

BULLETIN DU GROUPEMENT

d'informations mutuelles



G r o u p e m e n t
AMPERE

SE CONNAÎTRE, S'ENTENDRE, S'ENTRAIDER

July to September 2022

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Special Editorial



Dear Members of the Groupement AMPERE,
The summer of 2022 has provided our community with several opportunities to get together again. How great it is to finally share such unique science moments, and to exchange over buffets and coffee breaks at our favorite conferences and schools!

The summer season started with the successful organization of the MR Food conference in Aarhus, chaired by John Van Duynhoven. Then, we had the pleasure to enjoy a great edition of the Zakopane summer school. This edition was sadly a special one, organized in memory of the late Stefan Jurga, former member of the AMPERE bureau and historical organizer of this school. We are very grateful to Danuta Kruk for taking over this organization at short notice and for making the event so successful. The present bulletin features the poster prizes that were awarded at this occasion.

Then, July marked the return of the in-person Euromar conference after two remote editions, with a great event organized in Utrecht by Marc Baldus and his colleagues. The conference attracted more than 650 participants and 370 posters, featuring an attractive scientific program and including memorable social events. To close the summer season, the Alpine conference in Chamonix was a success thanks to the excellent work of the organizing and scientific committees.

While we are happy to witness the return of in-person events, the last two years have seen the emergence of new ways for our community to meet remotely, allowing more frequent and unconventional discussions. In this context, AMPERE is happy to launch a new initiative: the AMPERE Café, a series of virtual get-together events starting in October with an on-line magnetic resonance pubquiz. Many thanks to Guinevere Mathies, young member of the bureau whose portrait is included in the present bulletin, for this exciting initiative!

Unfortunately, the magnetic resonance community also lost one of its pioneers during the summer, and mourns the passing of Prof. Jacob 'Jake' Schaeffer on June 27, 2022. He will be greatly missed and will certainly inspire many future generations of scientists.

Best regards
Patrick Giraudeau
Vice-President, Groupement AMPERE

Portrait:

Guinevere Mathies

Why magnetic resonance and why NMR and MRI?

I was initially drawn to magnetic resonance, and EPR in particular, because of a notion of applied quantum mechanics. I wanted to experimentally observe the wave function. Now that I also do NMR spectroscopy and work in a Chemistry department, I enjoy the mix of math, physics, chemistry, biology, and engineering and how this comes together when doing complex experiments.

What is your favorite frequency?

275.7 GHz. This is the frequency of the home-built spectrometer I worked with during my PhD. It was generated by tripling a W-band source of 91.9 GHz. My task was to measure, at this frequency, continuous-wave spectra of high-spin Fe^{3+} sites in biological systems, i.e., at low concentration, with this spectrometer. Getting this to work was really challenging and involved constructing a new probe, but we obtained unique data in the end.

What do you still not understand?

Relaxation and spin diffusion.

Luckiest experiment you have ever done.

While first setting up the instrumentation for low-field pulsed DNP, I did not seem to be able to detect any ^1H NMR signal from a solid test sample. I then decided to just try pulsed DNP, with the NOVEL sequence, and a sample of trityl in glycerol/water at 80 K. I immediately saw a ^1H NMR signal. I was detecting the ^1H signal with an echo, but was not aware of the very short phase memory time in these systems. It was only because, as it turned out, pulsed DNP works very well with trityl in glycerol/water that I saw a signal at all.

What was the worst mistake you have made during your lab time?

As a master student, I wanted to clean microscope cover slips with piranha etch. I had set up a beaker with concentrated sulfuric acid in the hood and I was ready to add the hydrogen peroxide solution. Not being trained as a chemist, I felt a little uneasy with all that protective gear. My advisor joked it had been nice to know me and had wisely left the lab. As I started pouring, I heard loud bangs with each drop. I then realized I had grabbed the wrong bottle and had just poured concentrated ammonia solution into the concentrated sulfuric acid.



Most memorable conference story

There is no story that stands out, but I look back with fondness at all conferences I have attended. Usually, I experience overload by the end of the week.

With whom (historical person) would you like to meet?

Johan de Witt

When do you get your best ideas?

When I am at peace with the world and have the time to dig in for hours, or days.

If you had just one month time for travelling - where would you go to?

To Hermosa Beach, to play volleyball and surf the whole day.

Your idea of happiness.

To live and work in a place where the people give me energy and make every day an adventure.

Position: Emmy Noether group leader, Department of Chemistry, University of Konstanz, Germany
Awards: Rubicon postdoctoral fellowship, JMR Young Scientist Award at the 56th ENC, Emmy Noether fellowship
Homepage: chemie.uni.kn/mathies
Education: physics studies and PhD at Leiden University, postdoc at MIT
Interests: science, sport, social activities

AMPERE News:

The AMPERE Café



In the fall of 2021, AMPERE sent out an invitation for early career researchers to apply for a membership of the AMPERE bureau. The letter described the mission of AMPERE and requested a proposal for new activities. This got me thinking about new ways of connecting scientists in times of covid and an atmospheric concentration of CO₂ peaking at 421 ppm. Thanks to members of the community stepping up by organizing excellent on-line seminar series, there was no shortage of formal scientific exchange. Still, I felt that something was lacking.

Science is done by people and its progress requires human interactions. It may just be very important to share that incomplete thought. Or hear from someone in another research group how he or she solves that silly practical problem. However, first people need to become acquainted and feel at ease. This naturally happens at conferences, but these had suddenly become a rare commodity. And so, I went looking for an on-line concept that could emulate the informal social interactions of conferences.

The AMPERE Café is a framework for virtual get-togethers for the magnetic resonance community. Each „edition“ has its own format and topic. Together with Quentin Stern, I am organizing two editions this fall. On October 6th we will host an on-line magnetic resonance pub quiz and on November 17th we will have a panel discussion on „Magnetic resonance instrumentation of the future“. We hope, however, that the concept will live longer and can truly supplement existing structures. Suggestions from you for future editions of the AMPERE Café are very welcome.

Guinevere Mathies

Report:

AMPERE NMR School 2022

Zakopane, June 19-25, Poland

Scientific Committee:

Bernhard Blümich (Aachen), Germany, Janez Dolinšek (Ljubljana), Slovenia, Stefan Jurga (Poznan), Poland, Wiktor Koźmiński (Warszawa), Poland, David Lurie (Aberdeen), UK, Alex MacKay (Vancouver), Canada, Beat Meier (Zurich), Switzerland.

