International School on Foraminifera

9th Course

Urbino – 6th – 25th June, 2016

First Circular

Course Description

The 9th Course on Foraminifera is designed to provide an overview of the Taxonomy, Ecology, Biodiversity, and Geological History of Benthic and Planktonic Foraminifera. This intensive course is intended for students interested in Micropalaeontology, Palaeoceanography, Palaeoecology, Climate History, Biology, and Environmental applications. The aim is to provide a primer on the study of foraminifera and examples of how foraminifera can be used as (paleo)environmental and (paleo)oceanographical proxies. We review the current classification schemes of the foraminifera, discuss their ecology and life history, review their usefulness for biostratigraphical applications, and use case studies to investigate the geological history of the group with lab and practical sessions. The entire course consists of approximately 60 hours of lectures and 60 hours of practical work.

Course Structure

Four distinct courses are planned: Foraminiferal Introduction (7-11 June), Larger Benthic Foraminiferal Course (12-15 June), Planktonic Foraminiferal Course (17-21 June) and Smaller Benthic Foraminiferal Course (22-25 June).

Teaching Format

The course consists of lectures and practical classes covering the taxonomy, distribution, ecology, and paleoecology of foraminifera. Microscope lab sessions provide the opportunity for participants to learn the foraminiferal genera and species, and view Cretaceous to Neogene foraminiferal assemblages from Petroleum Exploration areas and ODP sites as well as Quaternary and modern assemblages. At the end of each lecture session, different tasks will be assigned to participants to reinforce the knowledge learned. Course materials include the pdf lectures and numerous pdf reprints of classic papers.

Courses Outline

6 June Monday Icebreaker Party

Foraminiferal Introduction

Day 1 (7 June Tuesday) ***Kaminski & Bernhard***

Welcoming speech and course presentation
Plenary lecture: *Foraminiferal adaptations to chemocline living: cell biology, ultrastructure, denitrification, and symbiosis*
Famous Names and Milestones in the Study of Foraminifera
Introduction to Foraminifera & Review of Foraminiferal Suborders

Sample Preparation Techniques
Lab Task 1: Identification of foraminiferal wall composition, coiling, chamber arrangement, and apertures of benthic foraminifera
Lab Task 2: Dividing forms by wall structure, coiling and chamber arrangement
Material: Nova Scotia Agglutinated Foraminifera & Mediterranean Sea

Day 2 (8 June Wednesday) ***Kaminski, Cetean & Frontalini***
Morphology and Classification of Benthic Foraminifera
Miliolids, Buliminids and small Rotaliids
Collecting modern foraminifera
Lab Task 1: Identification of benthic foraminiferal genera: wall composition, coiling, chamber arrangement and shape, and apertures
Material: Arabian Gulf and Adriatic Sea

Day 3 (9 June Thursday) ***Kaminski & Cetean***
Introduction to Planktonic Foraminifera
Morphology and Classification of Planktonic Foraminifera
Lab task 1: Identification of wall structures, coiling and chamber morphology
Material: Sargasso Sea and South Atlantic

Day 4 (10 June Friday) ***Hohenegger & Pawlowski***
Biology of foraminifera
Ecology and taphonomy of foraminifera
Lab 1: Statistical analyses for ecological and paleoecological studies
Lab 2: Sampling methods for living foraminifera
Lab Task 1: Using statistical program packages

Day 5 (11 June Saturday) ***Pawlowski & Sabbatini***
Taxonomy, distribution and ecology of monothalamous foraminifera
Introduction to molecular genetics of Foraminifera
Lab 1: Observations of living foraminifera & culturing techniques
Lab 2: Samples preparation for DNA extraction
Lab Task 1: Recognition and identification of monothalamous foraminifera

Larger Benthic Foraminifera

Day 6 (12 June Sunday) ***Hohenegger, Papazzoni & Briguglio***
Definition, biology and taxonomy of LBF: species concept and classifications
Biostratigraphic frameworks: evolutionary tendencies and fossil associations
Applications of LBF: Ecology and taphonomic signals
Functional morphology of LBF: actuopalaeontological approach
Upper Palaeozoic shallow water fauna: the Suborder Fusulinina
Lab 1: Hydrodynamics of nummulitids
Task 1: Water depth estimation based on LBF

