

# Newsletter of Micropalaeontology

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**Cover image:** Hand-made porcelain coccolithophores of the modern species *Coccolithus braarudii*. The typical size of *C. braarudii* is c.12 µm.

*Model and image by Samantha Gibbs, Ocean and Earth Science, National Oceanography Centre Southampton, University of Southampton, United Kingdom ([samantha.Gibbs@noc.soton.ac.uk](mailto:samantha.Gibbs@noc.soton.ac.uk)).*

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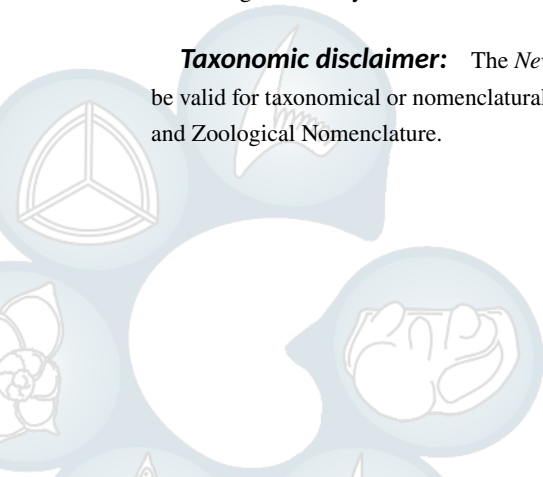
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'Methods in micropalaeontology' header: [Simple Gear Drawing](#)

Typeset in L<sup>A</sup>T<sub>E</sub>X with Stix, Carlito, and TXTT

### *Selected Extracts!*

*this file is only a small part of the TMS Newsletter  
- because it is only the nannofossil relevant parts.  
Jeremy*

*you can download the full newsletter from the TMS website*

## Contributions from

The Micropalaeontological Society    The Grzybowski Foundation



The International Nannoplankton Association



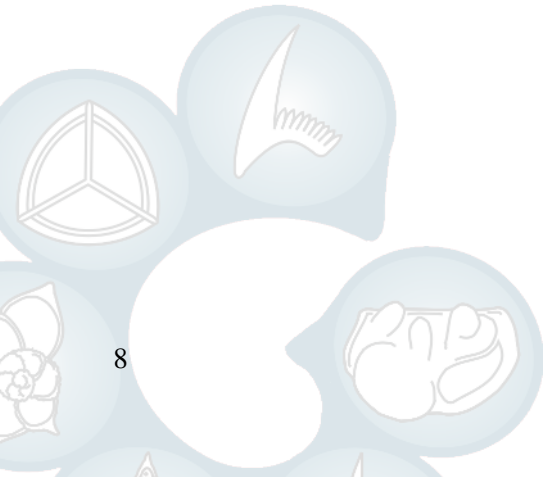
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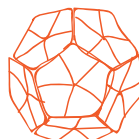
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## Conference and course announcements

The Micropalaeontological Society

# NANNOFOSSIL GROUP WORKSHOP



Tuesday 2<sup>nd</sup> October 2018  
University of Birmingham

This TMS workshop is open to all nannofossil enthusiasts; industrial, academic & student. The event will be held as an informal open session, with short talks and plenty of time to discuss current interests, advances and approaches within the nannofossil community.

The workshop will be an afternoon event with some refreshments provided. If you are interested in attending or giving a presentation, please contact the TMS Nannofossil Group reps:

Sarah Alvarez - [sarah.alvarez@bristol.ac.uk](mailto:sarah.alvarez@bristol.ac.uk)  
Mike McKnight - [mikejmcknight@gmail.com](mailto:mikejmcknight@gmail.com)



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and Climate', by Baumgartner et al. showed the evolution of siliceous plankton and its relation with the carbon and silicon cycles and climate. In the same session, other presentations regarded the Triassic–Jurassic boundary in the Pacific sites (Hori et al.), Upper Palaeozoic radiolarians in southwest Japan (Ito), and the dimorphism of the Permian Albalicellaria (Ito et al.).

O'Dogherty et al. presented, as keynote of Session S28, 'New Trends in Stratigraphy—Stratigraphic Section (SGF) Session', the chronostratigraphic calibration of Middle–Upper Jurassic radiolarites utilizing carbon isotope

stratigraphy. In the same session, Gorican et al. presented the current status and future direction of the Mesozoic radiolarian biochronology, while Matsuoka presented the phyletic analyses of *Loopus–Pseudodictyomitra* and *Vallupus* lineages at the Jurassic/Cretaceous boundary.