Organizing Committee:

Danuta Kruk, Chair

Stefan Jurga (1946-2022), Chair

Lidia Szutkowska, Roksana Markiewicz, Dorota Flak, Patryk Florczak, Marcin Jarek, Jacek Jencyk, Bartosz Kawczyński, Grzegorz Nowaczyk, Tomasz Zalewski, Dominika Tubacka

Adam Klimaszyk, Jakub Zaręba

The AMPERE NMR School was held between 19th and 25th June 2022 in Zakopane, Poland, situated in the High Tatra Mountains. The school had 104 participants from research institutions of 15 countries: Argentina, Czech Republic, Finland, France, Germany, India, Israel, Italy, Poland, Portugal, Slovenia, Sweden, Switzerland, Turkey, and the United Kingdom.

The conference was organized by the NanoBioMedical Centre and the Centre for European Integration of the Adam Mickiewicz University in Poznań under the auspices of the Groupement AMPERE. As every year, the school focused on the basic and advanced NMR techniques and attracted young and experienced scientists from across the world, who had the opportunity to exchange knowledge and ideas on recent NMR and related research, to learn about new techniques and developments in this field and to establish new contacts and collaborations.

The school's program covered the following topics:

NMR relaxometry, NMR diffusometry, Solid State NMR, NMR of quadrupolar nuclei, MRI and Field Cycling MRI, application of NMR in the area of biology, medicine, and material science, and technical aspects of NMR.

As the School was dedicated to the long-term organizer, Prof. Stefan Jurga, who passed away on March 15th, 2022, a special session was held with Adam Mickiewicz University's Vice-Rector, Prof. Michał Banaszak presenting a lecture on Prof. Jurga's achievements.

In total, there were 23 lectures:

Esteban Ancoarado: "New challenges and opportunities for low-field MRI"

Michał Banaszak/Aneta Woźniak-Braszak: „NMR off-resonance technique for

investigation of slow molecular motions in homo- and heteronuclear systems“

Michał Bielejewski: “Effective electric charge of ions studied by Nuclear Magnetic Resonance”

Anja Böckmann: “Carbon- and proton-detected solid-state NMR sequential assignments and applications to fibrils and membrane proteins”

Matthias Ernst: “Interaction Frames in Magnetic Resonance”

Zbigniew Fojud: “Nuclear Magnetic Resonance as a tool for exploration structure & molecular dynamics in soft and condensed matter“

Leonid Grunin: “Advantages of time-domain NMR in analysis of solid state materials”

Krzysztof Kazmierczuk: “NMR of signal processing, tutorial”

Maciej Kozak: “Flexible or disordered - a comprehensive look at selected unstructured proteins“

Wiktor Koźmiński: “High dimensionality and high-resolution NMR experiments for biomolecules”

Danuta Kruk: „NMR relaxometry for ionic liquids - insight into correlation effects“

Ilya Kuprov: “What exactly is spin: from cogito ergo sum to Pauli Hamiltonian”

Elżbieta Masiewicz: “Low frequency NMR relaxation of biomolecules“

Beat Meier: “Faster spinning and higher fields in biomolecular solid-state NMR”

Michał Nowakowski: “How does bacteriocins kill bacteria? The case of BacSp222”

Sergio A. Ortiz Restrepo: “Quantitative analysis of complex mixtures with benchtop ^1H NMR spectroscopy”

Claudia Schmidt: “Probing porous materials by NMR of guest molecules”

Siegfried Stapf: “NMR cum grano salis: relaxation and diffusion in salty soils on Earth (and elsewhere)”

Janez Stepišnik: “NMR method for research into molecular translation dynamics and chemical kinetics in liquids”

Ville-Veikko Telkki: “Multidimensional relaxation and diffusion experiments”

David Topgaard: “Massively multidimensional diffusion-relaxation correlation MRI”

Jadwiga Tritt-Goc: „The search for the best proton conductor based on biopolymer and nitrogen-containing heterocyclic molecule”

Magdalena Wencka: “ ^{27}Al NMR local study of the $\text{Al}_{0.5}\text{TiZrPdCuNi}$ alloy in high-entropy

and metallic glass forms”

The programme was enriched by the additional presentation of our sponsor – Bruker. Tutorials with online transmissions from the NMR laboratory of the NanoBioMedical Centre and Institute of Bioorganic Chemistry, Polish Academy of Sciences in Poznań, were performed:

1. “Anisotropic Character of Spin Interaction versus MAS” – Jacek Jenczyk
2. “MRI: basic principles and application” – Tomasz Zalewski and Marek Kempka
3. „NMR relaxometry” – Zbigniew Fojud, Mariusz Jancelewicz
4. “High-resolution solution state NMR” – Witold Andrałojć



This year's School was also preceded by the online preschool, which took place on the Zoom platform June 13-15th and consisted of 9 lectures:

„Introduction to diffusion by NMR“ given by William Price, Western Sydney University, Australia

„Introduction to NMR spectroscopy“ given by Fabien Ferrage, CNRS and Ecole Normale Supérieure, PSL University, Paris, France

„Hardware of portable NMR sensors“ given by Robert Morris, Nottingham Trent University, UK

„Radio talking with atoms and molecules“ given by Pedro José Sebastião, University of Lisbon, Portugal

„Basic Physics of MRI“ given by David Lurie, University of Aberdeen, Scotland, United Kingdom

„Use of NMR/MRI for Food Applications“ and „Doing online NMR/MRI Experiments with Foods“ given by Mecit Oztop, Middle East Technical University, Ankara, Turkey

„Understanding of NMR relaxation“ given by Danuta Kruk, University of Warmia and Mazury, Olsztyn, Poland

„NMR relaxometry – introduction to experiments“ given by Moreno Pasin, STELAR, Italy



Moreover, as every year, all participants were given the opportunity to present their research in a poster session consisting of 63 presentations. The prizes were awarded to the authors of the three best posters:

First place

Andrea Simion from Babeş-Bolyai University and National Institute for Research and Development of Isotopic and Molecular Technologies, presenting a poster entitled „HETERONUCLEAR DECOUPLING FOR MAS BEYOND 100 KHZ: ROBUSTNESS TOWARD ^1H OFFSET AND RF AMPLITUDE”

Distinctions:

Oksana Bondar from Taras Shevchenko National University of Kyiv and Jagiellonian University in Krakow, presenting a poster entitled „ZERO-FIELD NMR DETECTION OF PYRIDINE DERIVATIVES HYPERPOLARIZED WITH SABRE”

Ahmed Subrati from Adam Mickiewicz University, Poznań, presenting a poster entitled „PROBING STRUCTURAL, CHEMICAL, AND ELECTRONIC FEATURES OF LOCAL TURBOSTRATIC DOMAINS IN GRAPHITE OXIDE FRAMEWORKS”

The posters were evaluated by the members of the Poster Committee that consisted of Prof. Ilya Kuprov, Prof. Claudia Schmidt and Prof. Magdalena Wencka. All the winners received prizes accompanied by a certificate.

