6th IAGA School

linked to IUGG in Berlin 2023
at the Geomagnetic Observatory Niemegk
of German Research Center for Geosciences, GFZ, Germany
July 06th – 12th, 2023

The coordination and organisation of the IAGA School is done by the IAGA Interdivisional Commission on Education and Outreach (ICEO) chair person Barbara Leichter (GeoSphere Austria), supported by the local organisers Jürgen Matzka and colleagues from the GFZ Niemegk observatory.

Schedule Overview

The dates for the IAGA School are July 6th (arrival day) to July 12th (departure day), the lectures will be from July 7-11. 2023

Date	Timetable	Topic	Lectures
Thursday 6th July	arrival day		
Friday 7th July	9:00-11:00 lecture Break: 11:00-11:30 11:30-12:30 lecture Lunch: 12:30-13:30 13:30-15:00 lecture	**Core field/observations:** • Earth's Magnetic Field • Observing the Earth's magnetic field: ground observatory network • Measurements from satellites • Variations of the Earth's magnetic field: Lunar, secular, daily, annual, 11 years, irregular, reversals	**Kusumita Arora (India)**

	Break: 15:00-15:30 15:30-18:00 lecture/ practicals	• Models of the Earth's magnetic field	**Ashley Smith (UK) (Tutor)** **all days**
Saturday 8th July	9:00-11:00 lecture Break: 11:00-11:30 11:30-12:30 lecture Lunch: 12:30-13:30 Excursion: Tour of the Geomagnetic Observatory Niemegk	**Numerical core field simulation** • Fundamentals of the dynamo problem • Recent advances in Dynamo Simulations • Practical dynamo simulations	**Johannes Wicht (Germany)** **Jürgen Matzka and Marcos Vinicius Siqueira da Silva (Germany)**
Sunday 9th July	9:00-11:00 lecture Break: 11:00-11:30 11:30-12:30 lecture Lunch: 12:30-13:30 13:30-15:00 lecture Break: 15:00-15:30 15:30-18:00 lecture/ practicals	**Paleo-/rock magnetism** Palaeomagnetism: reading and deciphering records of the prehistoric field • First Principles: Rocks, sediments and archaeological materials as magnetic recorders • Practical Details: Sampling, measuring, checking for reliability • Palaeomagic: Data interpretation and statistics. Examples and exercises. • The Prehistoric field: The evidence for field variability, geomagnetic excursions and polarity reversals. • The Time Averaged Field: The geocentric axial dipole hypothesis, palaeomagnetic poles, continental reconstruction	**Gillian Turner (New Zealand)** (whole day)

Monday 10th July	9:00-11:00 lecture Break: 11:00-11:30 11:30-12:30 lecture Lunch: 12:30-13:30 13:30-15:00 lecture Break: 15:00-15:30 15:30-18:00 lecture/ practicals	**Magnetosphere**: **Magnetospheric Morphology** • Magnetospheric Boundaries • Magnetospheric Current Systems • Plasma Populations **Magnetospheric Dynamics** • Plasma Entry and Transport Processes • Storms and Substorms • Magnetosphere/Ionosphere Coupling • Auroral Acceleration **Lithospheric field**: • Introduction and history • Measurements and data processing • Mapping and relationship to subsurface structures • Applications in compared planetology.	**Jay Johnson (USA)** **Erwan Thébault (France)**
Tuesday July 11th	9:00-11:00 lecture Break: 11:00-11:30 11:30-12:30 lecture Lunch: 12:30-13:30 13:30-15:00 lecture Break: 15:00-15:30 15:30-18:00 lecture/ practicals	**EM/MT** Introduction Earth's electromagnetic environment Some theory Instruments Magnetotelluric (MT) methods Geomagnetic depth sounding (GDS) Controlled-source methods Forward modeling Inverse modeling Global conductivity structure	**Steven Constable (USA)** (whole day)
Wednesday 12th	departure day		

Lectures and lecturers

Name of Lecturer: **Kusumita Arora (India)**
kusumita.arora@gmail.com
CSIR – National Geophysical Research Institute (NGRI)

Topic: Core field/observations:

- Earth's Magnetic Field
- Observing the Earth's magnetic field: ground observatory network
- Measurements from satellites
- Variations of the Earth's magnetic field: Lunar, secular, daily, annual, 11 years, irregular, reversals
- Models of the Earth's magnetic field

Name of Lecturer/Tutor: **Ashley Smith (UK)**
Ashley.Smith@ed.ac.uk
University of Edinburgh

Topic: Tutor through the whole IAGA School time,
focusing on Python tools and data dissemination via Jupyter notebooks.

Name of Lecturer: **Johannes Wicht (Germany)**
wicht@mps.mpg.de
Max Planck Institute for Solar System Research

Topic: Numerical core field simulation

- Fundamentals of the dynamo problem
- Recent advances in Dynamo Simulations
- Practical dynamo simulations

Name of Lecturer: **Gillian Turner (New Zealand)**
gillian.turner@vuw.ac.nz
Academic (Postgraduate)
Wellington Faculty of Science

Topic: Palaeomagnetism: deciphering records of the prehistoric field

- First Principles: Rocks, sediments and archaeologicalmaterials as magnetic recorders
- Practical Details: Sampling, measuring, checking for reliability
- Palaeomagic: Data interpretation and statistics
- The Prehistoric field: the evidence for field variability, excursions, polarity reversals,

- the Time Averaged Field: the geocentric axial dipole hypothesis, palaeomagnetic poles, continental reconstruction

Name of Lecturer: **Jay R. Johnson (USA)**
jrj@andrews.edu
Andrews University / Department of Engineering

Topic: Magnetosphere

Magnetospheric Morphology
- Magnetospheric Boundaries
- Magnetospheric Current Systems
- Plasma Populations

Magnetospheric Dynamics
- Plasma Entry and Transport Processes
- Storms and Substorms
- Magnetosphere/Ionosphere Coupling
- Auroral Acceleration

Name of Lecturer: **Erwan Thebault (France)**
thebault.erwan@gmail.com
University of Nantes Laboratoire de Planétologie et de Géodynamique

Topic: Lithospheric field:
- Introduction and history

- Measurements and data processing
- Mapping and relationship to subsurface structures
- Applications in compared planetology.

Name of Lecturer: **Steven Constable (USA)**
sconstable@ucsd.edu
Institute of Geophysics and Planetary Physics
Scripps Institution of Oceanography

Topic: Electromagnetic Induction Methods

- Introduction
- Earth's electromagnetic environment
- Some theory
- Instruments
- Magnetotelluric (MT) methods
- Geomagnetic depth sounding (GDS)
- Controlled-source methods
- Forward modeling
- Inverse modeling
- Global conductivity structure