

Jamie L Molaro, PhD

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RESEARCH INTERESTS

Dr. Molaro has extensive experience in thermal and mechanical numerical modeling, an early background in terrestrial fieldwork and instrumentation, and is an expert on the properties of rocks and regolith on airless body surfaces. Molaro's investigations modeling bedrock, boulder, and grain-scale temperatures and stresses in rocky and icy material were the first to quantify the efficacy of thermal breakdown on airless bodies. This work is now being extended with in-situ observations of thermal rock breakdown as a Participating Scientist on the OSIRIS-REx mission, and with laboratory investigations as a Co-I on Project ESPRESSO, a SSERVI node. As part of the Enceladus Surface Sampler team at JPL, Molaro also performs numerical and laboratory investigations to study ice sintering and densification on comets and icy satellites, with a focus on characterizing the microstructural evolution of their properties for future exploration efforts. Prior to entry into the field, both of these surface processes were little known to the planetary science community. Molaro's work and expertise in these areas has fundamentally transformed our understanding of landscape evolution on these bodies, which has significant implications for our ability to explore small bodies in the solar system. Other projects include fracture processes on comet 67P/C-G, thermal moonquakes, regolith creep and mobilization, thermal shock processes on Mercury-crossing asteroids, and the multi-scale nature of landscape evolution.

EDUCATION & PROFESSIONAL POSITIONS

2017-pres	Research Scientist	<i>Planetary Science Institute</i>
2017-pres	Affiliate/Contractor	<i>Jet Propulsion Laboratory</i>
2015-2017	NASA Postdoctoral Program Fellow	<i>Jet Propulsion Laboratory</i>
2009-2015	Ph.D. & M.S. Planetary Science	<i>University of Arizona</i>
2013-2014	Certificate in College Teaching	<i>University of Arizona</i>
2008-2009	Research Assistant	<i>NASA Ames Research Center</i>
2008	Science Undergraduate Laboratory Intern	<i>Fermi National Accelerator Laboratory</i>
2004-2008	B.S. Physics	<i>San Francisco State University</i>

MISSIONS & PROJECTS

OSIRIS-REx: Participating Scientist on the Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer (*OSIRIS-REx*) mission to retrieve a sample from asteroid Benu.

Project ESPRESSO: Co-I on the Project for Exploration Science Pathfinder Research for Enhancing Solar System Observations, a node of the Solar System Exploration Research Virtual Institute (SSERVI).

Enceladus Surface Sampling Task Team: Member of a team at JPL tasked with characterizing the mechanical properties of the surface of Enceladus and developing sampling technology.

AWARDS & HONORS

2017 Jet Propulsion Laboratory STAR Award, Jet Propulsion Laboratory

2016 Gerard P. Kuiper Memorial Award, Lunar and Planetary Laboratory, University of Arizona

2015-2017 NASA Postdoctoral Program Fellowship, NASA, Caltech/Jet Propulsion Laboratory

2015 Outstanding Student Poster Award, European Geophysical Union

2015 College of Science Graduate Service Award (college-wide award), University of Arizona

2014-2015 Graduate Student Award for Service, Lunar and Planetary Laboratory, University of Arizona

2012-2015 NASA Earth and Space Science Fellowship

2014 1st Place, Exploration Science Forum Student Poster Competition, SSERVI

2014 Student Travel Grant, Eighth International Conference on Mars

2011 Galileo Circle Scholar, University of Arizona College of Science

2008 Graduation Honors Convocation Departmental Honoree, San Francisco State University

2007 Eden Academic Excellence Award, San Francisco State University

2004-2008 San Francisco State University Presidential Scholar (full scholarship)

FUNDED RESEARCH PROPOSALS

2018-2021, *NASA Solar System Workings Program*, The microstructural evolution of solar system ices through sintering (PI)

2017-2020, *NASA OSIRIS-REx Participating Scientist Program*, The role of thermal cycling in regolith production and surface evolution on (101955) Bennu (PI)

2017-2022, *NASA Solar System Exploration Research Virtual Institute*, Exploration Science Pathfinder Research for Enhancing Solar System Observations (Co-I)

2015-2017, *NASA Postdoctoral Program Fellowship*, Thermally Induced Breakdown of Airless Body Surfaces (Science-PI)

