European Mineralogical Conference 2024

Trinity College Dublin

19-23 August 2024



conference • Dublin, Ireland

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History

The 2024 EMC (European Mineralogical Conference) was the fourth in the series under this title. Previous conferences were held in Frankfurt, Rimini and Krakow. Following the usual protocol, the Mineralogical Society made a bid to the Presidents of the European Mineralogical Societies and won the right to host this year's event in Trinity College Dublin.

The EMC initiative is owned by the European Mineralogical Societies and representatives of those Societies take turns to bid to organize the event in their countries.

Venue

Within Ireland, Trinity College Dublin was selected as the venue. This was an easy choice to make. It is Ireland's most historic university, has a prime city-centre location, and its Events Staff are very aware of the needs of conference organizers and sympathetic to their requirements.



The Campanile at the heart of the Trinity College Campus.

Programme

Thirty eight sessions were proposed by members of the community and the conference ultimately went ahead with 32. The full conference Programme and Abstracts volume is available here: https://www.minersoc.org/wp-content/uploads/2024/09/EMC-Programme-and-Abstracts-FINAL.pdf.

Recording for YouTube

Extensive, though not complete, recording of presentations was done throughout the conference. As permission is secured and time allows, we will process some of the videos for individual talks and load them on the Mineralogical Society's YouTube Channel.

The following were the plenary lectures which were delivered during the conference:

What's so special about Mössbauer spectroscopy anyway?

C. McCammon

Natural Quasicrystals - Novel State of Matter, Open State of Mind L. Bindi

Deciphering functional group controls on CaCO₃ nucleation using sulfated glycomaterials and insights for natural systems

<u>Dove, P.M.</u>, Knight, B.M., Mondal, R., Vaissier Welborn, V., Gallagher, C.M.B., Schulz, M., Edgar, K.J. and De Yoreo, J.J.

Ultramafic geosystems: a source of metallic elements to the environment Kierczak, J.R.

The following is the list of sessions and keynote speakers who presented during them:

Session 1. Apatite - an accessory mineral with a big footprint in geochemical, environmental, and biological processes Session Chairs: David Chew, Alicja Wudarska, Bartosz Puzio

Session 2. The Petrology of Accessory Minerals: from the Ubiquitous to the Exotic Session Chairs: Callum J Hetherington, Ewa Slaby, Bartosz Budzyń

KEYNOTE: Exotic radio-minerals in the geological disposal of radioactive waste <u>Corkhill, C.L</u>., Mottram, L. M., Friskney A. A., Harding L., Kvashnina K., Bazarkina E. F. and Hyatt N.C.

Session 3. Multi-mineral petrochronology of metamorphism and deformation: linking grain-scale processes to lithosphere dynamics

Session Chairs: Stefania Corvó, Mattia Bonazzi, Hugo van Schrojenstein Lantman, Aratz Beranoaguirre

KEYNOTE: Nanorocks in zircon from metamorphic rocks: a new frontier in the investigation of melt evolution

<u>Tedeschi, M.</u>, Ferrero, S., Wunder, B., Hermann, J., Borghini, A., Pettke, T., Lanari, P., Paiva-Silva, P., Rubatto, D., Van Schijndel, V., Tollan, P. and O'Brien, P.J.

Session 4. Partial Melting in Continental Settings Session Chair: Owen Weller

KEYNOTE: Partial melting in the continental crust: thermal & chemical consequences of melting reactions and melt–rock interaction <u>Schorn, S.</u>

Session 5. Spectroscopic approaches for crystallochemical characterization of minerals and mineral behavior under ambient and non-ambient conditions: application for Earth and Planetary exploration

Session chairs: Giovanni B. Andreozzi, Stylianos Aspiotis, Lisa Baratelli, Simone Bernardini, Gioacchino Tempesta

KEYNOTE: Raman spectroscopy to study mineral host-inclusion systems: when experiments meet ab initio simulations

Murri, M., Prencipe, M., Mihailova, B., Angel, R.J. and Alvaro M.

Session 6. Structure-properties relationships of framework, layered and related minerals Session Chairs: Georgia Cametti, Michael Fischer, Paolo Lotti

KEYNOTE: The interdependence of structure and redox properties of clay minerals <u>Neumann, A.</u>

Session 7. Recent challenges and advances in theoretical and experimental mineral physics Session Chairs: Paola Comodi; Jun Tsuchiya

KEYNOTE: Single crystals at high-pressures and high-temperatures: constraining planetary interiors <u>Boffa Ballaran, T.</u>, Criniti, G., Kurnosov, A. and Glazyrin, K.

