

# CATHERINE M. ELDER

Jet Propulsion Laboratory  
M/S 183-301, 4800 Oak Grove Drive  
Pasadena, CA 91109  
(818) 354-9381 ◊ Catherine.Elder@jpl.nasa.gov

## EDUCATION

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- 2015      **Ph.D. Planetary Sciences (Minor in Geosciences)**  
University of Arizona  
Dissertation Title: *The Effects of Melt on Impact Craters on Icy Satellites and on the Dynamics of Io's Interior*
- 2008      **B.A. Astronomy**  
Cornell University

## RESEARCH EXPERIENCE

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- 2018–Present    **Research Scientist**  
Planetary Interiors and Geophysics Group  
Jet Propulsion Laboratory
- 2015–2018      **Postdoctoral Scholar**  
Geophysics & Planetary Geosciences Group  
Jet Propulsion Laboratory
- 2009–2015      **Graduate Research Associate**  
Department of Planetary Sciences/Lunar and Planetary Laboratory  
University of Arizona
- Summer  
2006            **Student Undergraduate Internship in Astrobiology (SUIA)**  
NASA Goddard Space Flight Center
- 2005–2008      **Undergraduate Research Assistant**  
Department of Astronomy  
Cornell University

## MISSION EXPERIENCE

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### Lunar Reconnaissance Orbiter (LRO)

- Diviner Lunar Radiometer Experiment Co-I (2018–Present), Postdoc (2015–2018)
- LRO Extended Science Mission 5 proposal theme lead for Regolith and Impacts section (2021-2022)
- Targeting and analyzing nighttime temperature observations to derive thermophysical properties and better understand the material properties of the lunar surface

### **Canadian Lunar Rover Mission**

- Lunar Advanced Filter Observing Radiometer for Geologic Exploration (LAFORGE) Co-I (2021-Present)

### **Europa Clipper**

- Investigation Scientist for the Europa Imaging System (EIS) (2019–Present)

### **Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer (OSIRIS-REx)**

- Participating Scientist (2017–2020)
- Member of the Thermal Analysis and Regolith Development Working Groups

### **Intrepid Pre-Decadal Mission Concept Study**

- JPL science liaison (2019–2020)

### **Moon Diver (NASA Discovery proposal)**

- Deputy Camera Scientist and regolith theme team member (2018–2019)
- Assisted in the development of the science traceability matrix, acted as a local science resource to the JPL engineering team, participated in the costing of the context cameras, and contributed to preliminary landing site safety assessment.

### **JPL Planetary Science Summer School (2016)**

- Principal Investigator
- Developed a mission concept for a Uranus orbiter.

## **HONORS AND AWARDS**

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2018	JPL Voyager Award
2016	JPL Postdoc Research Day Best Planetary Science and Life Detection Poster
2014	American Geophysical Union (AGU) Outstanding Student Paper Award
2014	Uwingu Student Travel Grant
2014	Hartmann Student Travel Award
2013	Lunar and Planetary Institute (LPI)'s Career Development Award
2013	Lunar and Planetary Laboratory (LPL)'s Shandel Travel Award
2012, 2013	University of Arizona Graduate Student Council Travel Grant
2007	NSF Research Experience for Undergraduates
2004–2006	Cornell University Dean's List

## INVITED TALKS

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2022	University of California, Santa Cruz Other Worlds Laboratory Planetary Lunch Seminar
2021	Geological Society of America Annual Meeting
2019	Geological Society of America Annual Meeting
2018	Geological Society of America Annual Meeting
2016	American Geophysical Union Fall Meeting
2015	University of California Los Angeles iPLEX seminar
2015	Southwest Research Institute Colloquium

## TEACHING AND ADVISING EXPERIENCE

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2017–Present    **Research advisor**  
*Jet Propulsion Laboratory*

Postdocs:

2022–Present    Austin Green  
2020–Present    Benjamin Byron

Undergraduates:

2020-2022      Ashley Rincon (Palomar Community College 2021, now an undergrad at UC Berkeley)  
Summer 2021    Emma Cooper (Pitzer College 2022, now at Sandia National Laboratories)  
Summers        Benjamin Douglass (University of Colorado, Boulder 2022, now a graduate student at Arizona State University)  
2018–2021      Ferdaws Rashid (Glendale Community College)  
Fall 2019       Jose Martinez-Camacho (Cal Poly Pomona 2019, now a graduate student at Southern Methodist University)  
2017–2019      Sophie Taylor (UCLA 2020)  
Summer 2018    James Haber, co-advised with Paul Hayne (Cornell University 2018, now a graduate student at Purdue)

High school:

2019–2021      Sam Orientale (Briarcliff High School 2021, now an undergrad at Dartmouth)

2008–2014      **Graduate Teaching Associate**

(9 semesters)    *University of Arizona*

Planet Earth: Evolution of a Habitable World (Spring 2013, Fall 2013)  
Golden Age of Planetary Exploration (Spring 2012)  
Astrobiology: A Planetary Perspective (Fall 2011, Fall 2012, Fall 2014)  
The Universe and Humanity: Origin and Destiny (Fall 2008, Spring 2009, Spring 2014)

- 2009            **Relevant Coursework**  
*University of Arizona*  
 Student in ‘Teaching College-Level Astronomy and Planetary Science’.  
 Taught by: Gina Brissenden and Edward Prather.
- 2006–2008    **Physics Tutor**  
*Cornell University*  
 Held office hours in the tutoring center, which was open to all students  
 in three different levels of introductory physics classes.

## RESEARCH GRANTS

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- 2021–2023    **Co-I, PI:** Matt Kenyon, “Next-generation cold object radiometer”,  
 NASA Maturation of Instruments for Solar System Exploration.
- 2019–2022    **PI,** “The Lunar Rock Size-Frequency Distribution and Implications for  
 Rock Breakdown”, NASA Lunar Data Analysis Program.
- 2019–2022    **PI,** “Mapping the Thickness of the Lunar Regolith Using a New Class  
 of Young Craters”, NASA Lunar Data Analysis Program.
- 2017–2020    **PI,** “Boulders on Bennu: Modeling Thermal Emission from Boul-  
 ders for Yarkovsky Effect and Thermal Inertia Investigations”, NASA  
 OSIRIS-REx Participating Scientist Program.
- 2017–2020    **Science-PI,** PI: Michael Bland, “Silicate Volcanism and the Habitabil-  
 ity of Europa’s Seafloor”, NASA Habitable Worlds.
- 2010–2013    Graduate student, Advisor/PI: Adam Showman, “The Coupled Orbital  
 and Thermal Evolution of Io”, NASA Earth and Space Science graduate  
 student Fellowship (NESSF).

