Alessondra "Sondy" Springmann, PhD

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Education

University of Arizona, Department of Planetary Sciences **Tucson, AZ**
Doctor of Philosophy Received August 2022
NASA Future Investigators in Earth & Space Science & Technology fellow 2020–2022

Massachusetts Institute of Technology **Cambridge, MA**
Master of Science in Earth and Planetary Science Received June 2011

Wellesley College **Wellesley, MA**
Bachelor of Arts in Astrophysics Received June 2007

Additional Training
Instituto de Astrofísica de Canarias Winter School on Planetary Exploration 2016
NASA Jet Propulsion Laboratory Planetary Science Summer School 2008

Selected Professional Experience

Southwest Research Institute **Boulder, CO**
Postdoctoral Researcher, Project ESPRESSO (NASA SSERVI Node) 2022–2025

- Designed, constructed, and operated cratering experiments under vacuum using high-speed cameras and laser instrument suite for microgravity flights (60+ parabolas of 20 seconds each) aboard a research aircraft
- Developed image analysis pipeline for particle detection, linking, and trajectory calculations using Source Extractor Python and `scikit` machine learning tools
- Expertise in image processing, scientific high-vacuum systems, class III lasers, and projectile launchers for impact experiments into regolith beds for future spaceflight instrument development
- Implemented checklists to reflect best practices in aerospace operations to ensure success of experiments
- Part of a large, distributed project with colleagues at institutions across the US

University of Arizona, Department of Planetary Sciences **Tucson, AZ**
Graduate Research Associate for Walter M. Harris 2016–2022
Graduate Research Assistant for Dante S. Lauretta 2014–2016

- Coordinated a multi-comet observing campaign with 60+ nights of time at 3 observatories with researchers from multiple institutions to collect visible wavelength observations for characterizing comet inner-coma processes
- Worked with observatory staff to ensure consistent data quality across telescopes
- Calibrated and processed comet observations to determine comet gas production rates

- Compared behavior of comet inner-coma volatile species including carbon dust and their interaction with the comet nucleus surfaces
- Conducted laboratory UV microchannel plate detector calibration for a sounding rocket experiment
- Constrained the thermal/orbital history of asteroid (101955) Bennu based on refractory element abundances to be measured in asteroid surface samples collected by the OSIRIS-REx spacecraft; participated in OSIRIS-REx science team meetings

Arecibo Observatory, National Astronomy and Ionosphere Center **Arecibo, PR**
Data Analyst and Observing Support, Planetary Radar Group 2012–2014

- Observed near-Earth asteroids and comets with 2.4 GHz/1 MW planetary radar
- Analyzed asteroid detection and orbital observations in realtime, informing immediate refinement to data taking process and improvement to obit determination
- Re-analyzed legacy Arecibo planetary radar observations of near-Earth asteroids with modern analysis tools for comparison studies
- Archived asteroid shape model for (101955) Bennu, target of the OSIRIS-REx asteroid sample return mission, with the Planetary Data System

MIT Earth, Atmospheric, and Planetary Sciences **Cambridge, MA**
Graduate Research Assistant 2007–2009; Spring 2011

- Modeled solidification and and overturn of terrestrial planet magma oceans
- Investigated early Earth magma ocean solidification and overturn, and its affect on mantle concentrations of rare-Earth elements
- Observed potentially hazardous asteroids with NASA Infrared Telescope Facility
- Used Magellan telescope images to model point-spread functions of Pluto system to extract lightcurves of Nix and Hydra
- Participated in occultation observations of Pluto and other TNOs in US and Japan

Peer-Reviewed Publications

[16] **Springmann, A.**, Soto, A., Parker, A. H., Whizin, A. D., Walsh, K. J., Meyer, Z., Renzetti, A. 2024. Particle detection and trajectory linking in laser sheet impact experiments under vacuum and reduced gravity. *The Planetary Science Journal*, in preparation.

