

# C. Adeene Denton

Tel.: 210-834-7472  
Web.: adeenedenton.com  
adeened@arizona.edu

University of Arizona  
Michael J. Drake Building  
Tucson, AZ 85705

## RESEARCH INTERESTS

---

Formation and evolution of planetary bodies through the lens of giant impacts and their aftermath.

## EXPERIENCE

---

- Postdoctoral Researcher** - Lunar and Planetary Laboratory, U. Arizona January 2023 – Present  
Advisor: Dr. Erik Asphaug  
Project title: Collisional formation of the Kuiper Belt.
- Project title: Collisional formation of the Kuiper Belt. **Research Scientist** - Lunar and Planetary Laboratory, U. Arizona September – December 2022  
Project title: Giant impacts around Saturn.
- Graduate Research Scientist** - Purdue University August 2019 – August 2022  
Department of Earth, Atmospheric, and Planetary Sciences
- Graduate Research Scientist** - Brown University August 2016 – July 2019  
Department of Earth, Environmental and Planetary Sciences

## EDUCATION

---

### Purdue University

PhD, Earth, Atmospheric, and Planetary Science December 2022  
Advisor: Brandon Johnson  
**Thesis:** Sputnik Planitia as a probe for Pluto's internal evolution.

### Brown University

M.Sc. Earth, Environmental, and Planetary Science May 2018  
Advisor: James W. Head  
**Thesis:** Subsurface collapse and denudation of the fretted terrain and the Arabia Terra plateau: Origins and implications for martian dichotomy boundary evolution.

### Rice University

B.S. Earth Science May 2016  
B.A. History  
GPA 3.88, Cum Laude  
**Senior Thesis:** Tectonic history of Enceladus's SPT and its ties to the formation of the tiger stripe fractures

## PUBLICATIONS

---

- Ballantyne, H., Asphaug, E., **Denton, C.A.**, Emsenhuber, A., and Jutzi, M. (2024). Sputnik Planitia as an impactor remnant indicates an ancient rocky mascon in an oceanless Pluto. *Nature Astronomy*. <https://doi.org/10.1038/s41550-024-02248-1>
- Emsenhuber, A., Asphaug, E., Cambioni, S., Gabriel, T.S.J., Schwartz, S. R., Melikyan, R.E., and **Denton, C.A.** (2023). A New Database of Giant Impacts over a Wide Range of Masses and with Material Strength: A First Analysis of Outcomes. *Planetary Science Journal*. <https://doi.org/10.3847/PSJ/ad2178>.
- Seaton, K., Gyalay, S., Stucky de Quay, G., Burnett, E.R. **Denton, C.A.**, et al. (2023). The Astrobiology eXploration at Enceladus: A New Frontiers mission concept study. *Planetary Science Journal*. <https://doi.org/10.3847/PSJ/acd119>.
- Denton, C.A.**, Gosselin, G.J., Freed, A.M. and Johnson, B.C. (2023), The formation and evolution of Sputnik Planitia, Pluto, prior to ice fill. *Icarus*. <https://doi.org/10.1016/j.icarus.2023.115541>

5. **Denton, C.A.**, and Rhoden, A.R. (2022), Tracking the Evolution of an Ocean Within Mimas Using the Herschel Impact Basin. *Geophysical Research Letters*. <https://doi.org/10.1029/2022GL100516>.
6. **Denton, C.A.**, Johnson, B.C., Wakita, S., Freed, A.M., Melosh, H.J., and Stern, A.S. (2021), Pluto's antipodal terrains imply a thick subsurface ocean and hydrated core. *Geophysical Research Letters*. <https://doi.org/10.1029/2020GL091596>.
7. Wakita, S., Johnson, B.C., **Denton, C.A.**, and Davison, T.M. (2021). Jetting during oblique impacts of spherical impactors. *Icarus*. <https://doi.org/10.1016/j.icarus.2021.114365>.
8. Palumbo, A.M. and Deutsch, A.N., Bramble, M.S., Tarnas, J.T., Boatwright, B.D., Lark, L.H., Nathan, E.M., Wilner, J.A., Chen, Y., Anzures, B.A., **Denton, C.A.**, et al. (2019), Scientific exploration of Mare Imbrium with OrbitBeyond, Inc.: Characterizing the regional volcanic history of the Moon. *New Space* 7, 137–150. <https://doi.org/10.1089/space.2019.0016>

