self-Organized Criticality Across the Main Sequence using Stellar Flares from *TESS*" *ApJL*, 925, L9, 2022. (Link)
- \*7. Morgan, M., **Seligman, D.**, Batygin, K., "Collisional Growth Within the Solar System's Primordial Planetesimal Disk and the Timing of the Giant Planet Instability" *ApJL*, 917, L8, 2021. (Link)
6. Levine, W., Cabot, S., **Seligman, D.**, Laughlin, G., "Constraints on the Occurrence of 'Oumuamua-Like Objects" *ApJ*, 922, 39, 2021. (Link)
5. Abbot, D., Webber, R., Hadden, S., **Seligman, D.**, Weare, J., "Rare Event Sampling Improves Mercury Instability Statistics" *ApJ*, 923, 2, 236, 2021. (Link)
4. Hopkins, P. F., Rosen, A. L., Squire, J., and 4 coauthors including **Seligman, D.** "Dust in the Wind with Resonant Drag Instabilities: I. The Dynamics of Dust-Driven Outflows in GMCs and HII Regions." *MNRAS*, Accepted, 2022. (Link)
3. Hopkins, P. F., Squire, J., **Seligman, D.** "Simulating the Diverse Instabilities of Dust in Magnetized Gas." *MNRAS*, 496, 2123, 2020. (Link)
2. Wang, S., Jones, M., Shporer, A. and 50 coauthors including **Seligman, D.**, "HD 202772A b: A Transiting Hot Jupiter around a Bright Mildly Evolved Star in a Visual Binary Discovered by TESS." *AJ*, 157, 51, 2019. (Link)
1. Kim, B., **Seligman, D.**, Kable, J., "Preference Reversals in Risky Decision-making are Accompanied by Changes in Attention to Different Attributes." *Frontiers in Neuroscience*, 6, 109, 2012. (Link)

## Unrefereed Publications and Op-eds

5. **Seligman, D.**, "Could the solar system be teeming with interstellar objects? We'll soon find out (op-ed)." *Space.com*, 2024. (Link)
- †4. **Seligman, D.**, "The Color Out Of Space." *Invited Review, Inference: International Review of Science*, 2021. (Link) DOI: 10.37282/991819.21.58
3. Mansfield, M., **Seligman, D.**, "I Knew You Were Trouble: Emotional Trends in the Repertoire of Taylor Swift." *ArXiv*, 2021. (Link)
2. Bannister, M., Opitom, C., Fitzsimmons, A., and 11 coauthors including **Seligman, D.** "Interstellar comet 2I/Borisov as seen by MUSE: first C<sub>2</sub>, NH<sub>2</sub> and red CN detections." *ArXiv* (Link).
1. Laughlin, G., Klanot, K., **Seligman, D.**, Adams, F. "On the Energetics of Large-Scale Computation using Astronomical Resources." *Ap&SS*, Under Review

## Select Media Highlights

> 600 News Articles and Appearances Dedicated to Publications with Significant Contributions

"Mysterious Space Object 'Oumuamua Not Alien, Scientists Say." *Wall Street Journal*, 2023. (Link)

"Scientists uncover what accelerated an interstellar comet through our solar system." *CNN*, 2023. (Link)

"Oumuamua Was a Comet After All, a Study Suggests." *NY Times*, 2023. (Link)

"Mystery of our first interstellar visitor may be solved." *Science*, 2023. (Link)

"Asteroids that speed up unexpectedly may be 'dark comets' in disguise." *NewScientist*, 2023. (Link)

"When Planets Collect Comets." *Sky & Telescope* and *AAS Nova*, 2022. (Link)

"These planets are in danger of asteroid strikes! Is Earth on the list?" *Hindustan Times Tech*, 2022. (Link)

"The Ambitious Idea to Study the Evolution of a Comet." *Smithsonian Magazine*, 2021. (Link)

"Proposed Centaur Mission Could Catch Comets in the Act of Formation." *Universe Today*, 2021. (Link)

"Wild idea: Tagalong spacecraft could watch a comet form." *Space.com*, 2021. (Link)