2012-2015, *NASA Earth and Space Science Fellowship*, Thermal Stress Weathering in the Inner Solar System (Science-PI)

2012-2015, NASA Outer Planets Research, Erosion on Titan as revealed by its crater population (grad student)

2011, *NASA Planetary Geology and Geophysics*, Thermal Weathering in the Inner Solar System (Co-I)

PEER REVIEWED PUBLICATIONS

- 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, and M. Pajola, 2019. Craters, boulders and regolith of (101955) Bennu indicative of an old and dynamic surface. *Nature Geoscience*, p.1.
- 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. D. d'Aubigny, et al [including **J. L. Molaro**], 2019. Properties of rubble-pile asteroid (101955) Bennu from OSIRIS-REx imaging and thermal analysis. *Nature Astronomy*, p.1.
- Graves, K. J., D. A. Minton, **J. L. Molaro**, M. Hirabayashi, 2019. Resurfacing asteroids from thermally induced surface degradation. *Icarus*, DOI: 10.1016/j.icarus.2019.01.003.
- Molaro, J. L.**, M. Choukroun, C. B. Phillips, E. S. Phelps, R. Hodyss, K. L. Mitchell, J. L. Lora, G. Merion-Griffith, 2018. The microstructural evolution of water ice in the solar system through sintering. *Journal of Geophysical Research: Planets*, 10.1029/2018JE005773.
- 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, 2018. OCEANUS: A Focused Mission to the Uranus System. *Acta Astronautica*, 148, pp.1-11.
- Molaro, J. L.**, S. Byrne, and J.-L. Le, 2017. Thermally induced stresses in boulders on airless body surfaces, and implications for rock breakdown. *Icarus* 294, 247-261.
- Neish, C., J. L. **Molaro**, J. M. Lora, A. D. Howard, R. L. Kirk, P. Schenk, V. J. Bray, and R. D. Lorenz, 2016. Fluvial erosion as a mechanism for crater modification on Titan. *Icarus*, 270: 114-129.
- Molaro, J. L.**, 2015. Stress, on the rocks: Thermally induced stresses in rocks and microstructures on airless bodies, implications for breakdown. *University of Arizona*, 3733225. [PhD Thesis]
- Eppes, M. C., A. Willis, J. L. **Molaro**, S. Abernathy, and B. Zhou, 2015. Cracks in Martian boulders exhibit preferred orientations that point to solar-induced thermal stress. *Nature Communications*, 6, 6712: 10.1038/ncomms7712.
- Molaro, J. L.**, S. Byrne, and S. Langer, 2015. Grain-scale thermoelastic stresses and spatiotemporal temperature gradients on airless bodies, implications for rock breakdown. *JGR Planets* 120: 10.1002/2014JE004729.
- Xiao, Z., Z. Zeng, N. Ding, and J. L. **Molaro**, 2013. Mass wasting features on the moon – how active is the Lunar surface? *Earth and Planetary Science Letters* 376: 1-11.
- Molaro, J. L.**, and S. Byrne, 2012. Rates of Temperature Change of Airless Landscapes and Implications for Thermal Stress Weathering. *Journal of Geophysical Research* 117, E10: 10.1029/2012JE004138.
- Pelletier, J. D., S. B. DeLong, C. A. Orem, P. Becerra, K. Compton, K. Gressett, J. Lyons-Baral, L. A. McGuire, J. L. **Molaro**, J. C. Spinler, 2012. How do vegetation bands form in dry lands? Insights from numerical

modeling and field studies in southern Nevada, USA. *Journal of Geophysical Research* 117, F4: 10.1029/2012JF002465.

Molaro, J. L., and C. P. McKay, 2010. Processes controlling rapid temperature variations on rock surfaces. *Earth Surface Processes and Landforms*, 35: 501-507.

McKay C. P., **J. L. Molaro**, and M. M. Marinova, 2009. High-frequency rock temperature data from hyper arid desert environments in the Atacama and the Antarctic Dry Valleys and implications for rock weathering. *Geomorphology*, 110: 183-187.

MANUSCRIPTS IN PREPARATION

Molaro, J. L., R.-L. Ballouz, E. R. Jawin, K.-J. Walsh, M. Delbo, W. Bottke, and others on the OSIRIS-REx Team. Direct observation of thermally induced fracture processes on asteroid 101955 Benu.

