Short course: **Earth and planetary materials and dynamics**
Lecture room V414 (CEED-PGP), Physics building, west wing, June 3-7, 2013
Unregistered people are welcome to attend parts of or the entire course sessions

Program

**Colour code, instructors:**
Reidar G. Trønnes, CEED and NHM, Univ. Oslo  
Stephanie C. Werner, CEED, Univ. Oslo  
Bernhard Steinberger, GFZ Potsdam and CEED, Univ. of Oslo  
Chris E. Mohn, CEED / Dept. of Chemistry, Univ. Oslo

15 min student presentations

**Time frame**

**M:** Morning, 09-12  
Lunch: 12-13  
**A:** Afternoon, 13-16

**Tuesday: 0900-1130**  
1130-1215

**Monday, June 3**

**M:** 0845-0850: Short introduction of participants  
0850-0910: Trond H. Torsvik, director, CEED:  
A new Centre for Earth Evolution and Dynamics, Univ. Oslo  
Introduction to comparative planetology  
Star evolution and nucleosynthesis  
Structure, composition and bombardment history of the solar system.

**A:** Planetary accretion and core segregation: processes and chronology  
Compositional models for the Earth - Bulk silicate (crust + mantle) and core  
Planetary heat flow and thermodynamics: convection and thermal boundary layers

**Tuesday, June 4**

**M:** Seismology and seismic tomography of the Earth  
Erlend Morisbak Jarsve: Mantle geodynamics and plate tectonics  
Nana Yaw Agyei-Dwarko: Mantle plumes and the origin of large igneous provinces  
Planetary melting and crust formation – fundamental phase relations

**A:** Guest lecture: James Hammond, School of Earth Sciences, University of Bristol, UK:  
Geodynamics of the Seychelles and Mascarene Basin  
Marzena Kohut: Early mantle differentiation and the question about geochemically isolated reservoirs  
Geochemical constraints on depleted and enriched mantle reservoirs: Earth, Moon and Mars
Wednesday, June 5

M: Dynamic topography
   Geodynamic relations between subduction, plume generation, LLSVPs and true polar wander
   Reference frames for plate motion and true polar wander

A: Veronica K.B. Olsen: Convective dynamics of the Earth’s mantle
   Relation between geoid, topography, volcanism and mantle dynamics, Earth and planets
   Diego González: Moon formation and differentiation
   Steven Mueller: New results from the Dawn mission to Vesta
   Vesta - Earth: Upper mantle melting and crustal differentiation at low and high pressures

Thursday, June 6

M: Hermann Drescher: Petrological constraints on recycled oceanic crust in mantle plumes
   Lotta Ternieten: Geochemical heterogeneities and mantle convection
   Mineral physics: p-V-T equations-of-state and experimental techniques
   Chris E. Mohn: Computational mineral physics: First principles molecular dynamics

A: Subsolidus mineralogy of peridotitic to basaltic compositions at 3-136 GPa
   Melting relations of peridotitic to basaltic compositions at 3-136 GPa
   Origin and composition of LLSVPs and ULVZs in the lowermost mantle

Friday, June 7

M: Core-mantle redox equilibrium (and non-equilibrium) in terrestrial planets
   Fe-spin state in the lowermost mantle, conductive and radiative heat flow
   Terrestrial planetary cores: phase relations and properties of Fe-dominated metal alloys

A: Volcanism and tectonics on the terrestrial planets
   Recycled oceanic crust and continental mantle lithosphere in oceanic basalts
   Guest lecture / wine seminar:
   Galen Gisler (PGP): d'Alembert's Paradox reconsidered: Do we really need viscosity to calculate drag?