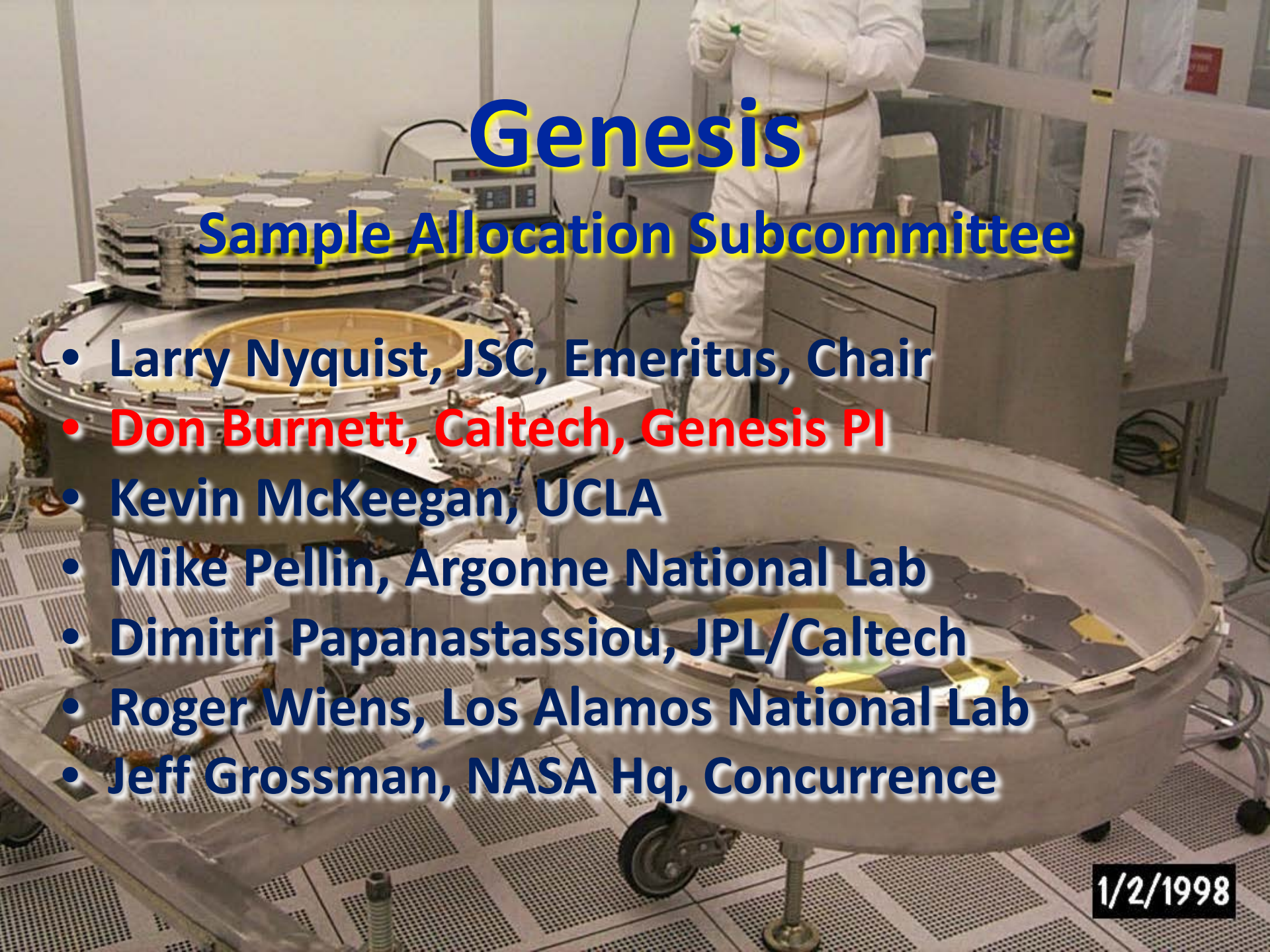
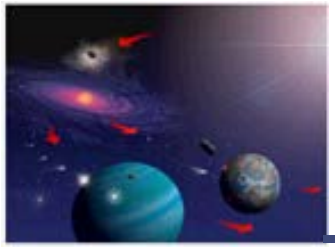