"We're One Step Closer To Uncovering Secrets Of Ancient 'Centaur' Comets." *Screenrant*, 2021. (Link)

"Vera Rubin Observatory Should Find 5 Interstellar Objects a Year, Many of Which we Could Chase Down With Spacecraft." *Universe Today*, 2021. (Link)

"Sad, Beautiful, Tragic: UChicago Researchers Analyze the Emotional Range of Taylor Swift's Music." *Chicago Maroon*, 2021. (Link)

"Taylor Swift is unhappiest with blue-eyed men, astrophysicists declare." *NY Post*, 2021. (Link)

"University of Chicago astrophysicists just released an algorithm to detect the 'emotional trends in the repertoire of Taylor Swift." *Business Insider*, 2021. (Link)

"Our galaxy's marvelous rogues and misfits." *Astronomy Magazine April Issue*, 2021. (Link)

"Oumuamua: Neither Comet Nor Asteroid, But A Cosmic Iceberg." *NY Times*, 2020. (Link)

"A Hydrogen Iceberg From A Failed Star Might Have Passed Through Our Solar System." *Scientific American*, 2020. (Link)

"Hydrogen Icebergs In Space? The Mystery Of 'Oumuamua - Podcast." *The Guardian*, 2020. (Link)

"Oumuamua could be a relic from giant clouds where stars are born - Podcast." *CBC Quarks and Quirks*, 2020. (Link)

"'Oumuamua Might Be A Giant Interstellar Hydrogen Iceberg." *Wired*, 2020. (Link)

"Mysterious Interstellar 'Oumuamua Could Be Made Of Something Almost Unheard Of In Science." *Fox News*, 2020. (Link)

"A dying star 1,000 times bigger than the sun could soon explode." *Euronews*, 2020. (Link)

"Mysterious 'Oumuamua Interstellar Object may have Simple Explanation After All." *NBC News MACH*, 2019. (Link)

"'Oumuamua, Our First Interstellar Visitor, May Have Been a Comet After All." *Scientific American*, 2019. (Link)

"Discovery of a Giant Planet." *Euronews-NBC*, 2019.

"Will There Be Another 'Oumuamua?" *Event Horizon Podcast*, 2019. (Link)

"Researchers Propose Mission to Intercept the Next Interstellar Asteroid." *Space.com*, 2018. (Link)

## Invited Colloquia and Invited Conference Presentations

- 03/2024 "New Populations of Solar System Small Bodies and What They Tell Us." Michigan State University Astronomy Colloquium, East Lansing, MI.
- 02/2024 "New Populations of Solar System Small Bodies and What They Tell Us." University of Hawai'i Institute for Astronomy Colloquium, Honolulu, HI.
- 10/2023 "Interstellar Interlopers and Dark Comets." 20th Serbian Astronomical Conference Invited Speaker, Belgrade, Serbia.
- 09/2023 "Interstellar Interlopers and Dark Comets." The Pennsylvania State University Astronomy Department Colloquium, State College, PA.
- 09/2023 "Interstellar Interlopers and Dark Comets." University of Texas at Austin Astronomy Department Colloquium, Austin, TX.
- 08/2023 "Prospects for Interstellar Interlopers and Dark Comets with the Rubin Observatory." Invited Speaker, Simonyi/NSF Scholars Talk, Rubin Science Medley, Rubin Observatory Project & Community Workshop, Tucson, AZ.
- 06/2023 "Interstellar Interlopers and Dark Comets." Invited Speaker and Panelist, Break-through Discuss 2023: Revolutions in Space Science – Near-Term Opportunities for Space Exploration (Link), Santa Cruz, CA. (Recording.)
- 09/2022 "Interstellar Comets and the New Insights to Planet Formation They Provide." Indiana University, Astronomy Department Colloquium, Bloomington, IN.
- 08/2022 "Interstellar Comets and the New Insights to Planet Formation They Provide." Southwest Research Institute Colloquium, Boulder, CO.
- 01/2022 "New Frontiers in Planetary Science: In Situ Observations of Interstellar Objects and Transitioning Cometary Bodies" Early-Career Invited Speaker, NASA Small Bodies Assessment Group (SBAG) Meeting 26, Virtual.
- 03/2021 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" University of Hawaii Institute for Astronomy Colloquium, Honolulu, HI.