Session 9. Crystallisation of carbonates: Mechanisms, kinetics, methods, case studies, and novel applications Session Chairs: Remi Rateau, Gabrielle Stockmann, Juan Diego Rodriguez-Blanco

KEYNOTE: Tracing Fluids in the Early Solar System Using Carbonates King, A. J., Schofield, P. F. and Russell, S.S.

Session 10. The role of ultramafic rocks in carbon capture and storage Session Chairs: Nadia Malaspina, Andrea Rielli, Alicja Lacinska

KEYNOTE: Carbon Capture and Mineral Storage: Italy as natural laboratory for its application <u>Boschi, C.</u>, Baneschi I., Castellari, I., Dini, A., Ganci F., Marieni C., Sigfússon B., Snaebjornsdottir S., Trumpy E. and Rielli A.

Session 11. Platinum group elements and minerals Session Chairs: Anna Vymazalova, Jussi Liipo

KEYNOTE: Characterisation of PGEs in Minerals Using X-ray Absorption Spectroscopy <u>Filimonova, O.N.</u>, Bikondoa, O., Kutyrev, A., Vymazalova, A. and Wermeille, D.

Session 12. Understanding the geology and formation of ore deposits - new constraints on the enrichment processes of metals Session Chairs: Maximilian Korges, Philip Rieger, Hilde Koch, Malte Junge

KEYNOTE: CARBONATITES: A Key Resource for REE Giebel, R.J.

Session 13. Micro- and nano-mineralogy of critical metals Session Chairs: José María González Jiménez, Malte Junge,

KEYNOTE: High resolution mineralogy and petrography of Mn-oxyhydroxides from Caribbean Ni-Co laterite deposits

<u>Villanova-de-Benavent, C.</u>, Nieto, F., Domènech, C., Domínguez-Carretero, D., Galí, S and Proenza, J.A.

Session 14. Atypical critical metal ores and ore deposits Session Chairs: Paul Slezak, Vladimir Khomenko, Daria Chernysh, Iryna Lunova (remote)

KEYNOTE: Crustal wall-rock assimilation and metasomatism caused by carbonatites – key processes for HFSE enrichment?

Walter, B.F., Marks, M.A.W., Giebel, R.J. and Markl, G.

Session 16. Mineralogy and circular economy Session Chairs: Daniel Vollprecht, Cyrill Grengg, Mario Tribaudino

KEYNOTE: The potential of Mineralogy in Circular Economy Pavese A.

Session 17. Innovation and challenges in process mineralogy, geometallurgy and supporting analytical techniques Session Chairs: Patrick Krolop, Marek Dosbaba, Dominique Brising

Session 18/19. Characterisation of gem materials and their geographic/geological origin Session Chairs: Alessandra Costanzo, Isabella Pignatelli, Lee Groat, Giovanna Agrosí

KEYNOTE: Why I study Diamonds Harris, J.W.

Session 20. Archaeometry: Geoscience-based approaches for studying the human past Session Chairs: Sabine Klein, Thomas Rose, Katrin Westner

KEYNOTE: Trading Egyptian blue – on material provenance and processing Rodler-Rørbo, A.

Session 21/23. Microbial biomineralization/microbes transforming metals Session Chairs: Casey Bryce, John Moreau, Gerhard Franz

KEYNOTE: Microbial reduction of metals: mechanisms, environmental implications, and biotechnological applications

<u>Kimber, R.L.</u>, Egan Morriss, C., Byrd, N. and Lloyd, J.R. **Session 22.** Biominerals and environment

Session Chairs: Giovanni De Giudici, Juraj Majzlan KEYNOTE: Investigating the physical basis of biomineralization: New insights from polysaccharides

<u>Dove, P.M.</u>, Knight, B.M., McCutchin, C.A., Edgar, K.J. and De Yoreo, J.J. **Session 25.** One drop at a time: fluid, melt and multiphase inclusions as tools to understand geological processes Session Chairs: Silvio Ferrero, Jannick Ingrin, Alessia Borghini, Rosario Esposito, Marta Berkesi

KEYNOTE: Sulphur speciation in magmatic fluids: facts and artefacts <u>Farsang, S.</u> and Zajacz, Z.

Session 26/28. Origin and composition of CO₂-bearing fluids and melts as transport agents between mantle and crust Session Chairs: Antonio Acosta-Vigil, Melanie J. Sieber, Luca Toffolo, Jesse Walters

KEYNOTE: Distribution of hydrous carbonate liquid in dunite: an experimental study

Fumagalli, P., Capizzi, L., Ildefonse, B., Tumiati S. and Poli S.

