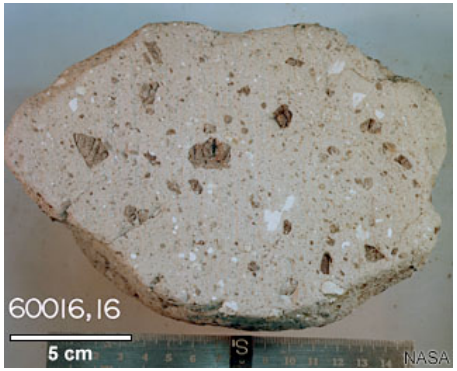
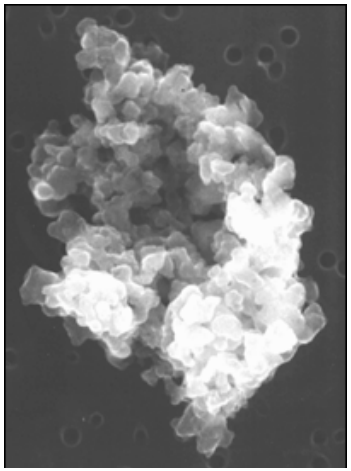
"Dedicated to maximizing planetary sample science while protecting the integrity of NASA-collected extraterrestrial materials"

Community Comments for the Planetary Science Subcommittee

October, 2015

Hap McSween





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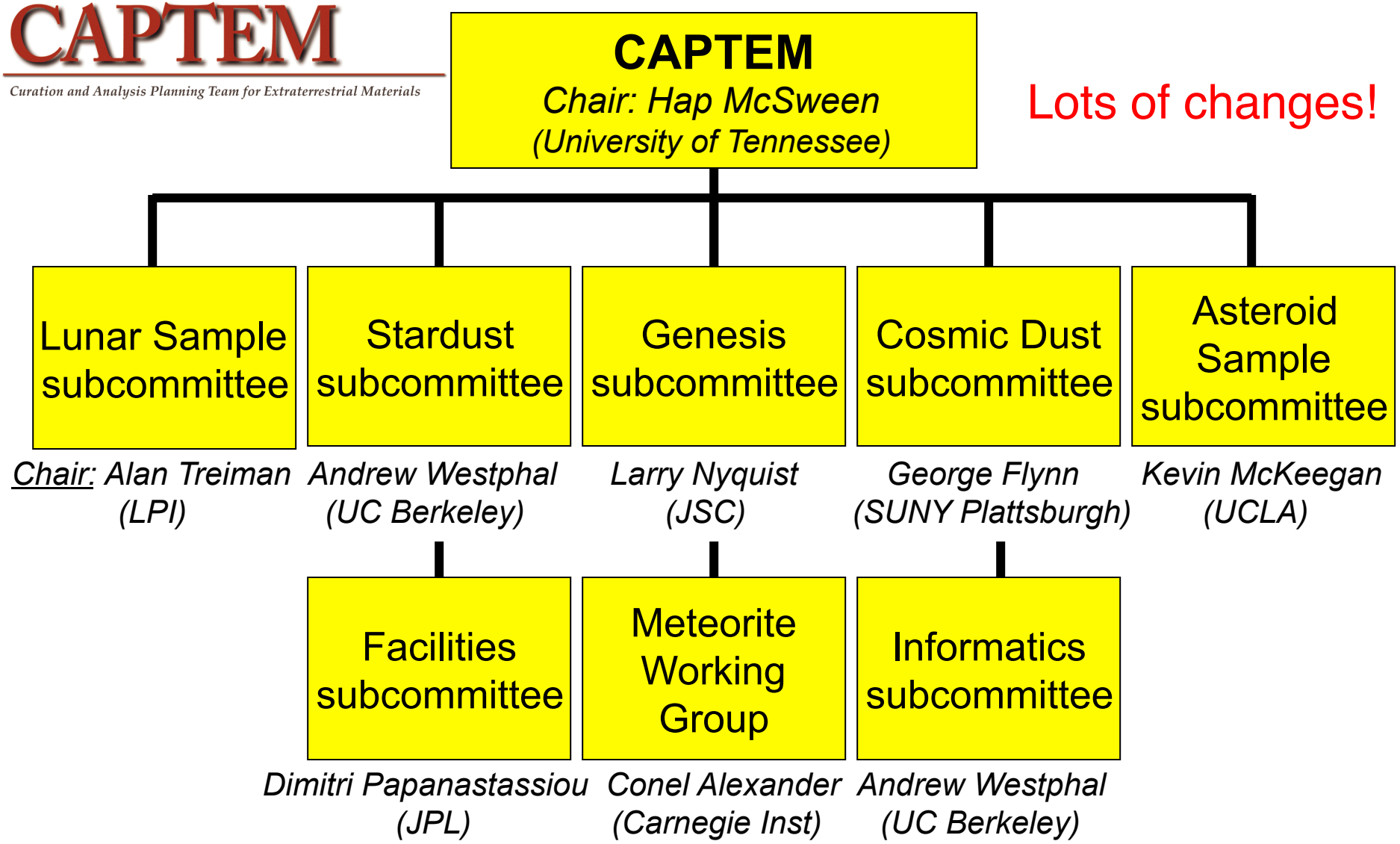