All abstracts of the oral presentations, tutorials and posters were published as printed proceedings (book of abstracts). The social programme included “All together party”, Dinner in the Regional Restaurant “Czarci Jar” with the folk music of the Tatras region, and excursion to Dunajec River Rafting.

All the additional information about the AMPERE NMR School is presented on the website: school.home.amu.edu.pl and schools’s twitter account: @AmpereNMR.

The next edition of the school will be held in Zakopane (Poland) from June 18th to 24th, 2023.



First Poster Prize AMPERE NMR School 2022

Andrea Simion, Faculty of Physics, Babeş-Bolyai University, Romania

Heteronuclear decoupling for MAS beyond 100kHz: robustness toward ^1H offset and RF amplitude

Andrea Simion^{a,b}, Matthias Ernst^c and Claudiu Filip^b

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^bNational Institute for Research and Development of Isotopic and Molecular Technologies, Cluj-Napoca, Romania

^cETH Zurich, Laboratory for Physical Chemistry, Zurich, Switzerland

Abstract: A new heteronuclear decoupling sequence for magic angle spinning (MAS) faster than 60 kHz dubbed Rotor-Synchronized Phase-Alternated Cycles (ROSPAC) was recently introduced [1]. Here, we explore the robustness of the ROSPAC sequence toward H offset and radio-frequency power in the regime of MAS beyond

100 kHz, by using a generalized theoretical framework based on Floquet theory [2]. Residual couplings were obtained from the Fourier coefficients of the interaction-frame trajectory. It is demonstrated that by applying ROSPAC heteronuclear decoupling, a significant minimization of the second-order cross-terms between the homonuclear and heteronuclear dipolar couplings (DxD) and between the heteronuclear dipolar coupling and chemical shift anisotropy (DxCSA), respectively, is obtained. Moreover, the magnitude of the Fourier coefficients calculated for the first-order resonance conditions are small in the low-power decoupling regime. The theoretical description allows us to understand the experimental results better and can provide ideas how to further improve the sequences.

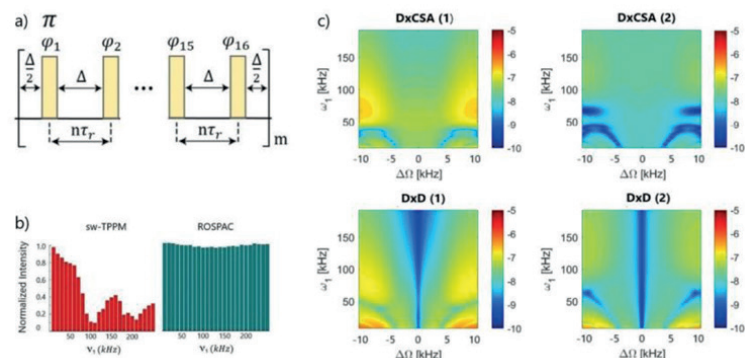


FIGURE 1. ROSPAC heteronuclear decoupling pulse sequence (a), experimental normalized intensity of the CH₂ group of Glycine as a function of the RF amplitude at 100 kHz MAS, using SW_r TPPM and ROSPAC (b), and the magnitude of the second-order cross-terms as a function of the RF power and ¹H offset (c).

Acknowledgments:

A. S. acknowledges a research fellowship from the World Federation of Scientists (WFS), CERN, Geneva, Switzerland.

References:

- [1] A. Simion et al., Heteronuclear decoupling with Rotor-Synchronized Phase Alternated Cycles, J. Chem. Phys, 2022 (submitted).
- [2] K. O. Tan et al., A generalized theoretical framework for the description of spin decoupling in solid-state MAS NMR: Offset effect on decoupling performance, J. Chem. Phys. 45, 094201, 2016.

Second Poster Prize AMPERE NMR School 2022

Oksana Bondar, Taras Shevchenko National University of Kyiv and Jagiellonian University in Krakow

Zero-field NMR detection of pyridine derivatives hyperpolarized with SABRE

Oksana Bondara^a, Piotr Put^b, Seyma Alcicek^b, Łukasz Bodek^b, Simon Duckett^c and Szymon Pustelny^b

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^cCentre for Hyperpolarization in Magnetic Resonance (CHyM), University of York, UK.

Zero and ultralow field (ZULF) nuclear magnetic resonance is becoming an interesting alternative to the conventional high-field NMR¹. In liquid samples at truly zero field, the NMR signals that are detected are exclusively determined by the spin-spin *J*-coupling network so they provide direct access to information about molecular structure and dynamic behavior. However, at ZULF, any thermal polarization is negligible so, the detection of NMR signal requires very sensitive detectors and/or polarization techniques. One promising polarization approach is para-hydrogen-induced polarization using the SABRE method.

A specific example of a molecule that is polarizable by SABRE is pyridine. This is an interesting molecule, whose derivatives are used as pharmaceutical agents due to their antimicrobial, antiviral, or anticancer properties. They also reflect potential contrast agent for MRI.

In this study, we present a series of ZULF NMR spectra of various SABRE-hyperpolarized biomolecules. In particular, we examine naturally- abundant nicotinamide, whose ZULF NMR spectrum is shown in Fig.1. The spectrum shows a complex structure with many ZULF NMR resonances observed between 10-20Hz. The structure results from a complex spin network involving both hetero- and homonuclear couplings. Peak assignment is supported by numerical simulations, which demonstrate a good agreement with the data.

With this single example (more during the conference), we demonstrate the ability of measuring ZULF NMR spectra of *in-situ* SABRE hyperpolarized biomolecules. Application of SABRE greatly improves the accessible range of polarizable compounds and hence broadens the applicability² of ZULF NMR spectroscopy as a highly sensitive analytical technique. It also suggests that it will be possible to construct compact and cheap ZULF NMR spectrometers in the future that can be used for *in-vivo* analysis.

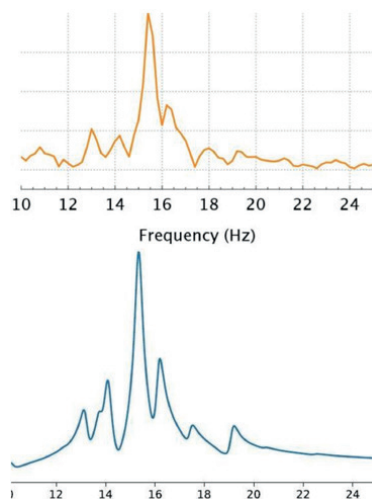


FIGURE 1. Measured (orange) and simulated (blue) ZULF NMR spectra of naturally-abundant nicotinamide.