## PROFESSIONAL SERVICE

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NASA Review Panel Group Chief, Panelist, External Reviewer, and/or Executive Secretary for the following programs: Planetary Data Archiving, Restoration, and Tools; Lunar Data Analysis Program; Mars Data Analysis Program; Discovery Data Analysis Program; New Frontiers Data Analysis Program; Solar System Workings; NASA Earth and Space Science Fellowship; PICASSO

Journal referee: *Geophysical Research Letters*, *Icarus*, *Journal of Geophysical Research – Planets*, *IEEE Transactions on Geoscience and Remote Sensing*

Roadmap to Ocean Worlds (ROW) team member

Judge of presentations: American Geophysical Union, Outstanding Student Paper Awards, Lunar and Planetary Science Conference, Dwornik Award, JPL postdoc Research Day

Poster Session

University of Arizona Graduate Student Council Travel Grant Reviewer

Graduate Student Representative to the Department of Planetary Sciences Faculty, 2011–2012

Co-Organizer of the Lunar and Planetary Laboratory Conference, 2011, 2012

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## PROFESSIONAL MEMBERSHIPS

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Geologic Society of America

American Astronomical Society, Division of Planetary Sciences

American Geophysical Union

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## OUTREACH

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2018	Explore JPL Europa exhibit volunteer
2018	Lunar Reconnaissance Orbiter Reddit ‘Ask Me Anything’
2014	Science Fair judge at Fruchthendler Elementary School, Tucson, AZ
2013, 2014	Volunteer at the ‘Science City’ section of the Tucson Festival of Books
2012	Volunteer at the Arizona Science and Astronomy Expo
Summer 2003	Weekly volunteer at the Boston Museum of Science

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## PEER-REVIEWED PUBLICATIONS

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(\*Postdoc supervised, Student supervised)

\*Byron, B. D., **Elder, C. M.**, Williams, J. P., Ghent, R. R., Gallinger, C. L., Hayne, P. O., and Paige, D. A. (2022). Thermophysical Properties of Lunar Irregular Mare Patches From LRO Diviner Radiometer Data. *Journal of Geophysical Research: Planets*, 127(7), e2022JE007214. doi:10.1029/2022JE007214

Beddingfield, C. B., Leonard, E., Cartwright, R. J., **Elder, C.**, and Nordheim, T. A. (2022). High Heat Flux near Miranda’s Inverness Corona Consistent with a Geologically Recent Heating Event. *The Planetary Science Journal*, 3(7), 174. doi:10.3847/PSJ/ac7be5

Williams, J.-P., A. V. Pathare, E. S. Costello, C. L. Gallinger, P. O. Hayne, R. R. Ghent, D. A. Paige, M. A. Siegler, P. S. Russell, **C. M. Elder** (2022) The Effects of Terrain Properties upon the Small Crater Population Distribution at Giordano Bruno: Implications for Lunar Chronology. *Journal of Geophysical Research - Planets*, 127(5): e2021JE007131. doi:10.1029/2021JE007131

Bland, M.T. and **Elder, C.M.** (2022) Silicate Volcanism on Europa’s Seafloor and Implications for Habitability. *Geophysical Research Letters*, 49(5), p.e2021GL096939.

Cartwright, R.J., Nordheim, T.A., DeColibus, D.R., Grundy, W.M., Holler, B.J., Beddingfield, C.B., Sori, M.M., Lucas, M.P., **Elder, C.M.**, Regoli, L.H., Cruikshank, D.P., Emery, J. P., Leonard, E. J., Cochrane, C. J. (2022) A CO<sub>2</sub> Cycle on Ariel? Radiolytic Production and Migration to Low-latitude Cold Traps. *The Planetary Science Journal*, 3(1), p.8.

Trang, D., T. Tonkham, J. Filiberto, S. Li, M. Lemelin, and **C. M. Elder** (2022) Eruption characteristics of lunar localized pyroclastic deposits as evidenced by remotely sensed water, mineralogy, and regolith. *Icarus* 375, 114837.

Leonard, E.J., **Elder, C.**, Nordheim, T.A., Cartwright, R., Patthoff, D.A., Beddingfield, C., Cochrane, C., Brooks, S., Tiscareno, M., Strange, N. and Balint, T. (2021) UMaMI: A New Frontiers-style Mission Concept to Explore the Uranian System. *The Planetary Science Journal* 2, no. 5: 174.

Cartwright, Richard J., Beddingfield, Chloe B., Nordheim, Tom A., **Elder, Catherine M.**, Castillo-Rogez, Julie C., Neveu, Marc, Bramson, Ali M., Sori, Michael M., Buratti, Bonnie J., Pappalardo, Robert T., Roser, Joseph E., Cohen, Ian J., Leonard, Erin J., Ermakov, Anton I., Showalter, Mark R., Grundy, William M., Turtle, Elizabeth P., Hofstadter, Mark D. (2021) The science case for spacecraft exploration of the Uranian satellites: Candidate ocean worlds in an ice giant system. *Planetary Science Journal*, 2:120.

Burke, Keara N., DellaGiustina, Daniella N., Bennett, Carina A., Walsh, Kevin J., Pajola, Maurizio, Bierhaus, Edward B., Nolan, Michael C., Boynton, William V., Brodbeck, Juliette I., Connolly, Harold C., Jr., Prasanna Deshapriya, Jasinghege D., Dworkin, Jason P., **Elder, Catherine M.**, Golish, Dathon R., Hoover, Rachael H., Jawin, Erica R., McCoy, Timothy J., Michel, Patrick, Molaro, Jamie L., Nolau, Jennifer O., Padilla, Jacob, Rizk, Bashar, Robbins, Stuart J., Sahr, Eric M., Smith, Peter H., Stewart, Stephanie J., Susorney, Hannah C.M., Enos, Heather L., Laurretta, Dante S. (2021) Particle Size-Frequency Distributions of the OSIRIS-REx Candidate Sample Sites on Asteroid (101955) Bennu. *Remote Sens.* 13, 1315. <https://doi.org/10.3390/rs13071315>

B. Rozitis, A. J. Ryan, J. P. Emery, P. R. Christensen, V. E. Hamilton, A. A. Simon, D. C. Reuter, M. Al Asad, R.-L. Ballouz, J. L. Bandfield, O. S. Barnouin, C. A. Bennett, M. Bernacki, K. N. Burke, S. Cambioni, B. E. Clark, M. G. Daly, M. Delbo, D. N. DellaGiustina, **C. M. Elder**, R. D. Hanna, C. W. Haberle, E. S. Howell, D. R. Golish, E. R. Jawin, H. H. Kaplan, L. F. Lim, J. L. Molaro, D. P. Munoz, M. C. Nolan, B. Rizk, M. A. Siegler, H. C. M. Susorney, K. J. Walsh, D. S. Laurretta (2020) Asteroid (101955) Bennu's weak boulders and thermally anomalous equator. *Sci. Adv.* 6, eabc3699.