Day 7 (13 June Monday) ***Hughes***
- Early Carboniferous foraminifera and their use for paleoenvironmental interpretation
Lab and Task 1: Asbian foraminiferal identification using thin sections (paleoenvironment study)
- Late Permian foraminifera of the Middle East and their biosteering application
- Triassic micropalaeontology of her Middle East: age application
Lab and Task 2: Triassic foraminiferal identification using photomicrographs (age determination)
- Jurassic foraminifera of the Middle East: age, paleoenvironment and implications for cycle definition
Lab & Task 3: Jurassic foraminiferal identification using thin sections (age determination)
- Jurassic foraminifera of the Middle East (Oxfordian): age and paleoenvironment
Lab & Task 4: Jurassic (Oxfordian) foraminiferal identification using photomicrographs: paleoenvironment exercise
Late Jurassic hypersalinity events: foraminiferal & associated microfaunal/floral responses

Lab & Task 5: Jurassic hypersaline foraminiferal identification using photomicrographs: paleoenvironment study
- Cretaceous foraminifera of the Middle East: age, paleoenvironment and implications for cycle definition
Lab & Task 6: Cretaceous (Aptian) foraminiferal identification using photomicrographs: age and paleoenvironment exercise
- Neogene foraminiferal applications in the Red Sea hypersaline-associated succession

Day 8 (14 June Tuesday) ***Papazzoni & Briguglio***
The Cenozoic LBF systematic groups
Introduction to Palaeogene LBF: biogeography and provinces
Early evolution in the Paleocene: agglutinated, porcelanaceous and hyaline
The LBF turnover and the Eocene-Oligocene boundary
The Eocene biodiversity (I): the genus *Alveolina*
The Eocene biodiversity (II): the genus *Nummulites*
Lab 1: classifications techniques, biometry and thin sections
Task 1: Identification of index species in thin section

Day 9 (15 June Wednesday) ***Hohenegger, Papazzoni & Briguglio***
The nummulite bank: characterization, ecology and biostratinomy
The Eocene biodiversity (III): the orthophragminids
Oligo-Miocene fauna
Distribution of recent LBF
Diversity and applications on recent LBF
Lab 1: Micro Computed Tomography on recent LBF
Task 1: Identification of index species
Evening Session: "*Foraminiferal Party*". Slide presentations by ISF participants -- five minutes each: -five photos, five PowerPoint slides

Day 10 (16 June Thursday)
Day-off

Planktonic Foraminifera

Day 11 (17 June Friday) ***Kucera & Kaminski***
Introduction to Planktonic Foraminifera and their Classification
Modern Planktonic Foraminifera
Taxonomy of modern planktonic foraminifera
Structure of cytoplasm, Feeding, Symbionts, Ontogeny
Reproductive and seasonal cycles, Depth habitats
Origin of Planktonic Foraminifera
Biogeography of Planktonic Foraminifera
Faunal Provinces, Climatic Zones and Water Masses
Lab 1: Recent assemblages - wall texture - shell morphology
Task 1: Identification of latitudinal zones based on PF

Day 12 (18 June Saturday) ***Kaminski & Kucera***
Neogene Planktonic Foraminifera
Miocene and Pliocene Planktonic Foraminifera
Pleistocene Planktonic Foraminifera
Biochronology and Zonal schemes
Lab 1: Miocene index species - Pliocene-Pleistocene index species
Task 1: Identification of biozones
Task 2: Identification of glacial and interglacial assemblages

Day 13 (19 June Sunday) ***Petrizzo***
Mesozoic Planktonic Foraminifera
Biostratigraphy
Notes on Paleoceanography
Lab 1: Upper Jurassic to Maastrichtian index species

Task 1: Morphology of Cretaceous PF
Task 2: Identification of biozones

Day 14 *(20 June Monday)* ***Petrizzo***
Paleogene Planktonic Foraminifera
Biostratigraphy
Notes on Paleoceanography
Lab 1: Paleogene index species
Task 1: Morphology of Paleogene PF
Task 2: Identification of biozones

