

# Cauê Sciascia Borlina

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## Education

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- 2016 - **Ph.D.** Planetary Science, Department of Earth, Atmospheric, and Planetary Sciences  
Massachusetts Institute of Technology, Cambridge, MA  
Advisors: Benjamin P. Weiss and Tanja Bosak
- May 2016 **B.S.E.** Honors including *summa cum laude*, Aerospace Engineering  
**Minor**, Physics  
University of Michigan, Ann Arbor, MI

## Current Appointment

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- Jun. 2016 – Graduate Student Researcher, Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology

## Past Appointments

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- Jan. – May 2016 Undergraduate Instructional Aide, Aerospace Department, University of Michigan
- Assisted Prof. Krzysztof Fidkowski with the course 423 in the Aerospace Department by holding office hours and review sessions, conducting lectures, and grading materials for the course.
- Jun. – Sep. 2015 Planetary Chemistry and Astrobiology Intern, Planetary Science, NASA Jet Propulsion Laboratory (JPL)
- Studied the implications of a physical model developed for Enceladus' Tiger Stripes dynamics by applying it to the fractures at the surface of Europa. Worked on defining surface stress field at the surface of Europa by using viscoelastic theory and implementing numerical methods recipes to obtain time variable solutions. Mentored by Dr. Steven Vance (JPL) and Prof. Edwin Kite (University of Chicago).
- Jun. – Sep. 2014 Undergraduate Research Fellow, Department of Geological and Planetary Sciences, California Institute of Technology
- Modeled thermal and physical evolution of sedimentary rocks at Gale crater with implications correlating diagenetic findings by the NASA's MSL mission to thermal, geological and geophysical characteristics of early Mars. Leading author peer-reviewed paper published and talk given at the Lunar and Planetary Science Conference 2015. Mentored by Prof. Bethany Ehlmann.
- Oct. 2013 – May 2016 Scientific Collaborator, NASA's Mars Science Laboratory (MSL) Mission, University of Michigan
- Analyzed data from the Rover Environmental Monitoring Station (REMS) on board of MSL. Projects included determination of thermal inertia and surface energy budget at Gale crater, and detection of potential frost events at MSL's traverse. Co-authored two peer reviewed papers. Mentored by Dr. Germán Martínez and Prof. Nilton Renno.
- May 2013 – May 2016 Assistant in Research, Department of Climate and Space Sciences and Engineering, University of Michigan
- Investigated saltation processes and a mechanism for dust formation at Owens Lake, a salty playa in California responsible for large dust production. One peer reviewed paper published and a second in preparation. Further involvement included design, build and test of an ice accumulation avoidance detector for aircraft operations, and participation in the development of the Michigan Mars Environmental Chamber. Mentored by Prof. Nilton Renno.
- May 2012 – May 2016 Study Abroad Mentor, Grupo Educacional Etapa, Sao Paulo, Brazil
- Mentored students through college applications and provided career advising. More than 50 students have been coached so far. Currently advising three students.

## Activities and Projects

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- Jan – May 2016 Board Member, School of Engineering Honors Program Student Advisory Board, University of Michigan
- Appointed board member for the School of Engineering Honors Program. Main responsibilities included advise the program by providing new ideas and feedback on the current requirements and format, and coordinate outreach events.
- Sep. – Jan. 2016 Co-Founder, G2V Space Systems
- Started a company with to goal to deliver space weather forecasting and warning time to help protect vital technologies from catastrophic solar disturbances. Awarded the Dare to Dream grant from the University of Michigan's Ross School of Business and currently on round two of the Michigan Business Challenge.
- Jan. 2015 – May 2016 President, Students for Exploration and Development of Space (SEDS), University of Michigan
- Coordinated outreach events and STEM projects with local schools, developed technical projects and planned Yuri's Night under a \$6500 budget. Head of a council formed by 15 students and a club with more than 200 active members.
- Jan. – Sep. 2015 Project Manager, Underwater Vehicle for Europa Exploration (UVEE), University of Michigan
- Founded group to develop a long distance controlled underwater rover for Europa (Jupiter's moon) exploration. Managed ten members on five different subsystems. Project mentored by Prof. Justin Kasper.
- Sep. 2014 – Jan. 2016 Outreach Committee Chair, American Institute of Aeronautics and Astronautics (AIAA), University of Michigan
- Organized the Aerospace Day as well several other outreach events around the Ann Arbor area. Aerospace Day is a major outreach event with 140 students experiencing STEM related projects during the day. Committee composed by twenty engineering students.

