Andrew Joseph Ryan

University of Arizona, Lunar and Planetary Laboratory
Telephone: +1.412.215.7100
Email: andrewryan2727@gmail.com; ryan@orex.lpl.arizona.edu

Education:

May 2018	**Arizona State University** School of Earth and Space Exploration *Ph.D. in Geological Sciences* Advisor: P.R. Christensen
Dec. 2013	**Arizona State University** School of Earth and Space Exploration *M.S. in Geological Sciences* Advisor: P.R. Christensen
May 2011	**Slippery Rock University** Department of Geography, Geology, and the Environment *B.S. in Geological Sciences* *Magna Cum Laude* Emphasis: Environmental Science; Physics (minor)

Professional Experience:

2019–present	**Postdoctoral Scholar** OSIRIS-Rex mission, University of Arizona LPL Tucson, Arizona – Advisors: J.P. Emery and M. Delbo
2018–2019	**Postdoctoral Scholar** Observatoire de la Côte d'Azur; Université Côte d'Azur Nice, France — Advisor: M. Delbo
2016–2017	**Science Team Member and Instrument Operations Specialist** NASA OSIRIS-REx Mission; OTES Instrument Arizona State University and University of Arizona
2016–2018	**Founder and Chief Technologist** SciSight, LLC — Commercial Spectroscopy Startup Tempe, Arizona
2015–2017	**Pancam Payload Downlink Lead (PDL)** Mars Exploration Rover (MER) - Opportunity Arizona State University
2011–2017	**Graduate Research Associate** Mars Space Flight Facility; School of Earth and Space Exploration Arizona State University
2011–Present	**Science Team Collaborator** Thermal Emission Imaging System (THEMIS) NASA/Mars 2001 Odyssey

Summer 2011	**Internship Program Staff Assistant** NASA Lunar and Planetary Science Academy Goddard Space Flight Center
Summer 2010	**Undergraduate Intern** NASA Lunar and Planetary Science Academy Goddard Space Flight Center
Summer 2009	**Undergraduate Intern** NASA Undergraduate Student Research Program (USRP) Johnson Space Center

Refereed Publications:

DellaGiustina, D.N., Emery, J.P.,…**Ryan, A.J.**,… and D.S. Lauretta, 2019, Properties of rubble-pile asteroid (101955) Bennu from OSIRIS-REx imaging and thermal analysis, *Nature Astronomy* 3, p. 341–351.

Walsh, K.J., Jawin, E.R.,… **Ryan, A.J.**,… and D.S. Lauretta, 2019, Craters, boulders and regolith of (101955) Bennu indicative of an old and dynamic surface, *Nature Geoscience* 12, p. 242–246.

Cambioni, S., Delbo, M., **Ryan, A.J.**, Furfaro, R., and E. Asphaug, 2019, Constraining the Thermal Properties of Planetary Surfaces using Machine Learning: Application to Airless Bodies, *Icarus* 325, p. 16–30.

Kletetschka, G., Hooke, R. L., **Ryan, A. J.**, Fercana, G., McKinney, E., and K. P. Schwebler, 2013, Sliding stones of Racetrack Playa, Death Valley, USA: The roles of rock thermal conductivity and fluctuating water levels, *Geomorphology* 195, p. 110 – 117.

Ryan, A. J. and P. R. Christensen, 2012, Coils and Polygonal Crust in the Athabasca Valles Region, Mars, as Evidence for a Volcanic History, *Science* 336, p. 449 – 452.

Publications in Preparation:

Ryan, A.J. and K.X. Whipple, Amphitheater-headed canyons of southeastern Utah: The case for bedrock channel erosion by overland flow, *Earth Surface Processes and Landforms* (Status: Submission expected early Q2)

Ryan, A.J., Pino-Munoz, D., Bernacki, M., and M. Delbo, Full-Field Modeling of Heat Transfer in Asteroid Regolith: Thermal Conductivity Results for Mono- and Polydisperse Particulates, *Journal of Geophysical Research* (Status: Submission expected early Q2).