Acknowledgments:

The authors acknowledge the support from the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie grant agreement No. 766402.

References:

- [1] J.W. Blanchard, D. Budker, Zero-to ultralow field NMR, *MagRes* 5 (2016) 1395–1410.
- [2] S. Alciçek, P. Put, D. Barskiy, V. Kontul and S. Pustelny, *The Journal of Physical Chemistry Letters*, 2021, 12, 10671–10676.

Third Poster Prize AMPERE NMR School 2022

Ahmed Subrati, Adam Mickiewicz University, Poznań

Probing structural, chemical, and electronic features of local turbostratic domains in graphite oxide frameworks

Ahmed Subrati^a, Patryk Florczak^a, Bartosz Gurzęda^b, Emerson Coy^a, Jacek Jenczyk^a, Miłkołaj Kościński^a, Barbara Peplińska^a, Stefan Jurga^a, and Piotr Krawczyk^b

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^cDepartment of Physics and Biophysics, Faculty of Food Science and Nutrition, Poznań University of Life Sciences, Poznań, Poland

Graphite oxide framework as a lightweight class of materials in the carbon family possesses remarkable and promising properties for a plethora of applications such as: hydrogen storage and supercapacitors. The establishment of interlayer tethering is of paramount necessity when realizing this class of materials as aforementioned processes require cyclic operation. The enhancement of the interlayer spacing as the intercalating stitched moieties are introduced offer collective van der Waals interaction energy which boosts frameworks performance in aforementioned applications. Tethering molecules studied so far concern mostly amines as they readily react with epoxide groups through epoxide ring opening [1]. However, the problem of undesirable conformations (loop, tail, and π - π parallel) emergence was addressed in multiple studies [1]. Some claimed that there exists a need to use aromatic stitching molecules to prevent the aforementioned conformations from happening as well as to have plausible amount of intercalating species between adjacent layers of graphite oxide. This is precisely what we have accomplished here. We electrochemically oxidized large graphite flakes ($\geq 500 \mu\text{m}$) to obtain electrochemically-derived graphite oxide (EGO) which was later functionalized with diaminoctane to obtain framework of EGO (EGOF-A1).

All samples were analyzed using different techniques to confirm oxidation and functionalization. Much to our surprise, we succeeded in resolving turbostratic domains with unprecedented combination of ^{13}C MAS NMR, HRTEM, and XRD analyses. Turbostratic domains used to be probed by conventional XRD, however, in the present work we resolved their contribution in ^{13}C MAS NMR and confirmed their emergence by HRTEM analyses as discernible Moiré patterns were visible [2]. Density functional theory (DFT) calculations conducted using QuantumEspresso package unveils subtle, yet deterministic, variations in electronic properties of Bernal (AB) and non-Bernal (AA) stacking of bilayer graphene. Bernal stacking is synonymous with graphitic stacking. DFT calculations of AB and AA bilayer graphene signify impact of ordering along c-axis on various properties such as: work function, pseudo charge density difference, and electronic band structures.

Acknowledgements:

This work was supported by the National Science Centre of Poland (2017/25/B/ST8/01634).

References:

- [1] M. Herrera-Alonso, et al., *Langmuir* 23, 10644 (2007).
- [2] A. Subrati, et al., *Carbon* 176, 327 (2021).

Report:

EUROMAR 2022

Utrecht, July 10-14, The Netherlands

The 18th EUROMAR meeting took place between 10th to 14th of July 2022 in Utrecht, The Netherlands. After two virtual meetings, Euromar22 was, for the 1st time again, organized as a fully live event which took place at the Educatorium on the science campus of Utrecht University. With in total 5 lecture halls, sponsor and poster areas and diverse meetings rooms close by, the venue was perfectly suited to meet and greet colleagues from the field of magnetic resonance and learn about the latest scientific and industry innovations in magnetic resonance.

Committees:

The International Scientific Committee consisted of:

Sharon Ashbrook (University of St Andrews), Marc Baldus (Utrecht University), Laura Castanar Acedo (University of Manchester), Alexandre Bonvin (Utrecht University), John van Duynhoven (Wageningen University), Huub de Groot (Leiden University), Sami Jannin (University of Lyon), Thomas Prisner (University of Frankfurt), Jeanine Prompers (UMC Utrecht), Alena Shchelokova (ITMO University, Saint-Petersburg), Susumu Takahashi (University of Southern California), Daniel Topgaard (Lund University), Marcellus Ubbink (Leiden University).

Members of the Local Organizing Committee:

Marc Baldus (Utrecht University), Geeske Badart (Utrecht University), Alexandre Bonvin (Utrecht University), Oscar van den Brink (COAST), John van Duyhoven (Wageningen University), Huub de Groot (Leiden University), Andrei Gurinov (Utrecht University), Hugo van Ingen (Utrecht University), Arno Kentgens (Radboud University), Jeanine Prompers (UMC Utrecht), Marcellus Ubbink (Leiden University), Aldrick Velders (Wageningen University), Markus Weingarth (Utrecht University).

Promotion & Communication:

The conference website was set up in fall 2021. In addition to the website, the organizers relied on Twitter to publicize the conference. Euromar22 had more than 1500 Followers on Twitter. Communication also took place via email lists such as the NMR information server and Linked-in where several updates to the meeting were published by the organizers but also by sponsors and -after the meeting- by speakers and other attendees of EUROMAR22.



EUROMAR 2022 in Figures

During the five days of the conference, 635 registered participants from 37 countries followed the lectures and industry talks. In addition, 370 posters were presented in dedicated poster sessions on three consecutive days. All posters were available for viewing throughout the entire conference. Each poster was presented on two days and the poster sessions were very well attended.

The conference program comprised in total 120 oral presentations, including 13 plenary, 42 invited, 62 promoted and 3 tutorial lectures. The following topics were covered: bioNMR, computation, EPR/ESR, hyperpolarization, hardware, materials, metabolomics, MRI, small molecules/drug discovery, solid-state NMR, solution NMR, benchtop/low field, single molecule detection/NV centers, paramagnetic NMR and exotica. The tutorial session covered MRI from a general introduction to latest research in MRI. The vast majority of the presentations was given in person. In about 10 cases, health or travel-issues prevented such presentations. Instead, online presentations were made possible that were followed by live Q&A sessions with the Euromar22 audience.



