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BULLETIN DU GROUPEMENT

d'informations mutuelles

Groupement
AMPERE

SE CONNAÎTRE, S'ENTENDRE, S'ENTRAIDER

October to December 2025

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Contents

If you would like to become a member of the AMPERE Society, you can register online under: www.ampere-society.org

Special Editorial

Groupement AMPERE

Dear members of the Groupement AMPERE,

Women are still often invisible in our community. Danielle Laurencin, Sharon Ashbrook, Melinda Duer, Christel Gervais, Giulia Mollica, Frédérique Pourpoint, and Elodie Salager took the important initiative to compile a list of women holding permanent positions in solid-state MR as professors, researchers, engineers, or industry professionals. The Groupement was honored by their request to publish the list, which you can find now at: www.ampere-society.org/women_in_MR. The list is being expanded to include women from all fields of magnetic resonance. Our long-term goal is to create a searchable online directory of all AMPERE members, but this task requires more human resources than we currently have available.

Kristina Comiotto from AMPERE had the excellent idea that we further enhance the visibility of our female colleagues by publishing a portrait once per month. You can now read the first portrait on the cover page of the AMPERE website.

A lack of visibility is also often a problem for our younger colleagues. Therefore, AMPERE has expanded its initiative to include and promote the next generation of MR researchers. This summer, Daryia Savchenko was joined by Sara Andres, Shira Haber, Perttu Hilla, Yuliia Horbenko, and Marco Schiavina. They represent different European countries and MR fields. Together, they now form the Young Member Subdivision of AMPERE, a dedicated space where they can develop initiatives that they deem important for our community. We look forward to discovering their ideas.

I wish you a mindful and pleasant end to the year and all the best.

Anja Böckmann

President
Groupement AMPERE

Portrait:

Dennis Kurzbach

Why magnetic resonance and why NMR and MRI?
With NMR, we can gain detailed insights into the world around us that no other method can likely provide. This makes the method very intriguing for me. Personally, though, I never chose NMR. As a student, I actually wanted to become a philosophy teacher (and also graduated as such), but somehow, NMR (and EPR) chose me.

What is your favorite frequency?
42 MHz, a frequency that likely can help to answer the ultimate questions.

What do you still not understand?
I don't understand many things. The most troublesome is probably the concept of adiabaticity when spins travel through a spatially inhomogeneous field. In my lab, where we do dissolution DNP experiments often, we are still struggling to understand what the hyperpolarized samples experience when transferred from the DNP to NMR magnets.

Luckiest experiment you have ever done.
Once, I set a hood on fire by accident, but the product I was synthesizing (a germyl substituted lead radical) was purified and removed from the hood before the fire started.

What was the worst mistake you have made during your lab time?
As an undergraduate, I worked with pyrophoric silica substances. When I disassembled a Schlenk line, some residual caught fire and fell into a dry-ice/ethanol bath, which immediately caught fire as well. As a result, the evaporating CO^2 distributed the burning ethanol throughout the fume hood, which eventually also caught fire (but only in parts).

Most memorable conference story?
When I was interviewed at the EUROMAR in Zürich by Geoffrey Bodenhausen for a post-doc position in dissolution DNP; we discussed Voltaire

With whom (historical person) would you like to meet?
I would like to meet Immanuel Kant. His writings have exceptional logic, and I really would like to know how one approaches reasoning on such a level—or better yet, how to synthesize such knowledge a priori.

When do you get your best ideas?
I always have ingenious ideas in impossible situations, such that I can't write them

down, for example, while taking a swim. Then, when I'm back at the shore, I have already forgotten the idea. So, today, I can't remember even one of the great ideas I had.

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

Your idea of happiness?
Health, family, peace.

Position:
Assoc. Prof. at the Institute of Biological Chemistry and NMR core-facility deputy head, University of Vienna, Austria.

Awards:
Ignatz L. Lieben Award,
ERC StG,
Otto Hahn Medal,
Feodor-Lynen Scholarship

Homepage:
https://kurzbach-group.univie.ac.at/

Education:
MSc in Philosophy, Chemistry, and didactics, University of Mainz, Germany.
PhD in physical chemistry at the MPI for Polymer Research, Mainz, Germany.
Habilitation in chemistry at the Ecole Normale Superieure, Paris, France.

Call for nominations:

Raymond Andrew Prize 2026

In memory of Professor Dr. Raymond Andrew and to honor his pioneering work in the field of magnetic resonance, the AMPERE Group has founded the Raymond Andrew Prize. The prize is awarded to young scientists for an outstanding PhD thesis in magnetic resonance.

For the Raymond Andrew Prize 2026 the AMPERE Prize Committee is seeking your help in searching for qualified candidates who completed their dissertation during the period of 2024/2025. The prize will be presented during
EUROMAR Gothenburg (Sweden) 28. June to 2. July 2026.

You are kindly invited to submit nominations by e-mail to:
andrewprize@ampere-society.org

Nominations must be received by 15th February 2026 and should include the following documents:

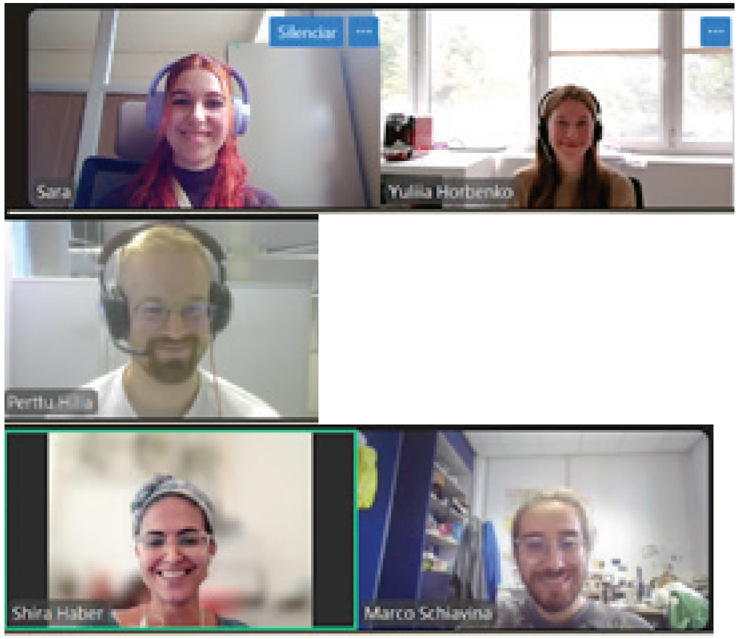
- Nomination letter
- Curriculum vitae
- List of publications and presentations at conferences
- PhD thesis in PDF

The thesis should be written in English. In exceptional cases, the thesis may also be submitted in triplicate as a hardcopy to the AMPERE Secretariat. Submissions that arrive too late will automatically be transferred to the next year. The prize committee will reconsider excellent contributions for two years in a row.

For a list of past Andrew Prize winners see:
https://www.ampere-society.org/Awards.html

AMPERE young members

September 10th 2025



The AMPERE Young Members' kick-off meeting, held online on 10. September 2025, began with introductions and idea sharing among enthusiastic participants
Sara Andrés, Yuliia Horbenko, Perttu Hilla, Shira Haber and Marco Schiavina.