Molaro, J. L., P. Becerra, C. Herny, R. Marschall, M. R. El-Maarry, N. Thomas, A. Pommerol, and P. Theologou. Thermally-driven formation mechanisms for fractures on Comet 67P/Churyumov-Gerasimenko.

Mitchell, K. L., R. Hodyss, M. Choukroun, **J. L. Molaro**, A. Le Gall, U. Khankhoje, J. C. Castillo, R. West, M. Janssen. Enceladus' brilliant surface: Insights into sub-gridscale surface structure from analysis of results from multiple Cassini instruments.

SERVICE & PROFESSIONAL MEMBERSHIPS

Peer Review & Other Service

DPS local organizing committee, 2016-2018
Session chair at the 2016/18 AGU and 2017 LPSC meetings
Reviewer for CDAP, NESSF, CosmoQuest. Executive secretary for MFRP.
Reviewed papers in *Icarus*, *Geology*, *Journal of Geophysics and Engineering*,
Geophysical Research Letters, and *Geosci. Instr., Methods and Data Systems*
Participation in a Keck Institute for Space Studies (KISS) workshop: Accessing the
Subsurface Oceans of Icy Worlds

Member

American Geophysical Union, Division for Planetary Sciences, The Explorers Club, The
Planetary Society

Invited Talks

Seminar at the Southwest Research Institute (2018)
Arizona Geological Society (2014)
Geological Society of America Annual Meeting (2012)

PROFICIENCIES AND PROFESSIONAL TRAININGS

Software/Languages: Matlab, NAIF SPICE Toolkit, OOF2, COMSOL Multiphysics
Datasets: Use of camera (e.g., LROC) and altimeter (e.g., LOLA, HiRISE DEMs) datasets, asteroid shape models, and thin section images with the above software
Mission Design: NASA-JPL's 28th Annual Planetary Science Summer School (2016)
Instrumentation: Campbell Scientific dataloggers and weather instruments, PAC Acoustic Emission Sensors, Instec Cryostage, Olympus BX51 microscope, LN2 cryosystems
Fieldwork: Planetary Geology Field Studies - field practicum course, multiple southwest locations
Field Studies in Geomorphology - field practicum course, Nevada (Pelletier et al, 2012)
Scientist with NASA Spaceward Bound, 2008-2012 (Molaro and McKay, 2010)

TEACHING EXPERIENCE

Fall 2014, Course Developer and Instructor, Introduction to Planetary Science for Teachers, *University of Arizona*
Spring 2010 and Fall 2010, Teacher's Assistant for two undergraduate courses, *University of Arizona*

EDUCATION AND PUBLIC OUTREACH

On-Going: Produce science and data-driven art promoted on social media and at www.dataarcana.com
2019: Interview on AZPM about OSIRIS-REx (<https://tinyurl.com/y3p2xy5d>)
2018: Organize tours of JPL for various middle and high school groups and educational organizations
2018: Interview on ROCKETGUT! blog (<https://www.rocketgut.com/stories/ss2>)
2018: Interview for Transverse RANGES online magazine (<https://www.transverseranges.com/articles/molaro/>)
2014, 2016-18: TAPS@DPS - Organized an Art of Planetary Science exhibition at the DPS Fall Meeting
2017: Panelist for Exploring by the Seat of Your Pants: Celebrating Space!
2013-2017: The Art of Planetary Science, founder and organizer, University of Arizona - The Lunar and Planetary Lab's annual art exhibition features science art (www.lpl.arizona.edu/art)
2017: Panelist for the Nevada County Reads, theme of The Martian and careers in space science
2016: Interview on Nina Unlocked sci-fi webseries (<http://www.recursor.tv/>)
2014: Interview on the SideStreets podcast
(<http://sidestreetspodcast.tumblr.com/post/94598953352/episode-025-floating-in-space-with-jamie-molaro>)
2014: Interview on The Digits! Blog
<http://watchthedigits.com/jamie-molaro-studies-other-planets-from-right-here-on-earth/>
2009-2015: General, University of Arizona
EPO volunteer for many Lunar and Planetary Laboratory outreach events
2008-2012: Organizer (2009) and scientist with the NASA Spaceward Bound field research and teacher education program
2005: Panelist on National Public Radio, Forum with Michael Krasny - The Future of Interdisciplinary Studies
(<http://www.kqed.org/a/forum/R504260900>)