Bottke, W. F., D. Vokrouhlický, R.-L. Ballouz, O. S. Barnouin, H. C. Connolly, Jr., **C. Elder**, S. Marchi, T. J. McCoy, P. Michel, M. C. Nolan, B. Rizk, D. J. Scheeres, S. R. Schwartz, K. J. Walsh, D. S. Laurretta (2020) Interpreting the Cratering Histories of Bennu, Ryugu, and Other Spacecraft-explored Asteroids, *The Astronomical Journal* 160:14, 37pp.

**Elder, C.M.**, B. Douglass, R.R. Ghent, P.O. Hayne, J.-P. Williams, J.L. Bandfield, E. Costello, (2019) The Subsurface Coherent Rock Content of the Moon as Revealed by Cold-Spot Craters. *Journal of Geophysical Research - Planets* 124, 3373-3384.

Walsh, K. J., E. R. Jawin, R.-L. Ballouz, O. S. Barnouin, E. B. Bierhaus, H. C. Connolly, J. L. Molaro, T. J. McCoy, M. Delbo, C. M. Hartzell, M. Pajola, S. R. Schwartz, D. Trang, E. Asphaug, K. J. Becker, C. B. Beddingfield, C. A. Bennett, W. F. Bottke, K. N.

Burke, B. C. Clark, M. G. Daly, D. N. DellaGiustina, J. P. Dworkin, **C.M. Elder**, D. R. Golish, A. R. Hildebrand, R. Malhotra, J. Marshall, P. Michel, M. C. Nolan, M. E. Perry, B. Rizk, A. Ryan, S. A. Sandford, D. J. Scheeres, H. C. M. Susorney, F. Thuillet, D. S. Lauretta & The OSIRIS-REx Team (2019) Craters, boulders and regolith of (101955) Bennu indicative of an old and dynamic surface. *Nature Geoscience* 12, 242-246.

DellaGiustina, D. N., J. P. Emery, D. R. Golish, B. Rozitis, C. A. Bennett, K. N. Burke, R-L. Ballouz, K. J. Becker, P. R. Christensen, C. Y. Drouet d'Aubigny, V. E. Hamilton, D. C. Reuter, B. Rizk, A. A. Simon, E. Asphaug, J. L. Bandfield, O. S. Barnouin, M. A. Barucci, E. B. Bierhaus, R. P. Binzel, W. F. Bottke, N. E. Bowles, H. Campins, B. C. Clark, B. E. Clark, H. C. Connolly Jr., M. G. Daly, J. de Leon, M. Delbo, J. D. P. Deshapriya, **C.M. Elder**, S. Fornasier, C. W. Hergenrother, E. S. Howell, E. R. Jawin, H. H. Kaplan, T. R. Kareta, L. Le Corre, J.-Y. Li, J. Licandro, L. F. Lim, P. Michel, J. Molaro, M. C. Nolan, M. Pajola, M. Popescu, J. L. Rizos Garcia, A. Ryan, S. R. Schwartz, N. Shultz, M. A. Siegler, P. H. Smith, E. Tatsumi, C. A. Thomas, K. J. Walsh, C. W. V. Wolner, X.-D. Zou, D. S. Lauretta & The OSIRIS-REx Team (2019) Properties of rubble-pile asteroid (101955) Bennu from OSIRIS-REx imaging and thermal analysis. *Nature Astronomy* 3, 341-351.

**Elder, C.M.**, A. M. Bramson, L. W. Blum, H. T. Chilton, A. Chopra, C. Chu, A. Das, A. Davis, A. Delgado, J. Fulton, L. Jozwiak, A. Khayat, M. Landis, J. L. Molaro, M. Slipski, S. Valencia, J. Watkins, C. Young, C. J. Budney, K. L. Mitchell (2018) OCEANUS: A high science return Uranus orbiter with a low-cost instrument suite. *Acta Astronautica* 148, 1-11.

Hayne, P. O., J. L. Bandfield, M. A. Siegler, A. R. Vasavada, R. R. Ghent, J.-P. Williams, B. T. Greenhagen, O. Aharonson, **C.M. Elder**, P. G. Lucey, D. A. Paige (2017) Global Regolith Properties of the Moon from the Diviner Lunar Radiometer Experiment. *Journal of Geophysical Research - Planets* 122, 2371-2400.

**Elder, C.M.**, P. O. Hayne, J. L. Bandfield, R. R. Ghent, J.-P. Williams, K. L. Donaldson Hanna, D. A. Paige (2017) Young Lunar Volcanic Features: Thermophysical Properties and Formation. *Icarus* 290, 224-237.

**Elder, C.M.**, V. J. Bray, H. J. Melosh (2012) The Theoretical Plausibility of Central Pit Crater Formation Via Melt Drainage. *Icarus* 221, 831-843.

## CONFERENCE PAPERS

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Nernas, I. A., L. Kerber, A. Parness, R. Kornfeld, G. Sellar, P. McGarey, T. Brown, M. Paton, M. Smith, A. Johnson, M. Heverly, J. Sawoniewicz, C. Yahnker, T. Pailevanian, E. Sunada, B. Gaume, A. Curtis, **C. Elder**, K. Uckert, M. Vaquero, Y. Cheng, B. Denevi, L. Jozwiak, A. Stickle, J. Whitten, L. Keszthelyi, J. Haruyama, R. Wagner, P. Hayne, T. Horvath, J. Head, J. Hopkins, J. Ricks, E. Boster (2019) Moon Diver: A Discovery Mission Concept for Understanding the History of Secondary Crusts through the Exploration of a Lunar Mare Pit. *IEEE Aerospace Conference* pp. 1-23. 10.1109/AERO.2019.8741788

## CONFERENCE PRESENTATIONS

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(\*Postdoc supervised, Student supervised)

2022

\*Byron, B. D., **C. M. Elder**, T. D. Glotch, and P. O. Hayne (2022) LRO Diviner Observations of Lunar Red Spots: Implications for Thermophysical Properties. In AGU Fall Meeting.

**Elder, C. M.** (2022) Boulders on Bennu: Exploring the Structure of Low Thermal Inertia Rock through Thermal Modeling. In AGU Fall Meeting.

Leonard, E. J., C. B. Beddingfield, **C. M. Elder**, T. A. Nordheim (2022) The Geologic History of Miranda's Inverness Corona. In AGU Fall Meeting.

Kleinboehl, A., M. E. Kenyon, B. H. Eom, W. R. Johnson, D. Wenkert, and **C. M. Elder** (2022) COBRA—A Compact Next-Generation Radiometer for Determining Atmospheric Structure and Radiative Balance of Ice Giants, and for Thermophysical Measurements of Ice Giant Satellites. In AGU Fall Meeting.

Wilcoski, A. X., P.O. Hayne, **C.M. Elder** (2022) Volatile Stability Modeling of Lunar Pits and Caves . Lunar Polar Volatiles Conference, abstract # 5037.