Additional Members: James Day (UCSD), Juliane Gross (U Houston), Kieren Howard (CCNY), Rhianon Mayne (TCU), Jeff Taylor (U Hawaii), Aaron Burton (JSC, Secretary)

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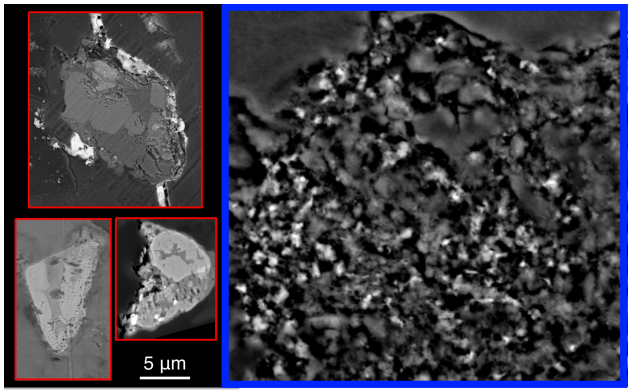
New Actions

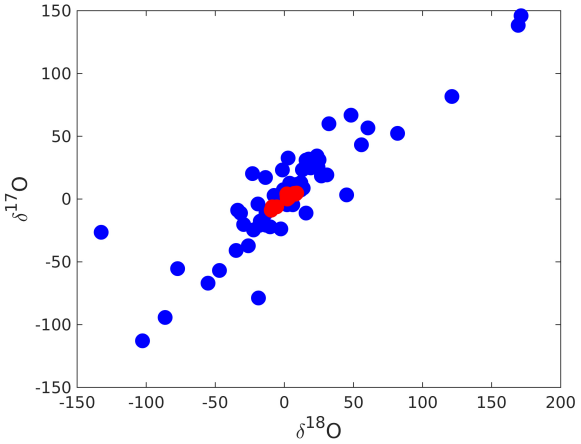
- CAPTEM is working on procedures for the curation and allocation of space-exposed hardware at JSC, including parts from: LDEF, Solar Max, EuReCa, Genesis, HST, Stardust, and Surveyor III
- CAPTEM co-sponsored a successful Stardust Workshop at the Meteoritical Society Meeting in Berkeley, CA in July
- CAPTEM's Meteorite Working Group met Sep 24-25, and its Lunar Subcommittee met Oct 2-4, to consider meteorite and lunar sample allocation requests
- CAPTEM's next (virtual) meeting will be Oct 26

Diversity of Fine-Grained Material in Comet Wild 2

Large oxygen isotope variations in cometary fines point to a primitive or diverse source

Material from comet Wild 2 returned by NASA's Stardust mission contains igneous objects similar to what is found in meteorites. The fine-grained material from this comet, however, is more difficult to study. A recent paper in *Geochimica et Cosmochimica Acta* reports the oxygen isotope composition of a large number of small and large rock fragments from comet Wild 2. The larger fragments have compositions seen in igneous components from meteorites. The small fragments, on the other hand, show a very broad range of compositions. This implies that the fine-grained material is either the primitive, unprocessed building blocks of the Solar System, or a very diverse sampling of inner Solar System reservoirs.





R. C. Ogliore *et al.*, *Geochimica et Cosmochimica Acta* **166**, 74–91 (2015)

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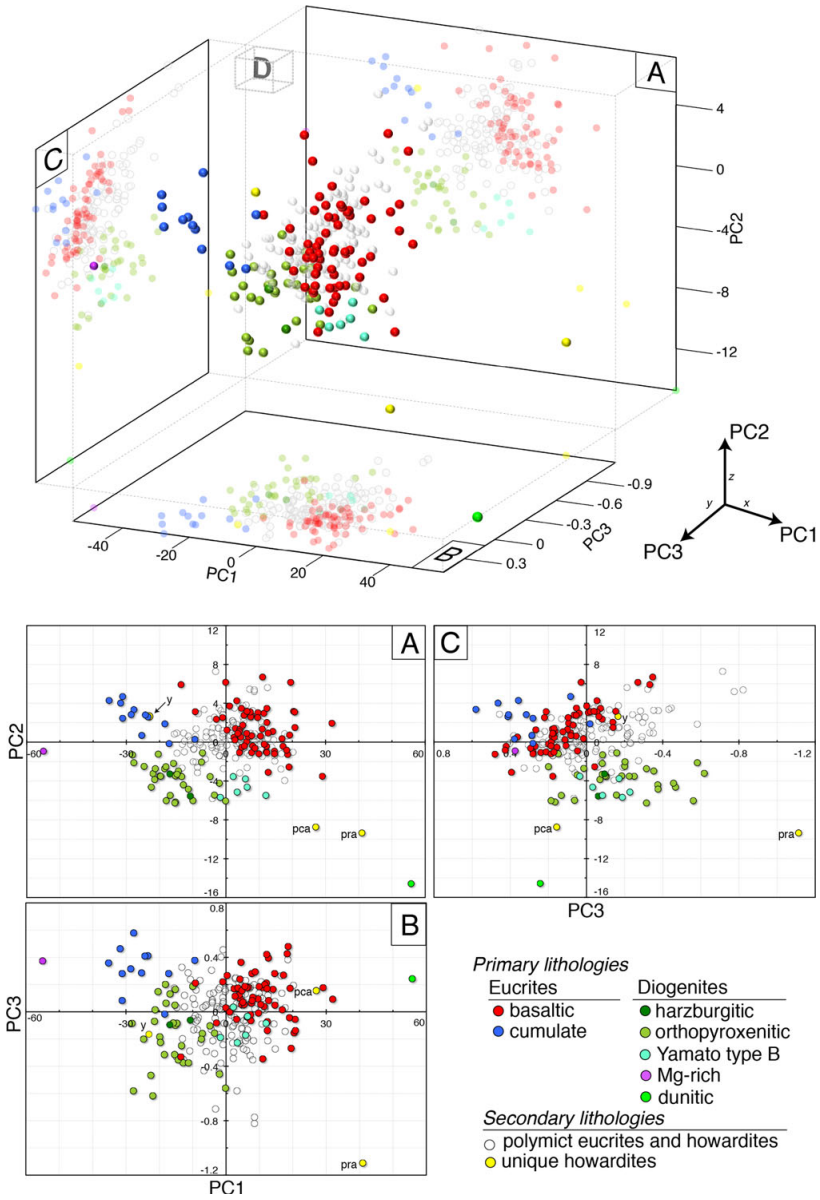
Science Highlights