Proposals included launching activities to promote various topics related to magnetic resonance and encourage the participation of young scientists, as well as boosting AMPERE's social media presence and organising social events.
The group is highly motivated to turn their ideas into action to build strong networks among AMPERE members.

Report:

18th ICMRM

Würzburg, 17-21 August 2025

The 18th ICMRM has been held from 17-21 August 2025 at the Julius-Maximilians-University of Würzburg in Würzburg, Germany.
The aim of the ICMRM series is to promote the most recent advances in the development of spatially resolved magnetic resonance methods and their applications.

The series of MR microscopy conferences started in 1991 in Heidelberg, Germany as the "Heidelberg Conferences" and was continued as a biannual meeting. In 1995 the Division of Spatially Resolved Magnetic Resonance (SRMR) was founded as a sub-division of Groupement AMPERE during the 3rd ICMRM held at Würzburg organizing the conference since this date. For its 30th anniversary the division came back to the very place of its foundation.

The conference covered a wide spectrum of applications of NMR and also a novel emerging modality called magnetic particle imaging (MPI).
On the first day an educational session on MR hardware and a plenary session on the four decades the conference has seen welcomed the participants. We were especially happy to have with Bernhard Blümich and Axel Haase two members of the first executive committee of SMRM give talks in the plenary session.
The following four days included plenty of exciting scientific talks and posters on the following topics:

- Flow & Diffusion MR
- Mobile MR
- Low Field MR
- Biomedical Imaging
- MR Hardware
- Porous Media
- Magnetic Particle Imaging & Spectroscopy
- NMR on Plants
- NMR in engineering
- Solid State NMR
- NMR Microscopy
- Cellular imaging

A special highlight were the awards sessions on Wednesday with the awards being presented a the conference banquet the same day.
The Paul Callaghan Young Investigator Award, which is endowed with 1000 €, saw in its finals five excellent talks given by Trishthal Parasram (University of Windsor, Canada), Swantje Romig (University of Rostock, Germany), Alfredo Ordinola (Linköping University, Sweden), Melis Özdemir (Hamburg University of Technology, Germany), and Pierre Estienne (NeuroSpin, CEA-Saclay, France). The very high quality of all the talks made it hard for the jury to select a winner. They decided on Pierre Estienne, who gave a talk on "Functional Brain Imaging and Targeted Lesion Studies Using Manganese-Enhanced MRI and Focused Ultrasound in Non-Conventional Model Species".

The Erwin Hahn Lecturer Award was this year awarded to Lynn Gladden (University of Cambridge, United Kingdom) for her lifetime of contributions to the community. She opened the awards sessions with her lecture entitled "Spatially-Resolved Magnetic Resonance: More Than Just a Camera". For his award in 2023 Henk van As (Wageningen University & Research, Netherlands) also gave his postponed Erwin Hahn Lecture on "Fascinated by NMR, MRI and … plants: about 50 years curiosity driven intact plant and plant materials applications with some relevant spin-off" closing the awards session.

The prize for the best poster presentation went to Xiaoxun Chen (Technical University of Munich, Germany) for his poster on "Next generation optical widefield magnetic resonance microscopy".
Finally, the image beauty contest was won by Marcel Ochsendorf (Fraunhofer MEVIS, Germany) with a beautiful image of a pineapple.

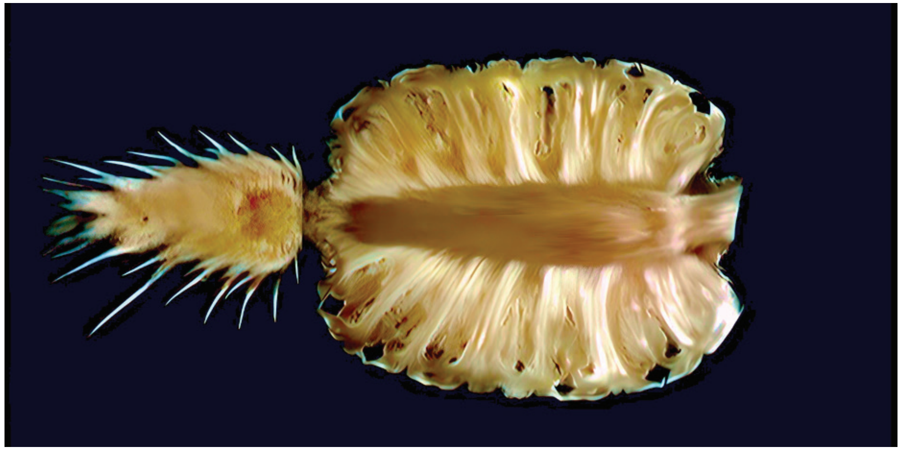


image beauty contest: Marcel Ochsendorf (Fraunhofer MEVIS, Germany)

Our invited speakers (besides the PCYIA finalists and the Erwin Hahn Lecturer) were:
Educational:
• Andrew Webb, Leiden University Medical Center, Netherlands
• Patrick Vogel, University of Würzburg, Germany
• Shaoying Huang, Singapore University of Technology and Design, Singapore
Plenary:
• Axel Haase, Technical University of Munich, Germany
• Bernhard Blümich, RWTH Aachen University, Germany
• Sarah Codd, Montana State University, United States
• Luisa Ciobanu, NeuroSpin, CEA-Saclay, France
In scientific sessions:
• Christopher Boyce, Columbia University, United States
• Nicole Seiberlich, University of Michigan, United States
• Jens Anders, University of Stuttgart, Germany
• Emine Saritas, Bilkent University, Türkiye
• Ljudmilla Borisjuk, IPK Gatersleben, Germany

Finishing this report some statistics on the conference:
69 oral and 33 poster presentations,126 participants,
thereof 41 students, ca. 30% female
19 countries, 14 invited speakers (without PCYIA finalists), 50% female, 7 countries

We are already looking forward to the 19th ICMRM in 2027 which will be hosted in Göteborg, Sweden.

Volker Behr and Peter Jakob
Chairs of 18th ICMRM in 2025

Awards: 18th ICMRM
Paul Callaghan Young Investigator Award
Pierre Estienne

Functional Brain Imaging and Targeted Lesion Studies Using Manganese-Enhanced MRI and Focused Ultrasound in Non-Conventional Model Species

Pierre Estienne[a,b], Gwenaël Pagé[a], Benoit Larrat[a], Kei Yamamoto[b], Luisa Ciobanu[a]

a: NeuroSpin, Commissariat à l'Energie Atomique et aux énergies alternatives, Saclay, France
b: Paris Saclay Institute of Neuroscience (NeuroPSI), CNRS, Univ. Paris-Saclay, Saclay, France

Introduction: Investigating the neural mechanisms underlying behavior in non-model organisms remains a major challenge due to the lack of suitable neuroimaging and molecular tools. Traditional techniques such as electrophysiological recordings and immediate early gene (IEG) mapping depend heavily on established stereotaxic brain atlases or species-specific antibodies, which are generally unavailable outside classical model organisms like rodents or zebrafish.
Surgical lesion studies, often used to confirm causal relationships between brain regions and behavior, face significant obstacles in species lacking stereotaxic coordinates or in aquatic animals where surgical environments are difficult to control. As a result, the scope of comparative neurobiology is often limited to a narrow group of tractable species.
To overcome these limitations, this study presents a protocol combining Manganese-Enhanced Magnetic Resonance Imaging (MEMRI) [1] for functional imaging with Magnetic Resonance-guided Focused Ultrasound (MRgFUS) for targeted, non-invasive brain lesions. This integrated approach is demonstrated in Amatitlania nigrofasciata (convict cichlid), a freshwater fish, and is adaptable to a wide range of species, offering new avenues for neuroethological and comparative research.