Leonard, E. J., C. B. Beddingfield, **C. M. Elder**, T. A. Nordheim (2022) The Geologic History of Miranda's Inverness Corona. The Geological Society of America Connects 2022, No. 117-9. <https://doi.org/10.1130/abs/2022AM-382443>

\*Byron, B. D., **C. M. Elder**, T. D. Glotch, and P. O. Hayne (2022) The Thermophysical Properties of Lunar Red Spots from LRO Diviner Lunar Radiometer Experiment Observations. NASA Exploration Science Forum.

Wilcoski, A. X., P.O. Hayne, **C.M. Elder** (2022) Thermal Modeling and Volatile Stability within Lunar Pits and Caves. NASA Exploration Science Forum.

**Elder, C. M.**, Haber, J., Hayne, P. O., Ghent, R. R., Williams, J. P., and Siegler, M. A. (2022) Inferring Lunar Mare Basalt Material Properties from Surface Rock Abundance. Lunar and Planetary Science Conference, #53, abstract #2360.

\*Byron, B. D., **C. M. Elder**, T. D. Glotch, and P. O. Hayne (2022) Low-Thermal Inertia Material at Lunar Red Spots: Observations from the LRO Diviner Lunar Radiometer Experiment. Lunar and Planetary Science Conference, #53, abstract #2305.

Rincon, A. E., **Elder, C. M.**, and Douglass, B. (2022) The Relationship Between Regolith Thickness and Time as Inferred from Cold-Spot Craters. Lunar and Planetary Science Conference, #53, abstract #2688.

Cooper, E. C., **Elder, C. M.**, and Kenyon, M. E. (2022) Modeling Surface Temperatures on the Uranian Satellites. Lunar and Planetary Science Conference, #53, abstract #2319.

Wilcoski, A. X., Hayne, P. O., and **Elder, C. M.** (2022) Lunar Pits and Caves: Thermal Environment and Volatile-Trapping Potential. Lunar and Planetary Science Conference,



#53, abstract #2598.

Leonard, E. J., Beddingfield, **C.**, **Elder, C. M.**, Nordheim, T. A., Cartwright, R. J., Cochrane, C., and Regoli, L. (2022) The Geology of Miranda's Inverness Corona. Lunar and Planetary Science Conference, #53, abstract #503.

Trang, D., Tonkham, T., Filiberto, J., Li, S., Lemelin, M., and **Elder, C. M.** (2022) Eruption Characteristics of Lunar Localized Pyroclastic Deposits Based on Water Content, Mineralogy, and Regolith Properties. Lunar and Planetary Science Conference, #53, abstract #2315.

Petro, N. E., Keller, J. W., Banks, M., **Elder, C. M.**, Stickle, A. M., and Stopar, J. (2022) The Lunar Reconnaissance Orbiter Mission as a New Era of Lunar Exploration Begins, Plans for Extended Mission 5. Lunar and Planetary Science Conference, #53, abstract #2326.

### 2021

\*Byron, B. D., **C. M. Elder**, J. P. Williams, and R. R. Ghent (2021) Thermophysical Properties of Lunar Irregular Mare Patches. In AGU Fall Meeting.

Wilcoski, A., P. O. Hayne, **C. M. Elder**, and T. Horvath (2021) Thermal Environments and Volatile-trapping Potential of Lunar Pits and Caves. In AGU Fall Meeting.

**Elder C. M.**, Ehlmann, B. L., Donaldson Hanna, K. L., \*Byron, B. D. (2021) Ina: Recent Lunar Volcanism? Lunar Surface Science Workshop XII: Landing Sites and Capabilities for Future CLPS Deliveries. Abstract #8012.

\*Byron, B., **C. M. Elder**, J.-P. Williams, R. Ghent (2021) Thermophysical Properties of Lunar Irregular Mare Patches. The Geological Society of America Connects 2021, No. 108-6, doi: 10.1130/abs/2021AM-370832 .

**Elder, C. M.** The Lunar Rock Size Frequency Distribution Derived from Thermal Infrared Observations. The Geological Society of America Connects 2021, No. 108-6, doi: 10.1130/abs/2021AM-370792 (invited).

Bland, M., and **C. Elder** (2021) A habitable seafloor environment on Europa enabled by the propagation of magmatic dikes through the crust. In AAS/Division for Planetary Sciences Meeting Abstracts, Vol. 53, No. 7, pp. 109-02.

Ahrens, C., **Elder, C.**, Ghent, R., and Paige, D. (2021) The Rockiness of Lunar Tectonic Features. In AAS/Division for Planetary Sciences Meeting Abstracts, Vol. 53, No. 7, pp. 306-01.

Cartwright, R., Beddingfield, C., Nordheim, T., **Elder, C.**, Castillo-Rogez, J., Neveu, M., Bramson, A., Sori, M., Buratti, B., Pappalardo, R., Roser, J., Cohen, I., Leonard, E., Ermakov, A., Showalter, M., Grundy, W., Turtle, E., and Hofstadter, M. (2021). The moons of Uranus: Five candidate ocean worlds and a bevy of small satellites in an ice giant system. Europlanet Science Congress, No. EPSC2021-141.

Petro, N. E., **Elder, C.**, Stickle, A., Stopar, J., Banks, M., and Keller, J. (2021). The

Lunar Reconnaissance Orbiter in 2021 and Beyond: Status and Future Plans. Lunar Exploration Analysis Group Meeting, Abstract #5030.

Stickle, A. M., Petro, N. E., **Elder, C. M.**, Stopar, J. D., Banks, M. E., and Keller, J. W. (2021). LRO Investigations of Volatiles Processes and the Space Environment of the Moon. Lunar Exploration Analysis Group Meeting, Abstract #5037.

Banks, M. E., **Elder, C. M.**, Keller, J. W., Petro, N. E., Stickle, A. M., and Stopar, J. D. (2021). LRO Support for Lunar Surface Exploration. Lunar Exploration Analysis Group Meeting, Abstract #5051.

**Elder, C. M.**, Petro, N. E., Keller, J., Stickle, A. M., Stopar, J., and Banks, M. (2021). LRO Investigations of Regolith and Impacts. Lunar Exploration Analysis Group Meeting, Abstract #5046.

Stopar, J. D., Banks, M. E., **Elder, C. M.**, Keller, J. W., Petro, N. E., Stickle, A. M., and LRO Team. (2021). New LRO Investigations of Volcanism, Tectonism, and the Lunar Interior. Lunar Exploration Analysis Group Meeting, Abstract #5032.

**Elder C. M.**, B. Douglass, R.R. Ghent, P.O. Hayne, J.-P. Williams, E. Costello (2021) The Subsurface Coherent Rock Content of the Moon as Revealed by Cold-Spot Craters. Lunar and Planetary Science Conference, #52, abstract #1725.

Douglass, B. and **C.M. Elder** (2021) Constraining the Thickness of the Lunar Regolith Using Cold-Spot Craters. Lunar and Planetary Science Conference, #52, abstract #2668.

