Update from NASA's Planetary Science Advisory Committee (PAC)

Anne Verbiscer
PAC Chair

NAS Space Studies Board Meeting Irvine, California 7 November 2018

PAC History and Membership

- NASA Planetary Science Advisory Committee (PAC) is a new (2017) Federal Advisory Committee Act (FACA) committee of NASA, and replaces the Planetary Science Subcommittee (PSS) of the NASA Advisory Council (NAC) Science Committee (SC) (since 2006)
- PSS Membership had previously included all Assessment and Analysis Group (AG) chairs
- PAC Membership
  - Solicitation in PEN, DPS newsletters – Fall 2016 (last PSS meeting 9/16)
  - Diversity-based selection (expertise, career stage, gender)
  - Members serve for 2 years
  - AG chairs are not PAC members, but are welcome and encouraged to attend and present AG reports at PAC meetings
  - PAC Chair is a member of the NAC Science Committee (led by SMD AA)

Planetary Science Advisory Committee (PAC) Members

Anne Verbiscer, Chair – Univ. of Virginia
Amy Mainzer, Vice Chair – JPL
Jonathan Rall, Exec. Secretary – NASA HQ
Robin Canup – SwRI
Lynn Carter – Univ. of Arizona
Justin Filiberto – LPI
Chris German – Woods Hole
Justin Hagerty – USGS
Dana Hurley – APL
Timothy Lyons – Univ. of CA, Riverside
Francis McCubbin - NASA JSC
Aki Roberge – NASA GSFC
Britney Schmidt – Georgia Tech
Rhonda Stroud- US Naval Research Lab

PAC Activities

- Three meetings in 2018: 1 face-to-face, 2 telecons
- Government Performance and Results Modernization Act (GPRA-MA) review of NASA-funded activities in FY 2018.
- Planetary Mission Senior Review (PMSR)
  - Seven missions (Lunar Reconnaissance Orbiter LRO and 6 Mars missions)
  - PAC approved Terms of Reference for Senior Review Subcommittee
  - PAC will deliver its formal recommendations to NASA June 2019
- Preparing for the 3rd Planetary Decadal. Mid-term report released August 2018. Remaining mission studies will be conducted via a competed ROSES call.

Selected Findings

- Support and Applause for NASA's policy statement on antidiscrimination.
- Open New Frontiers Program (mid-sized ($1B) class missions)
- Planetary Science community participation in Astro2020

Open New Frontiers

For the upcoming Planetary Decadal Survey, PAC encourages NASA to include in its charge to the National Academies that the New Frontiers mission class be open to all targets and destinations, as the Discovery mission class is, rather than limited to a fixed set of targets provided by the Decadal Survey. An open New Frontiers competition would enable proposing teams to be creative in their mission objectives and designs and to be fully responsive to new discoveries, enabling NASA to obtain the highest science return on its investments.

Planetary Input into the Astrophysics Decadal Survey (Astro2020)

PAC is concerned that the Astrophysics Decadal Survey is proceeding without input from the Planetary Science Community.