Methods:
MEMRI Functional Imaging: $MnCl_2$ is a contrast agent taken up by active neurons. We first optimized the $MnCl_2$ dosage and administration route by testing intraperitoneal and intramuscular injections at 50 or 75 mg/kg $MnCl_2$. Based on these results, our final experimental protocol employed intraperitoneal injections of $MnCl_2$ at a dose of 50 mg/kg. Postinjection, fish participated in repeated behavioral sessions involving a problem-solving task to promote behavior-linked manganese accumulation. Forty-eight hours later, animals were anesthetized and imaged on a 17.2 T Bruker Biospin MRI scanner using a volume transmit/receive coil with inner diameter of 45 mm. For manganese accumulation quantification we acquired T1 weighted images at 80 µm in plane resolution. Other relevant acquisition parameters are as follows: TR/TE 250/2.8 ms, 24 slices, slice thickness 0.2 mm, 40 averages. T1-weighted images were analyzed

using retina-based normalization to compare manganese accumulation across brain regions.

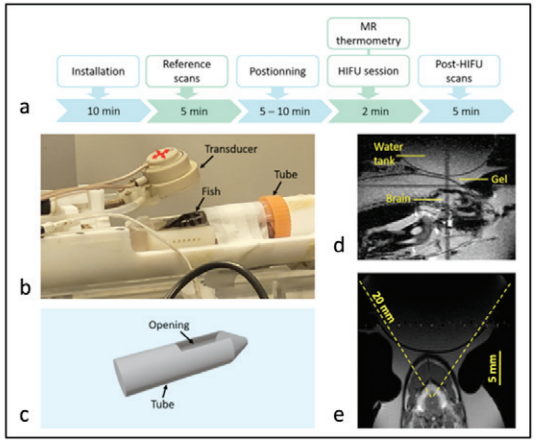


Figure 1. Experimental setup for simultaneous HIFU and MR imaging. a. Workflow of the study. b. MR and ultrasound setup. The transducer can move along the two perpendicular directions symbolized by the red arrows. c. The fish was placed in the tube and maintained in water under anesthesia. An opening was created to apply transducer on the fish head. Sagittal T1-weigthed (d.) and coronal T2-weigthed (e.) images.

HIFU Lesion Protocol: To validate functional imaging results, MRgFUS was used to induce thermal lesions in targeted brain areas [2]. An MR-compatible ultrasound transducer, placed in a 7T MR scanner [3], delivered 15-second sonications to the cerebellum with an estimated acoustic pressure

of 6 MPa. The focal spot was positioned using T2-weighted MR images (Figure 1). Real-time MR thermometry monitored tissue heating (~18°C increase), and T2-weighted scans taken 48 hours post-sonication assessed lesion formation. Visual confirmation was obtained via post-mortem inspection of formalin-fixed brains.

Results and discussion:

Intraperitoneal injection proved more effective than intramuscular administration, and the 50 mg/kg dose offered a reliable balance between contrast and animal safety (Figure 2). MEMRI enabled non-invasive visualization of behaviorally induced brain activity at sub-millimeter resolution. Manganese uptake was robust in regions associated with task engagement, with significantly higher signal intensities in the inferior lobe (mean relative intensity: 7139±388, n=10) of trained fish compared to controls (mean relative intensity: 6422±425, n=10, $p<0.001$).

HIFU induced well-localized brain lesions in the cerebellum without compromising overall health or motor abilities, allowing continued participation in behavioral tasks. MR thermometry effectively tracked focal temperature increases, while T2 signal changes and macroscopic hemorrhage confirmed lesion formation (Figure 3). Lesions in the inferior lobe, a region activated during task performance, resulted in impaired behavioral responses, validating its role in the task and demonstrating the utility of HIFU for causal

studies of brain function. This dual approach addresses several limitations of traditional methods: it eliminates the need for surgical procedures or transgenic lines, allows precise targeting of deep brain structures, and can be implemented in species lacking detailed neuroanatomical data.

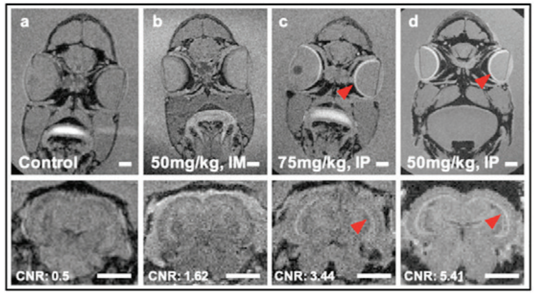


Figure 2. Manganese dosage for MEMRI in convict cichlids. T1 weighted images. a-d: Intraperitoneal injections provide better signal than intramuscular injections for similar manganese concentrations. Scale bar: 2.5mm.

Conclusion: The combination of MEMRI and MR-guided HIFU represents a transformative toolkit for neuroethological research in non-conventional species. MEMRI enables functional mapping of neural activity linked to natural behaviors, while HIFU allows precise, non-invasive lesions to test causal involvement of specific regions. This methodology can be broadly applied to species across the vertebrate and invertebrate spectrum, including those lacking established genetic or anatomical resources [3]. By facilitating functional brain imaging and lesion studies in previously inaccessible species, this approach opens new avenues in comparative neuroscience and evolutionary biology.

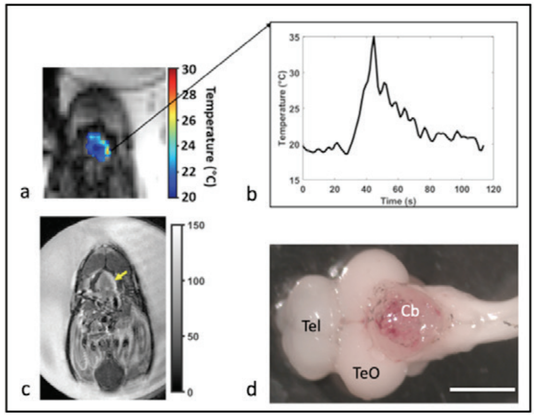


Figure 3. Thermal ablation of the cerebellum. a. Thermometry map of the cerebellum where a temperature rise was detected on the left. b. Temperature evolution over time during MR thermometry scan time. c. An hyperintense T2w signal was observed, 48 hours after HIFU protocol, at the location of the temperature rise indicated by the yellow arrow. d. Dorsal view of a lesioned fish brain, showing extensive hemorrhage in the corpus cerebelli (Cb).

References:
[1] Radecki et al., PNAS (2014).
[2] Dervishi et al., Int. J. Hyperthermia. (2013).
[3] Magnin et al., J Ther Ultrasound (2025).
[4] Wagner, Egelhaaf & Carr, J. Comp. Physiol. (2024).