## HONORS AND AWARDS

---

### Research and Conference

<i>Future Investigator in NASA Earth and Space Science and Technology (FINESST)</i>	2020 – 2022
<i>Lunar and Planetary Institute Career Development Award</i>	2020
<i>Women in Space Travel Grant</i>	2019, 2020
<i>Large Meteorite Impacts VI Travel Award</i>	2019
<i>Association for Women Geoscientists Takken Travel Award</i>	2019
<i>National Academies Space Science Week Early Career Program</i>	2019
<i>Brown University Graduate Travel Grant</i>	2017, 2018, 2019
<i>Brown University International Travel Grant</i>	2016

### Academic

<i>Asteroid 16883 Adeenedenton</i>	2024
<i>Meteoritical Society/Geological Society of America Pellas-Ryder Award</i>	2023
<i>Purdue Earth Atmospheric and Planetary Sciences Outstanding Graduate Student</i>	2021
<i>Purdue Earth Atmospheric and Planetary Sciences Three-Minute Thesis Winner</i>	2021
<i>Dance Magazine 25 to Watch</i>	2019
<i>Brown University Presidential Fellow</i>	2016 – 2019
<i>ExxonMobil Outstanding Undergraduate in Earth Science</i>	2016
<i>Charles S. Garside Jr. Prize in History</i>	2016
<i>Houston Geological Society Outstanding Student Award</i>	2015
<i>Houston Geological Society Maby Scholarship</i>	2015
<i>Houston Gem and Mineral Society Scholarship</i>	2014

## CONFERENCE PRESENTATIONS: FIRST AUTHOR

---

1. **Denton, C.A.**, Asphaug, E., Emsenhuber, A., and Melikyan, R. E., (2024) A new giant impact origin for Pluto and Charon. Impacts Workshop, Rochester, New York
2. **Denton, C.A.**, Asphaug, E., Melikyan, R. E., and Emsenhuber, A. (2023) Does strength help Pluto capture Charon? American Astronomical Society Division for Planetary Sciences Annual Meeting, San Antonio, Texas.
3. **Denton, C.A.**, Ferguson, S. N. Keane, J. T. Asphaug, E., and Melikyan, R. M. (2023). Get Me Pictures of Oberon: How Large Impact Craters Can Amplify Imagery and Geodetic Measurements to Probe the Interiors of the Uranian Satellites. Uranus Flagship Workshop, Pasadena, California.
4. **Denton, C.A.**, Gosselin, G.J., Freed, A.M., and Johnson, B.C. (2023). The Formation and Evolution of the Sputnik Basin, Pluto, Prior to Nitrogen Ice Fill. 54th Lunar and Planetary Science Conference, The Woodlands, Texas.
5. **Denton, C.A.**, Rhoden, A.R., and Ferguson, S.N. (2023). Using the Herschel Impact Basin to Track the Evolution of an Ocean within Mimas. 54th Lunar and Planetary Science Conference, The Woodlands, Texas.
6. **Denton, C.A.**, Johnson, B.C., Wakita, S., Freed, A.M., Melosh, H.J., and Stern, A.S. (2021). Antipodal terrains produced by Sputnik Planitia-forming impact imply Pluto has thick ocean and hydrated core. 52nd Lunar and Planetary Science Conference, The Woodlands, Texas.