At last, Danelian and Monnet presented the pattern of changes in the Ordovician radiolarian diversity. This contribution was presented in Session S37, 'The Onset of the Great Ordovician Biodiversification (GOBE): Fossils, Radiations and Lagerstätten—IGCP 653 session'.

## Nanno News—updates from the TMS Nannofossil Group and the INA

**Jeremy Young<sup>1</sup> and Sarah Alvarez<sup>2</sup>; <sup>1</sup>University College London (UK), <sup>2</sup>University of Bristol (UK)**

### INAsset—nannofossil summer school, Lyon 1–7 July 2018

Nannofossil specialists have long felt a need to organise some kind of training opportunity for students joining their specialization. More particularly, we have watched the success of the Urbino Summer Schools

for planktonic Foraminifera, palaeoceanography, and agglutinated Foraminifera and debated whether to attempt something similar. Finally, it was resolved in the last INA conference, (INA 17 Athens 2017) to organise a summer school, and Emanuela Mattioli accepted the in-

visitation to host it in Lyon. This seemed a fine choice of venue for multiple reasons including:

1. Emanuela, with Fabienne Giraud, has built up a powerful research group and they have excellent facilities including particularly multiple light microscopes.
2. Lyon is a centrally placed European city with excellent transport connections.
3. Lyon is a beautiful European city with fine restaurants, a long history, and lots of bars.
4. Emanuela is an enthusiastic researcher with a fine record of organising meetings and workshops.

It was further decided to focus the first Summer School on Cenozoic nannofossil biostratigraphy and taxonomy since this was the most common focus for new nannofossil workers. Organization of the summer school<sup>2</sup> was lead by Giuliana Villa (INA president) and Emanuela Mattioli, with support from Matt Hampton (INA treasurer) and Jeremy

Young (INA web editor). Loosely following the model of the Urbino Summer Schools we set a registration fee of 500 € for the week, so as to properly cover the costs of organising the event and of bringing in first class lecturers. However, recognising that this is still a major expense for many students we also sought as much support and sponsorship as possible for the course so as to make it better value for all participants and to be able to sponsor some of the participants with funding difficulties. This effort proved successful (fortunately, training students is still a priority for many bodies) and we received valuable support from the INA Foundation, The Micropalaeontological Society, Lyon University (IDEX Lyon, LabEx LIO, and the Geology Department LGL-TPE). Equally importantly, the announcement of the course resulted in a rapid response from students wishing to benefit from it. Indeed we ended up being over-subscribed even after expending the number of places we could offer to the maximum.

So, after much planning, the

<sup>2</sup>Aptly named 'International Nannoplankton Association Summer School in Evolution and Taxonomy'





**Figure 2:** Group photo of the students and lecturers at the nannofossil summer school.

course finally took place in early July 2018, in the midst of both the FIFA World Cup and a heatwave affecting most of Europe and certainly Lyon. It lasted one week with systematic tuition provided by Claudia Agnini (Università degli Studi di Padova; Palaeocene), Jean Self-Trail (United States Geological Survey; Eocene), Giuliana Villa (Università di Parma; Oligocene), Eric de Kaenel (consultant; Miocene), and Luc Beaufort (CEREGE; Pliocene & Quaternary) supplemented by lectures on specific methods and topics by Baptiste Sucheras-Marx, Jorge Ferreira, Jeremy Young, and Emanuela Mattioli. The 20 stu-

dents were a similarly diverse group working in or coming from Canada, Colombia, Brazil, Argentina, China, Nepal, Iran, Syria, Lebanon, Israel, Greece, Hungary, Germany, Russia, Sweden, Italy, France, Portugal, and Ireland. The systematic sessions were heavily focussed on practical work in the microscope laboratory for which the lecturers had prepared multiple sets of slides from representative samples with fine preservation and abundant nannofossils. These provided the opportunity for students to learn the key marker species and gain an appreciation of nannofossil diversity through the Cenozoic. Having a wide range of lectur-

ers meant that each time period was covered by a worker with real expertise and enthusiasm for it. Perhaps equally importantly, having lecturers with different research priorities and taxonomic approaches meant that students were exposed to variable taxonomic concepts and the problematic reality that taxonomy is a subjective human construct rather than a simple description of discrete entities.