Awards: 18th ICMRM
Erwin Hahn Lecturer Award
Lynn Gladden

Spatially-Resolved Magnetic Resonance: More Than Just a Camera

Department of Chemical Engineering and Biotechnoogy, University of Cambridge, Philippa Fawcett Drive, Cambridge CB3 0AS, U.K.

As in any research field, 'timing' plays a huge role in the opportunities we have and the research directions we take - particularly when you are starting a research group. In my case, the lucky 'timing' was in being hired in a chemical engineering department at much the same time as the early availability of commercial magnetic resonance spectrometers equipped with the hardware and basic software to do both chemical spectroscopy and diffusion/flow measurements, and with the ability to obtain spatial resolution in these measurements. This lecture will reflect on how spatially- resolved magnetic resonance has become increasingly useful in advancing our understanding of the physical and chemical processes that play important roles in the performance of many chemical technologies.
The motivation for the group's work has always been to ***understand*** the physics and chemistry underpinning the performance of a given application. Can we use magnetic resonance to remove bottlenecks in our understanding as we move from the basic science on which a technology is based through to the implementation of that technology? The questions that we seek answers to drive the development and implementation of new magnetic resonance methods in the group.

The lecture will include examples of some of the major themes of our activities over the years:
• Sorbents and catalysts: The importance of heterogeneity
• Three-dimensional structure and flow imaging: Measuring quantities that had never previously been measured
• The ability to measure unsteady-state behaviour: Undersampling, compressed sensing and
Bayesian approaches
• Operando spatially-resolved magnetic resonance: Measurements at process operating conditions

Most importantly, this lecture is an opportunity to celebrate the work undertaken by all the research students, post-doctoral researchers and academic colleagues who have worked in the group, and the friendship of so many senior academics around the world.

Awards: 17th ICMRM
Erwin Hahn Lecturer Award
Henck van As

Fascinated by NMR, MRI and ... plants: about 50 years curiosity driven intact plant and plant materials applications with some relevant spin-off

Laboratory of Biophysics, Wageningen University, Wageningen, the Netherlands

I entered the field of NMR during my MSc thesis work (1975) at the Physical Chemistry Laboratory, Free University, Amsterdam, headed by Prof. Cor MacLean. He was one of the Dutch pioneers in NMR. During this work 60 and 100 MHz (at that time high (!) field) NMR spectrometers were available.
I continued by starting a PhD thesis work on January 1 (!), 1977, at the Landbouwhogeschool (now Wageningen University), Wageningen. My thesis supervisor was Prof. Tjeerd Schaafsma. The topic was the study of water transport in plants by use of spin-echo NMR. I chose this position because of the dynamic and enthusiastic demonstration by Adrie de Jager during the application visit. I became attracted by spin echo dynamics and time domain NMR, may be plants, but was not (yet) aware of the complexity of plants and its consequences for NMR. It was really pioneering work.
In 1977 some of my, more experienced, colleagues did not believe that (whole body) MRI could ever be a method of choice in hospitals, based on the early noisy results. Notwithstanding, the first clinical systems became available in the early 80's! Significant and fascinating development of the technology followed in the decades since, leading to its widespread use in medicine and other disciplines as is clear from the spatially resolved magnetic resonance methods and their applications presented during the ICMRM (and MRPM) meetings.
After my graduation I continued as a PD and, since 1986, Associate Professor (Biophysics) at Wageningen University. The research focused on unravelling and understanding (not only water) transport processes and dynamics at different time and length scales in porous bio- systems to study structure-function relationships. For this, Time Domain NMR and quantitative MRI (correlated relaxometry, diffusometry and flow and the effect of exchange), and (rheo-)MRI methods and hardware were developed. Main applications were intact plants (production, hydraulic conductance, water limitation, product quality; first portable NMR flowmeter for flow in plants in 1982-1986), plant-like materials and foods (composition, processing, structure, function). The (some dedicated plant) NMR/MRI systems covered low field (10 MHz) up to very high field (up to 900 Hz).

In this lecture I will present results of my fascination, (portable) NMR, MRI and ... transport in plants, as it developed during more than 40 years. It was curiosity driven research, resulting in some relevant spin-off. Certainly I have enjoyed it!

Awards: 18th ICMRM
Poster Award
Xiaoxun Chen

Next generation optical widefield magnetic resonance microscopy

X. Chen[1], J.C. Draeger[1], U. Banerjee[1], R.D. Allert[1], K.D. Briegel[1], A. Blank[2], D.B. Bucher[1]

1: Technical University of Munich (TUM), München, Germany,
2: Technion – Israel Institute of Technology, Haifa, Israel

Optical widefield nuclear magnetic resonance microscopy (OMRM) is a novel technique that fuses the spatial resolution of optical microscopy with the chemical specificity of nuclear magnetic resonance (NMR) spectroscopy. By leveraging nitrogen-vacancy (NV) centers in diamond, OMRM bypasses conventional magnetic resonance imaging (MRI) methods that rely on k-space encoding and magnetic field gradients, enabling direct real-space imaging of NMR signals through optically detected magnetic resonance (ODMR). In prior work, we demonstrated the capabilities of this widefield optical NMR microscopy approach by imaging NMR signals within a model microstructure, achieving a spatial resolution of approximately 10 µm over an area of ~235 × 150 µm2. Each camera pixel captures a complete NMR spectrum, providing comprehensive information on signal amplitude, phase, local magnetic field strengths, and gradients [1].

Here, we present our current development for our next-generation OMRM platform, which has improved sensitivity, a larger field of view, and enhanced chemical resolution. The microscope has been integrated into a superconducting magnet with an increased magnetic field strength of > 0.4 T. It also integrates a 2.1 mm × 30 µm top-hat light-sheet illumination system and a new high-speed camera with an increased frame rate, enabling enhanced sensitivity and a 2 × 2 mm2field of view in microfluidic environments [2,3]. By combining the advantages of optical imaging with the chemical specificity of NMR [4,5,6], this technology opens up new possibilities for highly parallelized chemical analysis at the microscale. It lays the groundwork for a broad range of applications, including high- throughput NMR analysis and high-resolution magnetic resonance imaging of thin-film materials [1,7].

References:
[1] Briegel, Nat. Commun. (2025). [2] Allert, Lab. Chip. (2022). [3] Bruckmaier, J. Magn. Reson. Open. (2021). [4] Bucher, Nat. Protoc. (2019). [5] Glenn, Nature. (2018). [6] Levine, Nanophotonics. (2019). [7] Bruckmaier, Sci. Adv. (2023).

Report:

10th EFEPR Summer School

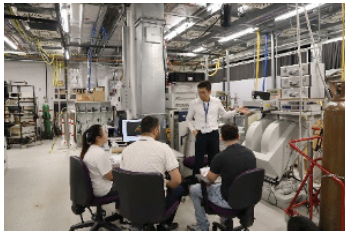
on Fundamental theory and state-of-the-art applications of EPR Spectroscopy.
Manchester, UK, 31st August - 6th September 2025

The 10th and latest edition of the European Federation of EPR (EFEPR) Groups Summer School was recently held in sunny Manchester (UK). These intensive, week-long schools are aimed at PhD, Masters and post-doctoral researchers. The first was held in 1999 in Caorle (Italy), with subsequent events held every few years until the dark times of the Covid-19 pandemic necessitated a break. After that short hiatus, the event recommenced in spectacular style in 2023 in Geneva where the local organiser (Enrica Bordignon) and her team ran a fantastic event which reminded everyone involved what they had been missing. The baton was passed to Manchester.