Trang, D., T. Tonkham, S. Li, L. M. Jozwiak, and **C. M. Elder** (2021) The Relationship Between Water Abundance and the Physical and Compositional Properties of Lunar Localized Pyroclastic Deposits. Lunar and Planetary Science Conference, #52, abstract #1698.

**Elder, C.M.**, T. Nordheim, D.A. Patthoff, E. Leonard, R. Cartwright, C. Cochrane, C. Paranicas, M. Tiscareno, A. Masters, D. Hemingway, M. Sori, H. Cao, R. Pappalardo, B. Buratti, I. De Pater, W. Grundy, M. Showalter, B. Kurth, I. Jun, J. Moses, K. Aplin, J. Casani (2021) Uranus Magnetosphere and Moons Investigator (UMaMI). Lunar and Planetary Science Conference, #52, abstract #2289.

Cochrane, C.J., T.A.Nordheim, S.D. Vance, M.Styczinski, K.Soderlund, **C. M. Elder**, E. J. Leonard, R. J. Cartwright, C. B. Beddingfield, L.H. Regoli, N. Gomez-Perez (2021) In Search of Subsurface Oceans within the Moons of Uranus. Lunar and Planetary Science Conference, #52, abstract #1559.

Cartwright, R. J. , T. A. Nordheim, W. M. Grundy, D. DeColibus, M. M. Sori, C. B. Beddingfield, E. J. Leonard, **C. M. Elder**, C. J. Cochrane, L. H. Regoli, D. H. Atkinson, B. J. Holler, D. P. Cruikshank, J. P. Emery (2021) Latitudinal Distribution of CO<sub>2</sub> Ice on Ariel Consistent with Seasonal Migration. Lunar and Planetary Science Conference, #52, abstract #1298.

Leonard, E. J., C. Beddingfield, **C. M. Elder**, T. A. Nordheim, R. J. Cartwright, C.Cochrane, and L.Regoli (2021) Investigating the Formation of Miranda's Inverness

Corona. Lunar and Planetary Science Conference, #52, abstract #2296.

Beddingfield, C. B., E. J. Leonard, **C. M. Elder**, T. A. Nordheim, R. J. Cartwright, C. Cochran, L. Regoli, and D. Atkinson (2021) A Digital Elevation Model of Miranda's Youngest Corona, Inverness. Lunar and Planetary Science Conference, #52, abstract #2543.

Scully, J. E. C., Cerretti, A. Viswanathan, J. K. Steckloff, C. Richey, A. Probst, G. Poh, M. Melwani Daswani, C. L. McLeod, X. Mao, R. Lillis, N. Kumari, H. Kraus, T. Hoogenboom, H. Hay, T. A. Goudge, E. C. Fayolle, **C. M. Elder**, S. Diniega, S. Daftry, P. K. Byrne, S. M. Brooks, J. G. Blank, P. Becerra, S. Bandyopadhyay (2021) Foreign Nationals Employed and Studying in Planetary Research in the United States, and Recommendations for Supporting this Group. Lunar and Planetary Science Conference, #52, abstract #1493.

S. D. Vance, **C. Elder**, A. Hofmann, S. Howell, M. Milazzo, R. T. Pappalardo, J.L.Noviello, D. A. Patthoff, Z. Khan, J. Rathbun, J. Vertesi and co-signers of the associated 2023 Planetary Science Decadal White Paper (2021) Addressing Mental Health in Planetary Science. Lunar and Planetary Science Conference, #52, abstract #2552.

### 2020

Rozitis, B., AJ Ryan, JP Emery, PR Christensen, VE Hamilton, AA Simon, DC Reuter, M Al Asad, RL Ballouz, JL Bandfield, OS Barnouin, CA Bennett, M Bernacki, KN Burke, S Cambioni, BE Clark, MG Daly, M Delbo, DN DellaGiustina, **CM Elder**, RD Hanna, CW Haberle, ES Howell, D Golish, ER Jawin, HH Kaplan, LF Lim, JL Molaro, D Pino Munoz, MC Nolan, B Rizk, MA Siegler, HCM Susorney, KJ Walsh, DS Lauretta (2020) Thermophysical Properties of Bennu and the OSIRIS-REx Sample Sites. AAS Division for Planetary Sciences Meeting 52, Abstract #400.06.

Rathbun, J., **C Elder**, J Keane, C Richey, R Watkins, N Zellner (2021) Enabling the Planetary Workforce to Do the Best Science by Funding Work That is a Service to the Profession. AAS Division for Planetary Sciences Meeting 52, Abstract #502.03.

**Elder C. M.**, B. Douglass, R.R. Ghent, P.O. Hayne, J.-P. Williams, E. Costello (2020) The Subsurface Coherent Rock Content of the Moon as Revealed by Cold-Spot Craters. Lunar and Planetary Science Conference, #51, abstract #1167.\*

Pajola, M., B.Rizk, E.R. Jawin, K.J.Walsh, D.N. DellaGiustina, H.Campins, J.L. Molaro, M. Delbo, T.J. McCoy, S.R. Schwartz, R. Ballouz, G. Poggiali, J.R. Brucato, E. Dotto, E.B. Bierhaus, K. Burke, C.A. Bennett, M.G. Daly, **C. Elder**, P. Michel, O.S. Barnouin, M.C. Nolan, and D.S. Lauretta (2020) Surface Density and Size Distribution of Clasts on (101955) Bennu's Boulders: Exposed Clasts or Fallback Material? Lunar and Planetary Science Conference, #51, abstract #1400.\*

Kerber, L., B.W. Denevi, I. Nenas, L. Keszthelyi, J.W. Head, C. Pieters, L. Wilson, J. Haruyama, R.V. Wagner, P.O. Hayne, J.W. Ashley, J.L. Whitten, A.M. Stickle, A. Parness, K. Donaldson Hanna, R.C. Anderson, D.M. Needham, P. Isaacson, L. Jozwiak, R. Klima, C. Jackson, T.C. Prissel, C.W. Hamilton, K. Uckert, **C. Elder**, and A. Colaprete

(2020) Moon Diver: Journey into the Ancient Lavas of the Moon. Lunar and Planetary Science Conference, #51, abstract #1857.\*

Diniega, S., Julie Castillo-Rogez, Ingrid Daubar, **Catherine Elder**, Robert Pappalardo, Christina Richey, Jennifer Scully, Mickey Villarreal (2020) Why and How to Write a Useful “Code of Conduct” for Planetary Conferences and Mission Teams. Lunar and Planetary Science Conference, #51, abstract #2482.\*

**Elder, C.M.**, T. Nordheim, D.A. Patthoff, E. Leonard, R. Cartwright, C. Cochrane, C. Paranicas, M. Tiscareno, A. Masters, D. Hemingway, M. Sori, H. Cao, R. Pappalardo, B. Buratti, I. De Pater, W. Grundy, M. Showalter, B. Kurth, I. Jun, J. Moses, K. Aplin, J. Casani (2020) Uranus Magnetosphere and Moons Investigator (UMaMI). Lunar and Planetary Science Conference, #51, abstract #2277.\*

Roberts, J.H. A.M. Rymer, M.L. Cable, F. Nimmo, C.S. Paty, M.T. Bland, **C.M. Elder**, H. Korth, T.B. McCord, W.B. McKinnon, R.T. Pappalardo, C.A. Raymond, L. Roth, J. Saur, D.M. Schroeder, G. Steinbrugge, K.M. Soderlund, G. Tobie, S.D. Vance, D.A. Young, D.A. Senske, and the Europa Clipper Interior Thematic Working Group (2020) Integrated Europa Interior Science with Europa Clipper. Lunar and Planetary Science Conference, #51, abstract #2281.\*

\*Note the Lunar and Planetary Science Conference, #51 was canceled due to the COVID-19 outbreak. Abstracts included here were accepted and scheduled for oral or poster presentations but not presented.