[15] Kareta, T., J. W. Noonan, W. M. Harris, and **Springmann, A.** 2023. Ice, Ice, Maybe? Investigating 46P/Wirtanen's Inner Coma for Icy Grains. *The Planetary Science Journal 4*(5), 85, `https://doi.org/10.3847/PSJ/accc28`

[14] Slivan, S. M., and 19 others including **Springmann, A.** 2023. Spin vectors in the Koronis family: IV. Completing the sample of its largest members after 35 years of study. *Icarus* **394**, 115397, `https://doi.org/10.1016/j.icarus.2022.115397`

[13] **Springmann, A.**, W. M. Harris, E. L. Ryan, C. Lejoly, E. S. Howell, B. Mueller, N. H. Samarasinha, L. M. Woodney, and J. K. Steckloff 2022. Repeating Gas Ejection Events from Comet 45P/Honda-Mrkos-Pajdušáková. *The Planetary Science Journal 3*(1), 15, `https://doi.org/10.3847/PSJ/ac3e66`

[12] Lejoly, C., W. Harris, N. Samarasinha, and 24 others including **Springmann, A.** 2022. Radial Distribution of the Dust Comae of Comets 45P/Honda-Mrkos-Pajdušáková and 46P/Wirtanen. *The Planetary Science Journal 3*(1), 17, https://doi.org/10.3847/PSJ/ac4501

[11] Chichura, P. M., and 143 others including **Springmann, A.** 2022. Asteroid Measurements at Millimeter Wavelengths with the South Pole Telescope. *The Astrophysical Journal 936*(2), 173, https://doi.org/10.3847/1538--4357/ac89ec

[10] Buie, M. W., B. Keeney, R. Strauss, and 76 others including **Springmann, A.** 2021. Size and Shape of (11351) Leucus from Five Occultations. *The Planetary Science Journal 2*(5), 202, https://doi.org/10.3847/PSJ/ac1f9b

[9] Steckloff, J. K., J. Debes, A. Steele, and 4 others including **Springmann, A.** 2021. How Sublimation Delays the Onset of Dusty Debris Disk Formation around White Dwarf Stars. *ApJ Letters 913*(2), L31, https://doi.org/10.3847/2041--8213/abfd39

[8] Kareta, T., J. Andrews, J. Noonan, and 10 others including **Springmann, A.** 2020. Carbon Chain Depletion of 2I/Borisov. *ApJ Letters 889*(2), L38

[7] **Springmann, A.**, D. S. Lauretta, B. Klaue, Y. S. Goreva, J. D. Blum, A. Andronikov, and J. K. Steckloff 2019. Thermal alteration of labile elements in carbonaceous chondrites. *Icarus* **324**, 104 – 119, https://doi.org/10.1016/j.icarus.2018.12.022

[6] Noonan, J., V. Reddy, W. Harris, and 22 others including **Springmann, A.** 2019. Search for the H Chondrite Parent Body among the Three Largest S-type Asteroids: (3) Juno, (7) Iris, and (25) Phocaea. *The Astronomical Journal 158*(5), 213

[5] Reddy, V., M. Kelley, D. Farnocchia, and 66 others including **Springmann, A.** 2019. Near-Earth asteroid 2012 TC4 campaign: Results from global planetary defense exercise. *Icarus*

[4] Shepard, M., B. Timerson, D. Scheeres, and 8 others including **Springmann, A.** 2018. A revised shape model of asteroid (216) Kleopatra. *Icarus* **311**, 197–209

[3] Crowell, J. L., E. S. Howell, C. Magri, and 7 others including **Springmann, A.** 2017. Radar and Lightcurve Shape Model of Near-Earth Asteroid (1627) Ivar. *Icarus* **291**, 254–267

[2] Shepard, M. K., P. Taylor, M. Nolan, and 13 others including **Springmann, A.** 2015. A radar survey of M- and X-class asteroids. III. Insights into their composition, hydration state, & structure. *Icarus* **245**, 38–55

[1] Person, M., E. Dunham, A. Bosh, and 44 others including **Springmann, A.** 2013. The 2011 June 23 Stellar Occultation by Pluto: Airborne and Ground Observations. *The Astronomical Journal* **146**, 83

Selected Leadership and Service

AAS Division for Planetary Sciences nominating committee chair 2020–2023

- Identified and nominated potential candidates from professional society membership to run for vice chair and committee positions for professional society
- Produced diverse candidate slates balancing seniority in field, country of origin, research specialty, institutional affiliation, and demographics

Lunar & Small Bodies Graduate Conference co-organizer 2016–2021

- Organized one-day graduate student conference for 30+ attendees before annual NASA Exploration Science Forum meeting, both in-person at NASA Ames and online over Zoom and Gather.town
- Created conference talk schedule and selected session chairs; invited external speakers

UA Dept. of Planetary Sciences graduate alumni chair 2015–2020

- Communicated department updates and events to alumni via email and social media
- Organized in-person and virtual alumni/student meetups
- Fundraised from alumni for annual graduate student-hosted events