CONFERENCE ABSTRACTS

- Molaro, J. L., et al., 2019, DPS-EPSC. Thermally driven fracture processes on asteroid Bennu: Relating simulations to observations
- Delbo, M., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. Distribution of fractures on boulders on (101955) Bennu: OSIRIS-REx searching for evidence of thermal cracking
- DellaGiustina, D., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. Interpretation of Color and Albedo Variation on Bennu
- Pajola, M., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. Boulders inside the craters of asteroid (101955) Bennu: Surface densities and size-frequency distributions
- Rizk, B., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. Exposed inclusions or fallback? A closer look at Bennu's weathered boulders
- Ryan, A., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. Physical Interpretation of Bennu's Thermal Inertia
- Schwartz, S., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. The Global Distribution of Boulder Orientations on (101955) Bennu
- Walsh, K., et al. [including **J. L. Molaro**], 2019, DPS-EPSC. Geology of Bennu's equatorial ridge
- Jawin, E. R., et al. [including **J. L. Molaro**], 2019, JpGU. Evidence of mass-movement and boulder transport on Bennu from NASA's OSIRIS-REx Space Mission.
- Dworkin, J. P., et al. [including **J. L. Molaro**], 2019, AbSciCon. OSIRIS-REx EXPLORES ASTEROID (101955) BENNU: A PRIMITIVE NEAR-EARTH ASTEROID.
- J. L. Molaro**, M. Delbo, R.-L. Ballouz, E. Jawin, K. Walsh, M. Pajola, T. J. McCoy, S. Schwartz, C. M. Elder, D. N. DellaGiustina, B. Rizk, C. D. d'Aubigny, D. S. Lauretta, and the OSIRIS-Rex Team, 2019, LPSC. Fracture Formation Mechanisms on Bennu and Evidence of Thermally Driven Breakdown.
- J. L. Molaro**, K. Walsh, E. Jawin, R.-L. Ballouz, M. Pajola, S. Schwartz, J. P. Dworkin, H. C. Connolly, and D. S. Lauretta, 2019, LPSC. Team Dynamics During a Four-day Effort to Map Bennu's Surface: A Collaborative Effort.
- Delbo, M., **J. L. Molaro** et al., incl. the OSIRIS-REx team, 2019, LPSC. Distribution of cracked boulders on (101955) Bennu: searching for evidence of solar-induced thermal stress
- Ballouz, R.-L., et al. incl. **J. L. Molaro**, and the OSIRIS-REx team, 2019, LPSC. Crater Erasure on Small Bodies: Synthesizing Dynamical Surface Processes in Bennu's Journey to Near-earth Space.
- Lauretta, D. S., et al. incl. **J. L. Molaro**, and the OSIRIS-REx team, 2019, LPSC. Osiris-rex Arrives at Asteroid (101955) Bennu: Exploration of a Hydrated Primitive Near-earth Asteroid.
- Jawin, E. R., et al. incl. **J. L. Molaro**, and the OSIRIS-REx team, 2019, LPSC. The Geology of Bennu's Biggest Boulders
- Pajola, M., et al. incl. **J. L. Molaro**, and the OSIRIS-REx team, 2019, LPSC. Size-frequency Distribution of Boulders >1 m in Selected Areas of Asteroid 101955 Bennu.
- Walsh, K. J., et al. incl. **J. L. Molaro**, and the OSIRIS-REx team, 2019, LPSC. Bennu's Global Geology.
- 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. Elder, P. Michel, **J. L. Molaro**, M. C. Nolan, S. R. Schwartz, & The OSIRIS-REx Team, 2019, Italian Congress of Planetology, Scientific Analysis of the Size-Frequency Distribution of Boulders >10 m on Asteroid 101955 Bennu
- Molaro, J. L.**, M. Pajola, C. M. Elder, 2018, AGU Fall Meeting, The interaction between grain- and boulder-scale effects on thermally induced rock breakdown