### 2019

Pajola, M. B. Bierhaus, K.J. Walsh, D.N. DellaGiustina, E.R. Jawin, M. Delbo, J. Molaro, S.R. Schwartz, R.-L. Ballouz, C.A. Bennett, B. Rizk, K.N. Burke, H. Campins, J.R. Brucato, G. Poggiali, E. Dotto, M.G. Daly, **C.M. Elder**, P. Michel, M.E. Perry, O.S. Barnouin, M.C. Nolan and D.S. Lauretta (2019) Surface densities and size-frequency distributions of meter-size boulders inside craters on (101955) Bennu. American Geophysical Union Fall Meeting.

Ryan, A.J., D. Pino-Munoz, J.P. Emery, M. Delbo, B. Rozitis, R.-L. Ballouz, J.L. Molaro, M. Bernacki, J. Bandfield, **C. Elder**, M. Siegler, and D.S. Lauretta (2019) Thermal Modeling to Determine the Existence and Nature of Layered Material on Bennu. Asteroid Science in the Age of Hayabusa2 and OSIRIS-REx, abstract #2189.

Bottke, W.F., D. Vokrouhlicky, R.-L. Ballouz, O.S. Barnouin, H.C. Connolly Jr., **C. Elder**, T.J. McCoy, P. Michel, M.C. Nolan, B. Rizk, D.J. Scheeres, S.R. Schwartz, K.J. Walsh, D.S. Lauretta (2019) Interpreting the Cratering History of Bennu, Ryugu, and Other Space-Craft Explored Asteroids. Asteroid Science in the Age of Hayabusa2 and OSIRIS-REx, abstract #2189.

**Elder, C.M.**, B. Douglass, R.R. Ghent, P.O. Hayne, J.-P. Williams, J.L. Bandfield, E. Costello (2019) The Subsurface Coherent Rock Content of the Moon as Revealed by Cold-spot Craters. Geologic Society of America Annual Meeting T93 13-10 (invited).

Bottke W., D. Vokrouhlicky, R. Ballouz, O. Barnouin, H. Connolly, **C. Elder**, D.

Lauretta, T. McCoy, P. Michel, M. Nolan, B. Rizk, D. Scheeres, S. Schwartz, and K. Walsh (2019) Interpreting the Cratering History of Bennu, Ryugu, and Other Spacecraft-Explored Asteroids. European Planetary Science Congress-Division of Planetary Science Joint Meeting abstract #862

Ryan, A., J. Emery, B. Rozitis, P. Christensen, V. Hamilton, M. Delbo, D.P. Munoz, M. Bernacki, K. Walsh, R. Ballouz, B. Clark, D. DellaGiustina, **C. Elder**, E. Howell, L. Lim, J. Molaro, M. Nolan, B. Rizk, S. Schwartz, M. Siegler and the OSIRIS-REx Team (2019) Physical Interpretation of Bennu's Thermal Inertia. European Planetary Science Congress-Division of Planetary Science Joint Meeting abstract #324.

Maurizio P., E. Bierhaus, K. Walsh, D. DellaGiustina, E. Jawin, M. Delbo, J. Molaro, S. Schwartz, R. Ballouz, C. Bennett, B. Rizk, K. Burke, H. Campins, J.R. Brucato, E. Dotto, M. Daly, **C.M. Elder**, P. Michel, M. Perry, O. Barnouin and the OSIRIS-REx Team (2019) Boulders inside the craters of asteroid (101955) Bennu: Surface densities and size-frequency distributions. European Planetary Science Congress-Division of Planetary Science Joint Meeting abstract #187.

L. Kerber, B.W. Denevi, I. Nesnas, L. Keszthelyi, J.W. Head, C. Pieters, L. Wilson, J. Haruyama, R.V. Wagner, P.O. Hayne, J.W. Ashley, J.L. Whitten, A.M. Stickle, A. Parness, K. Donaldson Hanna, R.C. Anderson, D.M. Needham, P. Isaacson, L. Jozwiak, R. Klima, C. Jackson, T.C. Prissel, C.W. Hamilton, K. Uckert, **C. Elder** (2019) Moon Diver: A Discovery Mission Concept for Understanding Secondary Crust Formation Through the Exploration of a Lunar Mare Pit Cross-Section. European Lunar Symposium.

**Elder, CM, B Douglass, PO Hayne, RR Ghent, J-P Williams, JL Bandfield, E Costello** (2019) Mapping Regolith Thickness on the Moon Using a New Class of Young Craters. Lunar and Planetary Science Conference, #50, abstract #2485.

Klimczak, C., P.K. Byrne, P.V. Regensburger, D.R. Bohnenstiehl, S.A. Hauck, A.J. Dombard, D.J. Hemingway, S.D. Vance, D.M. Melwani, **C.M. Elder** (2019) Strong Ocean Floors Within Europa, Titan, and Ganymede Limit Geological Activity There; Enceladus Less So. Lunar and Planetary Science Conference, #50, abstract #2912.

L. Kerber, B.W. Denevi, I. Nesnas, L. Keszthelyi, J.W. Head, C. Pieters, L. Wilson, J. Haruyama, R.V. Wagner, P.O. Hayne, J.W. Ashley, J.L. Whitten, A.M. Stickle, A. Parness, K. Donaldson Hanna, R.C. Anderson, D.M. Needham, P. Isaacson, L. Jozwiak, R. Klima, C. Jackson, T.C. Prissel, C.W. Hamilton, K. Uckert, **C. Elder** (2019) Moon Diver: A Discovery Mission Concept for Understanding Secondary Crust Formation Through the Exploration of a Lunar Mare Pit Cross-Section. Lunar and Planetary Science Conference, #50, abstract #1163

M Pajola, K Burke, D DellaGiustina, D Lauretta, B Rizk, C Bennett, K Walsh, E Jawin, M Delbo, JL Molaro, SR Schwartz, R Ballouz, JR Brucato, E Dotto, EB Bierhaus, H Campins, M Daly, **C Elder**, P Michel, O Barnouin, MC Nolan (2019) Global and Select Regional Size-Frequency Distribution of Boulders on Asteroid (101955) Bennu. Lunar and Planetary Science Conference, #50, abstract #1575.