Two years later, over 150 people gathered in Manchester for the 10th Summer School, comprising of 117 attendees, 24 expert lecturers, and several exhibitors. The attendees came from 58 different academic institutions across 22 countries, making it a truly international event. Over 58% of the attendees were female and additionally 40% of the lecturers, matching well with the numbers from the Geneva event; this was not forced in any way but rather is a statement on the healthy diversity of the discipline.

The meeting started with a lively social on the Sunday evening, before Daniel Klose commenced scientific proceedings the following morning with a lecture on 'The fundamental principles of electron spin and EPR'. That first day focussed on spin Hamiltonians and parameters, continuous wave (cw) EPR methods, instrumentation and theory.
Day 2 introduced pulsed EPR, from fundamentals of spin dynamics, time dependence in quantum mechanics, pulsed instrumentation and methods. That afternoon focussed on pulsed hyperfine methods, whilst the morning of day 3 focussed on pulsed electron-electron dipolar methods before concluding with a remote demonstration, from the local EPR labs, of setting up basic spin echo experiments.

The afternoon of day 3 was left free for the attendees to explore the local sights of Manchester. Which, being the first great city of the Industrial Revolution, has a rich social, cultural, scientific and industrial heritage.



Day 4 was a day of practicals and tutorials. Students engaged hands-on in a diverse range of experiments that they had selected in advance, including multi-frequency cw, light-induced, rapid-scan and multi-harmonic acquisition, DEER/PELDOR, ENDOR and ESEEM/HYSCORE methods. Tours were also available of local biological EPR and DNP facilities. Despite the large number of attendees, students were able to get hands-on experience in groups of 2-3, exploiting the wide range of equipment available in the EPSRC-funded UK National Research Facility (NRF) for EPR Spectroscopy at Manchester.

In addition to the practicals, each student attended two tutorial sessions from a range on offer that covered topics including density matrix methods, ab initio electronic structure calculations, and EPR data modelling and analysis.

Day 5 concluded the science content with a series of application lectures covering biological, catalytic, quantum information, light-induced and electrically-detected methods. The final lecture of the Summer School was a little more light-hearted, with Ilya Kuprov giving advice on how to navigate the scientific publishing process.

There were three lively poster sessions, with over 100 posters presented, held in the evenings across the week. The School closed with a banquet on the Friday evening at which six poster prizes were awarded; two each kindly sponsored by the Groupement Ampere, the IES, and the UK NRF for EPR. Our congratulations to all six winners: the abstracts of the winning posters are given below.

The 11th EFEPR Summer School will be held in 2027 hosted at the University of Barcelona, for updates see www.EFEPR.org.The local organic organiser (Valentin Novikov) gave a short presentation announcing this. He seemed to be confident that it would be sunnier than Manchester.

The organisers are hugely grateful to the lecturers, not only for the delivery of the lectures, workshops and demonstrations, but also for doing so at their own expense. (The long-distance prize goes to Stefan Stoll who travelled from Seattle to deliver two EasySpin masterclasses.) They are also grateful for the generous sponsorship by Bruker BioSpin, SciMed/CIQTEK, Cryogenic Ltd – all of whom attended as exhibitors - Amplify My Probe, Springer, the International EPR Society (IES) and, last but not least, the Groupement Ampere, which will be a sponsor of the XIIIth EFEPR Conference Brno (Czech Republic) August 29 to September 5, 2026. All these contributions helped to keep the attendance fee as low as possible.

Finally, our thanks to all the attendees: they make the Summer School what it is - a hugely enjoyable, educational and engaging experience.

Local Organising committee
Adam Brookfield,
Alice Bowen
David Collison
Elizabeth Fleming
Eric McInnes
Muralidharan Shanmugam
Floriana Tuna

IES: Maria Chiara Pagliero

IES: Anand Anilkumar

EPR NRF: Sophie Dean

EPR NRF: Margrete Jeul Henrichsen

AMPERE: Eun-Jeon Jang

AMPERE:Gianluca Marcozzi

Awards: 10th EFEPR Summer School
AMPERE Poster Prize:
Eun-Jeong Jang

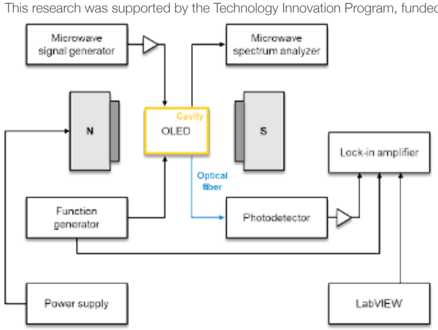
Optically Detected Magnetic Resonance of Organic Light-Emitting Diodes

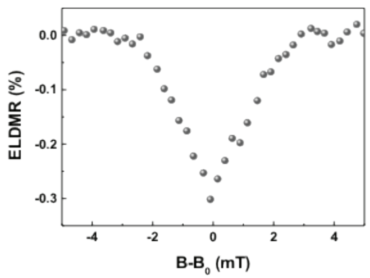
Eun-Jeong Jang[a], Sungmin Kwon[b], Soon-Sung Kwon[c], Dabin Yoon[c], Jae-Hyun Lee[c]

a: Department of Electronic Engineering, Hanbat National University, Daejeon, 34158, Republic of Korea
b: Research Institute of Printed Electronics & 3D Printing, Industry-University Cooperation Foundation, Hanbat National University, Daejeon, 34158, Republic of Korea
c: Department of Creative Convergence Engineering, Hanbat National University, Daejeon, 34158, Republic of Korea

Optically detected magnetic resonance (ODMR) is a technique that measures changes in optical signals induced by spin-dependent processes: it includes electroluminescence-detected magnetic resonance (ELDMR), which is based on electrical excitation, and photoluminescence-detected magnetic resonance (PLDMR), which is based on optical excitation.
For instance, in systems utilizing triplet states, such as organic light-emitting diodes (OLEDs), the irradiation with resonant microwaves disturbs the steady-state population distribution of triplet sub-levels, resulting in changes in luminescence. These changes in luminescence enable the selective detection of paramagnetic species directly involved in the emission process.
In this study, we propose an ODMR measurement setup applicable to various optoelectronic devices and design a structure capable of responding to both electrically and optically generated triplet excitations. The proposed system overcomes the limitations of conventional material-specific electron spin resonance (ESR) and achieves a high signal-to-noise ratio (SNR) irrespective of material or device type by employing a rectangular resonator. Furthermore, through a case study on selected donor–acceptor molecular systems designed for OLED applications, we analysed the triplet state of the localized exciton and the triplet state of the charge transfer state in organic molecules.

This research was supported by the Technology Innovation Program, funded by the Ministry of Trade, Industry & Energy (MOTIE, 20020408).





