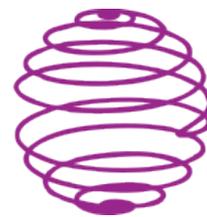


PANACEA news

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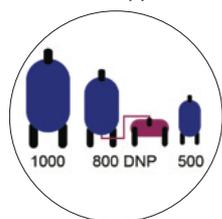


A Pan-European Solid-State NMR Infrastructure
for Chemistry-enabling Access



Issue 9, December 2025

PANACEA 12-months extension
Encouraging new PANACEA applications



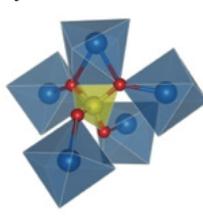
MagLab research visits
Solid-state NMR summer visits



4th Annual Users Meeting
Scientific conference, June 2026



JRA publication highlight
Paramagnetic systems by solid-state NMR



PANACEA at EUROMAR
Outreach to the community

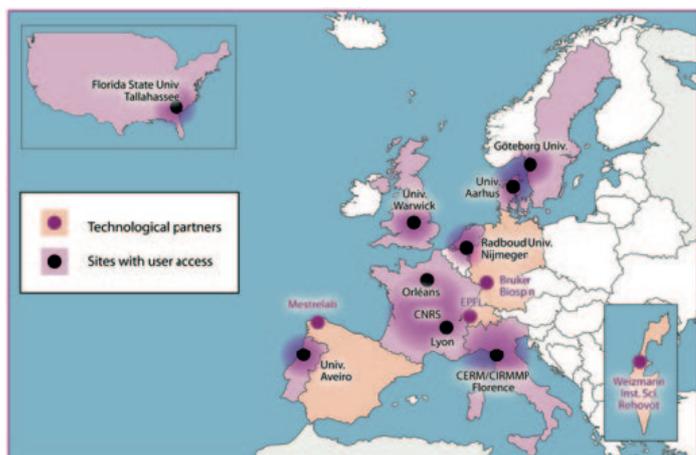


Infrastructure publication
Publication showcasing PANACEA highlights



PANACEA extended for 12 additional months!

PANACEA has recently been granted from the European Commission a **12-month project extension**. The project will therefore continue running smoothly up until **end of August 2026**, we warmly welcome new users to apply for measurement time by submitting their project on the dedicated submission portal.



Eligible projects may receive up to **14 days of spectrometer time, expert support and fully funded user mobility grants**. All proposals are peer-reviewed by scientific experts and granted projects will be assigned to partner infrastructures with remaining transnational access capacity.

Interested in fully-funded measurement time at one of our partner infrastructure? Submit your project here: www.panacea-nmr.eu/access.

4th Annual Users Meeting

The consortium is pleased to officially announce its final celebration: **The 4th and last Users Meeting!**

Held back-to-back with **EUROMAR 2026**, this annual event aims to **foster collaboration** and **build bridges** between **solid-state NMR experts** and scientist from both **industry** and **academia**.

We warmly invite all interested participants to join us for a **day dedicated to showcase the latest advances in solid-state NMR applications** for chemistry and material science.

The meeting will feature presentations from **leading experts** in the fields, as well as highlights from **user projects** that have benefitted from PANACEA's transnational access measurement time.



4th PANACEA Annual Users Meeting
June 27, 2026, Göteborg, Sweden
Registration opens January 15.

More information on the venue, program and more logistics to come on the *event* section of our website: <https://panacea-nmr.eu/events>.

PANACEA key numbers

1650 access days
27 spectrometers
> 200 chemistry-related projects

4 user meetings
3 hands-on trainings
1 NMR Summer School

3 industry-targeted workshops
32 taster days for industrials
8 summer fellowships for students

Summer 2025 NMR research visits to MagLab, USA

On the 18th to the 31st of August 2025, the Summer Research Visits took place at the National High Magnetic Field Laboratory, MagLab, in Tallahassee, USA.

Eight lucky undergraduate, master's and PhD students from Europe had the opportunity to embark on a fully funded programme that included hands-on training in sample and probe handling, lectures on instrumentation, and in-depth DNP theory. The immersive

experience allowed participants to develop practical skills, interact with leading experts, and gain valuable insights into solid-state NMR research.

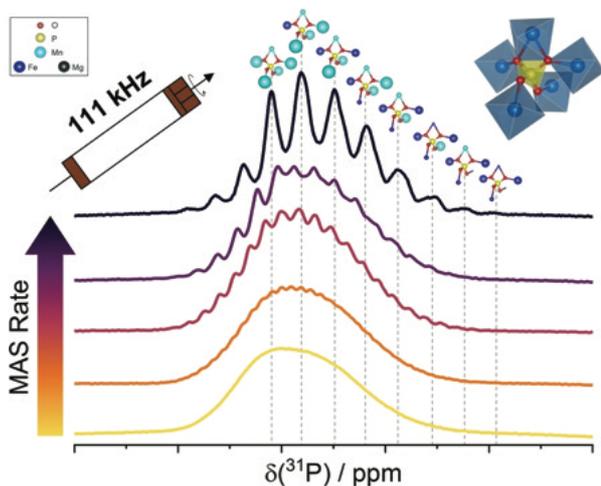
This initiative was made possible thanks to the outstanding coordination of our partner team at Florida State University. In particular, we wish to acknowledge **Frédéric Mentink-Vigier**, **Ilya Litvak** and **Fraith Scott** for their support, ensuring the success of the Summer Research Visits.