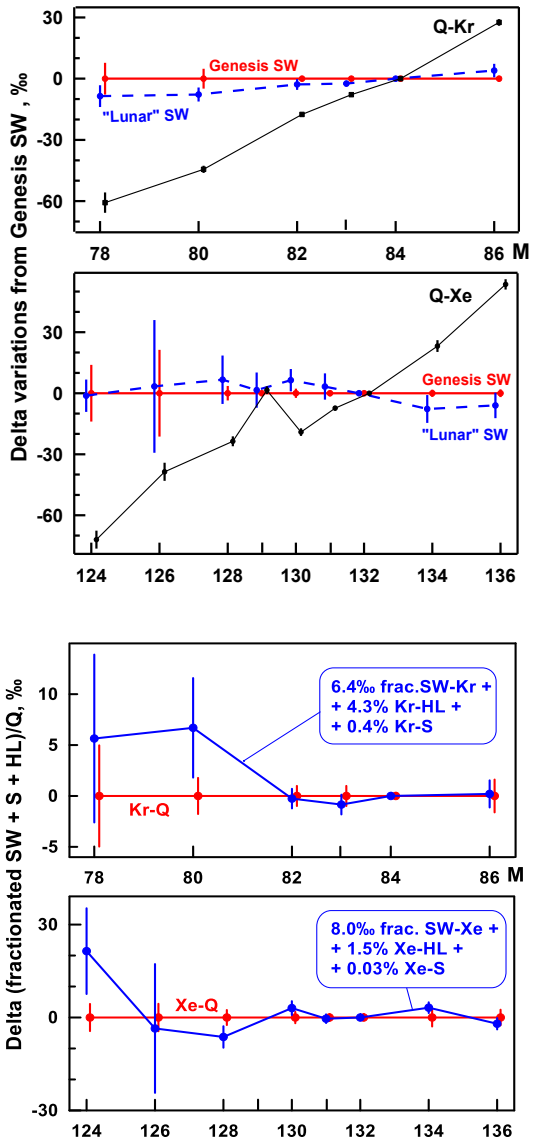
Using analyses of meteorites to interpret gamma-ray and neutron data from the Dawn mission to Vesta

Fast neutron counts, thermal neutron absorption, high-energy gamma-rays, and iron concentrations were measured by the GRaND instrument on the Dawn spacecraft at asteroid Vesta. Statistical analysis of these parameters in HED meteorites (also fromVesta) allows identification of these rocks on Vesta's surface.

Beck A. W. et al. (2015) *Meteoritics & Planetary Science*, 50, 1311-1337.



Science Highlights



"Gold Standard" for the Isotopic Composition of Kr and Xe in the Solar System[1]

With the solar baseline now determined from solar wind returned by Genesis, we can determine the contributions of presolar components to planetary atmospheres and interiors.

- Longstanding research has identified a noble gas component dubbed the "Q-component", hosted in planetary samples in a mysterious "phase-Q" that is incompletely characterized[2].
- The Q-composition is the underlying constituent of the noble gases in all primitive meteorites[2], and is a probable component of the noble gas inventory of the planets.
- Meshik's work allows "Q-Kr" and "Q-Xe" to be resolved into a dominant component that is isotopically fractionated from the solar wind composition (SW) plus minor extra-solar components called "HL" and "S".

[1] Meshik et al. (2014) *Geochimica et Cosmochimica Acta.* 127, 326-347.
[2]Busemann et al. (2000) *Meteoritics & Planetary Science* 33, 949-973.