Molaro, J.L., M. Delbo, R.-L. Ballouz, E. Jawin, K. Walsh, M. Pajola, T. McCoy, S.

Schwartz, **C.M. Elder**, D. DellaGiustina, B. Rizk, C. d'Aubigny, D.S. Lauretta, OSIRIS-REx Team (2019) Fracture Formation Mechanisms on Bennu and Evidence of Thermally Driven Breakdown. Lunar and Planetary Science Conference, #50, abstract #1597.

Emery, JP, B Rozitis, PR Christensen, VE Hamilton, AA Simon, DC Reuter, M Delbo, LF Lim, CA Thomas, BE Clark, A Ryan, **CM Elder**, MA Siegler, ES Howell, MC Nolan, DS Lauretta, Osiris-Rex Team (2019) Thermophysical Properties of (101955) Bennu from OSIRIS-REx Observations. Lunar and Planetary Science Conference, #50, abstract #2582.

Pajola, M., D. DellaGiustina, C. Bennett, K. Burke, D. S. Lauretta, B. Rizk, M. Delbo, K. Walsh, J. R. Brucato, E. Dotto, E. B. Bierhaus, H. Campins, M. Daly, **C.M. Elder**, P. Michel, J. Molaro, M. C. Nolan, S. R. Schwartz & The OSIRIS-REx Team (2019) Scientific Analysis of the Size-Frequency Distribution of Boulders  $\geq 10$  m on Asteroid (101955) Bennu. Italian Congress of Planetology XV.

Hayne, P. O., D. A. Paige, J.-P. Williams, **C.M. Elder**, M. A. Siegler, J. L. Bandfield, L. Rubanenko, T. Powell, T. Horvath, N. M. Bowles (2019) Lunar Thermal Models: New Insights from the Diviner Lunar Radiometer Experiment. Thermal Models for Planetary Science III.

Emery, J. P., B. Rozitis, B., P. R. Christensen, V. E. Hamilton, M. Delbo, L. F. Lim, C.A. Thomas, A. A. Simon, B. E. Clark, A. Ryan, **C.M. Elder**, M. A. Siegler, E. S. Howell, M. C. Nolan, D. S. Lauretta, The OSIRIS-REx Team (2019) Thermophysics of (101955) Bennu: Observing and Thermal Modeling Plans of OSIRIS-REx and Initial Results from Approach Phase Data. Thermal Models for Planetary Science III.

### 2018

**Elder, C.M.**, M. B. Bland (2018) The Plausibility of Silicate Volcanism on Europa's Seafloor. American Geophysical Union, Fall Meeting, abstract #P41B-07.

Kerber, L., B. W. Denevi, I. A. Nenas, L. P. Keszthelyi, **C.M. Elder (presenter)**, J. W. Head, C.M. Pieters, R. G. Sellar, A. M. Stickle, R. L Klima, P. O. Hayne, Jennifer L Whitten, Michael Paton, Patrick McGarey, Kerri Donaldson Hanna, Robert C Anderson, Travis Brown, Debra Hurwitz Needham, Peter Isaacson, Kyle Uckert, Lauren M Jozwiak, Christopher Hamilton, Robert Wagner, Karl L Mitchell, James Warren Ashley, Junichi Haruyama, Aaron Parness, Miles W Smith, Richard P Kornfeld, Tyler Horvath, Tabb C Prissel, Colin Jackson, (2018) Moon Diver: A Discovery Mission Concept for Understanding Planetary Flood Basalts through the Exploration of a Lunar Mare Cross-Section. American Geophysical Union, Fall Meeting, abstract #P54D-09.

Emery, J.P., B. Rozitis, P. R. Christensen, V. E. Hamilton, M. Delbo, L. F. Lim, C. A. Thomas, B. E. Clark, A. Ryan, **C.M. Elder**, M. A. Siegler, M. C. Nolan, D. S. Lauretta, The OSIRIS-REx Team, (2018) Thermophysical Properties of (101955) Bennu from OSIRIS-REx Approach Phase Data. American Geophysical Union, Fall Meeting, abstract #P21A-06.

Pajola, M., D. DellaGiustina, C. Bennett, K. Burke, D. S. Lauretta, B. Rizk, M. Delbo,

K. Walsh, J. R. Brucato, E. Dotto, E. B. Bierhaus, H. Campins, M. Daly, **C.M. Elder**, P. Michel, J. Molaro, M. C. Nolan, S. R. Schwartz, The OSIRIS-REx Team, (2018) The Size-Frequency Distribution of Boulders >10 m on Asteroid 101955 Bennu: landing safety and scientific return. American Geophysical Union, Fall Meeting, abstract #P33C-3854.

Molaro, J. L., C. Nielsen, M. Pajola, **C.M. Elder** (2018) The interaction between grain- and boulder-scale effects on thermally induced rock. American Geophysical Union, Fall Meeting, abstract #P51D-2911.

**Elder, C.M.** and Bland, M. (2018) Partially Molten Magma Oceans on Io and Europa. Geologic Society of America 130th Annual Meeting, Paper No. 67-13 (invited).

Martinez-Camacho, J. M., P. O. Hayne, **C.M. Elder** (2018) Thermal Inertia of Rocks on the Moon. Lunar and Planetary Science Conference, #49, abstract #2556.

Haber, J. T., P. O. Hayne, **C.M. Elder** (2018) Rock Abundance and Surface Ages in the Lunar Maria. Lunar and Planetary Science Conference, #49, abstract #2463.

### 2017

**Elder, C.M.**, P. O. Hayne, T. D. Glotch (2017) Low Thermal Inertia Volcanic Deposits on the Moon. International Association of Volcanology and Chemistry of the Earth's Interior 2017 Scientific Assembly #361.

Glotch, T. D., **C.M. Elder**, P. O. Hayne, B. T. Greenhagen, D. Dhingra, W. S. Kiefer, G. J. Taylor (2017) Composition and physical properties of silicic features on the Moon. SSERVI Exploration Science Forum.

**Elder, C.M.** and P. O. Hayne (2017) The Lunar Rock Size Frequency Distribution from Diviner Infrared Measurements. European Lunar Symposium.

Glotch, T. D., **C.M. Elder**, P. O. Hayne, B. T. Greenhagen, D. Dhingra, W. S. Kiefer (2017) Overview of Silicic Magmatic Activity on the Moon. New Views of the Moon 2 - Europe.

Bramson, A. M., **C.M. Elder**, L. W. Blum, H. T. Chilton, A. Chopra, C. Chu, A. Das, A. B. Davis, A. Delgado, J. Fulton, L. Jozwiak, A. Khayat, M. E. Landis, J. L. Molaro, M. Slipski, S. Valencia, J. Watkins, C. L. Young, C. J. Budney, K. L. Mitchell (2017) OCEANUS: A Uranus Orbiter Concept Study from the 2016 NASA/JPL Planetary Science Summer School. Lunar and Planetary Science Conference, #48, abstract #1583.