7. **Denton, C.A.**, B.C., Wakita, S., Freed, A.M., Melosh, H.J., and Stern, A.S. (2021). Pluto's antipodal terrains imply a thick subsurface ocean and hydrated core. New Horizons Science Plenary Meeting, Boulder, Colorado.
8. **Denton, C.A.**, Johnson, B.C., Freed, A.M., and Melosh, H.J. (2020). Seismology on Pluto?! Antipodal terrains produced by Sputnik Planitia-forming impact, 51st Lunar and Planetary Science Conference, The Woodlands, Texas
9. **Denton, C.A.** and Johnson, B.C. (2019). Formation of the Sputnik Planitia basin: Moving towards refined constraints on ocean thickness. Large Meteorite Impacts VI, Brasilia, Brazil.
10. **Denton, C.A.** and Head, J.W. (2019). Fretted channels and closed depressions in Arabia Terra, Mars: Origins and implications for subsurface hydrologic activity. 50th Lunar and Planetary Science Conference, The Woodlands, Texas.
11. **Denton, C.A.** and Head, J.W. (2019). Fretted channels and closed depressions in Arabia Terra, Mars: Origins and implications for subsurface hydrologic activity. Women in Space Conference, Scottsdale, Arizona.
12. **Denton, C.A.** and Head, J.W. (2018). Mapping the fretted terrain north of Arabia Terra, Mars: Results and implications for dichotomy boundary formation. 49th Lunar and Planetary Science Conference, The Woodlands, Texas.
13. **Denton, C.A.** and Head, J.W. (2018). Subsurface hydrologic activity in northern Arabia Terra, Mars: Implications for formation of fretted channels. 49th Lunar and Planetary Science Conference, The Woodlands, Texas (Poster).
14. **Denton, C.A.** and Head, J.W. (2018). Mapping the fretted terrain north of Arabia Terra, Mars: Results and implications for dichotomy boundary formation. Women in Space Conference, Toronto, Canada.
15. **Denton, C.A.** and Head, J.W. (2017). Arabia Terra-Meridiani Planum as possible glacial loess and outwash/playa plains adjacent to Late Noachian/Early Hesperian icy highlands. 48th Lunar and Planetary Science Conference, The Woodlands, Texas.
16. **Denton, C.A.** and Head, J.W. (2017). Protonilus Mensae: Origin by contact and deferred melting associated with emplacement of Late Noachian flood volcanism (Poster). 48th Lunar and Planetary Science Conference, The Woodlands, Texas.
17. **Denton, C.A.** and Kring, D. A. (2016). Differential vertical and radial displacement along faults in the crater wall during the formation of Meteor Crater, AZ (Poster). 47th Lunar and Planetary Science Conference, The Woodlands, Texas.