KEYNOTE: Redox dehydration in subduction zones <u>Padrón-Navarta, J.A.</u>

KEYNOTE: The migration of methane-hydrogen-rich fluids may trigger seismic failure in subduction zones at forearc depths

<u>Giuntoli F.</u>, Menegon L., Siron G., Cognigni F., Leroux L., Compagnoni R., Rossi M. and Vitale Brovarone A.

Session 27. All change: subsolidus, melting, volatile and redox reactions in the upper mantle Session Chairs: Emma Tomlinson, Caterina Melai

KEYNOTE: The continental subduction factory as a precursor to long-term volatile storage in the lithosphere

<u>Aulbach, S.</u>

Session 29. Water in the deep (and not so deep) Earth

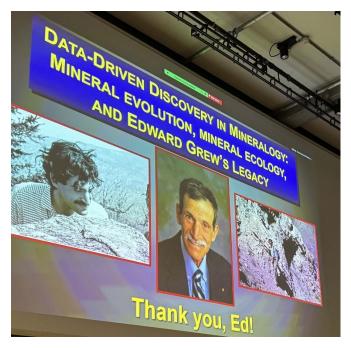
Session Chairs: Sylvie Demouchy, Davide Novella, Michael Jollands

KEYNOTE: H storage and speciation within the deep Earth Bolfan-Casanova, N.

Session 31. The Testimony of the Minerals: A Celebration of Edward S. Grew at 80 Session Chairs: Bob Hazen, Barb Dutrow, Gerhard Franz and Jesse Walters

KEYNOTE: Data-driven discovery in mineralogy: Mineral evolution, mineral ecology, and Edward Grew's legacy Hazen, Robert M.

KEYNOTE: Mechanisms of uranium incorporation into garnet Marschall, H.R., Ackermann, C., Millonig, L.J., Kutzschbach, M., Walters, J.B., Schmidt, A., Woodland, A.B. and Hezel D.C.



Session 32. The future of mineralogy, petrology, geochemistry and cosmochemistry - New informatics approaches to harnessing the multidimensionality of complex Earth and planetary systems

Session Chairs: Shaunna Morrison, Anirudh Prabhu, Robert Hazen, Marko Bermanec

KEYNOTE: Minerals as a case study of a bounded (as opposed to open-ended) evolutionary system – **Mineralogical Society Hallimond Lecture** <u>Hazen, Robert M.</u>



Bob Hazen being awarded the Hallimond Lecture Certificate by Sally Gibson

Session 33. New Minerals, nomenclature, and classification Session Chairs: F. Hatert, M. Pasero

KEYNOTE: Mineral species and mineral substances according to the IMA-CNMNC <u>Bosi, F.</u>

Session 34. Exploring Solar System evolution using meteorites and returned samples Session Chairs: Martin Lee, Beverley Tkalcec

KEYNOTE: Applying Correlative Microscopy in Solar System Science Daly, L.

Session 35/36. Geoscience outreach in museums and beyond Session Chairs: Mike Rumsey, Bastian Joachim-Mrosko, Melanie Kaliwoda

KEYNOTE: More than cool curiosities: using social media for mineral science communication to engage on geoscience topics <u>Anderson, E.B.</u>

Session 37. General Session Chairs: D. Chew, E. Tomlinson

Session 38. Chemical evolution of sediments and igneous rocks and their implications on Earth's ocean, crust, and mantle Session Chairs: Josua J. Pakulla, Jaganmoy Jodder

KEYNOTE: Aleutian Arc Initiation: Tectonic and climatic implications <u>Hoernle, K.</u>, Jicha, B., Portnyagin, M., Hauff, F., Höfig, T., Yogodzinski, G., Timm, C., Guillong, M., Berndt, C., Savelyev, D., Bezard, R., Baranov, B.

Field trips

Trip 1. Giant's Causeway

Three field trips took place during the conference. By far the most popular was that to the Giant's Causeway. Two busloads, totalling almost 100 delegates visited what is arguably Ireland's most famous geological location. The trips were led by Stephen Daly and Tom Belgrano (Bus 1) and by Emma Tomlinson and Sean McClenaghan (Bus 2). Delegates really enjoyed their day in Northern Ireland even though the Irish weather was less than kind (note raincoats and ponchos in the photo below).