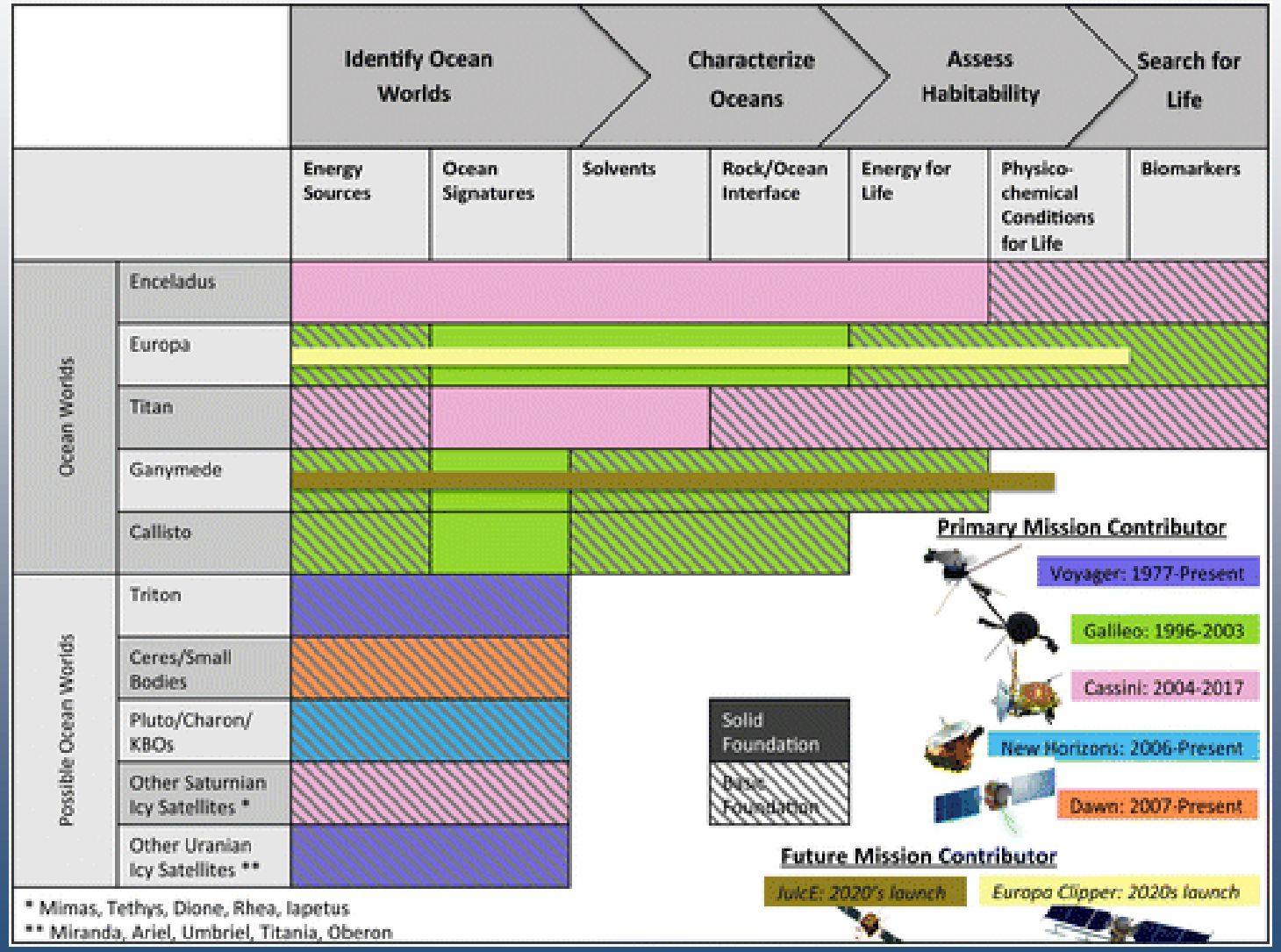
PAC recommends that there be representation from the Planetary community on the Committees assessing priorities for space and ground-based astronomy in the coming decade.

NASA Roadmap to Ocean Worlds (ROW)

Forum Article in *Astrobiology*
by Hendrix et al.
Chartered by Outer Planets Assesstment Group (OPAG) for NASA PSD. Available 13 October 2018