- 03/2021 "A Galactic Census of Minor Bodies: What Are They, How Do They Form, and Where Do They Come From?" MIT Department of Earth, Atmospheric, and Planetary Sciences Colloquium, Cambridge, MA.
- 11/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" T.C. Chamberlin Colloquium, Chicago, IL.
- 06/2019 "On the Anomalous Acceleration of 11/2017 U1 'Oumuamua" AAS DDA Raynor L. Duncombe Prize Talk, Boulder, CO.

## Invited Seminars

- 02/2024 "Interstellar Interlopers." University of Hawai'i Institute for Astronomy Seminar, Honolulu, HI.
- 09/2023 "Interstellar Interlopers and Dark Comets" University of Pennsylvania Astronomy and Astrophysics Seminar, Philadelphia, PA.
- 09/2023 "What can we learn about SETI from the first interstellar object 11/'Oumuamua?" The Pennsylvania State University PSETI Seminar, State College, PA.
- 03/2022 "Interstellar Interlopers and Centaurs" UCLA Planetary Science Seminar, Los Angeles, CA.
- 10/2021 "A Sublime Opportunity: The Dynamics of Transitioning Cometary Bodies and the Feasibility of In Situ Observations of The Evolution of Their Activity" LPL Small Bodies Group Meeting, Tucson, AZ.
- 10/2021 "Space Missions to Interstellar Objects" Harvard Center for Astrophysics Seminar, Cambridge, MA.
- 09/2021 "A Galactic Census of Minor Bodies: What Are They, How Do They Form, and Where Do They Come From?" Fermilab Astrophysics Seminar, Batavia, IL
- 09/2021 "A Galactic Census of Minor Bodies: What Are They, How Do They Form, and Where Do They Come From?" UC Berkeley CIPS Seminar, Berkeley, CA.
- 09/2020 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" JILA Astrophysics Seminar, Boulder, CO. Recording available here.
- 12/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" TAPIR Seminar, Pasadena, CA.
- 11/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" UNLV Seminar, Las Vegas, NV.
- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" NAU Seminar, Flagstaff, AZ.
- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" Origins Seminar, Tucson, AZ.
- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" UCLA Seminar, Los Angeles, CA.
- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" Yuk Lunch Seminar, Pasadena, CA.

- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" Harvard ITC Seminar, Cambridge, MA.
- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" Yale Geophysics Atmosphere, Oceans and Climate Dynamics Seminar, New Haven, CT.
- 09/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" Cornell Planetary Lunch, Ithaca, NY.
- 09/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" ISSI Team Meeting, Bern, Switzerland.
- 01/2019 "From The Stars An Assessment of the Scientific Opportunities Provided by Interstellar Asteroids" John Harvard Symposium, Harvard University.
- 11/2018 "'Oumuamua!" CITA Stars and Planet Seminar, Toronto.
- 10/2018 "'Oumuamua!" JHU/STScI CAS Astrophysics Wine and Cheese, Baltimore, MD.
- 08/2018 "'Oumuamua!" Harvard Smithsonian Center for Astrophysics, Stars and Planets Seminar, Cambridge, MA.
- 08/2018 "Dust in the Wind: New Instabilities in the Interstellar Medium" Kavli Summer Program in Astrophysics, Flatiron Institute, NY.
- 04/2018 "The Feasibility and Benefits of In Situ Exploration of 'Oumuamua-like Objects." University of Wisconsin, Milwaukee, Center for Gravitation, Cosmology and Astrophysics.
- 04/2018 "The Feasibility and Benefits of In Situ Exploration of 'Oumuamua-like Objects." Columbia University, Thursday Seminar.
- 08/2017 "A Vorticity-Preserving Hydrodynamical Scheme for Modeling Accretion Disk Flows." Cornell University, Astrophysics Lunch.
- 03/2017 "Nonlaminar Flow in Protostellar Disks." University of Florida, Florida Star and Planet Formation Days.
- 03/2017 "Vorticity-Preserving Hydrodynamical Simulations." University of Florida, ASTROWIN Florida Astrophysics Winter Workshop.

