
Lunar and Planetary Institute

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Houston, TX 77058

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Education:

Brown University, Department of Earth, Environmental, & Planetary Sciences (2017 – 2021)

Ph.D. Planetary Geosciences (2021)

Thesis: *The Influence of Temperature on the Formation of Large Impact Structures Throughout the Solar System*

Advisor: Dr. Brandon C. Johnson, Dr. Alexander J. Evans

Committee Members: Dr. Christian Huber, Dr. Colleen Dalton, Dr. Kelsi N. Singer

M.Sc. Planetary Geosciences (2019)

Thesis: *Ice shell structure of Ganymede and Callisto as determined through impact crater formation*

Advisor: Dr. Brandon C. Johnson

Committee Members: Dr. Alexander J. Evans, Dr. Christian Huber, Dr. Ralph Milliken

University of Minnesota in Duluth, Department of Earth & Environmental Sciences (2006-2009)

M.Sc., Geological Sciences; (2009)

Thesis: *Results of equilibrium resurfacing Monte Carlo models and their application to Venusian resurfacing*

Advisor: Dr. Vicki L. Hansen

Committee Members: Dr. John Swenson, Dr. Barry James, Dr. Richard Maclin

Cook College, Rutgers University, Department of Earth & Planetary Sciences (2001-2006)

B.Sc. Geology and Astrophysics (2006)

G. H. Cook Honors Thesis, Geochemistry of Asteroids (May 2005)

Advisor: Dr. Jeremy S. Delaney

Research Experience:

The Lunar and Planetary Institute, Postdoctoral Fellow; Houston, TX (2022 – Present)

Numerical modeling of lunar impact basin development

Investigation into the longevity of volatiles in regolith

Brown University, Graduate Researcher; Providence, RI (2017 – 2021)

Studying impact crater formation with iSALE hydrocode modeling

Spherical harmonic analysis of topographic and gravimetric datasets

Data analysis using MatLab and Python

University of Minnesota – Duluth, Graduate Researcher; Duluth, MN (2006 – 2008)

Monte Carlo analysis of impact crater distribution and retention using MatLab

Statistical analysis of simulated global crater distributions

Geologic mapping of Venus

National Air and Space Museum, Smithsonian, Undergraduate Intern; Washington, D. C.

(Summer 2005)

Worked with Dr. Jim Zimbelman studying and comparing lava flows on Mars and Hawaii

Lunar and Planetary Institute; Undergraduate Intern; Houston, TX (Summer 2004)

Worked with Dr. John Lindsay and Dr. Allan Treiman studying Australian Archean cherts
Performed light microscopy and SEM analysis to determine their composition and origin

Rutgers University, Undergraduate Researcher; Piscataway, NJ, (2003 – 2005)

Worked with Dr. Jeremy Delaney to study the geochemistry of meteorites from the 4 Vesta
Performed light microscopy and electron microprobe analysis to determine their composition and identify trends within the HED meteorite suites

Publications:

1. **Bjonnes, E.**, Johnson, B. C., Silber, E. A., Singer, K. N., and Evans, A. J. Ice shell structure of Ganymede and Callisto based on impact crater morphology. (2022) *JGR: Planets*, 127 (4). (<https://doi.org/10.1029/2021JE007028>)
2. Crósta, A. P., Silber, E. A., Lopes, R. M. C., Johnson, B. C., **Bjonnes, E.**, Malaska, M. J., Vance, S. D., Sotin, C., Solomonidou, A., and Soderblom, J. S. Modeling the formation of Menrva impact crater on Titan: Implications for habitability. (2021) *Icarus*, 370. (<https://doi.org/10.1016/j.icarus.2021.114679>)
3. Silber, E. A., Johnson, B. C., **Bjonnes, E.**, MacGregor, J. A., Kjær, K. H., Larsen, N. K., and Wiggins, S. Effect of ice sheet thickness on formation of the Hiawatha impact crater. (2021) *Earth and Planetary Science Letters*, 566. (<https://doi.org/10.1016/j.epsl.2021.116972>)
4. **Bjonnes, E.**, Johnson, B.C. & Evans, A.J. Estimating Venusian thermal conditions using multiring basin morphology. (2021) *Nat Astron.* 5, p. 498-502. (<https://doi.org/10.1038/s41550-020-01289-6>)
5. **Bjonnes, E.**, Hansen, V. L., James, B., and Swenson, J. B. (2012) Results from new Monte Carlo modeling and implications for Venus surface histories. *Icarus*, 217(2). p. 451-461. (<https://doi.org/10.1016/j.icarus.2011.03.033>)
6. **Bjonnes, E.**, Johnson, B. C., and Andrews-Hanna, J.C. Lunar chronology through the lens of impact basin development (In Review)
7. Rolf, T. and Weller, M. B. (co-leads) et al., (**Bjonnes, E.**) Dynamics and evolution of Venus' mantle through time, Vol. 83: Venus: Evolution Through Time. Spohn, T., et al. (Eds), ISSI Workshop held in January/August 2021, (In Review)
8. Herrick, R.R. (lead) et al., (**Bjonnes, E.**) Resurfacing history and volcanic activity of Venus, Vol. 83: Venus: Evolution Through Time. Spohn, T., et al. (Eds), ISSI Workshop held in January/August 2021 (In Review)
9. **Bjonnes, E.**, Nichols-Fleming, F., Jones, M. J., Das, E., Cutler, A., Weller, M. T., Evans, A. J. A giant impact origin for lunar crustal asymmetry? (In Prep)
10. Potter, R. W., Deutsch, A. N., and **Bjonnes, E.** Longevity of ice in lunar polar craters (In Prep)