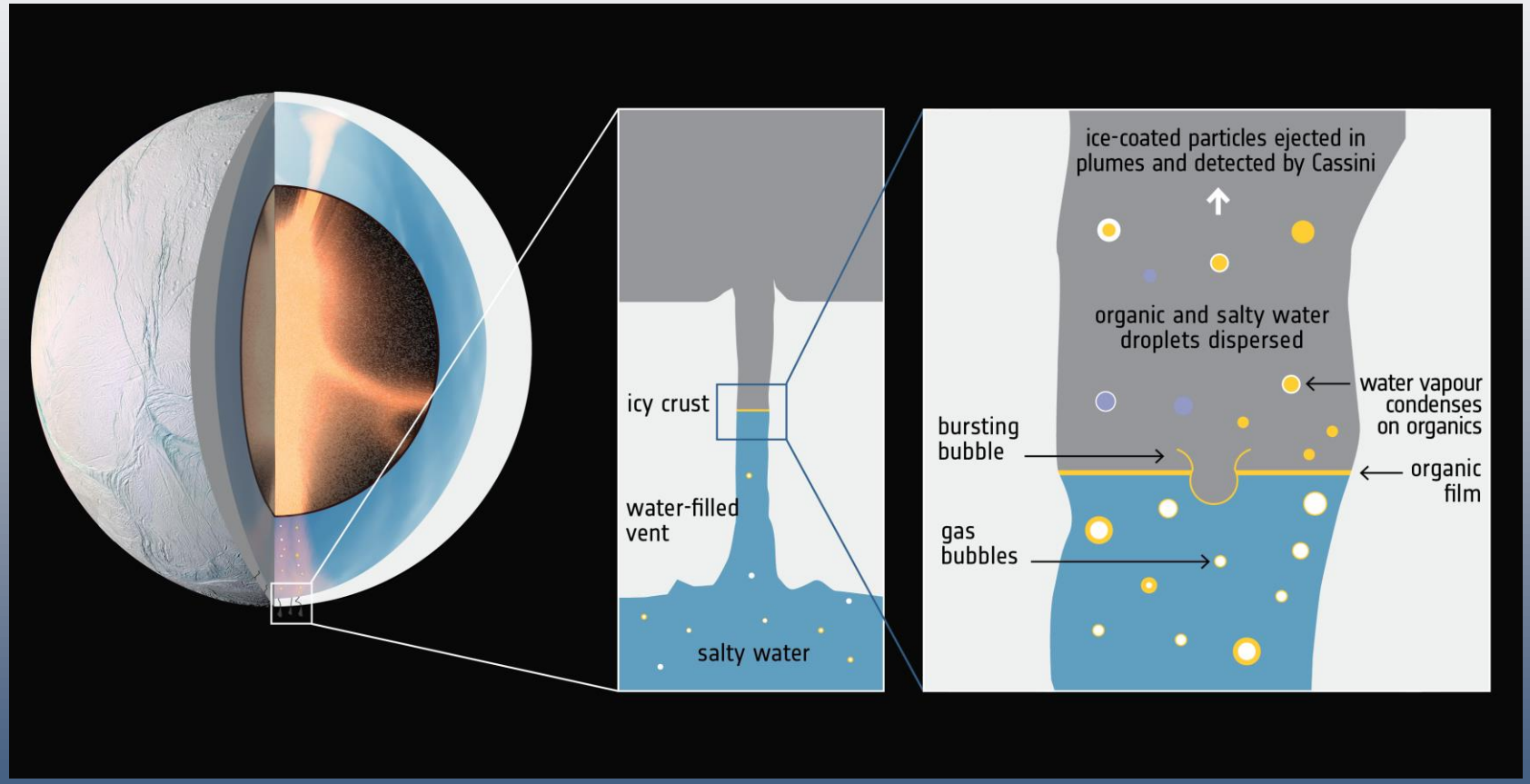
Findings:
1. To map out a coherent Ocean Worlds Program, significant input is required from studies here on Earth. Rigorous Research and Analysis studies are called for to enable future missions to Ocean Worlds

2. Collaborations required between Earth ocean scientists and extraterrestrial ocean scientists.



Complex Organics Bubble Up From Saturn's Moon Enceladus

Postberg et al. (2018, *Nature* 558)



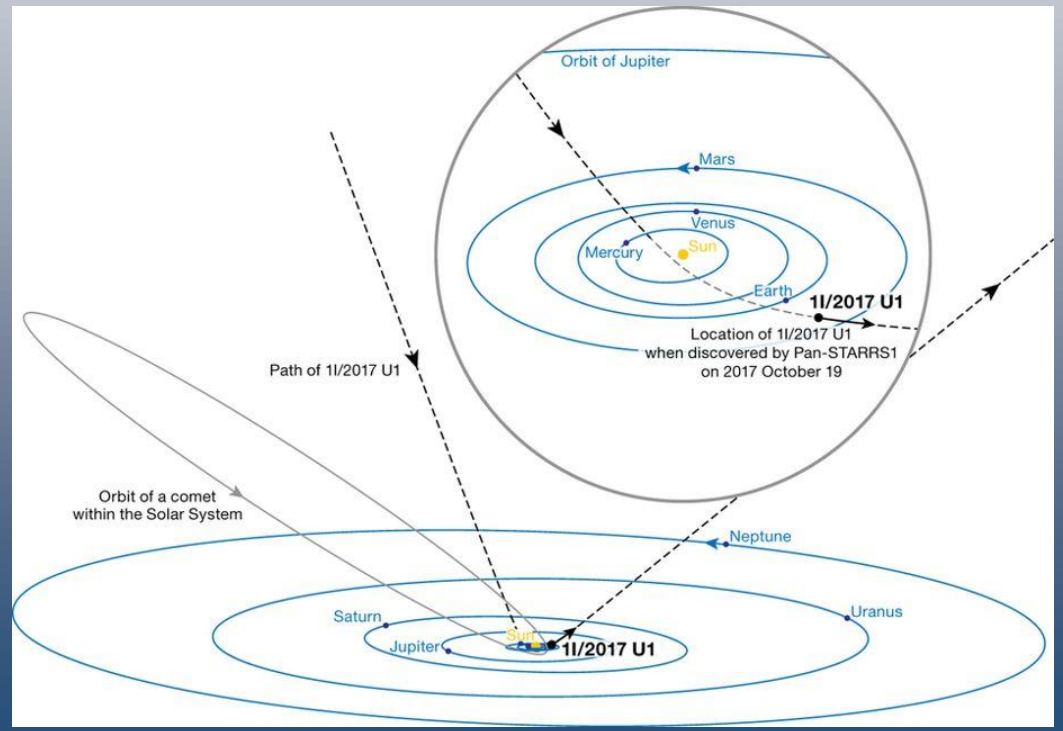
Cassini observations of emitted ice grains containing concentrated and complex macromolecular organic material with molecular masses above 200 atomic mass units.