## Contributed Scientific Presentations

- 06/2023 "Dark Comets? Unexpectedly Large Nongravitational Accelerations on a Sample of Small Asteroids." Asteroids, Comets, Meteors Conference Abstract 2036, Flagstaff, AZ, (Oral) ([Link](#)).
- 10/2022 "Interstellar Comets and the New Insights to Planet Formation They Provide" American Astronomical Society, Division for Planetary Science, 304.04, London, ON. (Oral)
- 08/2022 "Theoretical and Observational Evidence for Coriolis Effects in Coronal Magnetic Fields Via Direct Current Driven Flaring Events" Cool Stars 21, Toulouse, France (Poster) ([Link](#)).
- 06/2022 "From The Stars: An Assessment of the Scientific Opportunities Provided by Interstellar Objects (Dissertation Talk)" AAS 2022 Summer Meeting, Pasadena, CA (Oral).

- 05/2022 "Interstellar Comets and the New Insights to Planet Formation They Provide" AASTCS 9: Exoplanets IV, 405.03, Las Vegas, NV. (Oral)
- 01/2022 "From The Stars: An Assessment of the Scientific Opportunities Provided by Interstellar Objects (Dissertation Talk)" CHAMPS Exoplanet Early Career Highlight Seminar (to replace AAS 2022 Winter Meeting canceled due to COVID), Virtual (Oral)
- 12/2021 "A Sublime Opportunity: In Situ Observations of The Onset of Intense Activity in Transitioning Cometary Bodies" American Geophysical Union Fall Meeting, New Orleans, LA. (Oral)
- 11/2021 "A Sublime Opportunity: *In Situ* Observations of The Onset of Intense Activity in Transitioning Cometary Bodies " Great Lakes Exoplanets Area Meeting, Ann Arbor, MI. (Oral)
- 10/2021 "A Sublime Opportunity: In Situ Observations of The Onset of Intense Activity in Transitioning Cometary Bodies" American Astronomical Society, Division for Planetary Science, Virtual Conference. (Oral)
- 04/2021 "The Onset of Chaos in Permanently Deformed Binaries from Spin-Orbit and Spin-Spin Coupling" Boston Area Exoplanet Meeting VIII, Cambridge, MA (Oral)
- 10/2020 "The Onset of Chaos in Permanently Deformed Binaries from Spin-Orbit and Spin-Spin Coupling" American Astronomical Society, Division for Planetary Science, Virtual Conference. (Oral)
- 08/2020 "The Onset of Chaos in Permanently Deformed Binaries from Spin-Orbit and Spin-Spin Coupling" American Astronomical Society, Division for Dynamical Astronomy, Virtual Conference. (Oral) Recording available here.
- 11/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" Institute for Advanced Study Coffee Seminar, Princeton, NJ (Oral)
- 10/2019 "Oumuamau!" Steward Observatory Symposium, Tucson, AZ (Oral)
- 10/2019 "Evidence that 'Oumuamua was Composed of Molecular Hydrogen Ice" ASU Seminar, Tempe, AZ (Oral)
- 06/2019 "On the Anomalous Acceleration of 11/2017 U1 'Oumuamua" Emerging Researchers in Exoplanet Science (ERES) V, Ithaca, NY (Oral)
- 05/2019 "Just exactly what was 'Oumuamua?" Gruber Symposium, New Haven, CT (Oral)
- 04/2019 "On the Anomalous Acceleration of 11/2017 U1 'Oumuamua" Boston Area Exoplanet Meeting VI, Cambridge, MA (Oral)
- 11/2018 "'Oumuamua!" Princeton University, Princeton, NJ (Oral)
- 06/2018 "The Feasibility and Benefits of In Situ Exploration of 'Oumuamua-like Objects." Emerging Researchers in Exoplanet Science (ERES) IV, Penn State, State College, PA (Oral)
- 05/2018 "Impactor Missions to Future Oumuamua-like Objects" University of Chicago Chalk Talk, Chicago, IL (Oral)
- 04/2018 "'Oumuamua" 2017 Gruber Symposium, Yale University, New Haven, CT (Oral)