UA Dept. of Planetary Sciences colloquium graduate organizer 2015–2019

- Created speaker schedule for weekly department colloquia reflecting a broad diversity of planetary scientists regarding research specialties and backgrounds
- Organized graduate students to attend lunch with weekly speakers

Selected Technical Skills

- **Python**, scikit-learn, Pandas, Numpy, Scipy, git/GitHub, SQL
- Dropbox, Box, OneDrive, Google Drive, UNIX/macOS system administration
- Microsoft Office, Google Docs/Google Sheets, LaTeX, Overleaf, Bibdesk, Zotero, Asana
- Adobe Creative suite, Slack, Discord, Microsoft Teams, Zoom, Google Meet, Webex

Selected Conference Proceedings and Abstracts

- **Springmann, A.** et al. Ejecta particle detection and trajectory linking in laser sheet impact experiments under vacuum and reduced gravity. *AAS/DPS Meeting #56*, Boise, ID, 2024.
- **Springmann, A.** et al. Development of the Grain Velocimetry and Tomography Analyzer System (GraVeTAS) for Measuring Impact Ejecta Properties. *Asteroids, Comets, Meteors Conference*, Flagstaff, AZ, 2024.
- **Springmann, A.** et al. A repeating CN jet feature from 45P/Honda-Mrkos-Pajdušáková. *AAS/DPS Meeting #51* online, 2020.
- **Springmann, A.** et al. Observations of a CN outburst from 45P/Honda-Mrkos-Pajdušáková. *EPSC-DPS Joint Meeting*, Geneva, Switzerland, 2019.
- **Springmann, A.**, and 10 others. Modeling the large-grain ($>$ 2 cm) coma of comet 45P/Honda-Mrkos-Pajdušáková from Arecibo Observatory radar observations. *AAS/DPS Meeting, #50*, Knoxville, TN, 2018.
- **Springmann, A.**, and 6 others. 1994 CJ_1: a binary NHATS/PHA with equal size components. *Joint ISAS-LPL Workshop on Planetary Science Enabled by Epsilon Class Missions*, Tucson, AZ, 2017.
- **Springmann, A.**, and 11 others. Particle sizes in the coma of Comet 45P/Honda-Mrkos-Pajdušáková from Arecibo radar observations. *AAS/DPS Meeting, #49*, Provo, UT, 2017.

- **Springmann, A.** and D.S. Lauretta. Thermal History of Near-Earth Asteroids: Implications for OSIRIS-REx Asteroid Sample Return. *AAS/DPS Meeting, #48*, Pasadena, CA, 2016.
- **Springmann, A.**, and 10 others. Radar-Derived Shape Model of Near-Earth Binary Asteroid System (285263) 1998 QE2. *AAS/DPS Meeting, #46*, Tucson, AZ, 2014.

Observing Experience

- Gordon 305-m telescope/planetary radar system — Arecibo Observatory, Puerto Rico
- Magellan 6.5-m Baade telescope — Las Campanas Observatory, Chile
- NASA 3.0-m Infrared Telescope Facility (remote observing) — Mauna Kea, HI
- Bok 2.28-m telescope — Kitt Peak National Observatory, AZ
- Kuiper 1.54-m telescope — Catalina Station, Mount Bigelow, AZ
- Kagoshima University 1.0-m telescope — Kagoshima University Observatory, Japan
- Nickel 1.0-m telescope — Lick Observatory, Mount Hamilton, CA

Field Studies

- Death Valley and Amargosa Basin, Geological Society of America Foundation — 2019
- Petrified Forest & Canyon de Chelly (UA Dept. of Planetary Sciences) — 2018
- Mojave Desert and Death Valley (Dept. of Planetary Sciences) — 2018
- Central Florida karst and shoreline processes (Dept. of Planetary Sciences) — 2016
- Salton Sea and Colorado Desert (Dept. of Planetary Sciences) — 2015
- Northern Arizona Greeley 'Holey Tour' (Dept. of Planetary Sciences) — 2015

Outreach & Teaching Experience

Extensive background in public presentations to diverse groups ranging from middle school to members of the public; interviewed for media pieces in print, web, video, and podcast formats. Award-winning instructor with 6+ years of both domestic and international, classroom and experiential teaching and tutoring experience to university and high school students in observational astronomy, planetary science, physics, mathematics, computer science, organizational skills, and sailing.