- Dec. 2013 – Internal Vice President, Sigma Gamma Tau (National Honor Society for Aerospace Engineering), University of Michigan
- Jan. 2016
- Planned review sessions for Aerospace courses, conducted peer advising, promoted seminars with professors from the college and developed series of Matlab and Mathematica tutorials for second year engineering students. Started a \$1000 leadership award for students in the department. Further involvement included academic chair for two terms.
- Sep. – Jul. 2014
- Member, Centennial Anniversary Committee, Department of Aerospace Engineering, University of Michigan
- Organized efforts to represent the Aerospace Department/University of Michigan at the EAA AirVenture Oshkosh 2014. Led a group of 15 students during the organization of the project. Further involvement included planning outreach events with the Ypsilanti Community Middle School.
- Sep. – Jul. 2013
- Mechanical System Chief Engineer, Student Space Systems Fabrication Laboratory, University of Michigan
- Built, designed and tested several supports for different instrumentation of the Michigan Mars Environmental Chamber. Led a group of 5 students.

### Honors, Awards and Fellowships

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- Sep. 2018 Shrock Fellowship, Massachusetts Institute of Technology
- Jun. 2017 MSL Extended Mission-1 Science and Operations Team, NASA Group Achievement Award
- Sep. 2017 Grayce B. Kerr Fellowship, Massachusetts Institute of Technology
- Sep. 2016 Presidential Graduate Fellowship Award, Massachusetts Institute of Technology
- Mar. 2016 Distinguished Leadership Award, University of Michigan
- Jun. 2015 MSL Prime Mission Science and Operations Team, NASA Group Achievement Award
- 2012 – 15 Dean's List, University of Michigan (Fall 2012, Winter 2013, Fall 2013, Winter 2014, Fall 2014, Winter 2015, Fall 2015, Winter 2016).
- 2012 – 15 University Honors, University of Michigan (Fall 2012, Winter 2013, Fall 2013, Winter 2014, Fall 2014, Winter 2015, Fall 2015, Winter 2016).
- Jul. 2014 Summer Undergraduate Research Fellowship, California Institute of Technology
- Mar. 2014 James B. Angell Scholar, University of Michigan.
- Oct. 2013 Aviation Week Twenty20s, Raytheon/*Aviation Week* - Recognizes best 20 Engineering, Math, Science and Technology students in the United States.
- Apr. 2013 Engineering Leadership Recognition, Student Space Systems Fabrication Laboratory.

### Journal Articles

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- 2018 **Borlina, C. S.**, Weiss, B. P., Lima, E. A., [...] Maloof, A. C. Re-evaluating the evidence for a Hadean-Eoarchean Dynamo. *Under Review*.
- 2018 Tang, F., Taylor, R. J. M., [...] **Borlina, C. S.**, [...] Harrison, R. J. Secondary magnetite in ancient zircon precludes analysis of a Hadean geodynamo. *Under Review*.
- 2018 Pajusalu M., **Borlina, C. S.**, Seager S., Ono S., Bosak T. Open-source sensor for measuring oxygen partial pressures below 100 microbars. *PLOS ONE (in press)*.
- 2018 Weiss, B. P., Fu, R. R., Einsle, J. F., ...**Borlina, C. S.**, [...] Walsworth R. L. Secondary magnetic inclusions in detrital zircons from the Jack Hills, Western Australia and implications for the origin of the geodynamo. *Geology*.
- 2017 **Borlina, C. S.**, & Renno, N. O. The Impact of a Severe Drought on Dust Lifting in California's Owens Lake Area. *Nature Scientific Reports*.
- 2015 Harrison, R. G., Barth, E., Esposito, F., Merrison, J., Montmessin, F., Aplin, K. L., **Borlina, C. S.**, Berthelier, J. J., Déprez, G., Farrell, W., Houghton, I. M. P., Renno, N. O., Nicoll, K. A., Tripathi, S. N., Zimmerman, M. Applications of electrified dust and dust devil electrostatics to Martian atmospheric electricity. (*Space Science Reviews; also book chapter in ISSI series*).
- 2015 Martínez, G. M., Renno, N. O., Fischer, E., **Borlina, C. S.**, [...] Gomez-Elvira, J. Likely frost events at Gale Crater: analysis from MSL/REMS measurements. *Icarus*.
- 2015 **Borlina, C. S.**, Ehlmann, B. L., & Kite, E. S. Modeling the Thermal and Physical Evolution of Mount Sharp's Sedimentary Rocks, Gale Crater, Mars: Implications for Diagenetic Minerals on the MSL Curiosity Rover Traverse. *Journal of Geophysical Research: Planets*.
- 2014 Martínez, G. M., Renno, N. O., Fischer, E., **Borlina, C. S.**, [...] Haberle, R. M. Surface energy budget and thermal inertia at Gale Crater: Calculations from ground-based measurements. *Journal of Geophysical Research: Planets*.

