

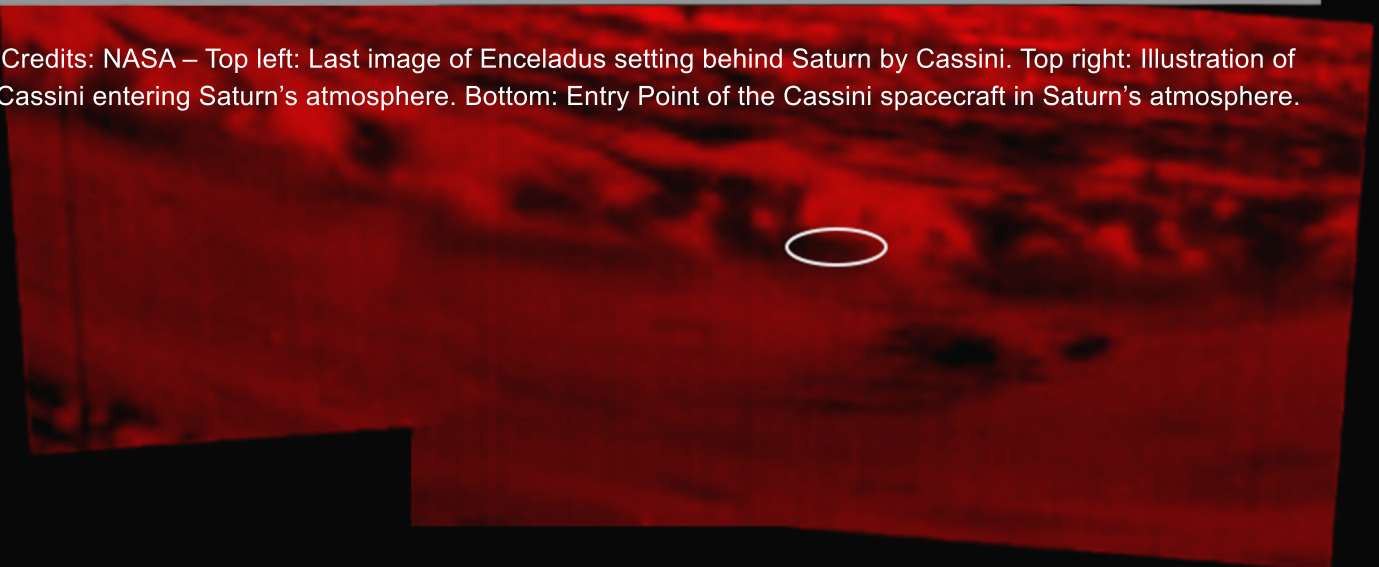


CARL SAGAN CENTER

Activity Report September 2017

Dr. Nathalie A. Cabrol, Director

Credits: NASA – Top left: Last image of Enceladus setting behind Saturn by Cassini. Top right: Illustration of Cassini entering Saturn's atmosphere. Bottom: Entry Point of the Cassini spacecraft in Saturn's atmosphere.



Peer-Reviewed Publications

1. Díaz-Santos T, Armus L, Charmandaris V, Lu N, Stierwalt S, et al. including **Lord S** (2017). A Herschel/PACS Far-infrared Line Emission Survey of Local Luminous Infrared Galaxies. *ApJ* 846, article id. 32, 22 pp.
2. Lauer, TR, Throop, HB, **Showalter, MR**, et al. (2017) The New Horizons and Hubble Space Telescope search for rings, dust, and debris in the Pluto-Charon system. *Icarus*, in press. <https://arxiv.org/abs/1709.07981>.
3. McKay, C. P., **D. T. Andersen**, and A. Davila (2017), Antarctic ecosystems as planetary models: University valley as a model for Mars and Lake Untersee as a model for Europa and Enceladus, *The Polar Journal*, 7 (2). Accepted 17 Sept. 2017, *In Press*
4. Mogul, R. R., P. Vaishampayan, M. Bashir, C.P. McKay, K. Schubert, **R. Bonaccorsi**, E. Gomez, S. Tharayil, G. Payton, J. Capra, J. Andaya, and 34 others (2017) accepted, High-Resolution Microbial Diversity of Biological Soil Crusts Across a Gradient of Surface Coverage in the central Mojave Desert accepted. *Frontiers in Microbiology - Terrestrial Microbiology*
5. Moore et al., including **R. A. Beyer** (2018). Bladed Terrain on Pluto: possible origins and evolution, *Icarus* 300, 129-144, DOI: 10.1016/j.icarus.2017.08.031
6. Yant M, Young KE, Rogers AD, McAdam AC, Bleacher JE, **Bishop JL** et al. (2017) Visible, Near-Infrared and Mid-Infrared Spectral Characterization of Hawaiian Fumarolic Alteration near Kilauea's December 1974 Flow: Implications for Spectral Discrimination of Alteration Environments on Mars. *American Mineralogist*, in press.