- 04/2018 "The Feasibility and Benefits of In Situ Exploration of 'Oumuamua-like Objects." American Astronomical Society, Division for Dynamical Astronomy, San Jose, CA. (Oral)
- 11/2017 "A Vorticity-Preserving Hydrodynamical Scheme for Modeling Accretion Disk Flows." Habitable Worlds 2017: A System Science Workshop, Laramie, Wyoming (Poster)
- 09/2017 "A Vorticity-Preserving Hydrodynamical Scheme for Modeling Accretion Disk Flows." NY Area Computational Hydro Workshop, Flatiron Institute, Center for Computational Astrophysics (Oral)
- 06/2017 "A Compressible, Vorticity-Preserving Hydrodynamical Scheme for Modeling Accretion Disk Flows." Emerging Researchers in Exoplanet Science (ERES) III, Yale University, New Haven, CT (Oral)
- 04/2017 "A Vorticity-Preserving Hydrodynamical Scheme for Modeling Protostellar Disk Flows." 2017 Gruber Symposium, Yale University, New Haven, CT (Oral)
- 03/2017 "A Vorticity-Preserving Hydrodynamical Scheme for Modeling Protostellar Disks." 2017 Aspen Winter Conference, Formation and Dynamical Evolution of Exoplanets, Aspen, CO, March 2017 (Poster)
- 01/2014 "A Combined Study of Photospheric Magnetic and Current Helicities and Subsurface Kinetic Helicities of Solar Active Regions during 2006 – 2012." 223rd AAS Conference: Presentation 158.01 (Poster)
- 08/2013 "A Comparison Between Photospheric Magnetic and Current Helicities and Subsurface Kinetic Helicity during 2007 – 2012" National Solar Observatory/National Optical Astronomy Observatory Tucson, AZ (Oral)
- 09/2012 PCBs for Astronomical Instrumentation" at CURF Fall Research Symposium University of Pennsylvania (Poster)

## Observational Experience

- 10/2017 Palomar Observatory
- 07/2013 Kitt Peak

## Outreach Presentations

- 03/2024 "Interstellar Insights: SETI Experts on the Hunt for Truth Amidst Misinformation," Emerald City Comic Con, Seattle, WA. (Link.)
- 04/2023 "Interstellar Objects and Dark Comets," Finger Lakes Mineral Club, Ithaca, NY. (Link to recording.)
- 02/2023 "Interstellar Objects," Cornell Friends of Astronomy.
- 09/2018 "'Oumuamua!" New Haven Astronomy on Tap
- 02/2016 "Creating Solar Storms, Particles, and Uncertainty." Science in the News.
- 11/2015 "Stellar Astrophysics." Meantime Presenter at Yale University GPSS
- 10/2015 "Stellar Astrophysics." Open Labs Science Cafe at Yale University GPSS
- 10/2014 "Scientific Innovation at Lower Merion." Lower Merion Innovation Center

## Contact References

1. Professor Gregory Laughlin  
Ph.D. Advisor  
Email: [greg.laughlin@yale.edu](mailto:greg.laughlin@yale.edu)  
Affiliation: Yale University, Department of Astronomy
2. Professor David Jewitt  
Email: [djewitt@gmail.com](mailto:djewitt@gmail.com)  
Affiliation: Department of Earth, Planetary and Space Sciences, University of California Los Angeles
3. Professor Nikole Lewis  
Email: [nkl35@cornell.edu](mailto:nkl35@cornell.edu)  
Affiliation: Department of Astronomy and Carl Sagan Institute, Cornell University
4. Professor Kaitlin Kratter  
Email: [kkratter@arizona.edu](mailto:kkratter@arizona.edu)  
Affiliation: Steward Observatory, University of Arizona