**Figure 3:** At work on the microscopes during the summer school in Lyon.

Perhaps even more important, the course gave the students the opportunity to properly meet both experts in their field and each other. To facilitate this, the social dimension was not neglected, and we had an ice breaker party (in a riverside bar), a summer school dinner (in a fine Lyonnaise bouchon), an end-of-event meal (in a local bar while watching the Brazil–Belgium game), and fi-

nally a one day field-trip (no Caenozoic, but lovely ammonites). All participants seemed to leave happy, both knowing a lot more about nannofossils and with many new friends—and since this was both a talented and enthusiastic group we can reasonably predict that many of these friendships will be maintained through long careers of nannofossil study. Indeed they will probably continue long after most of the lecturers have turned off their microscopes.

## Recent meetings

### *TMS Foram and Nannofossil Group Meeting*

The joint Foraminifera and Nannofossil Group Spring Meeting took place in Edinburgh on Friday 22 June. The session was held within the FORAMS 2018 conference, and ran as a two-hour session of talks and an accompanying poster session. The theme was ‘Reconstructing Past Ocean Environments with Foraminifera and Nannofossils’. Many thanks to the conveners Lyndsey Fox, Kirsty Edgar, and Martin Langer for arranging the session, which was well-attended throughout. The nannofossil presence at this meeting was

noticeably reduced in comparison to previous years, which is unfortunate. However, those of us that did make it managed to fit in some useful discussion of nannofossil taxonomy, and our ideas for a Nannofossil Group workshop later this year—see below.

### **Upcoming meetings**

#### ***TMS Nanno Group workshop, Birmingham—2 October 2018***

The next Nannofossil Group workshop will take place at the University of Birmingham on Tuesday, 2 October 2018, and will be held as an informal and open session with as many short talks as possible. This event will provide a much-needed opportunity for us to get together to discuss current interests and advances within the nannofossil community. The workshop will be open to all nannofossil workers; industrial, academic, and student. Further details will be announced on the TMS website and associated social media platforms shortly. Please email the Nannofossil Group representatives if you are interested in attending or in giving a presentation ([sarah.alvarez@bristol.ac.uk](mailto:sarah.alvarez@bristol.ac.uk) or [mikejmcknight@gmail.com](mailto:mikejmcknight@gmail.com)). We

look forward to hearing from you!

#### ***TMS Annual Conference, Leeds—14–15 November 2018***

The TMS Annual Conference will be held at the Town Hall in Leeds on 14 and 15 November 2018, hosted by the School of Earth and Environment, University of Leeds. The theme for the first day is ‘Microfossil Insights Into Greenhouse Worlds’, which will comprise a selection of talks that span the geological record of microfossils. The second day will be held as an open session, with short talks and posters related to any area of micropalaeontology. Further details are available at <http://www.tmsoc.org/tmsoc2018>.

#### ***INA 17, Santos, Brazil—September 2018***

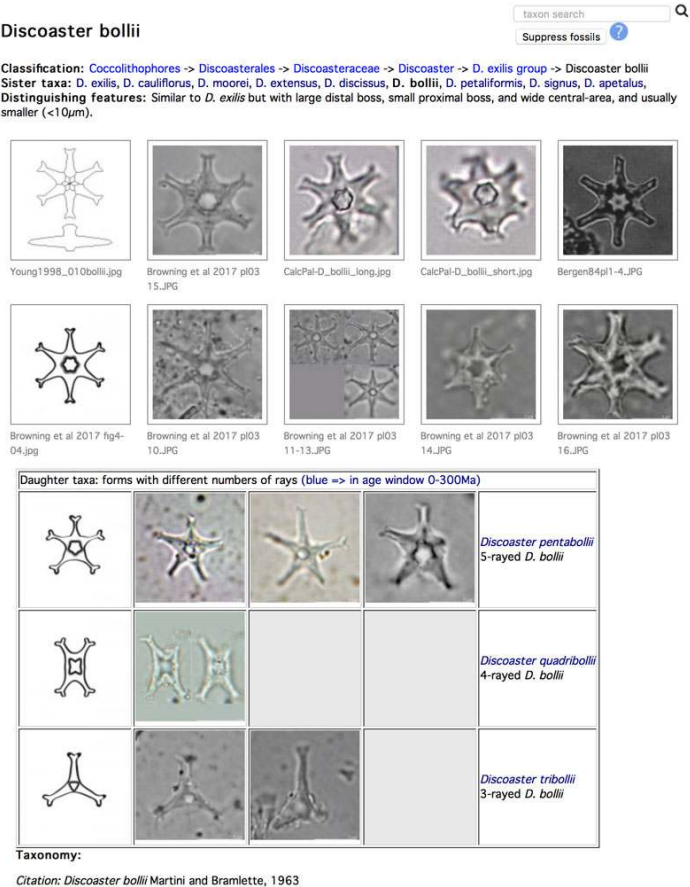
Our next INA conference will take place next year in Santos Brazil, a coastal resort town near São Paulo. It is scheduled to take place in the first week of September and more details will be available shortly on the INA [website](#).