Genesis

Sample Allocation Subcommittee

- Larry Nyquist, JSC, Emeritus, Chair
- Don Burnett, Caltech, Genesis PI
- Kevin McKeegan, UCLA
- Mike Pellin, Argonne National Lab
- Dimitri Papanastassiou, JPL/Caltech
- Roger Wiens, Los Alamos National Lab
- Jeff Grossman, NASA Hq, Concurrence

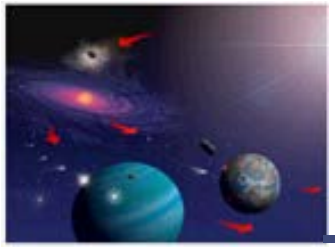


Major Issues

- **Replacement for subcommittee chair**
- **Desirability of expanding the investigator base**
  - **Publication rate is decreasing.**
  - **Remaining investigations more difficult, new approaches required?**
- **Roles clarification needed?**
  - **Do perceptions of the approval process agree with reality?**
    - **Does an investigation need first to be presented at a Genesis Science (Team) meeting?**
- **An opportunity exists to address these issues at the Sunday Genesis Science Meeting.**
  - **I will share some time “looking forward” with Don Burnett.**

Genesis Science Meeting
Sunday March 20, 2016
Woodlands Waterway Marriott Hotel - Waterways 6 Ballroom

9:00 – 9:30	Mass, not FIP?	Reisenfeld
9:30 – 10:00	FIP Fractionation Theory	Laming
10:00 – 10:20	Better Xe isotopes	Meshik
10:20 – 10:50	SRC Lid foils	Nishiizumi
10:50 – 11:00	Coffee Break	
11:00 – 11:30	Mg isotopes	Huss
11:30 – 12:00	DLC and Mg isotopes	Jurewicz
12:00 – 1:00	Lunch	
1:00 – 1:20	S Isotopes	Chakraborty
1:20 – 1:40	H fluence; Regimes	Koeman-Shields
1:40 – 2:00	Genesis Re Os Fe	Sharma
2:00 – 2:20	Ni fluence	Schmeling
2:20 – 2:40	Br fluence	Pravditseva
2:40 – 3:00	NaK fluence	Rieck, Jurewicz
3:00 – 3:10	Coffee Break	
3:10 – 3:30	Chili and Genesis	Davis, Stephan
3:30 – 3:50	Particle Removal	Kuhlman
3:50 – 4:10	Challenges from 60336	Goreva
4:10 – 4:30	Looking forward	Burnett
4:30 – 4:50	Sample Inventory Update	Allton, Allums

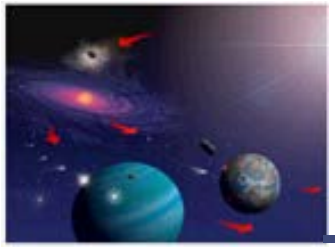


Future Genesis Science Objectives

- **Twelve measurement objectives to complete the Science Goals of the Genesis Mission, three of which are given below.**

Burnett and Jurewicz White Paper – January, 2016 - Table 1.			
	Specific Science Objectives	Measurement Objectives	Feasibility
1	Eliminate potential systematic errors in Genesis O isotopic composition used in essentially all present nebula models.	Mg isotopic composition.	Feasible; measurements in progress by several teams.
2	Measure average solar nebula composition for the rock-forming elements making up the terrestrial planets.	Abundances of elements with low first ionization potential.	Feasible for elements lighter than Ni (many require only better analytical standards)
3	Test for systematic differences in isotopic compositions between Sun and planetary materials.	Isotopic compositions of non-volatile elements heavier than Ar, specifically Fe.	Fe should be feasible; development required for other elements.

- **Continued support by the Discovery Data Analysis Program is justified.**
- **The quality of the science return of the Genesis mission was undeniably affected by the crash in Utah; some worthy goals require the larger collection and pristine collection procedures envisioned for the mission.**



SW Element Fractionation

Define the Fractionation Factor F:

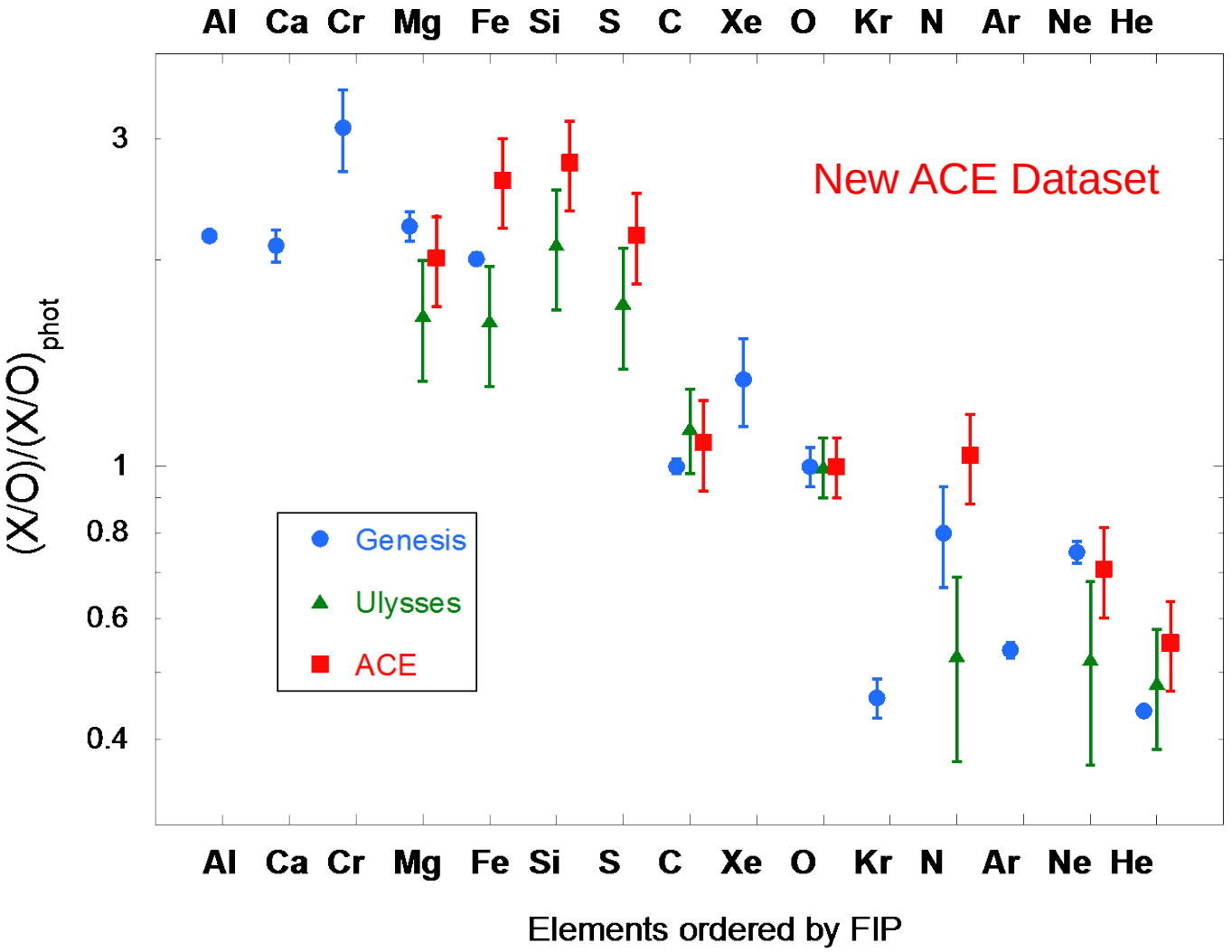
$$F = (X/Mg)_{SW} / (X/Mg)_{photosphere}$$

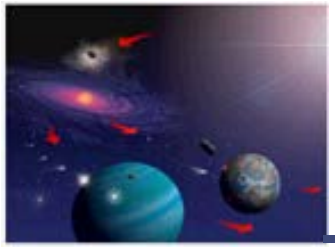
Genesis

$$F = (X/O)_{SW} / (X/O)_{photosphere}$$

In more general use

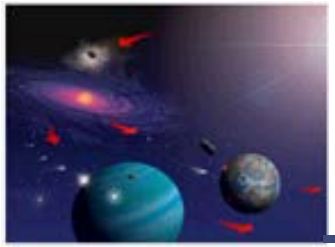
FIP Plot


Al Ca Cr Mg Fe Si S C Xe O Kr N Ar Ne He
3
1
0.8
0.6
0.4
(X/O)/(X/O)phot
New ACE Dataset
Genesis
Ulysses
ACE
Al Ca Cr Mg Fe Si S C Xe O Kr N Ar Ne He
Elements ordered by FIP



Example: Concentration and Isotopic Composition of S.