Awards: 10th EFEPR Summer School
AMPERE Poster Prize:
Gianluca Marcozzi

Chirality-induced spin selectivity in photosystem I

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Chirality-induced spin selectivity (CISS) is the phenomenon describing the formation of local spin polarization in the presence of a chiral potential. In systems exhibiting CISS, the rate at which electrons are transferred through the chiral medium is spin-dependent, resulting in a spin filtering effect. Interest for applications in spintronics and in quantum computing, for example for the initialization and for the readout of qubits, has recently been growing due to the impressive efficiency of CISS even at room temperature [1].
Nevertheless, a complete theoretical description of the reported experimental data on CISS is still missing. Key insight can be obtained by studying simple systems consisting of a photoinducible donor-bridge-acceptor (D-χ-A), where the bridge is chiral. The sample under investigation in this work is photosystem I (PSI), a well-characterized sample that was studied via contact voltage measurements exhibiting increasing CISS for increasing temperature in a range between 200K and 300K, with a maximum spin polarization of around 80% [2].
The techniques of choice for this work are transient EPR (trEPR) and out-of-phase electron spin echo envelope modulation (OOP-ESEEM) acquired for different temperature values. While in the absence of CISS a fast electron transfer through the bridge results in a singlet spin state, in the case of CISS the electron wavefunction has also triplet character.
Information about the wavefunction can be inferred in trEPR from the absorptive and emissive spectral features. The trEPR spectrum of PSI for temperatures below 200K is well described using a singlet state after electron transfer, as extensively reported in literature [3], while the spectroscopic features are supposed to change when increasing the temperature, due to the increase of CISS efficiency. Furthermore, recording the intensity of the OOP-ESEEM signal as a function of the turning angle of the first pulse β represents another method to extract the spin state of the system after electron transfer. Two contributions, one proportional to sin(β) and the other to sin(2β), have been observed [4, 5]. The weight of these contributions is supposed to change in case of CISS, providing therefore a way of estimating the efficiency of the process.

This work was supported by the European Research Council Synergy Grant CASTLe (proj.n.101071533).

References: [1]. Naaman, R., et al. Nat. Rev. Chem., 2019, 3, 250-260. [2]. Carmeli, I., et al. Angew. Chem. Int. Ed., 2014, 53, 8953–8958. [3]. Kamlowski, A. et al. J. Phys. Chem. B, 1998, 102, 42, 8266–8277
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Awards: 10th EFEPR Summer School
IES Poster Prize
Anand Anilkumar

Design, Simulation, and Fabrication of Sample Holders for EPR using Ultra-Precision 3D Printing Techniques

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Mett & Hyde [1] and Sidabras et al.[2] showed that placing multiple flat sample cells perpendicular to the electric field in microwave cavities reduce the RF losses in aqueous samples and, therefore, enhances the electron paramagnetic resonance (EPR) signal. This was later extended to cylindrical geometries in Sidabras et al.[3]. For a cylindrical TE011geometry, Sidabras et al. [3] fabricated the Aquastar by extruding PTFE. Overall, signal improvements from these geometries are limited by the dielectric constant of the holder material (PTFE; ε = 2.1 + j 2.1 × 10-4) and manufacturing techniques. Further improvement of the EPR signal was shown to be possible by reducing dielectric losses of the sample tube holder and by reducing the size of the flat cells.
Recently, ultra-precision additive manufacturing with 3D printers, such as the Boston MicroFabrication (BMF; Boston, MA) microArch S140, provide feature resolutions down to 10 µm. Ultra-precision 3D printers allow for unique geometries to be fabricated, where extrusion techniques fail. However, the materials used for these ultra-precision 3D printers are very lossy at microwave frequencies (HTL 10 GHz: ε=3.45 + j 0.084).

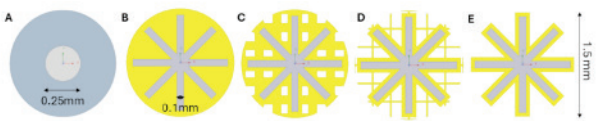

Figure 1: Cross-sections of Sample tubes made of A) PTFE, BMF, Htl material with aquastar design with B) 100%, C) 50%, D) 20% and E) 0% Plastic.

To make 3D printing practical the dielectric losses must be reduced by removing the surrounding lossy plastic without compromising the rigidity of the tube.

One solution is to introduce geometric lattices with 20%, 30%, or 40% reduction of plastic as the structure of the sample tubes (Figure 1 B - D). By introducing lattices to the structure of the sample tubes, the dielectric losses can be reduced without decreasing the structural integrity. In this work, we have simulated and printed sample tubes with different levels of solidity and compare them with the cylindrical PTFE sample tubes within a cylindrical TE011 cavity at 9.5 GHz. All the simulations were performed with High-Frequency Structure Simulator in Ansys Electronics Desktop 2024 R1. The Unsaturable and saturable Signals, Su and Su, were calculated from the magnetic field distribution inside the cavity. Using the BMF microArch S140 3D printer, we have printed sample tubes with lattices of different solidity values at 50 µm resolution, which have promising rigidity and signal improvement compared to PTFE sample tubes. The printed sample tubes were tested in a Bruker Elexsys E500 spectrometer using a Saphire Dielectric Resonator. A two-fold increase in the Ss and Su was observed for a 20% latticed sample tube compared to PTFE sample tubes (Figure 1 A) and an inward relation of signal intensity against solidity level was observed in the experiments, which is in correlation with the simulation results.

This work was supported by NIH Grant no. 1R01GM149568, Emergent Technology for Studying the Structure/Function Relationship of Enzymes Using Electron Paramagnetic Resonance.
References: [1]. Mett, R. R. & Hyde, J. S. Journal of Magnetic Resonance 165, 137–152 (2003).
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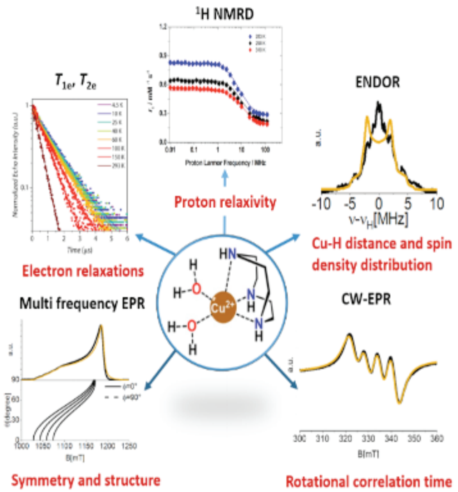
Awards: 10th EFEPR Summer School
IES Poster Prize
Maria Chiara Pagliero

**Exploring Spin Dynamics of Cu(II) Transition Metal Ion Complexes.
Implications for the development of MRI Diagnostic Probes.**

Maria Chiara Pagliero, Valeria Lagostina, Mauro Botta, Fabio Carniato,
Enrico Salvadori, Mario Chiesa

The electron spin is central to a number of technological applications, from quantum information technologies (QIT) to magnetic resonance imaging (MRI). Both can be implemented through the development of tailored paramagnetic Transition Metal Ion (TMI) complexes and require a detailed understanding of spin dynamics and their relation to the TMI complex structure. For this reason, EPR spectroscopy is a key technique to investigate structure-function relationships of such systems, providing guidance and design principles for controlling electron and nuclear spin coherence times.