The trips visited three locations: Stop 1. Portrush sill at Ramore Head, Portrush; Stop 2: Lava flows and a further perspective on the Portrush sill at Royal Court Hotel



and Stop 3: The Giant's Causeway sensu stricto:



Trip 2. Carlingford and Slieve Gullion

This trip was led by Mike Stock, Mark Cooper and Jack Beckwith and was attended by 12 delegates.

Palaeogene igneous intrusions in the British and Irish Igneous Province are some of the earliest expressions of the proto-Icelandic plume, with the largest and most geologically diverse examples exposed in Carlingford (Co. Louth) and Slieve Gullion Complex (Co. Armagh). These centres comprise compositionally bimodal, complex stratigraphies of gabbro and granite, alongside associated magma conduits (dykes and sills). The Slieve Gullion Igneous Centre includes a large and particularly well-preserved ring dyke structure which records the intrusion of magma along caldera collapse faults (the "Ring of Gullion"). Alongside their genetically- and temporally-related Scottish counterparts (e.g. Rum, Mull), the Irish Palaeogene intrusions played a central role in the development of early 20th Century igneous petrology and the development of seminal ideas which underpin our modern understanding of magmatic processes. They have also been subject to historic minerals exploration due to the high abundance of sulphides and chalcophile soil anomalies.

Many thanks to Mike, Mark and Jack.



Trip 3. Site visit to the National Collections Centre in Swords, Co. Dublin.



From left: Rachel Walcott, Mateo Françoise, Jose Maria Gonzalez, Birgit Kreher-Hartmann, Patrick Roycroft, Nicolas Meisser, Mike Rumsey, Ena Topalović, Erika Anderson and Gabrielle Stockmann

On Wednesday 21st August, Dr Patrick Roycroft (fifth from the left in the photo), Curator of Geology at the National Museum of Ireland (NMI), hosted a visit to the museum's Collections Resource Centre in Swords (north County Dublin) where a select group of nine EMC2024 delegates got to view the largest display of Irish minerals in decades. Rarities such as cotterite were on show, plus many minerals not (yet) mentioned in Andy Tindle's *Minerals of Britain and Ireland* (2008). Delegates were thoroughly engaged, asked many questions, wrote suggestions, and offered to form collaborations in the future, both on minerals as such and on the fascinating subject of mineral labels. As a bonus, Patrick also treated the group to a large poster display and mini-workshop on spectacular optical zoning in muscovite. The trip ended with lunch combined with a group discussion on how a book on Irish minerals might look. A successful event, and the NMI was proud to be part of EMC2024.

Gabrielle Stockman, standing on the right in the photo above, had these kind words to say about the conference and the trip to Swords: "The conference field trip that I took part in took us to the National Museum of Ireland's Collections Resource Centre at Swords. Our brilliant and entertaining guide, Dr Patrick Roycroft, made it an unforgettable visit. He guided us through the Geology of Ireland and the highlights of the Irish mineral collection in a couple of hours that felt way too short when we had to depart. We could have spent the whole day there."

Public Lecture

Dr Karen Hanhøj, director of the British Geological Survey, gave an invited public lecture in the Burke Lecture Theatre on Tuesday evening, 20th August, attended by ~160 people in person and a further 50 or so who joined online. <u>The slides for Karen's talk are available here</u>.



Sponsors

The conference benefited from an enormous groundswell of support from its special interest groups from the national societies and from those companies and organizations which were able to afford to make a financial contribution. Contributions in terms of advertising our event (note below that almost 30% of delegates first heard about the conference through word of mouth), supporting speaker attendance, and coming along to display their wares and to engage with our delegates are essential parts of why in-person events are so important. Exhibitions are an integral part of our conferences and convenors must attempt to make it worthwhile for sponsors to attend in person.



Qiao Shu representing Springer at EMC

Sponsors were invited to give presentations to our delegates immediately after plenary sessions each morning. This gave them a unique opportunity to highlight their organizations and to welcome delegates to come along and chat with them.

Below are the logos of all of the organizations which helped to support our conference in some way.



Ice-breaker and Banquet

The ice-breaker was held at the conference centre, thus enabling delegates to register and move from there into the important job of catching up with friends and colleagues. It was a lovely start to the week.

The conference banquet was held in Hogan Suite of Croke Park, the national sports stadium for Gaelic Games. Delegates had fun making their way to the northside of the city using local transport. One or two local buses were dominated by German and Italian accents on their way to dinner! The food served was of a very high standard and delegates were entertained by the O'Maolagáin family, a group of musicians playing traditional Irish music.