Conferences: Abstracts and Proceedings

Bonaccorsi, R., D. Willson, and C.P McKay. 2017, High, Low, Hot, and Cold Extremes and the Search for Life in the Solar System. XVII International Conference on Science, Arts and Culture; *Sailing through the wonders of Astrobiology*, Veli Lošinj, Croatia, 25-29 September 2017

Glines NH, Hargitai HI, Gulick VC (2017) Paleolakes of Northeastern Hellas Basin. EPSC Abstracts 11, EPSC2017-418-1, European Planetary Science Congress, Riga.

Willson, D., S. Thomson, **R. Bonaccorsi**, and C.P. McKay (2017). Effect of High Velocity Collection on Trypsin Functionality for Life Detection, ART meeting, September 28, 2017 NASA Ames Research Center

Technical Reports & Data Releases

Jeffrey Coughlin:

- K2 C12 and C13 data were processed and delivered to MAST, along with C14 raw data.
- Delivered a sizeable update to the DR25 catalog products that include the results of our #2 and #3 data scrambling runs.
- In process of delivering extra Kepler DR25 data sets to NExSci and GitHub.
- Released the K2 Handbook
(https://archive.stsci.edu/k2/manuals/k2_handbook.pdf)

Popular Publications/Web Stories/ Other Media / Interviews

Coughlin J (2017). Did an interview on finding exoplanets with Kepler and the implications for SETI for First News in the UK (www.firstnews.co.uk), which is a newspaper geared towards children and young adults.

Marchis F. on Unistellar:

- <http://cosmicdiary.org/fmarchis/2017/09/26/saying-hello-to-pluto-from-san-francisco-with-the-evscope/>
- <http://cosmicdiary.org/fmarchis/2017/09/17/seeing-pluto-with-your-own-eyes-from-your-backyard-with-unistellars-evscope/>
- <http://cosmicdiary.org/fmarchis/2017/09/15/starfest-in-central-park-urban-astronomy-for-all/>
- <http://cosmicdiary.org/fmarchis/2017/09/05/unistellars-evscope-successfully-finds-images-asteroid-florence/>

F. Marchis is mentioned in an article published in [Tor.com](http://tor.com), H.G. Wells and the Speculative Dream of Astronomy by Jeffrey Rotter

Web story about SETI Institute and Dropbox featuring **F. Marchis** and the GPI instrument

- [Blog post](#)
- [YouTube version of video](#)

Shostak, Seth, “FRB 121102: Radio Calling Cards from a Distant Civilization?”, SETI Institute web article, September 6, 2017,

Showalter MR (9/7) led the effort to get the first 14 names of features on Pluto approved by the IAU. He was quoted in the NASA press release. **Beyer R** also played a major role in the effort.

Invitation to Speak (Professional and Public)

Bonaccorsi, R. 2017, High, Low, Hot, and Cold Extremes and the Search for Life in the Solar System. *Sailing through the wonders of Astrobiology*, Veli Lošinj, Croatia, 25-29 September 2017

Bonaccorsi, R., Ambienti Estremi Terrestri come Modello per la Ricerca della Vita nel Sistema Solare. Opening of the 2017-2018 Academic Year, University of Genova, Genova, November 4th-11th

Busch MW, *Small Bodies In The Solar System*; talks to elementary and high school students in Colorado, Illinois, and Washington states; organized via "Skype a Scientist" - <https://www.skypeascientist.com/> .

Marcu O (09/22) *Epigenetics and Trauma*, plus screening of the film *In Utero*, Western Institute for Social Research, Berkeley, CA, WISer 9th Annual Conference Bay Area 2017: "The Choice"- Advocacy & Resilience Initiatives. Human Dignity, Social Justice & Inclusivity.

Richards, J and Shostak S, "NowThis" Facebook video filmed partially at the ATA and "aired" Sept 29.