Contrast agents based on paramagnetic metal complexes have contributed to the success of MRI as a diagnostic procedure in medical science. To date, all clinically approved contrast agents are Gd(III) chelates which, thanks to their high spin state (S=7/2) and long electronic relaxation times, are particularly effective in shortening the T_1 and T_2 1H relaxation times of water. However, efforts are currently placed in search for alternatives, with emphasis on paramagnetic first-row transition-metal complexes as safer and more abundant alternatives [1]. As part of a larger collaborative project, in this work, we report a detailed study of two different copper (II) complexes $[Cu(TACN)]^{2+}$ and $[Cu(TREN)]^{2+}$, with different geometric and electronic structure, ligand's denticity and hydration state of the metal, providing key parameters that influence proton relaxivity such as the rotational correlation time, the metal-proton distance and the spin density delocalization at coordinated water protons.



This work was supported by Unione europea, Next Generation EU, Missione 4, Componente 1 CUP D53D23016730001.

E.S acknowledges the project "Sonde diagnostiche innovative e sostenibili per Risonanza Magnetica per Immagini (MRI) basate su complessi di ioni metallici abbondanti e biocompatibii" funded by Fondazione CRT (CUP:D13C23003640007).

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Awards: 10th EFEPR Summer School
EPR NRF Poster Prize
Margrete Juel Henrichsen

Covalency in cubic Gd(III) systems: Experiments and theory

Margrete Juel Henrichsen*, Jesper Bendix, Høgni Weihe

Department of Chemistry, University of Copenhagen, Copenhagen, Denmark

We present the EPR spectrum of Gd(III) as an impurity in $Cs_2Na[YF_6]$ and compare the results with those pertinent to Gd(III) in other cubic lattices. Calculating the eigenvalues of Gd(III) in these systems, including the crystal-field parameters and an isotropic spin-orbit coupling constant, predicts the sign of the ground state splitting in cubic 6-coordinate systems to be opposite of that in cubic 8-coordinate systems, Experimentally, the splitting in both systems have the same sign. We introduce symmetry-restricted covalency[1] in the calculation of the eigenvalues of the f7configuration and show that the symmetry-restricted covalency has profound influence of the zero-field splitting (ZFS) of the spin-octet ground multiplet. Including the symmetry-restricted covalency in the calculations fully accounts for the sign of the ground-state splitting for all cubic systems. We apply the same type of calculations for Gd(III) in C_{3h} symmetry. In this symmetry, the crystal field theory predicts a positive sign of the ZF splitting. However, the experimentally determined sign of the ZFS for systems of this symmetry are not all determined to be positive[2]. By including the symmetry-restricted covalency, we find that the calculations align with experimentally determined signs and magnitudes of the ground state splitting.

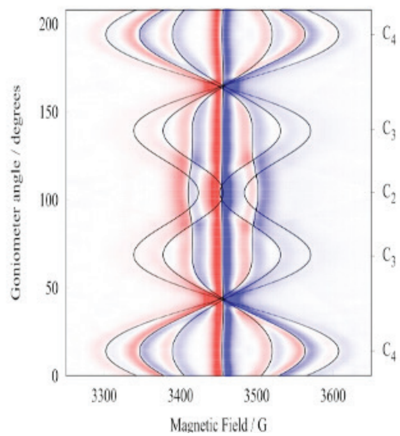

Fig. 1: Room temperature perpendicular-mode (9.6 GHz) density plot of the angular dependence of the 7 allowed transitions of Gd^{3+}(1%) in Cs_2NaYF_6. Red and blue colors represent positive and negative derivative intensities, respectively. The crystal was rotated around a C_2 axis with the magnetic field vector sweeping a plane containing molecular C_4, C_3, and C_2 axes. These special orientations are labelled on the right ordinate axis. The solid black lines are computed resonance magnetic fields based on eqn(1) [2] and the parameters: b_4=-1.224*10^{-5} cm-1 and b_6=+7.1419*10^{-8} cm^{-1}.

References: [1]. N. M. Edelstein, J. Phys. Chem. A 124 (2020) 4253

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Awards: 10th EFEPR Summer School
EPR NRF Poster Prize
Sophie Dean

A Continuous wave EPR investigation of the paramagnetic centres in Sn-based perovskite photocatalysts

S.Dean, A.Folli

Zero Innovation Institute, Cardiff Catalysis Institute, School of Chemistry, Cardiff University, Translational Research Hub, Cardiff, CF24 4HQ, UK

The use of tin perovskites ($ASnO_{3)}$ in photocatalysis has grown over recent years, driven by the pursuit of greener chemistry and the use of naturally earth-abundant materials. In this study, the A-site cation (Ca, Sr, Ba) was varied and X-band CW-EPR spectroscopy was employed to investigate both intrinsic and photoexcited paramagnetic species.

$SrSnO_3$ exhibited two isotropic environments: one is attributed to Sn^{3+} (g = 1.994) and one is assigned to an oxygen vacancy with a trapped electron i.e., a V0* centre (g = 2.0058). Upon UV irradiation Sn^{3+} signal intensity increased due to electron transitions from a Sn^{2+} intra band gap state to the conduction band. After turning off the irradiation, the Sn^{3+} signal intensity decayed by 24% over 60 minutes.
$CaSnO_3$ exhibited no signal at room temperature but at 116 K two resonances were observed: isotropic Sn^{3+} (g = 1.996), and a rhombic oxygen species (g_1 = 1.981, g_2 = 2.0075 and g_3 = 2.022). All signals intensified under UV light. Over 60 minutes Sn^{3+} and oxygen species signals decayed by 15% and 20% respectively.
$BaSnO_3$ displayed a strong signal at room temperature, unchanged by UV irradiation. This double isotropic signal has been ascribed to an oxygen species (g_1 = 1.9788, g_2 = 2.0055 and g_3= 2.0138) and a Ba^{2+} cation vacancy (g = 2.008). At low temperature, the rhombic oxygen species signal increased with UV irradiation and decayed very slowly over time. Using terephthalic acid as a probe in the photocatalytic generation of OH radicals, we correlated Sn^{3+} concentration with photocatalytic efficiency. SrSnO3, containing the most intrinsic Sn^{3+}, showed the highest activity, while $BaSnO_3$ with no detectable Sn^{3+} performed the worst. $CaSnO_3$ exhibited intermediate behaviour.