In addition to the scientific program, the meeting was also flanked on July 15th by the Satellite meeting "Magnetic Resonance at Ultra-High Field" chaired by Markus Weingarth and Hugo van Ingen with more than 300 registered participants. In this satellite meeting, international leaders in the field of NMR presented recent developments and applications using 1.2 GHz NMR instruments. The program also included talks of younger members of the Dutch national uNMR-NL consortium covering solid and solution-state NMR as well as microMRI research at the new 1.2 GHz system at Utrecht University which was officially inaugurated during the symposium.

Sponsors:

We are indebted to 23 sponsors who supported Euromar22. Sponsor stands were located close to the lecture halls or poster sessions. In addition, the program contained a pre-meeting symposium from Bruker, two lunch symposia from JEOL, one lunch workshop from Magritek and two industry presentations in a dedicated lunch session.

Prizes:

The Sunday opening session of Euromar22 ended with three prize winners who all gave their lectures in person. The Ernst Prize 2022 was awarded by Lucio Frydman and Falko Busse to Harald Schwalbe from Goethe University of Frankfurt/Germany. The Ernst Prize is intended to award achievements going beyond fundamental research, for groundbreaking applications of new or of previously known techniques in all areas of magnetic resonance. The Varian Young Investigator Prize which is intended to recognize a single investigator, for his/her achievements in any area of magnetic resonance was awarded by Thomas Prisner to Rina Rosenzweig (Weizmann Institute of Science/Israel). Last but not least, Jakob Lindale (Duke University, USA) received from Bernhard Bluemich the Raymond Andrew Prize for an outstanding PhD thesis in magnetic resonance.



The closing session of Euromar22 started with this year's graduate students and post-doctoral fellows who received the Elsevier Journal of Magnetic Resonance Young Scientist Awards. These awards have been selected based on excellence by the EUROMAR scientific program committee. This year, the awards went to Natalie Golota (MIT), Andrei Kuzhelev (Goethe University, Frankfurt), Felix Torres (ETH Zurich) and Maxime Yon (Lund University).

Lastly, the International EPR (ESR) Society (IES), represented by the IES president Songi Han, handed out two best poster award certificates to Mantas Simenas (Vilnius University) and Tobias Hett (University of Bonn) for their posters. Congratulations to all winners !

Sustainability & Accommodation:

Sustainability was important to the local organizing committee of Euromar22. By offering only vegetarian food during the lunches (a general policy of our university), by providing refillable water bottles and by actively promoting public transport we have tried to accomplish a sustainable meeting. Indeed, the



conference location was easily reachable by public transport (Tram, bus) and many attendees rented bikes to travel between the conference, their accommodation and the city of Utrecht. For international travel travellers our conference website contained the Utrecht University Train Zone Map to find information on:

- the total travel time to Utrecht city centre from various destinations in Europe
- the level of comfort of the journey
- the CO₂ emission of the journey

If the departure city was not listed on the Train Zone Map, we referred the attendees to the online CO2 footprint calculator to determine how much CO2 emissions they could avoid by travelling by train.

For accommodation, we had secured a variety of accommodation in Utrecht at preferential rates for the EUROMAR 2022 delegates and booking could be done via special website. In collaboration with the Utrecht science park, we were also able to secure cheap student accommodation for 200 young EUROMAR attendees on the campus.

Social Activities:

After more than 2 years of mostly virtual meetings, social activities were a central component of Euromar22.

The Welcome Mixer took place in the Educatorium Restaurant of Utrecht University. The external caterer organized a walking reception with drinks and bites. Together with the musical Trio - The King Fellows Trio- it was a relaxing evening and the conference started with a sunny vibe.

Also, the Bruker night at the soccer stadium of FC Utrecht on Monday evening was very well attended. Tuesday and Wednesday evening were free for the delegates, allowing them to venture to the beautiful city of Utrecht celebrating this year 900 years of city rights and visiting one of the many restaurants and/or bars around the canals and the old city centre.

Thursday evening then marked the closure event of Euromar22 at TivoliVredenburg, again in the city centre of Utrecht. TivoliVredenburg is the Music Center of Utrecht. The evening started with a spectacular dance performance: Barock meets Rock. After that, delicious food was served and as of 10 pm a live band started. A real dancing evening concluded the EUROMAR22 conference until after midnight which was very well attended – a real NMR party!

Innovations

This year's conference included several online talks of oral presenters that had to cancel their participation on short notice due to personal (mostly COVID-related) circumstances. All except one of these presentations were pre-recorded and uploaded on a conference

file server. In all cases, Q&A sessions featured live participation of the speakers and interaction via camera and microphone that connected the online speaker with the Euromar22 audience in the lecture halls. In addition to microphones in the lecture halls, delegates could ask questions to the speakers/conference chairs using the conference app. This app also contained information on the oral and poster program, the speakers as well as other useful information including local transport. To increase sustainability, the entire book of abstracts was only provided in electronic form. After the meeting, also an online survey was sent to all Euromar22 delegates.

Conclusions:

Without doubt, the world has changed since the last “in-person normal” Euromar meeting in 2018 and this has affected our professional and private lives. Also, and especially in the last 12 months prior to the start on July 10th, the organization of Euromar22 involved many emotional highs and lows on how the meeting would look like, having to keep different scenarios open until the last minute.

In spite of the continuing turbulent times, we feel that our mission to set up a meeting in which personal interactions were possible again, fostering exchange of scientific ideas, meeting old and making new friends was accomplished. We thank all attendees and sponsors that have made Euromar22 a stimulating and joyful meeting. Last but not least, a big thank you also goes to all volunteers in our local groups that did a terrific job to make Euromar 22 work. Bedankt & tot ziens from Utrecht !



The 2022 Euromar Organizing Committee

Minutes of the meeting of the AMPERE Bureau

Utrecht, on July 12, 2022

Members present (13):

M. Baldus, H. Oschkinat, B. Blümich, J. Parkinson, J. van Duynhoven, A. Kentgens, Q. Stern, T. Prisner, A. Böckmann, B.H. Meier, J.-N. Dumez, S. Hiller, M. Ernst

Excused (9):

G. Bodenhausen, L. Ciobanu, J. Dolinšek, P. Girardeau, D. Kruk, G. Mathies, G. Otting, J. Plavec, Y.-Q. Song

Agenda:

1. Approval of the agenda.
2. Approval of the minutes of the AMPERE Bureau meeting Online March 17, 2022
3. Report on the state of the AMPERE Society (A. Böckmann)
4. Financial Report (M. Ernst)
5. Preparation of AMPERE Bureau elections (A. Böckmann)
6. Preparation of AMPERE Committee elections (M. Ernst/A. Böckmann)
7. Past and current meetings
 - EUROMAR 2022, Utrecht (Netherlands), July 3-8 (M. Baldus)
 - MR Food 2022, Aarhus (Denmark), July 10-14 (J. van Duynhoven)
8. Varia

At 13:00 hours, Matthias Ernst opened the meeting.