## Nannotax update

In December last year a set of five papers was published, in the *Journal of Nannoplankton Research*, by Jim Bergen, Eric de Kaenel, Emily Browning, Stacie Blair, and Todd Boesiger (Bergen et al. 2017, Blair et al. 2017, Boesinger et al. 2017, Browning et al. 2017, de Kaenel et al. 2017). This team have been collaborating for over two decades on the biostratigraphy of the Gulf of Mexico Neogene and Oligocene, within BP and its heritage companies or as consultants working for BP. The work has also included intensive study of the exceptional material recovered during ODP Leg 154 from the Ceara Rise, and development of a new cyclostratigraphic framework which is due to be published shortly. These five papers documented the taxonomic concepts applied, including comprehensive revision of three key genera—*Discoaster*, *Sphenolithus*, and *Helicosphaera*. Virtually all species in these genera are covered from the Late Oligocene to the Pliocene. This includes a wealth of new data on stratigraphic ranges and the taxa are illustrated by 170 line drawings and more than 1000 colour light microscope images—

typically with both phase contrast and cross-polars images of carefully selected beautifully preserved specimens. Most obviously though, the papers include description of some 63 new species.

This is by far the most important publication on the taxonomy of nannofossils of this time interval for decades. So, incorporating the new information into the Nannotax webdatabase (<http://www.mikrotax.org/Nannotax3>) has been a major project. Since the paper was published in the *Journal of Nannoplankton Research*, there are no copyright issues in doing this, it is journal policy that content published in the *Journal of Nannoplankton Research* may be used on Nannotax unless the authors request otherwise, and in this case the authors were fully supportive of their work also being online and the full resolution image are available within the .pdf files. Preparing the images and metadata was a significant task, but the major challenge was assessing and incorporating the proposed new taxa. As an indication of the scale of this, the proposed 65 new taxa represent an approximately 50 % increase in the number of spe-



**Figure 4:** *Discoaster bollii*—screenshot of nannotax page showing how proposed species based on ray-number are displayed as subtaxa/variants.

cies included in nannotax in these genera in this time interval, and a significant number of taxa regarded as synonyms in other treatments are here considered discrete species.

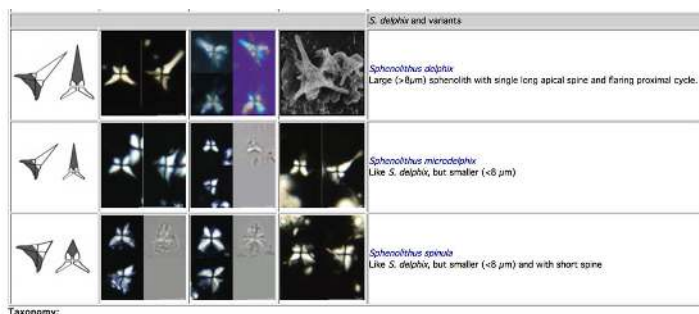
Obviously, the authors have adopted more of a splitting approach to taxonomy and this stems from a philosophy of attempting to achieve the maximum possible biostratigraphic resolution both by using fine morphological differences, and by using events based on variations in abundance as well as total range. The utility of the approach is recorded by the fact that the group have successfully been recording more than two hundred biostratigraphic events in the period from 1 to 30 Ma—i.e. approximately one event per 150 000 years, which is an order of magnitude higher than we normally expect—although not dissimilar to what has been routinely achieved in the Pleistocene and Late Quaternary.

