As a part of the lecture series “Special Topics in Dynamics and Evolution of the Earth and Planets”, the Research School DEEP and the Ivar Giæver Geomagnetic Laboratory present:

**Earth Magnetism and Paleogeography from the Precambrian to the present**

*Invited guest lecturer:* Prof. Lauri J. Pesonen (Univ. Helsinki)

The course is designed for graduate students (PhD and MS levels) with a broad interest in geophysics, geology and planetary science. The main objective of the course is to give students a comprehensive overview of the Earth magnetism at the present time (geomagnetism) and in the geologic past (paleomagnetism), including its applications for reconstructing the paleogeography through geologic time, which lays down the essential foundation for our understanding of the evolution and dynamics of the Earth at planetary scale.

The course will be given at the Centre for the Earth Evolution and Dynamics (CEED), University of Oslo, during the spring semester of 2017 (schedule will be announced later). The course consists of five 3-hour lectures and includes student presentations, laboratory exercises, and training sessions on using the software for paleogeographic reconstructions. The topics covered by the course include:

- **Magnetic properties of rocks and minerals**
  *Here you will learn about most common magnetic minerals, how rocks get magnetized, how we measure natural remanent magnetism of rocks, and how these data contribute to our understanding of the geomagnetic field and paleogeography through geologic time.*

- **Geomagnetic field**
  *You will learn about why the Earth has a strong planetary magnetic field, where and how it originates, how we measure and describe the field, how it changes on a short and longer time scales, how we know that it reversed its direction in the past, and how this information can help us deciphering sedimentary records and defining the motions of lithospheric plates.*

- **Magnetic anomalies and their interpretations**
  *You will learn about magnetic anomalies of various scale and origin and how we interpret them.*
• Geodynamo, dipole and multipole fields
  You will learn about the geodynamo process in the liquid core of the Earth that generates the main planetary magnetic field. You will also learn why the geomagnetic field is dominantly dipolar, the fundamental dipole equations and the methods for testing whether the field is truly dipolar with paleomagnetic data. We will also discuss non-dipole fields and how we describe them using spherical harmonic analysis.

• Paleomagnetism
  You will learn the fundamentals of paleomagnetism, including data analysis, statistical methods, and methods for separating remanent magnetization components from the measured vector.

• Precambrian geomagnetic field
  We will study the Precambrian geomagnetic field using a novel paleomagnetic data base PALEOMAGIA. We will discuss the paleosecular variation, reversals and the intensity of the field during the Precambrian. This session includes laboratory exercises consisting of measurements of paleomagnetic and rock magnetic properties on Precambrian rock samples, and processing of paleomagnetic data.

• Precambrian paleogeography
  This section will give you an overview of the techniques for reconstructing the positions of continents in the geologic past using paleomagnetic data. Here you will be given a primer on using modern computer software (GMAP and GPlates) for producing paleogeographic reconstructions.

Grades and Credits:
The course is open to PhD candidates enrolled in the Norwegian Research School for Dynamics and Evolution of Earth and Planets (DEEP) and it gives 5 ECTS with a pass/fail grade upon completion.

We can offer the course as a 5 ECTS special curriculum (with an A to F grade) for master students enrolled at UiO. To master students enrolled at other institutions we can only offer documentation for participation.

All students must give a short presentation on a given topic and pass a home examination.

For more information about the course please contact:
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For general questions regarding DEEP please contact: post-deep@geo.uio.no