Ad 1. The agenda was approved as is.

Ad 2. The minutes of the AMPERE Bureau were approved unanimously.

Ad 3.

The president A. Böckmann mourned the passing of Jacob Schaefer and acknowledged his contributions to NMR science. Sadly also, Stefan Jurga, a former member of the AMPERE Bureau passed way. He was in the middle of organizing the Zakopane summer school. Fortunately, Danuta Kruk agreed to step in spontaneously and realized a great conference. She is acknowledged by the Bureau for that. Further notable members that had passed away in the last year include Aharon Loewenstein and Wes Anderson. They will be kept in the memory of the society members.

A. Böckmann then introduced the new AMPERE online café organized by G. Mathies.

Further future plans are to create an online directory of AMPERE members and to promote publication by members.

Ad 4.

M. Ernst presented the financial report. Finances are generally stable, however, this year the society overspent by around 9'000 CHF. This was due to reduced income as a consequence of the mostly remote format EUROMAR 2021, as well as extraordinary spending to support Ukrainian scientists. There were little activities in the subdivisions due to lack of conferences, and finances are stable there. Similarly, EUROMAR account is stable. There will be a general assembly online later in the year to approve the finances.

Ad 5.

The terms of Matthias Ernst and Sebastian Hiller run out in 2022 and both agreed to serve another term. The Bureau recommends their re-election.

Ad 6.

In the AMPERE Committee, there are 5 people whose term will end in 2023, four of them agreed to be re-elected: Peter Crowley IE, Ana Gil PT, Frode Rise NO, Sharon Ruthstein IL. One of them, Birte Kragelund DK, decided to step down. Several suggestions for replacement and additions were collected. These will be presented to the AMPERE Committee.

Ad 7.

Final reports of past meetings:

The report of the EUROMAR 2022 was given by M. Baldus. The conference is well in shape, it has over 650 participants and 370 posters. There were some short-term rearrangements due to individual COVID cases, but generally everything works fine. The budget is estimated to be slightly positive. The decision to not hold the conference hybrid, but in real life, appeared a good decision. The location of the conference in university premises instead of a conference center is seen very positive. The Bureau thanked M. Baldus for the organization. EUROMAR 2023 will be in Glasgow and 2024 in Bilbao (repeat from COVID-cancelled 2020). The Bureau discussed possible improvements and innovations in conference organization for futures EUROMARs.

J. v. Duynhoven reported on the NMR Food conference. It took place 7-10 June 2022 with 100 participants and was generally successful. There were mostly Europeans and Brazilian participants, but few Americans or Asians.

Ad 8.

The bureau discussed the future format of the AMPERE committee meeting. The bureau agreed that the committee meeting should be continued to be held in person at the

EUROMAR conference. It is not expected that committee members travel to the site just to attend the committee meeting, but it should be normal for committee members to attend EUROMAR at least some of the times and then attend the committee meeting on that occasion. Committee members that do not attend EUROMAR at least once in their 4-year term, are discouraged to opt for a second term. On the organizational level, the Bureau decides that in the future, all attendants of EUROMAR automatically get a 1-year membership or their existing membership prolonged by one year.

The meeting closed at 14:25.

Utrecht, 12 July 22

Minutes: Sebastian Hiller

Minutes of the meeting of the AMPERE Committee

Utrecht, on Wednesday, July 13, 2022

Members present (28):

S. Ashbrook, R. Boelens, E. Bordignon, K. Houben, V. Klimavicius, J. Martins, J. Matysik, P. Novak, G. Parigi, I. Reile, S. Ruthstein, M. Sardo, V.-V. Telkki, D. Topgaard, L. Trantirek, P. Vasos, A. Böckmann, M. Ernst, S. Hiller, G. Mathies, Q. Stern, G. Bodenhausen, H. Oschkinat, T. Prisner, A. Kentgens, B. Blümich, B.H. Meier, J. Parkinson.

Excused (24):

V. Chizhik, P. Crowley, J. Dolinsek, I. Felli, A. Gil, P. Giraudeau, K. Jaudzems, K. Köver, W. Kozminski, G. Mollica, A. Pastore, M. Pons, F. Rise, P. Schanda, G. Spyroulias, C. Thiele, J. Tritt-Goc, J. Dolinsek, S. van Dorslaer, L. Ciobanu, Y.-Q. Song, J. van Duynhoven, G. Otting, J. Plavec

Agenda:

1. Approval of the agenda.
2. Approval of the minutes of the AMPERE Committee meeting Online January 12, 2020
3. Report on the state of the AMPERE Society (A. Böckmann)
4. Financial report to be presented at the General Assembly (M. Ernst)
5. AMPERE Bureau elections (A. Böckmann)

6. Preparation of Committee Elections at GA (M. Ernst, A. Böckmann)

7. Varia

At 12:58 hours, Matthias Ernst opened the meeting.

Ad 1. The agenda was approved as is.

Ad 2.

The minutes of the previous AMPERE Bureau meeting were approved unanimously.

Ad 3.

The president A. Böckmann welcomed everyone present. She remarked that the ongoing EUROMAR conference is very successful and well-organized. A. Böckmann then commemorated the colleagues that passed away since the last meeting and acknowledged their contributions to NMR science. The society mourns the passing of Jacob Schaefer. Sadly also, Stefan Jurga, a former member of the AMPERE Bureau passed away. He was in the middle of organizing the Zakopane summer school. Fortunately, Danuta Kruk agreed to step in spontaneously and realized a great conference. She is acknowledged by the AMPERE society for that. Further notable members that had passed away in the last year include Aharon Loewenstein and Wes Anderson. They will be kept in the memory of the society members.

A. Böckmann then welcomed the new young AMPERE Bureau members, G. Mathies and Q. Stern. G. Mathies organizes an online café. Further future plans of the society are to create a searchable online directory of AMPERE members and to promote publications authored by society members.

Ad 4.

M. Ernst presented the financial report of the past 2 years. Finances are generally stable, however, in the past year the society had spent around 9'000 CHF more than its income. This was due to reduced revenue from EUROMAR 2021 as a consequence of its online format, as well as extraordinary spending to support Ukrainian scientists. There were little activities in the subdivisions due to lack of conferences, and finances are stable there. Similarly, EUROMAR account is stable. Generally, the society is in a financially healthy state.