- Molaro, J. L.**, M. Pajola, C. M. Elder, 2018, DPS Meeting, The interaction between grain- and boulder-scale effects on thermally induced rock breakdown
- 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. Elder, P. Michel, **J. L. Molaro**, M. C. Nolan, S. R. Schwartz, & The OSIRIS-REx Team, 2018, AGU Fall Meeting, Scientific Analysis of the Size-Frequency Distribution of Boulders >10 m on Asteroid 101955 Bennu
- Mitchell, K. L., R. Hodyss, M. Choukroun, **J. L. Molaro**, and A. Le Gall, 2018, COSPAR, Enceladus' brilliant surface: rationalizing Cassini radar and optical remote sensing observations
- Badescu, M., P. Backes, S. Moreland, A. Brinkman, D. Riccobono, M. Dotson, N. Csomay-Shanklin, S. Ubellacker, **J. L. Molaro**, M. Choukroun, G. Genta, 2018, IEEE. Sampling Tool Concepts for Enceladus Lander In-Situ Analysis.
- Molaro, J. L.**, P. Becerra, C. Herny, R. Marschall, M. R. El-Maarry, N. Thomas, A. Pommerol, and P. Theologou, 2018, LPSC #2881, Thermally-driven formation mechanisms for fractures on Comet 67P/Churyumov-Gerasimenko
- Molaro, J. L.**, G. Merion-Griffith, C. B. Phillips, K. L. Mitchell, R. Hodyss, M. Choukroun, 2018, LPSC #2977, Microstructural evolution of solar system ices through sintering.
- Mitchell, K. L., R. Hodyss, M. Choukroun, **J. L. Molaro**, and A. Le Gall, 2018, LPSC #2924, Enceladus' brilliant surface 2: rationalizing cassini radar and optical remote sensing.
- Siegler, M. A., J-P. Williams, **J. L. Molaro**, D.A. Paige, 2018 LPSC #2083, Temperatures at the Taurus-Littrow Valley: Legacy of the Apollo 17 heat flow experiment and LRO Diviner.
- Weber, R. C., J.-L. Dimech, D. Phillips, **J. L. Molaro**, N. C. Schmerr, and C. Fassett, 2018, LPSC #1497, Thermal moonquakes: Implications for surface properties.
- Molaro, J. L.**, C. B. Phillips, and G. Merion-Griffith, 2017, AGU, Ice sintering timescales at the surface of Europa and implications for surface properties.
- Molaro, J. L.**, C. B. Phillips, and G. Merion-Griffith, 2017, DPS, Ice sintering timescales at the surface of Europa and implications for surface properties.
- C. B. Phillips, **J. L. Molaro**, and K. P. Hand, 2017, DPS, Surface modification and surface / subsurface exchange processes on Europa
- Weber, R, J. Dimech, D. Phillips, **J. L. Molaro**, and N. Schmerr, 2017, DPS, A new moonquake catalog from Apollo 17 seismic data I: Lunar Seismic Profiling Experiment: Thermal moonquakes and implications for surface processes
- Graves, K., D. Minton, **J. L. Molaro**, M. Hirabayashi, 2017, DPS, Resurfacing Asteroids From Thermally Induced Surface Degradation
- Molaro, J. L.**, P. Becerra, C. Herny, R. Marschall, M. R. El-Maarry, N. Thomas, A. Pommerol, and P. Theologou 2017, EPSC, Thermally-driven formation mechanisms for fractures on Comet 67P/Churyumov-Gerasimenko
- Molaro, J. L.**, G. Merion-Griffith, and C. B. Phillips, 2017, LPSC, Ice sintering timescales at the surface of Europa and implications for surface strength.
- Molaro, J. L.**, and C. B. Phillips, 2017, LPSC, Thermomechanical behavior of ice and ice-rock mixtures at the mineral grain scale.
- Phillips, C. B., and **J. L. Molaro**, 2017, LPSC, Europa's surface properties and processes.
- Bramson, A.M., C. M. Elder, 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, 2017, LPSC, OCEANUS: A Concept Study for a Uranus Orbiter Mission from the 2016 NASA/JPL Planetary Science Summer School.
- 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. Slipiski, S. Valencia, A. Das, J. Watkins, C. Young, C. J. Budney, K. L. Mitchell, 2016, SBAG, OCEANUS: A Concept Study for a Uranus Orbiter Mission from the 2016 NASA/JPL Planetary Science Summer School.
