

Saverio Cambioni

Curriculum Vitae

Lunar and Planetary Laboratory
University of Arizona
1629 E. University Blvd
Tucson, AZ 85721 USA

cambioni@lpl.arizona.edu

P +1 (347) 449-3823

Website:

#grainsofsand/saveriocambioni

RESEARCH INTERESTS

In my research, I use **machine learning** to streamline ground- and space-based observations and computer simulations into fast and **accurate surrogate physical models**. My research focuses on **remote sensing data fusion** for maximizing the scientific return of future **space missions** and the interpretation of asteroids as leftover of **planetary formation**.

RESEARCH and TEACHING EXPERIENCE

University of Arizona – Dept. of Planetary Science (Tucson, AZ)

Graduate Associate

2019 – present

Teaching Assistant (PTYS 206)

Fall 2018

Graduate Research Assistant

2017 – 2018

Apprentice; host: Prof. William B. Hubbard

Summer 2015

Observatoire de la Côte d'Azur (Nice, France)

Summer 2018

Visiting researcher; host: Dr. Marco Delbo

EDUCATION

University of Arizona (Tucson, AZ)

January 2017 – present

Lunar and Planetary Laboratory

PhD student; Advisor: Prof. Erik Asphaug

University College Lamaro Pozzani (Rome, Italy)

October 2011 – October 2016

Certificate in Business Culture

Sapienza (Rome, Italy)

October 2011 – October 2016

Department of Mechanic and Aerospace Engineering

Master of Science in Space Engineering (with Honors); Advisor: Prof. Luciano Iess

Thesis: “Concentric Maclaurin Spheroid models for Jupiter in the context of Juno mission sensitivity”

Bachelor of Science in Aerospace Engineering (with Honors)

SPACE MISSION INVOLVEMENT

- NASA OSIRIS-Rex – Student collaborator under Co-I S. Schwartz, 2019 – present
- NASA Psyche – Student collaborator under Co-I E. Asphaug, 2018 – present

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RESEARCH TOOLS

- **Machine Learning**
 - Supervised training of surrogate models
 - Regression and classification (e.g., neural networks, SVM)
 - Unsupervised data analysis (e.g., clustering techniques)

- **Numerical modelling**
 - Programming in Python and MATLAB

PROJECT GRANTS, HONORS, AWARDS

- GPSC grant, titled: “Virtual Reality Gives New Insights Into How Planets Form”, 2019
- Lunar and Planetary Laboratory Graduate Teaching Award, 2018
- University of Arizona Galileo Circle Scholarship, 2018
- University of Arizona Graduate and Professional Student Council Travel Award, 2018
- Lunar and Planetary Laboratory Curson Travel Award, 2018
- Sapienza, University of Rome, Graduate Student Award, 2017
- Erasmus scholarship – visiting student at TU Delft, The Netherlands, 2016
- Italian Student and Scholar in North America Foundation research grant, 2015
- NASA Space Apps Challenge, Rome edition – 1st prize, 2014
- Sapienza, University of Rome, Excellent Undergraduate Student Award, 2014
- University College Lamaro Pozzani, Rome, scholarship, 2011 – 2016
- Sapienza, University of Rome, 100% tuition remission, 2011 – 2014
- Ministry of Education, Rome, Excellent High School Student, 2011
- Rotary Club Scientific Award, 2011
- Lion Club Literature Award, 2010

PROFESSIONAL ACTIVITIES AND SERVICE

- UA Associate Graduate Council for the College of Science, member, 2017–Present
- American Astronomical Society Junior Member, 2017–Present

PUBLICATIONS

- Cambioni, S.**, Asphaug, E., Emsenhuber, A., Gabriel, T. S. J., Furfaro, R., and Schwartz, S. R. Realistic On-The-Fly Outcomes of Planetary Collisions: Machine Learning Applied to Simulations of Giant Impacts. *The Astrophysical Journal*, Volume 875, Number 1
- Cambioni, S.**, Delbo, M., Ryan, A. J., Furfaro, R., and Asphaug, E. Constraining the Thermal Properties of Planetary Surfaces using Machine Learning: Application to Airless Bodies. *Icarus*, 2019

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Rizk, B., and other 27 authors (including **Cambioni**, S.) OSIRIS-REx low-velocity particles during outbound cruise. *Advances in Space Research*, 2018.

Cambioni, S., Malhotra, R.. The mid-plane of the Main Asteroid Belt. *AJ*, 155.3: 143, 2018

INVITED PRESENTATIONS

Cambioni, S. (2018) Application of Machine Learning to Planetary Science, SWRI, Boulder

PRESENTATIONS and ABSTRACTS

Cambioni, S., Carter, L. M., Haynes M., Asphaug, E., Furfaro, R. Machine Learning for Characterizing Shallow Subsurface Ice via Radar-Thermal Data Fusion: Validation at Lake Vostok, East Antarctica. EPSC/DPS 2019.

Cambioni, S., Bennett, C., A. Kevin J. Walsh, et al. A Search for Smooth Terrains on Asteroid (101955) Bennu using Machine Learning. EPSC/DPS 2019.

Cambioni, S., Delbo, M., Ryan, A. J., Furfaro, R., Asphaug, E. Constraining the Thermal Properties of Airless Bodies using Machine Learning. Lunar and Planetary Science Conference. Vol. 50, 2019

Cambioni, S., Asphaug, E., Emsenhuber, A., Gabriel, T. S. J., Furfaro, R., Schwartz, S. R. Beyond Perfect Merging: Machine Learning applied to Simulations of Giant Impacts. Lunar and Planetary Science Conference. Vol. 50, 2019

Cambioni, S., Gabriel, T. S. J., Asphaug, E., et al. Application of Machine Learning to Giant Impact Studies. In EPSC Abstracts, volume 12, 2018.

Cambioni, S., Malhotra, R. et al. An Upper Limit On Earth's Trojan Asteroid Population from OSIRIS-REx. Lunar and Planetary Science Conference. Vol. 49. 2018

Pellegrino, A., **Cambioni**, S. et al. HORUS — a CubeSat-based multi-angle and multi-spectral Earth Observation (EO) system. The "Innovative Ideas on Micro/Nano-Satellite Missions and Systems Report on Deorbit Device Competition (DDC) and Mission Idea Contest (MIC4)", IAA-Book Series- Volume 1 Number 7, IAA, Paris, 2017

Pellegrino, A., **Cambioni**, S., et al. "Look App", A Free Ios Application For Space Events. IAC-15.E2.3-YPVF.4.1x28617, IAC Jerusalem, 2015

SELECTED OUTREACH

Cambioni, S. Earth Trojan: The Phantom Asteroids. *Talk at SpaceDrafts*, Tucson, 2017/4

Cambioni, S. Space Darwinism. Journal article on the access to space. "*Panorama per i giovani*" (*Journal of College "Lamaro Pozzani"*), 2016/4

- Cambioni, S. Following the water. Interview with Dr. Alfred S. McEwen, LPL. *“Panorama per i giovani” (Journal of College “Lamaro Pozzani”)*, 2015/8
- Cambioni, S. Space University Challenge. Journal article on Rome SpaceApps challenge. *“Panorama per i giovani” (Journal of College “Lamaro Pozzani”)*, 2015/2
- Cambioni, S. Technological power in orbit. Journal article about space race during the cold war. *“Panorama per i giovani” (Journal of College “Lamaro Pozzani”)*, 2012/2
- Cambioni, S. Space to Brazil. Journal article about Brazilian space program. *“Panorama per i giovani” (Journal of College “Lamaro Pozzani”)*, 2011/3