**Elder, C.M.** and P. O. Hayne (2017) Thermophysical Properties of Lunar Volcanic Deposits. Lunar and Planetary Science Conference, #48, abstract #2431.

**Elder, C.M.**, A. M. Bramson, L. W. Blum, H. T. Chilton, A. Chopra, C. Chu, A. Das, A. Davis, A. Delgado, J. Fulton, L. Jozwiak, A. Khayat, M. E. Landis, J. L. Molaro, M. Slipski, S. Valencia, J. Watkins, C. L. Young, C. J. Budney, K. L. Mitchell (2017) New Frontiers-Class Missions to the Ice Giants. Planetary Science Vision 2050 Workshop #8147.

Hendrix, A. R., Hurfurd, T. A., the ROW Team (2017) Roadmaps to Ocean Worlds. Planetary Science Vision 2050 Workshop #8171.

2016

**Elder, C.M.**, P. O. Hayne, K. L. Donaldson Hanna, J. L. Bandfield, R. R. Ghent, J.-P. Williams and D. A. Paige (2016) Young Lunar Volcanic Features: Thermophysical Properties and Formation. American Geophysical Union, Fall Meeting, abstract #P51D-08 (invited).

**Elder, C.M.**, P. O. Hayne, S. Piqueux, J. L. Bandfield, J.-P. Williams, R. R. Ghent and D. A. Paige (2016) The Lunar Rock Size Frequency Distribution from Diviner Infrared Measurements. American Geophysical Union, Fall Meeting, abstract #P24A-04.

Piqueux, S., P. O. Hayne, A. Kleinboehl, C. S. Edwards, **C.M. Elder**, N. G. Heavens, D. M. Kass, D. J. McCleese, J. T. Schofield, J. H. Shirley, M. D. Smith (2016) Global Surface Dust Distribution Changes on Mars (MY24-33). American Geophysical Union, Fall Meeting, abstract #P21A-2074.

**Elder, C.M.**, P. O. Hayne, K. L. Donaldson Hanna, J. L. Bandfield, J.-P. Williams, R. R. Ghent, D. A. Paige. (2016) Young Lunar Volcanic Features: How Did They Form? EPSC-DPS Joint Meeting, #215.11.

**Elder, C.M.**, A. M. Bramson, A. Davis, H. T. Chilton, L. W. Blum, A. Chopra, C. Chu, A. Khayat, A. Delgado, J. Fulton, L. Jozwiak, M. Landis, J. L. Molaro, M. Slipski, S. Valencia, A. Das, J. Watkins, C. Young, C. J. Budney, K. L. Mitchell. (2016) OCEANUS: A Concept Study for a Uranus Orbiter Mission from the 2016 NASA/JPL Planetary Science Summer School. Outer Planet Assessment Group Meeting.

Hayne P. O., J. L. Bandfield, A. R., Vasavada, R. R. Ghent, M. A. Siegler, J.-P. Williams, B. T. Greenhagen, **C.M. Elder**, D. A. Paige (2016) Global Regolith Properties from Diviner Thermal Infrared Measurements. New Views of the Moon 2. #6065.

**Elder, C.M.**, P. O. Hayne, R. R. Ghent, J. L. Bandfield, J.-P. Williams, D. A. Paige (2016) Regolith Formation on Young Lunar Volcanic Features. Lunar and Planetary Science Conference, #46, abstract #2785.

Piqueux, S., P. O. Hayne, **C.M. Elder**, B. T. Greenhagen, D. A. Paige, J.-P. Williams, M. Siegler (2016) Depth-Dependency of Lunar Regolith Thermophysical Properties from Transient Shadows Observed by Diviner. Lunar and Planetary Science Conference, #46, abstract #1762.

2015

**Elder, C.M.**, P. O. Hayne, S. Piqueux, J. L. Bandfield, R. R. Ghent, J.-P. Williams, D. A. Paige (2015) New Constraints on the Rock Size Distribution on the Moon from Diviner Infrared Measurements. American Geophysical Union, Fall Meeting, abstract #P53B-2120.

Hayne, P. O., R. R. Ghent, J. L. Bandfield, A. Vasavada, J.-P. Williams, M. Siegler, P. Lucey, B. Greenhagen, **C.M. Elder**, D. A. Paige (2015) Regolith Formation Rates



and Evolution from the Diviner Lunar Radiometer. American Geophysical Union, Fall Meeting, abstract #P43F-02.

**Elder, C.M.**, P. J. Tackley, A. P. Showman (2015) Heat Loss Through Volcanism on Io. Comparative Tectonic and Geodynamics of Venus, Earth and Rocky Exoplanets, abstract # 1839.

#### 2014

**Elder, C.M.**, P. J. Tackley, A. P. Showman (2014) Convection and Melt Migration in Io's Mantle. American Geophysical Union, Fall Meeting, abstract #P41E-08.

**Elder, C.M.**, A. P. Showman (2014) Melt Migration Through Io's Convecting Mantle. Lunar and Planetary Science Conference, #45, abstract #1651.

**Elder, C.M.**, P. J. Tackley, A. P. Showman (2014) Convection in Io's Partially Molten Mantle. Lunar and Planetary Science Conference, #45, abstract #2336.

#### 2013

**Elder, C.M.**, A. P. Showman (2013) Melt Migration Through Io's Convecting Mantle. American Geophysical Union, Fall Meeting, abstract #P51C-1751.

**Elder, C.M.**, V. J. Bray, H. J. Melosh (2013) The Theoretical Plausibility of Central Pit Crater Formation via Melt Drainage. Lunar and Planetary Science Conference, #44, abstract #2796.

**Elder, C.M.**, A. P. Showman (2013) Melt Migration Through Io's Convecting Mantle. Lunar and Planetary Science Conference, #44, abstract #2993.

#### 2011

**Elder, C.M.**, A. P. Showman (2011) Tidal Dissipation in a Partially Molten Material. EPSC-DPS Joint Meeting, p. 623.

#### 2010

**Elder, C.M.**, V. J. Bray, H. J. Melosh (2010) Central Pit Formation in Ganymede Craters Via Melt Drainage. Lunar and Planetary Science Conference, #41, abstract #2519.

#### 2007

**Elder, C.M.**, P. Helfenstein, P. Thomas, J. Veverka, J. A. Burns, T. Denk, C. Porco (2007) Tethys Mysterious Equatorial Band. American Astronomical Society, DPS #39, abstract #11.06.

Rauscher, E., J. Harrington, **C.M. Elder**, D. Deming, L. J. Richardson, S. Seager, K. Horning, K. Menou (2007) Looking for Variability in Two Spitzer Secondary Eclipses of HD 209458b at 24 Microns. American Astronomical Society, DPS #39, abstract #22.01.