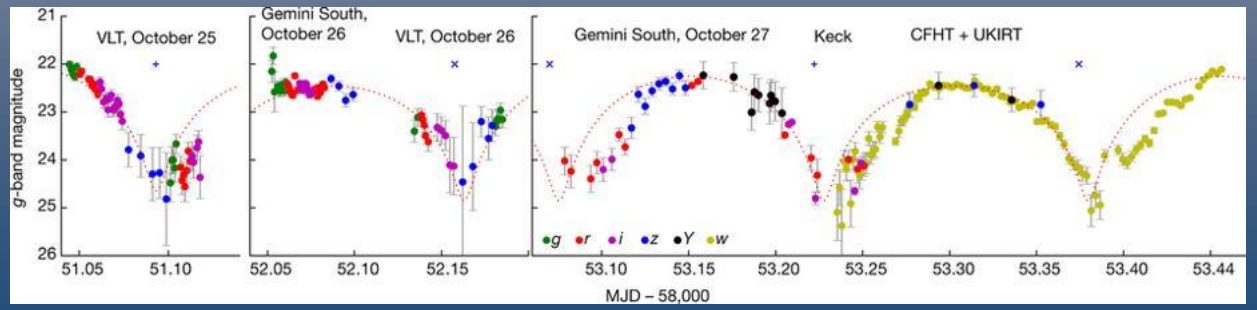
Data constrain the macromolecular structure of organics detected in the ice grains and suggest the presence of a thin organic-rich film on top of the oceanic water table, where organic nucleation cores generated by the bursting of bubbles allow the probing of Enceladus' organic inventory in enhanced concentrations.

First Interstellar Object from outside the Solar System: 1I/2017 U1 ‘Oumuamua

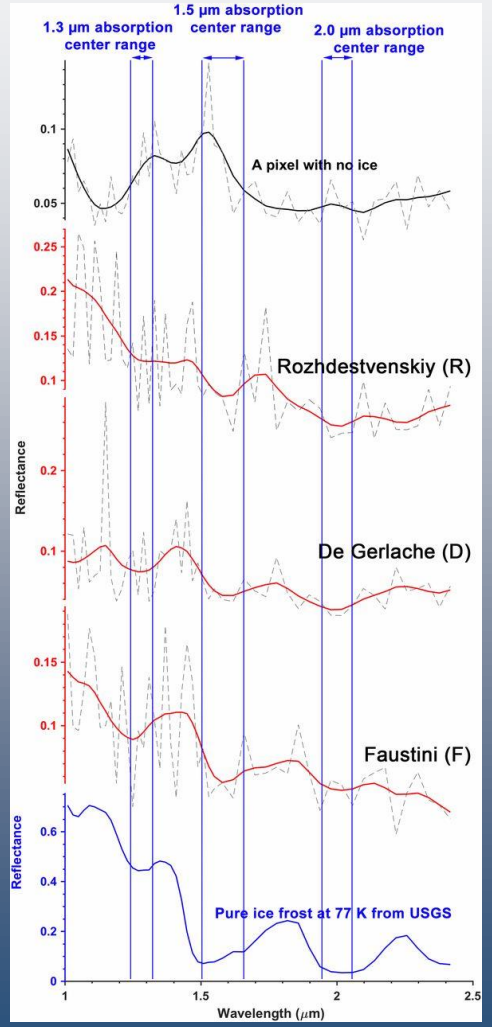
Meech et al. 2017 *Nature* 552, 378-381

High amplitude lightcurve (10:1 axis ratio) reveals an extremely elongated object.
Red color, low albedo, not unique, but shape is!
No cometary activity; came within 0.25 AU of Sun





Moon Mineralogy Mapper (M3) on Chandrayaan-1 Finds Water Ice on the Moon



Li et al. *PNAS*, September 4, 2018, 115 (36) 8907-8912
Near-infrared spectral evidence for water ice in permanently shaded areas near the lunar poles.