Ad 5.

The terms of Matthias Ernst and Sebastian Hiller in the AMPERE Bureau run out in 2022. Both agreed to serve another term. The committee re-elects each of them for a second term in their respective functions.

Ad 6.

In the AMPERE Committee, there are 5 people whose term will end in 2023. Four of them agreed to be re-elected: Peter Crowley (Ireland), Ana Gil (Portugal), Frode Rise (Norway), Sharon Ruthstein (Israel). One of them, Birte Kragelund (Denmark), decided to step down.

The committee nominated the interested members mentioned above for re-election by the general assembly, as well as new members from countries with vacancies and from countries with large communities. Nominated candidates are: Thomas Vosegaard (Denmark), Meghan Halse (United Kingdom), Dennis Kurzbach (Austria), Patrick van der Wel (Netherlands). These candidates will be contacted and presented to the AMPERE General Assembly for election.

Furthermore, it is discussed and approved that the general assembly will continue to be held online instead of at the EUROMAR, for logistic reasons. The general assembly will be held online on August 30, 2 pm CEST.

Ad 7.

The committee discussed the future format of the AMPERE committee meeting. It is agreed that the committee meeting should be continued to be held in person at the EUROMAR conference. It is not expected that committee members travel to the site just to attend the committee meeting, but it should be normal for committee members to attend EUROMAR at least some of the times and then attend the committee meeting on that occasion.

The meeting closed at 13:46.

Utrecht, 13 July 2022

Minutes: Sebastian Hiller

Minutes of the meeting of the AMPERE General Assembly

online, on Tuesday, August 30, 2022

Members present:

A. Böckmann, M. Ernst, S. Hiller, B. Blümich, S. Aravamudhan, A. Belguese, B. Meier, B. Bode, B. Corzilius, C. Schmidt, D. Topgaard, D. Kurzbach, E. Bordignon, F. Kozak, G. Bodenhausen, G. Parigi, G. Mathies, G. Karlsson, H. Oschkinat, I. Koptuyug, I.

Kuprov, I. Geru, I. Felli, J. Barton, J. Dolinšek, J.-N. Dumez, J. Parkinson, J. Martins, K. Saalwächter, L. Lecoq, L. Brigandat, L. Epasto, M. Sardo, M. Baborieau, M. Ziegler, M. Negroni, M. Halse, M.-H. Nguyen, O. Lafon, P. van der Wel, P. Vasos, Q. Stern, R. Boelens, S. Haber-Pohlmeier, S. Ruthstein, “Sonia”, “Suter”, T. Agback, T. Prisner, M. Plaumann

Agenda:

1. Approval of the agenda
2. Approval of the minutes of the AMPERE General Assembly Online June 30, 2022
3. Report on the state of the AMPERE Society (A. Böckmann)
4. Financial report and approval (M. Ernst)
5. Report on AMPERE Bureau elections (A. Böckmann)
6. AMPERE Committee elections (M. Ernst)
7. Varia
8. Closing remarks (A. Böckmann)

At 14:00 hours, Matthias Ernst opened the meeting.

Ad 1. The agenda was approved as is.

Ad 2.

The minutes of the previous AMPERE General Assembly were approved unanimously.

Ad 3.

A. Böckmann commemorated the colleagues that passed away in the past year. These are Stefan Jurga, Jacob Schaefer, Aharon Loewenstein, Wes Anderson, Shimon Vega, C.L. Kethrapal, Kenneth Parker, and Girjesh Govil. They continue to be missed by the society. Thomas Prisner added Dr. James S. Hyde.

In the past months, a total of four of the AMPERE conferences had been successfully conducted, The MR Food, the Ampere NMR School 2022, the EUROMAR 2022 and the Magnetic Resonance in Porous media meeting in Hangzhou (China). A. Böckmann particularly thanked Marc Baldus who made the EUROMAR 2022 in Utrecht a huge success. Upcoming conferences are the Alpine conferences in Chamonix in 2022 and 2023, the EUROMAR 2023 in Glasgow and Hyperpolarization 2023 in Leipzig.

A. Böckmann showed the AMPERE tree and highlighted individual divisions. Finally, she introduced the new AMPERE online café organized by G. Mathies.

Ad 4.

M. Ernst presented the financial report of the past year and discussed key aspects. Finances of the society is continuing to be stable and the financial situation of all subdivisions remains stable and partially very positive. The society is overall in a very

healthy state. The financial report was unanimously approved by the members present, with 2 abstentions.

Ad 5.

A. Böckmann reported that secretary general M. Ernst and executive secretary S. Hiller had been elected by the AMPERE committee for a second term into the Bureau and thanked them for their work.

Ad 6.

M. Ernst explained the current composition of the AMPERE committee and the nominees for additions. Four committee members are nominated for their second term starting in 2023. These are Peter Crowley, Ireland, Ana Gil, Portugal, Frode Rise, Norway, and Sharon Ruthstein, Israel. These were elected with 45 yes, 1 no, 1 abstention.

In addition, new candidates to the committee were nominated: Meghan Halse, UK, Dennis Kurzbach, Austria, Igor Komarov, Ukraine, Patrick van der Wel, Netherlands, Thomas Vosegaard, Denmark. These were elected with 42 yes, 1 no, 1 abstention.

All candidates had been asked prior to the meeting and accepted their election.

Ad 7.

Rolf Boelens announced his retirement from the committee and was thanked by the president for his participation and activities.

Ad 8.

A. Böckmann thanked everyone for the participation in the meeting and encouraged initiatives for the society.

The meeting closed at 15:30.