Conference Proceedings:

1. **Bjonnes, E.**, Johnson, B. C., Andrews-Hanna, J. C., Garrick-Bethell, I., and Kiefer, W. S. (2022) Excavation of lightly shocked deep lunar material during crater collapse. In 85th Annual Meeting of the Meteoritical Society, Abstract #6516. Lunar and Planetary Institute, Houston, TX. Poster.
2. **Bjonnes, E.**, Johnson, B. C., Andrews-Hanna, J. C., Garrick-Bethell, I., and Bourikas, T. M. (2022) Excavation of Apollo sample 76535 during formation of the Serenitatis Basin. In Lunar and Planetary Science LII, Abstract #1551. Lunar and Planetary Institute, Houston, TX. Oral.

3. **Kaufman, S. V.**, Palumbo, A. M., Bjonnes, E., and Mustard, J. F. (2022) The mineralogic implications of impact-induced climate perturbations: Insight from conduction and reactive transport modeling. In Lunar and Planetary Science LII, Abstract #1543. Lunar and Planetary Institute, Houston, TX. Oral.
4. **Bjonnes, E.**, Johnson, B. C., and Evans, A. J. (2021) The Effects of Venus' Thermal Conditions on Multiring Basin Formation. In Lunar and Planetary Science LII, Abstract # 1513, Lunar and Planetary Institute, Houston, TX. Recorded Oral.
5. Crósta, A. P., Silber, E. A., Lopes, R. M. C., Malaska, M. J., Solomonidou, A., Johnson, B. C., Vance, S. D., Sotin, C., **Bjonnes, E.**, and Soderblom, J. S (2021) Exploring Habitability Conditions in Titan's Impact Record: The Formation of Menrva Crater. In Lunar and Planetary Science LII, Abstract # 2309, Lunar and Planetary Institute, Houston, TX. Poster.
6. **Bjonnes, E.**, Johnson, B. C., and Evans, A. J. (2020) Determining Venus' Thermal Conditions Through Multiring Basin Formation. In Lunar and Planetary Science LI, Abstract # 2511, Lunar and Planetary Institute, Houston, TX. Oral.
7. **Bjonnes, E.**, Johnson, B. C., and Andrews-Hanna, J. C. (2019) Exploring the Peak-Ring to Multiring Basin Transition on the Moon. In Lunar and Planetary Science L, Abstract # 2026, Lunar and Planetary Institute, Houston, TX. Oral.
8. **Bjonnes, E.**, Johnson, B. C., and Evans, A. J. (2018) Modeling of Mead impact basin and implications for planetary heat flow. American Geophysical Union Fall Meeting, Washington, D. C. Oral.
9. **Bjonnes, E.**, Johnson, B. C., and Silber, E. A. (2018) Formation of Impact Craters on Ganymede and Callisto as a Constraint on Ice Shell Structure. In Lunar and Planetary Science XLIX, Abstract # 1548, Lunar and Planetary Institute, Houston, TX. Oral.
10. **Bjonnes, E.**, Hansen, V. L., and Swenson, J. B. (2008) Results of equilibrium resurfacing Monte Carlo models on Venus. In Lunar and Planetary Science XXXIX, Abstract # 2410, Lunar and Planetary Institute, Houston, TX. Oral.
11. **Bjonnes, E.**, Hansen, V. L., Swenson, J. B., and Maclin, R. F. (2007) Equilibrium resurfacing of Venus: Results of Monte Carlo modeling. In Abstracts with Programs, Vol. 39, No. 6, Geological Society of America, Denver, CO. p. 589. Oral.
12. **Bjonnes, E.** and Zimbelman, J. (2006) Comparison of lava flows from Hawaii and Asraeus Mons. In Lunar and Planetary Science XXXVIII, Abstract # 1733, Lunar and Planetary Institute, Houston, TX. Poster.
13. **Bjonnes, E.** and Delaney, J. S. (2005) Comparison of the Lithologies on the Surface of the Asteroid 4 Vesta based on the Petrology of 91 & 92 Series Antarctic Achondrites. In Lunar and Planetary Science XXXVI, Abstract #1344, Lunar and Planetary Institute, Houston, TX. Poster.
14. **Bjonnes, E.** and Lindsay, J. F. (2005) The depositional setting of Earth's oldest sedimentary rocks. In Lunar and Planetary Science XXXVI, Abstract #1821, Lunar and Planetary Institute, Houston, TX. Poster.
15. **Bjonnes, E.** and Delaney, J. S. (2004) Constraints on the lithological variation of the HED planetoid from the petrology of 91 & 92 series Antarctic achondrites. In Lunar and Planetary Science XXXV, Abstract #1030, Lunar and Planetary Institute, Houston, TX. Poster.