- Molaro, J. L.**, and S. Byrne, 2016, DPS, Thermally induced stresses in boulders on the Moon: Implications for breakdown
- Molaro, J. L.**, P. Hayne, and S. Byrne, 2016, LPSC, Thermally induced stresses in boulders on the Moon: Implications for breakdown
- Molaro, J. L.**, and S. Byrne, 2015, LPSC, Thermoelastic Stresses on Airless Bodies: Comparing Macro- to Microscopic Breakdown Processes
- Molaro, J. L.**, and S. Byrne, 2015, EGU Annual Meeting, Thermoelastic stresses on airless bodies and implications for rock breakdown
- Molaro, J. L.**, and S. Byrne, 2014, DPS Annual Meeting, Thermoelastic grain-scale stresses on airless and implications for rock breakdown.
- Molaro, J. L.**, J. T. Keane, S. Peacock, E. Schaefer, and H. Tanquary, 2014, DPS Annual Meeting, The Art Of Planetary Science: An Exhibition – Bringing Together The Art And Science Communities To Engage The Public
- Molaro, J. L.**, and S. Byrne, 2014, Exploration Science Forum, Thermoelastic grain-scale stresses on airless and implications for rock breakdown.
- Molaro, J. L.**, and S. Byrne, 2014, 8th Int. Conf. on Mars, Grain-Scale Thermoelastic Stresses on Phobos and Implications for Rock Breakdown.
- Byrne, S., P. Becerra, P. Russell, A. Pathare, **J. L. Molaro**, S. Mattson, and M. T. Mellon, 2014, 8th Int. Conf. on Mars Icy polar cliffs, stressed out and falling to pieces.
- Molaro, J. L.**, and S. Byrne, 2014, LPSC, Grain-Scale Thermoelastic Stresses on Airless Bodies and Implications for Rock Breakdown.
- Molaro, J. L.**, and J. T. Keane, 2014, LPSC, The Art of Planetary Science: An Exhibition
- Molaro, J. L.**, and S. Byrne, 2013, AGU Fall, Modeling grain-scale thermoelastic stresses on airless bodies.
- Molaro, J. L.**, and S. Byrne, 2013, LPSC, Microphysical Modeling of Thermoelastic Stresses.
- Byrne, S., P. Russell, A. Pathare, P. Becerra, **J. L. Molaro**, S. Mattson, M. T. Mellon, 2013, LPSC Abstracts, Fracturing the Icy Polar Cliffs of Mars.
- Niesh, C. D., R. D. Lorenz, **J. L. Molaro**, J. M. Lora, 2013, LPSC Abstracts, The Unusual Crater Soi on Titan: Possible Formation Scenarios.
- Molaro, J. L.**, and S. Byrne, 2012, AGU Fall Meeting, Thermal Weathering and Bedrock Erosion on Airless Bodies.
- Molaro, J. L.**, and S. Byrne, 2012, GSA Annual Meeting, Thermal Weathering and Bedrock Erosion on Airless Bodies.
- Molaro, J. L.**, and S. Byrne, 2012, LPSC Abstracts, Thermal stress weathering on airless, terrestrial bodies.
- Molaro, J. L.**, and S. Byrne, 2011, EPSC-DPS Joint Meeting, Thermal stress weathering on airless, terrestrial bodies.
- Molaro, J. L.**, J. M. Lora, and S. Byrne, 2011, EPSC-DPS Joint Meeting, Fluvial erosion of craters on Titan.
- Molaro, J. L.**, and S. Byrne, 2011, LPSC, Thermal Stress Weathering on Mercury and Other Airless Bodies.

- Molaro, J. L.**, and S. Byrne, 2010, AGU Fall Meeting, Thermal Weathering on Airless Bodies.
- Molaro, J. L.**, et al., 2008, Department of Energy Journal of Undergraduate Research, Exploring Light Sources and Photocathodes for Developing an Effective Purity Monitor.
- Molaro, J. L.**, 2006, Hawaiian International Conference on Arts and Humanities Abstracts, The Popol Vuh: A Conceptualization and Quantization of Space and Time Through Narrative.
- Molaro, J. L.**, 2005, San Francisco State University Symposium: Creations of the World, The Big Bang: A New Creation Story.
- Molaro, J. L.**, 2005, San Francisco State University Conference on The Future of Interdisciplinary Studies, Quiché Maya: A Legend of Time and Space.