Basel / the internet, 30 August 2022

Minutes: Sebastian Hiller

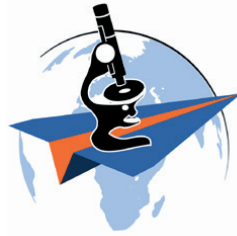
Balance of the Accounts of the Groupement AMPERE and Subdivisions

Period from May 31 2021 to May 31 2022

	Balance on May 31. 2021	Membershi p Fees / Registration Payments	Donations/ Conference support, Copernicus	Conferences Grants / Travelgrants/ Prizes and fees paid by cc for Subdivisions	Conference Sponsoring, costs conference organizers, CARA	Conference Surplus	Administrati on Bulletin print, Web Bureau Meetings / domains, credit card	Bank Charges / Depot Charges/ losses on Depot	Account Closing / Account carry over	Bank Interests Account carry over, Dividends	Gains on Value Paper	Balance on May 31. 2022
Groupement Ampere												
Ampere (CHF)	13'123.66						625.70	12.00		3'773.79		16'259.75
Ampere (Euro)	46'891.83	6'779.30	624.52	3'500.00	12'814.33		38.52	68.86	312.26			37'561.68
Andrew (CHF)	24'447.14			509.25				432.25		2.45		23'508.09
Andrew Depot (CHF)	99'696.78							5'649.00				94'047.78
Subdivisions												
Biol. Solid State (Euro)	13'830.46						66.00	34.74				13'729.72
EPR (CHF)	7'427.80									0.75		7'428.55
Food NMR (CHF)	615.37									0.05		615.42
MRPM (CHF)	32'610.85									3.25		32'614.10
SMRM (CHF)	65'941.32		2'130.68	2'185.92	3'926.86		39.54	32.00		6.50		61'894.18
Hyp (CHF)	7'345.40				3'225.00					0.60		4'121.00
Publication Div. (Euro)	0.00		312.26					30.70				281.56
Euromar												
Euromar (Euro)	98'578.30		15'000.00	15'000.00					49.08			98'529.22

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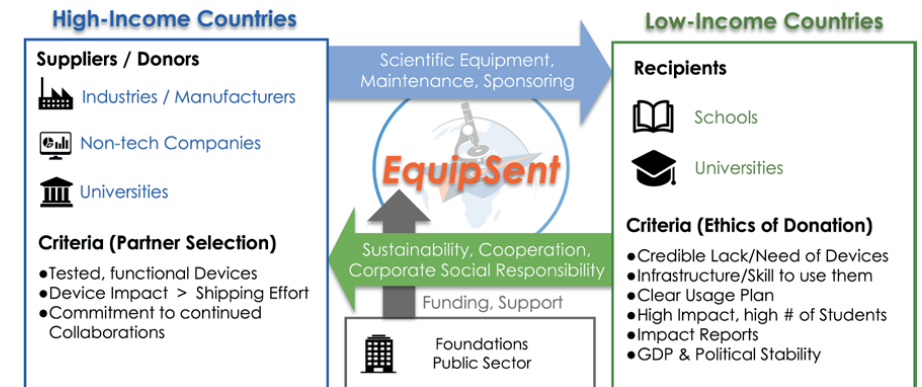
Our Solution

EquipSent seeks to connect these two worlds by directly matching donors of scientific equipment with those in need. As an intermediary between both parties, we reduce administrative efforts and help organizing the shipping, installation and legal contracting. Expenses are shared between the recipient and the industrial sponsors in return for CSR, new markets and advertisement.

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our Partners:



Executive Officers and Honorary Members of the AMPERE Bureau

The AMPERE BUREAU includes the executive officers (which take the responsibility and the representation of the Groupement between the meeting of the committee), the honorary members of the Bureau and the organizers of forthcoming meetings.

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AMPERE Committee

Sharon Elizabeth Marie Ashbrook (2016-2024) University of St. Andrews, United-Kingdom

Enrica Bordignon (2021-2025) University of Geneva, Switzerland

Vladimir Chizhik (2016-2024) University of St. Petersburg, Russia

Peter Crowley (2018-2026) National University of Ireland, Ireland

Janez Dolinšek (2016-2024) Institute Jozef Stefan, Slovenia

Isabella Caterina Felli (2016-2024) CERM, University of Florence, Italy

Ana Maria Pissarra Coelho Gil (2018-2026) University of Aveiro, Portugal

Patrick Giraudeau (2016-2024) Université de Nantes, France

Meghan Halse (2022-2026) University of York, United Kingdom

Klaartje Houben (2021-2025) DSM, Delft, The Netherlands

Kristaps Jaudzems (2019-2023) University of Latvia, Latvia

Vytautas Klimavičius (2021-2025) Technical University Darmstadt, Germany

Igor Komarov (2022-2026) Taras Shevchenko National University of Kyiv, Ukraine

Katalin Köver (2021-2025) University of Debrecen, Hungary

Wiktor Kozminski (2016 - 2024) University of Warsaw, Poland

Dennis Kurzbach (2022-2026) University of Vienna, Austria

Jose Martins (2021-2025) Ghent University, Belgium

Jörg Matysik (2021 - 2025) University Leipzig, Germany

Giulia Mollica (2021-2025) ICR, Aix Marseille University, France

Predag Novak (2019-2023) University of Zagreb, Croatia

Giacomo Parigi (2021-2025) University of Florence, Italy

Annalisa Pastore (2021-2025) King's College London, England

Miquel Pons (2016-2024) University of Barcelona, Spain

Indrek Reile (2019-2023) National Institute of Chemical Physics and Biophysics, Estonia

Frode Rise (2018-2026) University of Oslo, Norway

Sharon Ruthstein (2018-2026) Bar-Ilan University, Israel

Mariana Isabel Coutinho Sardo (2021-2025) University of Aveiro, Portugal

Paul Schanda (2021-2025) The Institute of Science and Technology, Austria

George Spyroulias (2017-2025) University of Patras, Greece

Ville-Veikko Telkki (2016-2024) University of Oulu, Finland

Christina Thiele (2016-2024) Technische Universität Darmstadt, Germany

Daniel Topgaard (2017-2025) Lund University, Sweden

Lukáš Trantírek (2021-2025) CEITEC - Central European Institute of Technology, Czech Republic

Jadwiga Tritt-Goc (2021-2025) Polish Academy of Sciences, Poland

Patrick van der Wel (2022-2026) University of Groningen, The Netherlands

Paul Vasos (2019-2023) Horia Hulubei Institute for Nuclear Physics (IFIN-HH), Romania

Thomas Vosegaard (2022-2026) Aarhus University, Denmark

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Karl Alexander Müller, IBM Zurich Research Laboratory, Switzerland

Hans Wolfgang Spiess, Max Planck Institute for Polymer Research, Germany

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Prize Committee

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Members:

Mark E. Smith, University of Southampton, England

Annalisa Pastore, King's College London, England

Alexej Jerschow, New York University, USA

Enrica Bordignon, University of Geneva, Switzerland

Future conferences

Ampere Event 2023

AMPERE NMR School	Zakopane (Poland)	June 18-24
Euromar 2023	Glasgow (United Kingdom)	July 9-13
17 th ICMRM	Singapore (Republic of Singapore)	August 27-31
Alpine Conference on Magnetic Resonance in Solids	Chamonix (France)	September 10-14
HYP23	Leipzig (Germany)	September 24-28



Groupe ment
AMPERE

www.ampere-society.org