#### INVITED EXTERNAL TALKS AND TEAM MEETINGS

---

**Colby College** - Waterville, ME (April 2024)

*Getting to the Heart of Pluto with Sputnik Planitia*

**Lowell Observatory** - Flagstaff, AZ (February 2024)

*Getting to the Heart of Pluto with Sputnik Planitia*

**Grand Canyon National Park** - Grand Canyon, AZ (February 2024)

*Geology in a galaxy far, far away: Exploring the planets of Star Wars*

**Grand Canyon National Park** - Grand Canyon, AZ (February 2024)

*Voyage to an Ice Giant: What's the Deal with NASA's Next Flagship Mission?*

**Grand Canyon National Park** - Grand Canyon, AZ (February 2024)

*Canyons Across the Solar System*

**Union College** - Schenectady, NY (January 2024)

*Giant Impacts Reveal the History of Pluto's Cryosphere*

**Jet Propulsion Laboratory** - Pasadena, CA (July 2023)

*Constraining Pluto's interior with giant impacts: It's just that easy!*

**Arizona State University** - Tempe, AZ (May 2023)

*Constraining Pluto's interior with giant impacts: It's just that easy!*

**New Horizons Science Team Meeting** - Wallace, ID (September 2022)

*The formation and evolution of the Sputnik basin prior to ice fill.*

- Southwest Research Institute** - Boulder, CO (August 2022)  
*Sputnik Planitia as a probe for Pluto's internal evolution.*
- Jet Propulsion Laboratory** - Pasadena, CA (July 2022)  
*Sputnik Planitia as a probe for Pluto's internal evolution.*
- The University of Western Ontario** - London, Ontario, Canada (February 2022)  
*Blown Wide Open: Searching for Oceans in the Outer Solar System with Giant Impacts.*
- Lunar and Planetary Institute** - Clear Lake, Texas (October 2021)  
*Blown Wide Open: Searching for Oceans in the Outer Solar System with Giant Impacts.*
- New Horizons Science Plenary Meeting** - Boulder, Colorado (April 2020)  
*Pluto's antipodal terrains imply a thick subsurface ocean and hydrated core.*
- TEDxProvidence 2017** - Providence, Rhode Island (September 2017)  
*Netflix and chill at 0 Kelvin: How human culture will make the leap to space.*

## CONFERENCE PRESENTATIONS: CONTRIBUTING AUTHOR

---

1. Bajjal, N., Asphaug, E., **Denton, C.A.**, et al. (2024). Effect of Asteroid Shape on Basin-scale Collisions: Implications for (16) Psyche. 55th Lunar and Planetary Science Conference, The Woodlands, Texas.
2. Scully, J., **Denton, C.A.**, Castillo-Rogez, J.C. et al. (2024). Insights into the Uranian moons Umbriel and Oberon from Dawn observations on Ceres and impact modeling. 55th Lunar and Planetary Science Conference, The Woodlands, Texas.
3. Ferguson, S.N., Leonard, E.J., Beddingfield, C.B., **Denton, C.A.**, Persaud, D.M., et al. (2023). Stereo Imaging to Enable Comprehensive Science at the Uranian Satellites. Uranus Flagship Workshop, Pasadena, California.
4. Bajjal, N., **Denton, C.A.**, and Asphaug, E. (2023). Seismic Transmission Through Asteroid Interiors: Insights from Impact Models. Asteroids, Comets, and Meteorites Conference. Flagstaff, AZ.
5. Bajjal, N., **Denton, C.A.**, and Asphaug, E. (2023). Porosity and Collisional Seismology of Asteroid Interiors. 54th Lunar and Planetary Science Conference, The Woodlands, Texas.
6. Ballantyne, H.A., Asphaug, E., **Denton, C.A.**, Emsenhuber, A. and Jutzi, M. (2022). Sputnik Planitia as an Impactor Remnant: An Ancient Mascon in a Frozen Ice Mantle. 53rd Lunar and Planetary Science Conference, The Woodlands, Texas.
7. Rhoden, A.R., Walker, M.E., **Denton, C.A.**, and Ferguson, S.N. (2022). Is Mimas a stealth ocean world? 53rd Lunar and Planetary Science Conference, The Woodlands, Texas.
8. Seaton, K.M., Burnett, E.R., **Denton, C.A.**, et al., (2022). Science objectives for a mission concept to Enceladus: The Astrobiology Exploration at Enceladus (AXE). 53rd Lunar and Planetary Science Conference, The Woodlands, Texas.
9. Seaton, K.M., Burnett, E.R., **Denton, C.A.**, et al., (2022). Mission implementation for a New Frontiers mission concept: The Astrobiology Exploration at Enceladus (AXE). 53rd Lunar and Planetary Science Conference, The Woodlands, Texas.
10. Mijjum, M. and **Denton, C.A.** (2021). URGE at Purdue EAPS: actions taken and barriers to developing a diverse and inclusive department. Geological Society of America Connects 2021, Portland, Oregon.

## TEACHING

---

### Lead/Co-Instructor

#### University of Arizona

ASTEROIDS Undergraduate Research and Education Program Summer Academy 2023

#### Brown University

Habitable Worlds: Possible Places for Life in the Solar System and Beyond, Summer @ Brown Stem II Program 2018, 2019