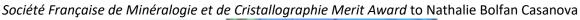
Groups enjoying the food, drinks and entertainment at the Croke Park banquet.

Ancillary meetings

As is always the case at EMC, IMA and other international meetings, the opportunity is taken to host the administrative meetings of numerous groups. The German Mineralogical Society (DMG), the IMA (International Mineralogical Association), several IMA commissions (New Minerals, Gem materials, Ore Mineralogy and others) and the EMU (European Mineralogical Union) took the opportunity to meet with colleagues (both in person and virtually).

Awards Ceremony

Friday afternoon's Awards Ceremony was attended by ~150 delegates. The ceremony combined the award-giving for national and international bodies as well as those being awarded prizes for their presentations at the conference.





Nathalie Bolfan Casanova



Mineralogical Society - Neumann Medal 2024 to C. McCammon

Catherine McCammon (right) receiving the Neumann medal from Society President, Sally Gibson

Mineralogical Society - Neumann Medal 2023 to L. Bindi



Luca Bindi receiving the Neumann Medal from Sally Gibson



Mineralogical Society - Max Hey Medal - L. Daly

Luke Daly receiving the Max Hey Medal from Sally Gibson

Mineralogical Society - Award of Honorary Membership to Edward S. Grew



Priscilla Grew receiving the Award of Honorary Fellowship on behalf of her husband, Edward S. Grew



Deutsche Mineralogische Gesellschaft - Beate-Mocek Prize 2024 - Jie Dodo Xu

Horst Marschall, DMG President, presenting the Beate Mocek Prize 2024 to Jie Dodu Xu

Deutsche Mineralogische Gesellschaft - Junior-Scientist Prize 2023 to Rebecca Volkmann



Horst Marschall presents the Young Scientist Prize 2023 to Rebecca Volkmann

Deutsche Mineralogische Gesellschaft Victor Moritz Goldschmidt Prize 2024 to Timo Hopp (announcement only)

Deutsche Mineralogische Gesellschaft – Abraham Gottlob Werner Medaille 2024 – Kaj Hoernle



Kaj Hoernle receiving the Abraham Gottlob Werner Medal 2024

Deutsche Mineralogische Gesellschaft - Victor-Moritz-Goldschmidt Prize 2024 to Johannes Buchen



Johannes Buchen receiving the Victor Moritz Goldschmidt Prize for 2024 from Horst Marschall



Deutsche Mineralogische Gesellschaft - Doris-Schachner Medal 2024 to Paul Rustemeyer

The Doris Schachner Medal 2024 being presented to Paul Rustemeyer by Horst Marschall

Sociedad Espanola de Mineralogia - Young Researcher Awards – Samuel Cristóbal Diaz (left) and Daniel Bermejo López (centre)



SEM Young Researcher Awards presented to Samuel Cristobal Diaz and Daniel Bermejo López by Maria de los Angeles Fernandez



European Mineralogical Union Medal - Jakub Kierczak

EMU President, Isabelle Daniel presenting the EMU Medal for Excellence to Jakub Kierczak

European Mineralogical Union - Jose Alberto Padrón Navarta



EMU President, Isabelle Daniel presenting the EMU Medal for Excellence to Jose Alberto Padrón Navarta



European Mineralogical Conference 2024 - Student Presentation Prizes

EMC 2024 Student Prize Winners, from left: A. Szreter (oral), N. Gies (oral), S. Cristóbal (poster), E. Funaro (poster) and, not pictured, P. Manselle (oral) and W. Palfey (oral). Many congratulations!

International Mineralogical Association medal - Patricia Dove



Patricia Dove, on receiving the IMA medal

International Mineralogical Association handover of chair from H.-P. Schertl to E. Ohtani



Eiji Ohtani (left) Hans-Peter Schertl (right)

Delegate statistics

A stated aim at the outset was the need to make the EMC event as inclusive as possible. Key to achieving this was making the event fully hybrid and by offering free access to the online version to those attending from low- and middle-income countries. Below are some conference statistics:

53 people attended remotely.

457 people attended in person.

50 Countries were represented including nine African and four South American nations.

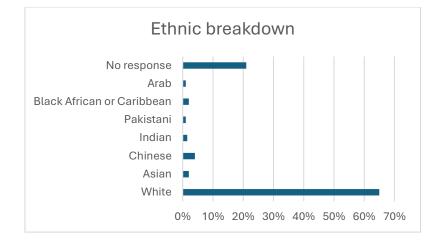
There were 471 presentations, of which 166 were presented during two poster sessions. The 300+ oral presentations were presented in parallel sessions, up to seven running concurrently on some of the conference days. This was done in an attempt to allow delegates to have their choice of presentation mode.