Invited Talks:

The Lunar and Planetary Institute, Houston, TX; Seminar Presentation, July 2022
 Purdue University, West Lafayette, IN; Invited Lecture, November 2021
 Lunar and Planetary Institute, Houston, TX; Seminar Presentation, September 2021
 VEXAG Colloquium Series, “Venus’ Heat Engine: Running or Idling?” August 2021
 University of California, Santa Cruz, CA; Colloquium Presentation, April 2021
 DLR - DAAD, Berlin, Germany; Colloquium Presentation, April 2021
 Southwest Research Institute, Boulder, CO; Colloquium Presentation, April 2021
 Brown University, Providence, RI; Invited Lecture, January 2021

Recognitions:

2022 – Present Graham Ryder Postdoctoral Fellow, The Lunar and Planetary Institute
 2022 Participant in the DART Borders Program
 2021 Dissertation Fellow, Brown University
 2020 Bevan French Research Fellow, Brown University
 2018 Outstanding Student Presentation Award, AGU Annual Meeting
 2006 Recipient of the Frantes Grant in September, University of Minnesota - Duluth
 Recipient of the Vinton Gwinn Award, Dept of Geological Sciences, Rutgers
 University
 2005 Recipient of an Aresty Foundation Research Grant, Rutgers University
 2004 Recipient of the Robert E. Sells Physics Scholarship, Rutgers University

Professional Service:

2022 Reviewer, Journal of Geophysical Research – Planets
 Reviewer, American Astronomical Society
 Panel Member, NASA Proposal Review Panel
 2021 Reviewer, Journal of Geophysical Research – Planets
 Reviewer, Icarus
 2018 Executive Secretary, NASA Proposal Review Panel

Department Service:

2022 Contributor, Planetary Newsletter; The Lunar and Planetary Institute
 2021 Diversity and Inclusion Action Committee Member; Brown University
 Graduate Student Department Representative; Brown University
 2020-2021 Diversity and Inclusion Action Committee Member; Brown University
 Graduate Student Department Representative; Brown University
 Planetary Working Climate Council Student Member; Brown University
 2019-2020 Diversity and Inclusion Action Committee Member; Brown University
 Diversity Working Group (DWG) Co-Chair; Brown University
 2018-2019 GeoClub Co-President; Brown University
 Diversity Working Group (DWG) Co-Chair; Brown University

Teaching Experience:

Teaching Assistant, Brown University:

EEPS 1810 – Physics of Planetary Evolution, Prof. Alexander Evans (Fall 2020)

EEPS 0850 – Weather and Climate, Prof. Meredith Hastings (Spring 2020)

Summer at Brown, Brown University:

CEPI 0927 – Dynamics of Solar System Formation (2019, 2020, 2021)

CEPI 0926 – Computational Physics (2020, 2021)

Teaching Assistant, University of Minnesota, Duluth:

GEOL 4450 – Structural Geology, Prof. Vicki Hansen (Spring 2008)

GEOL 1110 – Geology and Earth Systems (Fall 2008)

Mentoring:

Jon Brunton, Purdue University, Undergraduate Research Assistant (Summer and Fall 2020)

Work Experience:

Petroleum Geo-Services, Project Interpreter; November 2012-2017; Houston, TX

Led proprietary & internal projects in Eastern (US), Western (US), and Mexican Gulf of Mexico

Used seismic data to identify and interpret geologic structures including salt bodies and salt body overhangs, shale bodies, carapace layers, channel beds, gas pockets, and 3-way and 4-way oil traps

Took extended geology and geophysics classes including those in specialized salt evolution, depth imaging, and principals of geophysics

Attendance of yearly professional conferences

CGGVeritas, Seismic Imager; April 2009-November 2012; Houston, TX

Led projects in Eastern and Western Gulf of Mexico (US)

Used seismic data to identify and interpret geologic structures including salt bodies and salt body overhangs, shale bodies, carapace layers, channel beds, gas pockets, and 3-way and 4-way oil traps

Signal processing of raw data

Advanced education in salt tectonics, Gulf of Mexico geology

Attendance of yearly professional conferences