Shostak, S, September 5. "Developments in SETI," SIRS, at the Villages, San Jose, CA

Shostak, S, September 6. "The Science of Star Wars," Lincoln Hills Astronomy Society, Lincoln Hills, CA

Shostak, S, September 12. "Looking for Life Beyond Earth," ACLA convention, Beverly Hilton Hotel, Los Angeles, CA

Shostak, S, September 16. Guest Host on METI, "Star Talk All Stars" podcast, Brooklyn, NY

Shostak, S, September 18. "METI", interview by RT (Russian TV), New York City

Shostak, S, September 23. "Looking for Life in Space," Authors and Ideas Festival, Pebble Beach, CA

Shostak, S, September 30. "The Science of Star Wars," Mountain View Library, Mountain View, CA

Skok JR (September/21) *Seeking Signs of Life in Ancient Martian Hot Springs*. Sunnyvale, Brown University Alumni Silicon Valley Chapter.

Showalter MR has been invited to serve as a guest astronomy lecturer on a trip to the July 2019 total eclipse of the sun in Chile.

Sobron P (09/22). *Nueves Tecnologías para la Exploración Planetaria - Oportunidades en las Industriales de Exploración Terrestres*. Pachuca, Mexico, Simposio Iberoamericano Multidisciplinario de Ciencias e Ingenierías (SIMCI). Invited to give keynote talk at International Meeting. Topic was technology transfer from space to commercial applications.

Significant Events and Activities

Bonaccorsi, R. is preparing to join the Boulby International Subsurface Astrobiology Laboratory (BISAL, UK) Expedition (October 7th thru October 22nd, 2017). The event will start/end at Boulby Mine, Cleveland, UK and will be managed by a collaborative effort between the UK Center for Astrobiology (University of Edinburgh), the NASA Astrobiology Institute (NAI), and NASA Ames Research Center (California, USA).

Bonaccorsi, R. will be a key member of the BISAL Expedition team. She will coordinate a team from NASA Ames that will undertake scientific experiments involving life detection in salt and briny samples. At the end of the expedition she will be visiting the University of Edinburgh to work with Charles Cockell on the microbiology of selected samples from the mine.



Figure 1. Entrance to the cave



Figure 2. Permian halite and brine pool in Boulby Mine, an analogue environment for MINAR. (UKCA)



Figure 3. Inside the mine (Image Credit: Boulby Mine)

August 5 thru August 30, in collaboration with Death Valley National Park Service, **Rosalba Bonaccorsi** investigated new ephemeral lakes that formed at the bottom of Death Valley National Park's Ubehebe Crater. The ponds are the results of exceptional storms that hit

the Northern Side of the Park at the end of July and on Early August. Bonaccorsi has been monitoring rainfall in Death Valley since 2009. August 5th 2017 sets up the newest record for rainfall intensity in the area. Ca. 27 mm-rain were delivered in only two hours, forming a 22 cm-deep pond and depositing ~ 6 cm of sediments from a single event. These ephemeral events are important for the local (Credit Images: DEVA/NPS).



Cabrol N. The organization of the Workshop on the new SETI vision that will take place at the SETI Institute Jan. 16-18, 2017 is underway.

Coughlin J. C14 processing is nearly complete, and we are likely to process C2 after (which never had light curves exported.) Investigation into a possible re-processing of all K2 data continues. C15 is currently being observed without any issues, and work is underway on selecting targets for C16.

Ertem G (September). UV irradiation experiments are underway on Mars analog - organic mixtures buried under 5cm MMS-1 Mojave Mars Simulant to test the effects of irradiation on molecules.

Farewell Cassini: On September 15 Cassini ended its 20-year mission with a dramatic plunge into Saturn's atmosphere. Cassini spent 13 years in orbit around Saturn and as a result we have amassed a wealth of knowledge about Saturn, its rings, moons and weather. We know that at least two of its moons, Titan and Enceladus have the potential for life. Through its scientists (*e.g.*, **M. Showalter and his group, M. Tiscareno, P. Estrada**), the SETI Institute strongly supported the Cassini mission and contributed to the vast body of knowledge the mission brought, and also to the mission's legacy. A number of our researchers were present at JPL for the farewell event. Bill Diamond, the Institute's CEO, was present at NASA Headquarters in Washington on Sept. 15.

Ricca A, Roser J (September). A new NASA Solar System Workings project entitled "Ammonia on Charon: A Laboratory Study of Ammonia Hydrates in Support of New Horizons Observations" has been selected.

SETI. First of new generation analog to digital converters (SNAP) installed at ATA for testing.

[Where on Earth is the Flag?](#)

The Expedition Flag #1 was taken to Iceland in September by Natalie Glines and has now returned to the SETI Institute.

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