

# CATHERINE M. ELDER

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## EDUCATION

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### University of Arizona

Ph.D. Planetary Sciences (minor in geosciences)

Advisor: Adam P. Showman

*April 2015*

### Cornell University

B.A. Astronomy

*May 2008*

## RESEARCH EXPERIENCE

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### University of Arizona

*Graduate Research Associate*

January 2010 - Present

*Tucson, AZ USA*

- Supervisor: Adam P. Showman.
- Developed a one-dimensional model of heat loss from Io's mantle including the effects of convection and melt segregation.
- Conducted numerical simulations of mantle convection using the code StagYY, which includes the generation, segregation, and eruption of magma.

### University of Arizona

*Graduate Research Assistant*

May 2009 - December 2009

*Tucson, AZ USA*

- Supervisors: Veronica J. Bray and H. Jay Melosh
- Evaluated the feasibility of the formation of central pits in impact craters via impact melt drainage.

### Cornell University

*NSF REU extended to Undergraduate Research Assistant position*

May 2007 - June 2008

*Ithaca, NY USA*

- Supervisors: Paul Helfenstein and Peter Thomas
- Detected color variation in an equatorial albedo band on Tethys in Cassini ISS data using multiple image processing programs.

### NASA Goddard Space Flight Center

*Student Undergraduate Internship in Astrobiology*

Summer 2006

*Greenbelt, MD USA*

- Supervisor: Drake Deming
- Measured the temperature of an extrasolar planet using two sets of Spitzer MIPS data taken a year apart.

### Cornell University

*Astronomical Data Reductionist*

January 2005 - May 2006

*Ithaca, NY USA*

- Supervisor: Jim Houck
- Processed Spitzer IRS data and helped write IDL programs.

## TEACHING EXPERIENCE

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### University of Arizona

August 2008 - December 2014 (9 semesters)

*Graduate Teaching Associate*

*Tucson, AZ USA*

- Supervisors: Betty Pierazzo, Caitlin Griffith, Joe Spitale, Joe Giacalone, Ilaria Pascucci, Harold Larson, Isamu Matsuyama, and Tamara Rogers.
- Gave occasional lectures; helped in development of term projects, problem sets and tests; tutored students outside of class; and graded assignments and tests.

### University of Arizona

Spring 2009

*Student in 'Teaching College-Level Astronomy and Planetary Science' Course*

*Tucson, AZ USA*

- Instructors: Gina Brissenden and Edward Prather
- Reviewed research on the nature of teaching and learning.
- Learned about setting course objectives and using learner-centered teaching methods.

### Cornell University

September 2006 - May 2008

*Physics Tutor*

*Ithaca, NY USA*

- Supervisor: Robert Lieberman.
- Held office hours in the tutoring center for 3 hours per week. The center was open to all students in three different levels of introductory physics classes.
- Answered questions about class content, labs, and problem sets by explaining physics concepts.

## FELLOWSHIPS AND AWARDS

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American Geophysical Union (AGU) Outstanding Student Paper Award 2014

Uwingu Student Travel Grant 2014

Lunar and Planetary Institute's Career Development Award 2013

Shandel Travel Award 2013

NASA Earth and Space Science Fellowship (NESSF) 2010 - 2013

## PROFESSIONAL AFFILIATIONS

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American Geophysical Union

American Astronomical Society, Division of Planetary Sciences

## PUBLICATIONS

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

## CONFERENCE PRESENTATIONS

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

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

- Elder, C. M.**, Tackley, P. J., Showman, A. P., 2014. Convection in Io's Partially Molten Mantle. Lunar and Planetary Science Conference, #45, abstract #2336. Talk.
- Elder, C. M.**, Showman, A. P., 2013. Melt Migration Through Io's Convecting Mantle. American Geophysical Union, Fall Meeting, abstract #P51C-1751. Poster.
- Elder, C. M.**, Bray, V. J., Melosh, H. J., 2013. The Theoretical Plausibility of Central Pit Crater Formation via Melt Drainage. Lunar and Planetary Science Conference, #44, abstract #2796. Talk.
- Elder, C. M.**, Showman, A. P., 2013. Melt Migration Through Io's Convecting Mantle. Lunar and Planetary Science Conference, #44, abstract #2993. Talk.
- Elder, C. M.**, Showman, A.P., 2011. Tidal Dissipation in a Partially Molten Material. EPSC-DPS Joint Meeting, p. 623. Poster.
- Elder, C. M.**, Bray, V., Melosh, J., 2010. Central Pit Formation in Ganymede Craters Via Melt Drainage. Lunar and Planetary Science Conference, #41, abstract #2519. Talk.
- Elder, C. M.**, Helfenstein, P., Thomas, P., Veverka, J., Burns, J. A., Denk, T., Porco, C., 2007. Tethys Mysterious Equatorial Band. American Astronomical Society, DPS #39, abstract #11.06. Talk.
- Rauscher, Emily, Harrington, J., **Elder, C. M.**, Deming, D., Richardson, L. J., Seager, S., Horning, K., Menou, K., 2007. Looking for Variability in Two Spitzer Secondary Eclipses of HD 209458b at 24 Microns. American Astronomical Society, DPS #39, abstract #22.01. Poster.