Clearly, where taxa have proven utility they need to be properly documented in Nannotax, even if this is dependant on finer splitting than has been routine. On the other hand it is important to maintain continuity with previous taxonomic work

and to indicate where some workers (e.g. palaeoceanographers) may wish to use broader species concepts. Moreover, in some places the new taxonomy outlined in the BP papers has no proven stratigraphic utility—i.e. morphotypes appear to have been separated as species in order to test if they have discrete stratigraphic ranges but the species have been retained even when they do not have discrete ranges. So a degree of interpretation has been necessary in incorporating the new taxonomy into Nannotax. I have done this in various ways:

1. In a few cases, where the new taxa seem to have no utility, I have simply recorded them as synonyms (e.g. de Kaenel et al. 2017, recommend dividing *Discoaster exilis* into two forms based on whether they have straight proximal ridges (*Discoaster gozoensis*) or curved ones (*Discoaster exilis*)). However, since they record the two forms as intergrading, and having the same range, I have treated them as synonyms.
2. In some other cases, I have





**Figure 5:** *Sphenolithus delphix* group—screenshot showing how proposed species are displayed as related species within a species group.

recorded the alternate taxa as variants and presented them within the species page—for example it is proposed to treat forms of *Discoaster bollii* with 3, 4, or 5 rays as separate species—*Discoaster tri-bollii*, *Discoaster quadribollii*, and *Discoaster pentabollii*. I have essentially treated these as sub-taxa of *D. bollii* (Fig. 4).

*microdelphix* and *Sphenolithus spinula*—these are arguably variants of *Sphenolithus delphix* but distinguishing them is shown to be useful for stratigraphic precision. So all three species are included in Nannotax but within a single *S. delphix* group (Fig. 5).

## References

- In other cases, I have used species groups to record the alternate taxa with annotations making it clear where alternate species concepts might be used. For example, Bergen et al. (2017) describe the new species *Sphenolithus*
- Bergen JA, de Kaenel E, Blair SA, Boesinger TM, and Browning E (2017) Oligocene–Pliocene taxonomy and stratigraphy of the genus *Sphenolithus* in the circum North Atlantic basin: Gulf of Mexico and ODP Leg 154. *Journal of Nannoplankton Research* 37 (2–3): 77–112.
- Blair SA, Bergen JA, de Kaenel E, Browning E, and Boesinger TM (2017) Upper Miocene–Lower Pliocene taxonomy

and stratigraphy in the circum North Atlantic basin: Radiation and extinction of Amauroliths, Ceratoliths and the *D. quinqueramus* lineage. *Journal of Nannoplankton Research* 37 (2–3): 113–44.

Boesinger TM, de Kaenel E, Bergen JA, Browning E, and Blair SA (2017) Oligocene to Pleistocene taxonomy and stratigraphy of the genus *Helicosphaera* and other placolith taxa in the circum North Atlantic basin. *Journal of Nannoplankton Research* 37 (2–3): 145–75.

Browning E, Bergen JA, Blair SA, Boesinger TM, and de Kaenel E (2017) Late Mio-

cene to Late Pliocene taxonomy and stratigraphy of the genus *Discoaster* in the circum North Atlantic basin: Gulf of Mexico and ODP Leg 154. *Journal of Nannoplankton Research* 37 (2–3): 189–214.

de Kaenel E, Bergen JA, Browning E, Blair SA, and Boesinger TM (2017) Uppermost Oligocene to Middle Miocene *Discoaster* and *Catinaster* taxonomy and stratigraphy in the circum North Atlantic basin: Gulf of Mexico and ODP Leg 154. *Journal of Nannoplankton Research* 37 (2–3): 215–44.

## Grzybowski Foundation news ([gf.tmsoc.org](http://gf.tmsoc.org))

### Mike Kaminski, King Fahd University of Petroleum & Minerals (Saudi Arabia)

The spring of 2018 was a busy one for the Grzybowski Foundation. We helped organize the 11th International School on Foraminifera and gave a full tuition scholarship to a deserving student, we helped organize the 19th Czech–Slovak–Polish Paleontological Conference, and we had a table at the FORAMS 2018 conference. We also received additional books for our library at Micropress Europe.

At the European Micropalaeontological Reference Centre, we took possession of another wooden slide cabinet, which is already more than

half full. This cabinet now stores the DSDP/IODP shipboard micropalaeontological slides from Legs 29, 123, and 323.

The 11th course of the International School on Foraminifera took place in Urbino from 27 May to 14 June. This year's participants came from as far away as China, Madagascar, and the Ivory Coast! For a snapshot of activities that transpired during the course, please read the review by Yvette Bauder on page 68 of this Newsletter.