Day 15 *(21 June Tuesday)* ***Kaminski & Frontalini***
Morning field excursion to the Gubbio area
Cretaceous-Paleogene sequence at Contessa Highway and Contessa Road
Paleocene-Eocene Thermal Maximum and other hyperthermals at Contessa Road
Oceanic Anoxic Event 2 "Bonarelli" at Contessa Quarry
K/Pg boundary at Bottaccione
Oceanic Anoxic Event 1a "Selli" at Gorgo a Cerbara
Afternoon tourist visit to Gubbio
Social Dinner

Smaller Benthic Foraminifera

Day 16 *(22 June Wednesday)* ***Kaminski***
Morphogroups and functional morphology of smaller benthic foraminifera
Ecology and distribution of benthic Foraminifera
Lab: Databases, Taxonomy of benthic foraminiferal suborders
Task 1: Water depth estimation based on SBF
Task 2: Identification of SBF morphogroups

Day 17 *(23 June Thursday)* ***Kaminski & Frontalini***
Community Structure, Life History, and Reproduction
Oceanographic proxies, benthic foraminiferal microhabitats, and productivity/oxygenation
Benthic foraminifera and water mass properties
Atlantic and Mediterranean shallow water benthic Foraminifera
Lab: Modern smaller benthic foraminifera: Foraminiferal genera and assemblages
Task 1: Productivity/oxygen estimation based on SBF
Task 2: Environmental Interpretation

Day 18 *(24 June Friday)* ***Cetean & Alegret***
Biostratigraphy and Paleoecology of benthic foraminifera
The ODP record, Cretaceous/Paleogene boundary, Paleocene-Eocene Thermal Maximum, Eocene hyperthermals and late Eocene
Lab: A review of late Cretaceous to Paleogene faunas and index taxa
Task 1: Paleodepth estimation based on upper depth limits of SBF
Task 2: Paleoproductivity/paleoxygen estimation based on SBF
Aperitif

Day 19 *(25 June Saturday)* ***Kaminski & Foy***
Cenozoic Paleoceanographic events and SBF
Neogene of West Africa, and Gulf of Mexico: The ACEX Arctic Drilling Expedition
Lab: The Paleogene record; North Sea, Trinidad, Angola, Carpathians, Gubbio
A review of Jurassic to late Cretaceous faunas, Bering Sea Pleistocene faunas
Task 1: Flysch type fauna identification – index taxa
Task 2: Oxygen minimum zone fauna
Rigs and Stuff
Wellsite Micropalaeontology

Min number of participants: 10

Final deadline May 6th, 2016

Registration fees
Early registration (application sent and payment before February 5th, 2016)

PhD/MSc Students:

One module	£ 290 (Euro 380)
Two modules	£ 450 (Euro 590)
Three modules	£ 570 (Euro 750)
Full course	£ 660 (Euro 860)

Academic/Industrial staff :

One module	£ 430 (Euro 560)
Two modules	£ 650 (Euro 850)
Three modules	£ 800 (Euro 1050)
Full course	£ 900 (Euro 1175)

Late registration (application and payment sent after February 5th, 2016)

PhD/MSc Students:

One module	£ 330 (Euro 430)
Two modules	£ 540 (Euro 705)
Three modules	£ 700 (Euro 915)
Full course	£ 750 (Euro 980)

Academic/Industrial staff :

One module	£ 480 (Euro 620)
Two modules	£ 760 (Euro 995)
Three modules	£ 910 (Euro 1190)
Full courses	£ 950 (Euro 1250)

The fee includes:

- lectures (4-day course)
- lecture notes, handouts, PowerPoint, pdf of reprints
- icebreaker party
- refreshments
- aperitifs
- excursion
- social dinner

How to make an application
Registration must be done by submitting an application form that can be download from http://isf.tmsoc.org website, or by sending an email to isf@tmsoc.org

The course fee must be paid to the following bank account:
Registration is upon receipt of payment in Euro (€) by direct bank transfer to:
Account name: Fundacja Mikropaleontologiczna Micropress Europe
Bank address: Raiffeisen Bank Polska S.A., ul. Piekna 20, 00-549 Warszawa
SWIFT: RCBWPLPW
IBAN: PL91 1750 0012 0000 0000 2841 0832
Currency of account: Euro (€). (Please contact us for further instructions if you wish to pay in Pounds Sterling or in US Dollars).
Reason for payment: participant's name and 9th I.S.F. (e.g. John Smith – 9th I.S.F.)
As soon as you have a copy of the bank transfer, please send it by e-mail to isf@tmsoc.org