### Talks and Conference Proceedings

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- 2018 **Borlina, C. S.**, Weiss B. P., Lima E. A., [...] Maloof, A. C., 2018, December. Revisiting the evidence for the Hadean dynamo. *AGU Fall Meeting Abstracts*.
- 2018 **Borlina, C. S.**, Weiss B. P., Lima E. A., [...] Maloof, A. C., 2018, August. Questioning the evidence for the Hadean dynamo. Goldschmidt 2018.
- 2017 **Borlina, C. S.**, Weiss B. P., Lima E. A., [...] Einsle J., 2017, December. Paleomagnetism of Hadean to Neoproterozoic Detrital Zircons from the Jack Hills, Western Australia. *AGU Fall Meeting Abstracts*.
- 2017 **Borlina, C. S.**, Pajusalu, M., Bosak, T., 2017, June. Assessing Activity of Facultative Anaerobes at Nanomolar Oxygen Concentration Environments. Geobiology Society Conference 2017.
- 2016 Martínez, G., McConnochie, T., Renno, N., Meslin, P.Y., Fischer, E., Vicente-Retortillo, A., **Borlina, C.**, Kemppinen, O., Genzer, M., Harri, A.M. and de la Torre-Juárez, M., 2016, April. Diurnal variation of atmospheric water vapor at Gale

- crater: Analysis from ground-based measurements. In *EGU General Assembly Conference Abstracts* (Vol. 18, p. 9297).
- 2016 Martínez, G.M., McConnochie, T., Renno, N.O., Meslin, P.Y., Fischer, E., Vicente-Retortillo, A., **Borlina, C.S.**, Kemppinen, O., Genzer, M., Harri, A.M. and de la Torre-Juarez, M., 2016, March. Diurnal Variation of Near-Surface Atmospheric Water Vapor at Gale: Analysis from REMS and ChemCam Measurements. In *Lunar and Planetary Science Conference* (Vol. 47, p. 1761).
- 2015 Martínez, G. M., Fischer, E., Renno, N. O., Sebastián, E., Kemppinen, O., Bridges, N., **Borlina, C. S.**, Meslin, P.-Y., Genzer, M., Harri, A.-M., Vicente-Retortillo, A., Ramos, M., de la Torre Juárez, M., Gómez, F., Gómez-Elvira, J., and the REMS Team, 2015. Analysis of Likely Frost Events and Day-to-Night Variability in Near-Surface Water Vapor at Gale. American Geophysical Union. San Francisco, CA, USA.
- 2015 **Borlina, C. S.**, & Ehlmann, B. L. Modelling Diagenesis of Gale Crater Sedimentary Rocks: Scenarios Testable by the Curiosity Rover. In *Lunar and Planetary Science Conference* (Vol. 46, p. 1208).
- 2015 Martínez, G. M., [...] **Borlina, C. S.**, & Gómez-Elvira, J. Potential Sub-Micrometer-Thick Frost Events and Soil Water Content at Gale Crater: Calculations from MSL/REMS Measurements. In *Lunar and Planetary Science Conference* (Vol. 46, p. 2277).
- 2014 Martínez, G. M., [...] **Borlina, C. S.**, & Gómez-Elvira, J. Study of Potential Sub-Micrometer-Thick Frost Events and Soil Water Content at Gale Crater. In *AGU Fall Meeting Abstracts* (Vol. 1, p. 4014).
- 2014 Martínez, G. M., Renno, N., Fischer, E., **Borlina, C. S.**, ... & Gómez-Elvira, J. Ground-Atmosphere Interactions at Gale: Determination of the Surface Energy Budget, Thermal Inertia and Water Sorption on the Regolith. In *EGU General Assembly Conference Abstracts* (Vol. 16, p. 9081).
- 2014 Fischer, E., Martínez, G. M., Elliott, H., **Borlina, C. S.**, & Renno, N. Experimental Demonstration of the Formation of Liquid Brines under Martian Polar Conditions in the Michigan Mars Environmental Chamber. In *EGU General Assembly Conference Abstracts* (Vol. 16, p. 9162).
- 2013 Fischer, E., Martínez, G. M., Elliott, H. M., **Borlina, C. S.**, & Renno, N. O. The Michigan Mars Environmental Chamber: Preliminary Results and Capabilities. In *AGU Fall Meeting Abstracts* (Vol. 1, p. 1928).
- 2013 **Borlina, C. S.**, & Renno, N. O. Developing a Camera to Replicate the HiRISE Spectral Bands. In *AbGradCon 2013*.

#### **Invited Talks**

- 2018 **Borlina, C. S.**, 2018, October. Discutindo as evidências de um dynamo entre o Eon Hadean e a Era Eoarqueana. University of Sao Paulo, São Paulo, Brazil.