The Grzybowski Foundation had a strong presence at the FO-





**Figure 9:** A scanning electron image of the new species *Syracosphaera azureaplaneta* alongside a porcelain sculpture. The cells are around 12 µm in diameter.

River in Thenmala, India. The river water was sampled to identify which species of diatom were present. Joseph's bone marrow was subsequently sampled to identify if these species were also present. The report concluded that Joseph was alive when he died, as the diatom species were present in his bone marrow, which would only have happened if he was alive when he fell. The case is continuing, but this part of the mystery has been solved by diatoms!



**Meet the latest nannoplankton species:**  
*Syracosphaera azureaplaneta*

**Microfossil group:** Nannofossils

**Statement provided by:** Prof. Paul Bown (UCL)

During April 2018, Prof. Paul Bown and Dr Jeremy Young from University College London (UK), named a new species of coccolithophore ([Journal of Nannoplankton Research](#)) in honour of the BBC Blue Planet



**Figure 10:** Sir David Attenborough with *Syracosphaera azureaplaneta*.

series. This also coincided with the re-opening of the Kathleen Lonsdale Building, the new home of the UCL Earth Sciences Department, by Sir David Attenborough.

The new species, *Syracosphaera azureaplaneta* (Fig. 9) was found in the South Atlantic during an Atlantic meridional transect research cruise in 2008, but is widely distributed and belongs to one of the most diverse living coccolithophore groups.

Sir David Attenborough was presented with a porcelain sculpture (Fig. 10) of the new species (at 12 000 times actual size!) made in collaboration with Dr Samantha Gibbs (University of Southampton). UCL researchers have described more than 400 new living and fossil species, and these and many others can be seen through the Nannotax web resource (<http://www.mikrotax.org/Nannotax3/>), which includes images of the entire ancient and modern diversity (~4500 species).

available to micropalaeontologists interested in a career in industry. Prof. Laia Alegret, as well as taking us through the Palaeogene fauna, also discussed her involvement in the IODP JOIDES Resolution expedition. This module also had a wonderful field trip and provided an opportunity for participants to share their research by presenting at the Pizza Party in a truly stunning setting. It was very informative to see the range of research being undertaken using Foraminifera.

I am very grateful to the teachers and sponsors of this course. The

depth of learning, the range of material available to study, and their support was incredible. I would recommend this course to any student interested in studying these truly amazing creatures. I would also like to say that for me, the opportunity to stay and learn in a place as beautiful as Urbino will be cherished.

Sponsors who helped make this course happen included: The Micropalaeontological Society, Micropress Europe, The Grzybowski Foundation, CGG, Network Stratigraphic Consulting, Kreativika Microslides, and *PLOS ONE*.

### ***INASSET: A fantastic week in Lyon learning about calcareous nannofossils***

**Anita Nyerges, Eötvös Loránd Tudományegyetem (Hungary)**

The International Nannoplankton Association organized for the very first time the Summer School on Evolution and Taxonomy (INASSET) on 2–7 July at the Laboratoire de Géologie de Lyon, Université Lyon 1, France.

This five-days training focussed on the Cenozoic taxonomy and gave a really extended view about biomineralisation, palaeodata analyses methods, and the pioneering

new areas of coccolithophore research. I especially enjoyed the interactive microscope sessions, where I had a chance to learn from the fellow students as well: same research area, same stage of career, same scientific problems or questions. All participants became really good friends and colleagues within a short time. As a Ph.D. student, this week was the most stimulating period in my doctoral training so far. Now I can



**Figure 16:** Participants of the INASSET meeting.

continue and extend my research project with a strong basic knowledge.

I would like to thank the organ-

izers for the unforgettable experience and the TMS for giving me the opportunity to be there.

## **TMS Grant-in-Aid reports**

### ***11th International School on Foraminifera (ISF), Urbino (Italy), 28 May–14 June 2018***

***Juan Castaneda Venegas<sup>1</sup> and Naima el Bani Altuna<sup>2</sup>; <sup>1</sup>University of Birmingham (UK), <sup>2</sup>Norges Arktiske Universitet (Norway)***

After a not-so-short multimodal-transport journey, we reached Urbino. This medieval town offers breathtaking views of ancient walls, narrow streets, and idyllic hilly surroundings. Once inside the city, we found the Collegio Internazionale,

which works as both accommodation and lecture venue (very convenient). Daily lectures started promptly at 9:00 a.m., after breakfast, and ended at around 5:30 p.m. There were enough breaks in between for Italian coffee and lunch. The course