Ryan, A.J. , Christensen, P.R., Emery, J.P., and D.S. Lauretta, Thermal conductivity of airless body regolith: A new laboratory method and test results for monodisperse and polydisperse regolith simulants, *Journal of Geophysical Research* (Status: Submission expected early Q3)

Book contributions:

Encyclopedia of Planetary Landforms, 2015, *Springer Reference.* Eds. Hargital, H. and A. Kereszturi. Contributed entries: "Lava Coil" and "Lava Polygon (small)"

Teaching Experience

2014 – 2015	**Intro. to Geology Lecture (GLG101)** Mesa Community College *Adjunct Faculty Member*
2011 – 2012	**Intro. to Geology Lab (GLG103)** Arizona State University *Lab Instructor*
Fall 2012	**Intro. to Exploration (SES100)** Arizona State University *Teaching Assistant*

Education and Public Outreach

2016–2017	**Science Consultant,** "Port of Mars" Massive Multiplayer Online (MMO) game, Arizona State University Interplanetary Initiative
Spring 2016	**Science Mentor**, ASU Sundial Mentoring Program, demonstrate research to undergraduates interested in science.
Fall 2013	**Invited Public Lecturer**, ASU College of Liberal Arts and Sciences (CLAS) Academy Forum
2012–2016	**Mars Science Educator,** Earth and Space Open House**,** share recent Mars science with local families.
June 2012	**Guest Field Guide**, NASA Lunar and Planetary Science Academy, assist in planning and leading planetary geology field trip in northern Arizona.
2011–2016	**Guest Instructor and Panel Member,** Mars Student Imaging Project, work with 5^{th}-12^{th} grade student scientists.
June 2011	**Assistant Field Guide**, NASA Lunar and Planetary Science Academy, assist in planning and leading planetary geology field trip in the Channeled Scablands, eastern Washington.

Advising Experience

Spring 2016–present	**Phoenix Cubesat Mission Advisor** Arizona State University Sun Devil Satellite Laboratory
Spring 2013–2016	**Laboratory Mentor to Undergraduate Students** Arizona State University Thermophysics Laboratory *J. Zaloumis (2013-2015) and M. Askins (2016)*

Awards and Honors:

2016	**Edson Student Entrepreneurship Initiative Inductee** Seed funding ($10k), resources, and mentorship
2013	**Scholarship Recipient** NASA Planetary Volcanology Field Workshop, Hawaii
2012	**Scholarship Recipient** LPI/NLSI Sudbury, Ontario Impact Structure Field Camp
2012	**Dwornik Award – Best Graduate Poster (honorable mention)** GSA Planetary Geology Division, Lunar and Planetary Sci. Conf.
2011	**University Graduate Fellowship** ASU School of Earth and Space Exploration and Graduate College
2011	**Outstanding Senior Man, Class of 2011** Slippery Rock University Alumni Association
2009–2011	**Environmental Geosciences Outstanding Soph./Junior/Senior** Slippery Rock University GGE Department
2010	**Best Student Poster Presentation** Institute of Lake Superior Geology, 56th meeting
2010	**Environmental Geosciences Service Award** Slippery Rock University GGE Department
2008–2009	**Presidential Scholar** Slippery Rock University Academic Honors Committee
2006–2011	**Dean's List, 10 consecutive semesters** Slippery Rock University

Laboratory and Instrument Development Experience

- Thermal vacuum (TVAC) test lead technician and chamber operator for the Phoenix Cubesat infrared camera. Instrument operator for OTES instrument TVAC and full OSIRIS-REx spacecraft TVAC.
- Infrared optical system alignment and spectrometer design, assembly, and testing with SciSight, LLC.
- Design, assembly, characterization, calibration, and operation of OSIRIS-REx funded asteroid thermal conductivity liquid nitrogen cryostat chamber, Mars Space flight Facility, Arizona State University
- Design, assembly, characterization, calibration, and operation of MFRP funded Mars thermal conductivity chamber, Mars Space Flight Facility, Arizona State University
- Sample preparation and analysis for infrared emission spectrometers