- PIs: M. Thiemens and S. Chakraborty
- S abundance – Constrains Photosphere/Corona fractionation mechanisms
- Spacecraft measurements constrain the relative abundance of ^{34}S to $\delta^{34}S_{CDT}$ = -29±200‰.
- No spacecraft information is available on $\Delta^{33}S$.
- From 3 cm^2 of Genesis FZ-Si, the PIs estimate uncertainty limits of ~±3.7‰ for $\delta^{34}S_{CDT}$ and ~± 1.2‰ for $\Delta^{33}S$.

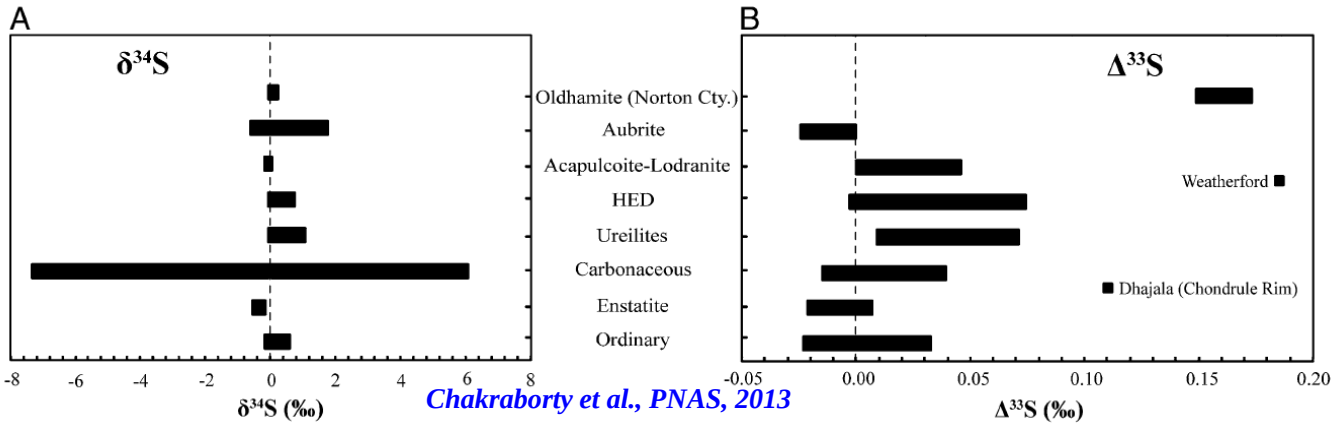


Genesis sample allocation procedures

- A sample allocation request/proposal is submitted by the PI in a standardized format available from the Astromaterials Curator's website.
- After requests are received by the Genesis Curator, they are e-mailed to the Subcommittee.
- Requests are generally initially discussed by email, and in complicated cases, a telecon will be arranged among the subcommitte members.
  - Attempt to keep telecons infrequent by doing background research for the e-mail discussions.

Sulfur Isotopes: Meteorites

➢**Sulfur is only the only element besides oxygen which shows anomalies at the bulk level in meteorites.**



Chakraborty et al., PNAS, 2013

➢**Like Oxygen, Sulfur is photochemically processed**

Specific measurement objectives (prioritized)—Prelaunch

1) O isotopes
2) N isotopes in bulk solar wind
3) Noble gas elements and isotopes
4) Noble gas elements and isotopes; regimes
5) C isotopes
6) C isotopes in different solar wind regimes
7) Mg,Ca,Ti,Cr,Ba isotopes
8) Key FIP elements (Na, Mg, Fe, Si, Ca, Cr, Ni, Al, C, N, O, etc)
9) Mass 80-100 and 120-140 elemental abundance patterns
10) Survey of solar-terrestrial isotopic differences
11) Noble gas elements and isotopes for higher energy solar particles
12) Li/Be/B elemental and isotopic abundances
13) Radioactive nuclei in the solar wind
14) F abundance
15) Pt-group elemental abundances
16) Key *s*-process heavy elements
17) Heavy-light element comparisons
18) Solar rare earth elements abundance pattern
19) Comparison of solar and chondritic elemental abundances

Sulfur Isotopes: Chondrites