

# The Structure of the Lunar Interior

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- Shallow structure – crust and upper mantle (emphasis on GRAIL)
  - Compositional constraints: Remote sensing
    - Pure anorthosite
    - Central peaks, norite
    - Olivine
    - SPA, PKT; opx vs olivine, *magma ocean overturn (magmatic evolution I?)*, etc
    - Mixed feldspathic layer
  - Crustal thickness
    - Mean thickness, implications for Al, KREEP, etc.
    - Global asymmetry
    - Density and density gradients
  - Basin-related structure
    - Mantle excavation vs. crustal thickness
    - Signature of ring faults and ring dikes
    - Mascon structure
  - GRAIL structures
    - Dikes – implications for early lunar evolution
    - PKT
    - Volcanoes, *lava tubes (development of the Moon chapter)*
    - Maria thickness
    - Crater signatures
    - Small-scale variability
- Deep mantle and core structure (GRAIL, seismology, other geophysical constraints)
  - Compositional constraints (mare basalt elemental abundances)
  - Seismology
    - Differences between most recent published seismic structure models
    - Evidence for partial melt (seismic Q, tie-ins to k2 & heat flow)
    - Evidence for layered core (array seismology)
  - LLR (MOI)
  - GRAIL (mass, gravity coefficients, dissipation, love numbers)
    - William et al. 2014 & 2015, Yan et al. 2015, Matsumoto et al. 2015
  - *Magnetic constraints on core (magnetism chapter)*
    - *Magnetic induction*
    - *Paleomagnetic constraints on core dynamo*
- Thermal evolution
  - Apollo heat flow & GRAIL constraints
  - Mantle convection
- Lunar geodynamics
  - Lunar figure and implications for the rotational-tidal evolution
    - Work by Garrick-Bethel, Matsuyama, Keane

- *Magma ocean overturn (magmatic evolution 1?)*
- *Mascon processes (cratering processes chapter)*

Potential contributors:

Shallow structure: Jeff Andrews-Hanna  
Deep structure: Renee Weber, Isamu Matsuyama  
Thermal evolution: Walter Kiefer, Matt Siegler  
Lunar figure &  
implications for the  
rotational-tidal  
evolution: James Keane, Isamu Matsuyama

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