Field Work

August 2015	**Iceland – Laki 1783–84 and Haluhraun 2014–15 lava flows**
	Flow texture mapping and interpretation
May 2014	**Hawaii – Dec. 1974 Kilauea fissure eruption**
	Flow texture mapping and interpretation
May 2012	**Southern Utah – Escalante Ntnl. Mon. and Henry Mt.**
	Amphitheater-headed canyon reconnaissance

Select Presentations and Abstracts

Ryan, A.J., Pino-Munoz, D., Bernacki, M., Delbo, M., Emery, J., Christensen, P.R., and D. Lauretta, 2019, Full-Field Modeling of Heat Transfer in Asteroid Regolith: Thermal Conductivity Results for Mono- and Polydisperse Particulates, *50th Lunar and Planetary Science Conference*, abstract 2512.

Ryan, A.J. and P.R. Christensen, 2017, Measurements of Regolith Simulant Thermal Conductivity Under Asteroid and Mars Surface Conditions, *American Geophysical Union 2017 Fall Meeting*, P33H-05 (talk).

Ryan, A.J. and P.R. Christensen, 2016, New laboratory technique to determine thermal conductivity of complex regolith simulants under high vacuum, *American Geophysical Union 2016 Fall Meeting,* P21A-2078

Ryan, A.J. and P.R. Christensen, 2015, Laboratory measurements of regolith thermal conductivity, *OSIRIS-REx Science Team Meeting 9*,

Ryan, A.J., and K.X. Whipple, 2014, An Investigation of Amphitheater-Headed Canyon Distribution, Morphology Variation, and Longitudinal Profile Controls in Escalante and Tarantula Mesa, Utah, *American Geophysical Union 2014 Fall Meeting,* EP31D.

Ryan, A.J., Hamilton, C.W., and P.R. Christensen, 2014, Coils in context: Dynamics of the Athabasca Valles Lava Flow, *8th International Conference on Mars*, abstract 1404.

Ryan, A.J., Piqueux, S., and P.R. Christensen, 2014, Radiometric determination of thermal conductivity of complex particulate materials under Mars-like conditions, *45th Lunar and Planetary Science Conference*, abstract 2220.

Ryan, A.J., Salvatore, M. R., Smith, R. E., Edwards, C. S., and P. R. Christensen, 2013, Solving for the Surface: An Automated Approach to THEMIS Atmospheric Correction, *American Geophysical Union 2013 Fall Meeting*, P51G.

Ryan, A. J., Whipple, K. X., and J.P. Johnson, 2012, Are amphitheater-headed canyons indicative of a particular formative process?, *American Geophysical Union 2012 Fall Meeting,* EP51A-0969.

Ryan, A. J. and P.R. Christensen, 2012, Lava Coils and Drifting Polygonal Terrain in Cerberus Palus, Mars, *43rd Lunar and Planetary Science Conference*, abstract 2552.

Ryan, A.J., 2011, Channeled Scablands as a Mars Analog. *Planetary Science Seminar for the Director of Science and Exploration,* Goddard Space Flight Center, Greenbelt, MD.

Ryan, A.J. and 9 others, 2011, Lifting of the Clast by Water and Ice: An Explanation for the Trails of the Racetrack and Bonnie Claire Playas, *Geological Society of America Abstracts with Programs* 43, p. 139.

Ryan, A.J. and M.J. Zieg, 2010, Petrographic and Geochemical Analysis of a Nipigon Diabase Sill. *Institute on Lake Superior Geology Proceedings* 56, p. 58-59.

Software and Operating System Experience

Proficient in: Mac, Linux, and Windows Operating Systems
Well versed in scientific software: COMSOL Multiphysics, Davinci (davinci.asu.edu), LabView, JMARS (jmars.asu.edu), ArcGIS
Able to program in: Davinci, Bash-/C-shell, Python, C/C++, MATLAB, and some experience with Java, HTML, IDL
CAD software proficiency: FreeCAD, SOLIDWORKS, Autodesk Fusion 360
High-level user of: Microsoft Office Suite (Word, Excel, PowerPoint), GIMP, InkScape, iMovie, Ableton Live DAW

Language

English (American) – Native
French – Intermediate proficiency