Correspondence and Information:

Dr. Fabrizio Frontalini
Dipartimento di Scienze della Terra, della Vita e dell'Ambiente (DiSTeVA)
Università degli Studi di Urbino "Carlo Bo" - Campus Scientifico, Località Crocicchia, 61029 Urbino (Italy) - fabrizio.frontalini@uniurb.it Tel: (+39) 0722 304309, Fax: (+39) 0722 304220, Mobile phone: (+39) 3928457666

Lectures
Prof. Michael A. Kaminski, King Fahd University of Petroleum & Minerals (Saudi Arabia)
Dr. Fabrizio Frontalini, Urbino University (Italy)
Prof. Laia Alegret, University of Zaragoza (Spain)
Dr. Joan M. Bernhard, Woods Hole Oceanographic Institution (USA)
Dr. Antonino Briguglio, University of Brunei Darussalam (Brunei)
Dr. Claudia Cetean, Robertson Ltd (UK)
Prof. Rodolfo Coccioni, Urbino University (Italy)
Dr. Danielle Foy, Blue Phoenix Geological Ltd. (UK)
Prof. Johann Hohenegger, University of Vienna (Austria)
Prof. Geraint Wyn Hughes, King Fahd University of Petroleum & Minerals (Saudi Arabia)
Prof. Michal Kucera, MARUM, University of Bremen (Germany)
Prof. Cesare Andrea Papazzoni, University of Modena e Reggio Emilia (Italy)
Prof. Jan Pawlowski, University of Geneva (Switzerland)
Prof. Maria Rose Petrizzo, Milano University (Italy)
Dr. Anna Sabbatini, Marche Polytechnic University (Italy)

Scientific Directors & Coordinators
Prof. Michael A. Kaminski, King Fahd University of Petroleum & Minerals (Saudi Arabia)
Dr. Fabrizio Frontalini, Urbino University (Italy)

Requirements

The course is primarily intended for young researchers at the PhD or MSc stages of their careers and industrial staff working with Foraminifera, Meiofauna, Micropalaeontology, Paleoceanography, Paleoecology, Climate History. Applicants will primarily be selected on the basis of the relevance of the course for their current work. Because the course is oversubscribed, places on the course are reserved in the order of payments received. Please register early in order to reserve your place.

Location

The course will be held in Urbino at the “Collegio Internazionale”. The “Collegio Internazionale” is in the historic center of Urbino, two blocks from the main square (please visit, http://www.collegiointernazionaleurbino.it/en/1/galleria-immagini.html).

Accommodation and meals

It is possible for participants to book accommodation at the “Collegio Internazionale” (University Hall). Most of the rooms are double-occupancy and have en-suite bathrooms, only a few single rooms are available and will be assigned in enrollment order. The rooms are furnished, air-conditioned, clean and comfortable. The cost of the accommodation is € 18 in double and € 25 in single per night including breakfast. The accommodation cost is paid upon your arrival in cash or by debit/credit card at the reception desk of Collegio Internazionale. Cafeteria meals may be obtained by a rechargeable debit card (each participant will receive a meal card at reception) at the nearby university residential block in the "Mensa del Duca" (1-minute walk from the Collegio Internazionale). The cost is either € 10 for a complete meal (first course, second course, side dish, bread, fruit and water) or € 6 for a smaller meal (main course, two side dishes, bread, fruit and water). Visitor's Tax € 7.50 for the entire stay.

The second circular with detailed information about the course is scheduled to be distributed in early March 2016 and will be sent to people who replied to the first circular.

We look forward to seeing you in Urbino!

For more information please visit our new website at **www.isf.tmsoc.org/**

Dr. Fabrizio Frontalini PhD
DiSTeVA, Università degli Studi di Urbino "Carlo Bo"
Campus Scientifico Enrico Mattei, Località' Crocicchia 61029 Urbino (Italy)
fabrizio.frontalini@uniurb.it
Tel: (+39) 0722 304309 Fax: (+39) 0722 304220 Mobile phone: (+39) 3928457666

ROBERTSON
A CGG Company

Network
STRATIGRAPHIC
CONSULTING LTD