### Guest Lecturer

<b>Pima Community College</b>	
BIO 109: Natural History of the Southwest	2023, 2024
<b>California State University, San Bernardino</b>	
HON 3200: Social Sciences and Natural Sciences Seminar (Title: Making Sense of the Universe)	2023
<b>University of Arizona</b>	
PTYS 523: Moons	2024
PTYS 595B: Special Topics in Planetary Science (Title: Collisions)	2021, 2023
<b>Purdue University</b>	
EAPS 35400: Planetary Interiors	2021
EAPS 35300/55600: Earth and Planetary Surface Processes	2020
<b>The College of William and Mary</b>	
ENSP 440/GEOL 427: The environmental and human history of North America	2021

## MENTORING

---

### Graduate Advisees

#### University of Arizona

Namya Baijal: Impact modeling and asteroid seismology	2022-Present
Robert Melikyan: Impact modeling and planetary interior evolution	2022-Present

### Undergraduate Advisees

#### University of Arizona

Matan Jacob Lagnado: Impact modeling on icy satellites	2023-Present
Zach Purdy: Impact-driven pressure-temperature evolution of small bodies	2023-Present

#### Purdue University

Evan Kelch: Geomorphologic mapping and analysis on Earth and Mars	2022
Pat Pesa II: Geologic mapping, planetary geology, and cratering on Pluto	2022

## SERVICE

---

**Recent journal referee work:** Planetary Science Journal, Icarus, Geophysical Research Letters, Journal of Geophysical Research: Planets

### Lunar and Planetary Laboratory - University of Arizona

Department Life Committee, Postdoctoral Representative	2023-Present
--------------------------------------------------------	--------------

### Department of Earth, Atmospheric and Planetary Sciences - Purdue University

First-Year Mentorship Program Founder and Co-Director	2020-2022
Diversity Committee Graduate Representative	2020-2022
Seminar Committee, Planetary Representative	2019-2022

### Department of Earth, Environmental and Planetary Sciences - Brown University

Graduate Professional Development Representative	2019
Planetary Climate Task Force	2018-2019
Graduate Diversity Working Group Workshop Leader	2018-2019
Graduate Student Body Co-President	2017-2018

## OUTREACH

---

### Grand Canyon Conservancy - Grand Canyon, AZ

February 2024

Astronomer in Residence for Winter 2024, providing visitors to the park with geology and astronomy-based experiences that connect the Grand Canyon to the Solar System.

### Sun City Astronomy Club - Oro Valley, AZ

2023

Speaker for local citizen astronomy group regarding ocean worlds and moons in the outer Solar System.

### Space Drafts - University of Arizona

2023

Speaker for local student-run group that connects the local community with a range of topics in astronomy and planetary science.

### Astronomy on Tap - Purdue University

2021

Organizer and speaker for local student-run group aimed at encouraging enthusiasm for earth and planetary science in the local community.

**Saturday Morning Astrophysics** - Purdue University 2020-2021  
Led workshops for upper-level middle and high school students on the physics behind impact cratering and its importance in the Solar System.

**Scientists in the Schools** - Pinhead Institute 2020-2021  
Volunteer and contributing scientist for Scientists in the Schools, a program designed to bring scientists and their research to local schools in San Miguel County, CO.

**Popular Astronomy Club of the Quad Cities** - Moline, IL 2021  
Speaker for local citizen astronomy group regarding the origin and evolution of Pluto and its role in the Kuiper Belt.

**Indiana Astronomical Society** - Indianapolis, IN 2020  
Speaker for statewide citizen astronomy group regarding the origin and evolution of Pluto and its role in the Kuiper Belt.

**Ethics and Human Rights Group** - Space Generation Advisory Council 2019-2021  
Founder and co-director of project group focused on sustainable space exploration and intersectional diversity and equity in the space sector.

**Graduate Women in Science and Engineering** - Brown University 2017-2019  
Director of university-wide networking, outreach, and inclusion efforts to support under-represented gender minorities in STEM.

**La Salle Scholars** - La Salle Academy, Providence RI 2018-2019  
Led workshops for high school students interested in unusual career opportunities, exploring different career pathways in earth and space science.

**Young Scholars' Conference** - Brown University 2017-2018  
Co-directed a conference for women in science and engineering to prepare them for the academic and industrial job market. Events included networking panels, practice job talks, and sample interviews.