Report:

Alpine Conference on Magnetic Resonance in Solids 2025
Chamonix, 14-18 September 2025

Scientific committee: Sharon Ashbrook (University of St Andrews), Songi Han (Northwestern University), Patrick van der Wel (University of Groningen)
Organizing committee: Wing Ying Chow (University of Warwick), Daniel Lee (University of Manchester), Michal Leskes (Weizmann Institute), Józef Lewandowski (University of Warwick), Charlotte Martineau-Corcos (CortecNet), Giulia Mollica (CNRS, Aix-Marseille Université)

The Alpine Conference on Magnetic Resonance in Solids 2025 took place in Chamonix, France, from Sunday the 14th to Thursday the 18th of September 2025. The conference gathered over 180 participants from more than 20 countries for four intense days of scientific exchange in the field of magnetic resonance in solids, with more than 140 submitted abstracts.
As in the previous edition, pre-conference tutorials were organized on Sunday morning to introduce the main concepts of magnetic resonance in solids for both organic and inorganic materials. An audience of about 50 people, composed mainly of PhD students and postdoctoral researchers, enthusiastically followed the lectures given by members of the organizing committee.
The scientific program was structured into four plenary sessions, including a prize session on Tuesday evening. The talks covered a broad range of topics, from methodological developments to applications, in systems ranging from MOFs and perovskites to battery materials and viral proteins. In total, the conference featured nine invited lectures (including one in the field of EPR) and seventeen promoted talks selected from the submitted abstracts. This year, a special parallel session on practical aspects of NMR was introduced on Wednesday morning. The session included a total of five tutorial lectures given by invited speakers, covering tensor rotations, phase cycling, optically-induced hyperpolarization, EPR hardware and CCPNMR analysis.

The **Regitze R. Vold Memorial Prize**, awarded for an outstanding contribution selected by the scientific committee, was presented to **Prof. Daniella Goldfarb** (Weizmann Institute of Science). She was recognized for her groundbreaking developments in EPR spectroscopy and its innovative applications to biological systems, in particular her pioneering contributions to in-cell protein structure studies. Renowned for her innovation, intellectual rigor, leadership, mentorship and advocacy, Prof. Goldfarb was also the first female Professor in Chemical Physics at the Weizmann Institute.

The **Caldarelli Prize in Magnetic Resonance for Young Investigators**, sponsored again this year by Bruker Biospin, was awarded to **Prof. Alex Forse** (University of Cambridge). He was recognized for his pioneering and innovative contributions to the development and application of solid-state NMR spectroscopy for understanding the structures and operating mechanisms of energy materials and porous solids. Highlights of his work include elucidating structure-property relationships in porous-carbon-based supercapacitors and introducing a new class of porous materials for direct CO_2 capture. The Caldarelli Prize recognizes the achievements of young scientists within 10 years of completing their PhD.

Two afternoons were dedicated to round-table sessions, during which small groups of participants engaged in focused discussions based on selected abstracts and pitch presentations. Introduced in 2017, the round tables have consistently been very well received, and once again resulted in two afternoons of lively scientific exchanges.

Based on online votes from participants, **two Best Round Table Prizes** were awarded this year to early-career researchers (PhD candidates or postdocs only). One prize, sponsored by the Groupement Ampère, was awarded to **Teresa Insinna**, postdoctoral researcher at CRMN Lyon (left picture), and the other one, sponsored by the Elsevier journal Solid State NMR, was awarded to **Astrid Berge**, PhD candidate at the University of Cambridge (right picture).

In addition to the main scientific programme, the organizing committee concluded the first morning of talks with a brief tribute to the memory of Jean-Nicolas Dumez (1984-2025), who coordinated three editions of the Alpine Conference between 2019 and 2023, and whose passing came far too early.

The conference was held at the Centre des Congrès de Chamonix, in the familiar setting of the Majestic building. Industrial and academic sponsors were present and contributed both to the scientific content and to the social dimension of the event. An aperitif organized by Bruker Biospin took place on the evening of the third day.

Thanks to the generosity of the sponsors, the conference awarded 20 student stipends, covering registration fees and part of the accommodation costs. Stipends were allocated based on the quality of the candidates' abstracts and CVs. Supporting the participation of young scientists remains a key objective of the conference.

The next edition of the Alpine Conference will take place in Chamonix from Sunday the 12th to Thursday the 16th of September 2027. The scientific committee will be composed of Christian Bonhomme (Sorbonne University, Paris), Marina Bennati (Max Planck Institute, Göttingen) and Bernd Reif (Technical University of Munich).

The organizing committee warmly thanks the sponsors – Groupement Ampère, Bruker, CortecNet, Doty Scientific, Elsevier, ISMAR, Jeol, NMR Service, Phoenix NMR, RMN GBP, Rototec/Spintec and NHMFL – for their invaluable support. Particular appreciation is expressed to Bruker for its essential contribution to the conference. The committee also thanks the scientific committee and all participants for their active involvement. The dedication of Evelyne Roudier and the staff of the Centre des Congrès Le Majestic, as well as the support of Sandra Cheade, Stéphane Viel and Marie-Thérèse Vialle from Aix-Marseille Université, are gratefully acknowledged.

In memory of
Liudvikas Kimtys (1940-2025)

Professor Liudvikas Kimtys was born in Palaižupė, Mažeikiai District, Lithuania.
He graduated from Vilnius University in 1956. In 1971, he defended doctoral dissertation in physics and mathematics. In 1986, he completed a habilitation thesis on "High-resolution NMR Spectroscopy of Molecular Associations and Phase Transitions in Hydrogen-Bonding Systems."

From 1976 to 2005, he served as the Head of the Department of General Physics and Spectroscopy. He became a professor in 1987 and was granted the title of Professor Emeritus in 2011.

He maintained collaboration with the universities of Bergen and Oslo (Norway), Aarhus and Copenhagen (Denmark), Lund (Sweden), Kent and York (England), Ghent (Belgium), Grenoble (France), Kazan (Russia), Kyiv (Ukraine).

His main research interests focused on spectral studies of materials in various states and molecular structures. Among his most significant achievements are the establishment of the Lithuanian school of NMR spectroscopy and the development of methods for investigating molecular compounds with hydrogen bonds, as well as organic materials in nanometric cavities.

Professor Kimtys authored more than 190 scientific articles, co-authored two books on NMR, and a few educational textbooks for students. He devoted considerable effort to the popularization of science and the study of the history of physics in Lithuania and at Vilnius University.

For his outstanding contributions, he received awards:
• The Lithuanian Science Prize (1993) for his series of works "Spectrometric Studies of the Dynamics and Interactions of Organic Compound Molecules in Various Phases."
• The Order of the Knight of the Kingdom of Norway (1998) for fostering cultural and scientific relations between Lithuania and Norway.

• The Prize of the Lithuanian Ministry of Education and Science for the popularization of science (2004).

Apart from being an excellent scientist and teacher, Professor Kimtys was a sociable and supportive personality who was appreciated by the community of the faculty of Physics and the University.

Vytautas Klimavičius
Vilnius, September 2025

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Future conferences

Ampere Event 2026

MRFOOD 2026	Milano, Italy	June 9-12
AMPERE NMR School 2026	Zakopane, Poland	June 14-20
Euromar 2026	Gothenburg, Sweden	June 28 to July 2
XIII EFEPR Conference	Brno, Czech Republic	Aug. 29 to Sept. 3
HYP 26	Göttingen, Germany	September 6-10
MRPM 2026	Ribeirão Preto, Brazil	October 26-29

Other Events 2026

Austrian NMR Meeting	Klosterneuburg, Austria	February 26-27
GRC Magnetic Resonance and Quantum Information Science	Hockstett, US	June 14-19
FGMR Annual Discussion Meeting	Mainz, Germany	September 13-17

Ampere Event 2027

Alpine Conference on Magnetic Resonance in Solids	Chamonix, France	September 12-16

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