Equality, Diversity and Inclusivity: Our Audience

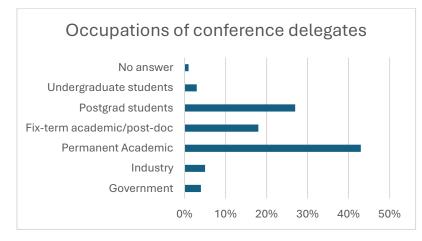
The Mineralogical Society has been taking positive steps towards increasing the diversity of the kind of people attending its events. With this in mind, we invite delegates to share, anonymously, some personal information and that is presented here in summary form.

2.5% of the delegates at our event are neurodiverse

In terms of ethnic breakdown, 65% of delegates are "white", 2% are Asian or Asian British, 4% are Chinese or British Chinese, 1.5% are Indian or British Indian, 1% are Pakistani or British Pakistani, 2% are Black African or Caribbean, 3% are mixed-race or multi-ethnic, 1% are Arab and 21.5% of delegates did not specify an ethnic background.

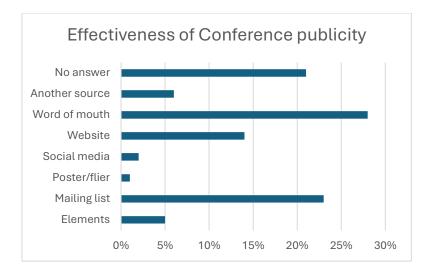


4% of our conference delegates work for a government; 5% work in industry; 43% have permanent academic positions; 18% have post-doc or fixed-term academic positions; 27% are post-graduate students; 3% are undergraduate students; and <1% did not respond to this question.



Publicity for the conference

5% of our delegates became aware of the meeting having read about it in *Elements* Magazine, 23% heard about it from a mailing list, 1% from a poster/flier, 2% from social media, 14% from a website, and 28% by word of mouth; 21% didn't respond to this question and 6% said they heard about the event from "another" source.



Hosts

The conference was hosted by Prof. David Chew and Dr Emma Tomlinson of the Geology Department.



David and Emma put in a huge effort both with the programme and with the local organization details and the community owes them a debt of gratitude.

Also on the team were Russell Rajendra, Helen Kerbey, Kevin Murphy and Maciej Jaranowski



Russell Rajendra



Helen Kerbey



Kevin Murphy, Sally Gibson, David Chew and Emma Tomlinson



Maciej Jaranowski and Kevin Murphy

Sally Gibson

The Society President officiated throughout the conference, representing the Society in terms of presenting awards, introducing the public lecture, etc. Most importantly she was to be seen chatting to delegates during breaks and talking to people about their work in the oral and poster sessions.

Maciej Jaranowski

Maciej Jaranowski volunteered to help with the conference in the year before the event and ended up, not just being a volunteer at the conference (managing the conference rooms with the other orange-shirted volunteers) but also helped extensively with the programme, written documents and much more. Many thanks to Maciej.

Society Staff

Thanks also to the Society Staff Helen Kerbey, Russell Rajendra and Kevin Murphy for the huge effort they put into the meeting.

Volunteers

Though we neglected to take a group photo of our conference volunteers, many of those who attended the meeting will recognize the photos below, in particular the orange shirts which our volunteers wore! The list of people who helped to make the conference a great success is as follows:

Vincent	Monchal	Trinity College Dublin	Ireland
Giorgia	Ballabio	University College Dublin	Ireland
Maciej	Jaranowski	Polish Academy of Sciences	Poland
Mattia	Sisti	University of Modena and Reggio	Italy
María	De Uribe-Zorita Mota	Oviedo University	Spain
Krisztina	Hajdu	Eotvos Lorand University	Hungary
Daniel	Dodoo	University of Melbourne	Australia
Andrea	Pierozzi	Trinity College Dublin	Ireland
Pratamanita Widi	Rahayu	Sapienza University of Rome	Italy
Bartosz	Puzio	AGH University of Krakow	Poland
Ewa	Stępień	University of Kraków	Poland
Lisa	Baratelli	University of Milan	Italy
Samuel	Cristóbal Diaz	IACT -CSIC	Spain
Kerstin	Drost	Trinity College Dublin	Ireland
Sara	Monico	Univ. Milan	Italy
Dani	Vitarelli	TCD	Ireland

