

**Friday, March 23, 2012**  
**LUNAR GEOPHYSICS AND INTERNAL STRUCTURE**  
**8:30 a.m. Waterway Ballroom 4**

**Chairs:** Paul Warren  
Walter Kiefer

- 8:30 a.m. Zuber M. T. \* Smith D. E. Asmar S. W. Konopliv A. S. Lemoine F. G.  
Melosh H. J. Neumann G. A. Phillips R. J. Solomon S. C. Watkins M. M.  
Wieczorek M. A. Williams J. G.  
[Gravity Recovery and Interior Laboratory \(GRAIL\) Mission: Status at the Initiation of the Science Mapping Phase](#) [#1489]  
The Gravity Recovery And Interior Laboratory (GRAIL) mission is on track to initiate its science phase on March 8, 2012. GRAIL will determine the structure of the lunar interior, and advance understanding of lunar thermal evolution.
- 8:45 a.m. Zhong S. J. \* Qin C. A G. R. Wahr J.  
[Coupling of Tidal Force with Heterogeneous Mantle Structure and its Implications for Using GRAIL Observations to Constrain Lunar Interior Structure](#) [#2754]  
Tidal force may produce non-degree-2 gravity and radial displacement responses for a planetary body with a heterogeneous mantle. We show how this mechanism can be explored to use GRAIL results to constrain lunar interior structures.
- 9:00 a.m. McGovern P. J. \*  
[An Intrusive Origin for Lunar Mascons: Magma Ascent Theory, Gravitational Signatures, and Tests for GRAIL](#) [#2937]  
I explore the idea that intrusive bodies beneath lunar impact basins are responsible for the immense “mascon” gravity anomalies.
- 9:15 a.m. Kiefer W. S. \* Macke R. J. Britt D. T. Irving A. J. Consolmagno G. J.  
[Regional Variability in the Density of Lunar Mare Basalts and Implications for Lunar Gravity Modeling](#) [#1642]  
Lunar mare basalts show considerable variability in both composition and density. We show how sample and remote sensing data can be combined to estimate lunar basalt densities, providing improved constraints on gravity model parameters.
- 9:30 a.m. Grimm R. E. \*  
[Thermal Models of the Lunar Procellarum KREEP Terrane: Geophysical Implications](#) [#2313]  
Subcrustal KREEP heating sufficient to explain mare volcanism would produce a residual gravity anomaly today that is not observed. KREEP heating must be distributed within the crust, and mare volcanism explained by secular cooling.
- 9:45 a.m. Nimmo F. \* Faul U.  
[Lunar Mantle Temperature Structure from Seismic and Geodetic Observations and Laboratory Dissipation Experiments](#) [#1564]  
The observed dissipation and  $k_2$  Love number of the Moon can be reconciled with laboratory measurements by invoking a relatively cold Moon, in which two-thirds of the radiogenic elements are in the crust. A deep zone of partial melt is not needed.
- 10:00 a.m. Tikoo S. M. \* Weiss B. P. Grove T. L. Fuller M. D.  
[Decline of the Ancient Lunar Core Dynamo](#) [#2691]  
The lunar dynamo likely produced at most weak (<7 microtesla) to null surface magnetic fields 3.2–3.3 billion years ago (Ga). This indicates a decline in field intensity from the ~65 paleofield inferred for samples aged 3.6–3.7 Ga.

- 10:15 a.m. Suavet C. \* Weiss B. P. Fuller M. Gattacceca J. Grove T. L. Shuster D. L.  
[Persistence of the Lunar Dynamo Until 3.6 Billion Years Ago](#) [#1925]  
Mare basalt 10017 provides a paleomagnetic record of a lunar core dynamo 3.6 billion years ago. These results extend the lifetime of the lunar dynamo by 100 million years and challenge current planetary dynamo models.
- 10:30 a.m. Richmond N. C. \* Hood L. L.  
[Further Constraints on the History of the Lunar Dynamo Field from Lunar Prospector Magnetometer Data](#) [#1898]  
Lunar Prospector MAG data will be presented for the Serenitatis and Schrodinger basins, which both show evidence of basin-related magnetization. The results will be used to provide constraints on the time period of lunar core dynamo operation.
- 10:45 a.m. Aharonson O. \* Goldreich P. Sari R.  
[Why do We See the Man in the Moon?](#) [#2532]  
Numerical simulations and analysis show that the Moon locks into resonance with a statistical preference of facing either the current nearside or farside toward Earth.
- 11:00 a.m. Nakajima M. \* Stevenson D. J.  
[The Initial State of the Moon Forming Disk and the Earth's Mantle Based on SPH Simulations](#) [#2627]  
We have performed giant impact simulations with SPH and derived thermal profiles of 2D impact-generated disks. A mechanical mixing process between the mantle materials originating from the proto-Earth and those from an impactor is also investigated.
- 11:15 a.m. Perera V. \* Garrick-Bethell I.  
[Lunar Symmetry: The True Shape of the Moon?](#) [#2634]  
We present a new center-of-figure referenced map of lunar topography, which shows that the nearside and the farside are more symmetric than previously inferred.
- 11:30 a.m. Warren P. H. \*  
[Constraints on the Impact-Accreted Carapace Hypothesis for the Lunar Farside Highlands](#) [#2941]  
The recent proposal that an impact-accreted carapace accounts for the greater thickness of the Moon's farside highlands crust is not plausible. The carapace would not have appropriately low density, nor the appropriate Al<sub>2</sub>O<sub>3</sub>-rich composition.