JRA publication: paramagnetic systems by solid-state NMR

Paramagnetic inorganic and organic materials, including catalysis and battery materials, present a challenge in solid-state NMR due to inherent resonance broadening, large chemical shift perturbations, increased relaxation rates and field inhomogeneities. In this recent publication, the authors present solutions for solid catalysts and battery materials using fast magic angle spinning (MAS), above 100 kHz. This ultra-fast spinning speed is associated with a smaller rotor diameter and hence a smaller amount of detectable material, but the authors show that the relative decrease in signal strength is mitigated by a substantial resolution improvement arising from a more complete suppression of the spinning side band manifold.

The methodology is applied to a hygroscopic Tb^{3+} -complex, an air-sensitive, high-spin Fe^{2+} -catalyst and mixed $Fe^{2+}/Mn^{2+}/Mg^{2+}$ olivine-type cathode materials and allows for site-specific assignments of resonances in these complex paramagnetic solids.



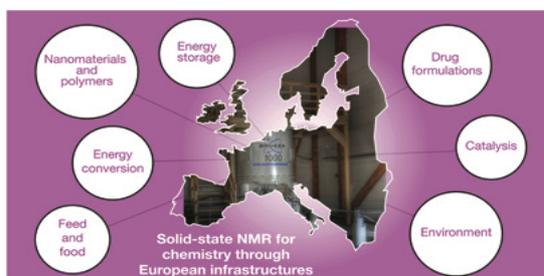
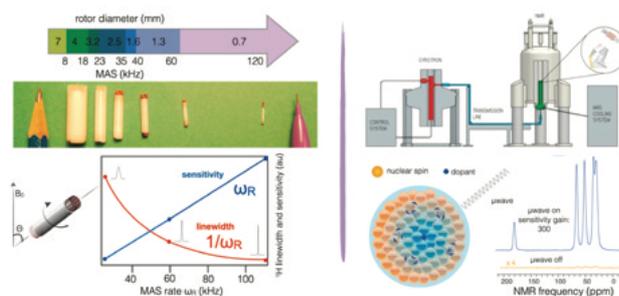
The figure displays the effect of faster MAS rates on the resolution obtained in a ^{31}P NMR spectrum for mixed-composition olivine-type $LiMPO_4$ battery materials. The relative sizes of the metal ion spheres, depicted on the top, reflect the corresponding absolute pathway contributions, *i. e.* the isotropic ^{31}P shift that is induced by replacing the diamagnetic Mg^{2+} with either Fe^{2+} or Mn^{2+} at the respective position.

Koppe, J., Sanders, K., Robinson, T., Lejeune, A., Proriol, D., Wegner, S., Pureau, A., Engelke, F., Clément, R., Grey, C., Pell, A. and G. Pintacuda, Resolving Structures of Paramagnetic Systems in Chemistry and Materials Science by Solid-State NMR: The Revolving Power of Ultra-Fast MAS, *Angew. Chem. Int. Ed.*, **137** (1), e202408704, 2025

Consortium publication: infrastructure-driven solid-state NMR research

Sophisticated solid-state NMR technologies have been made available to PANACEA users for over three years in over 100 projects. The partner labs, offering expertise and instrumentation, have also been driving advances in DNP methods, probe design and ultra-fast MAS and development of interoperable software platforms such as EasyNMR and CHEMADATA. A recent review paper showcases the advancements made within the PANACEA initiative and their impact on modern solid-state NMR applications, illustrating how infrastructure-driven research can integrate cutting edge research with cross-disciplinary user applications in the field of solid-state NMR applications.

A combination of recent breakthroughs in hardware and methods developments, paired with strategic investments, has given users improved resolution and sensitivity, e.g. via faster magic angle spinning (160 kHz) allowing for 1H detection on paramagnetic samples and the design and use of new polarizing agents for dynamic nuclear polarization (DNP) enhanced NMR.



The figures display the effects of faster magic angle spinning speeds (top left) and a generalized scheme for DNP-NMR (top right), both being developed within the PANACEA framework. The PANACEA projects have impacted research areas from nano-materials to energy storage and drug formulations.

Coulon R., *et al.*, Transforming solid-state nuclear magnetic resonance towards a chemistry-ready technique. *Solid State Nucl. Magn. Reson.* Oct 30;140:102048, 2025

PANACEA at EUROMAR 2025 in Oulu

From July 6th to 10th 2025, PANACEA partners were at the heart of the NMR community at EUROMAR 2025 in Oulu, Finland.

The PANACEA booth was staffed with expert partners ready to engage in discussions about the latest developments in our **joint research activities** and the possibilities to apply solid-state NMR techniques in new **user projects**.

It was a real pleasure to meet, greet, and connect with passionate researchers and collaborators in the field of NMR. A warm thank you to everyone who stopped by and engaged with us.



User highlight - Darragh McHugh, Galway IE

Q1: Can you present yourself?

My name is Darragh McHugh, and I'm a PhD student from Ireland, based at the University of Galway. I work in the Galway Porous Materials research group under the supervision of Dr Constantina Papatriantafyllopoulou, where we focused on MOF materials for biomedical applications. My research involves designing and synthesising novel MOFs with the aim of developing targeted drug delivery systems for breast cancer treatment. I assess the therapeutic potential of these materials using a multicellular breast cancer model and techniques including confocal microscopy, flow cytometry, and TEM.

Q2: Could you tell us a bit more about your scientific academic journey?

I was drawn to metal-organic frameworks (MOFs) because of their tunable structures and promising applications in drug delivery. I completed my undergraduate degree in Medicinal Chemistry, where I particularly enjoyed my final-year research project, which deepened my interest in materials for biomedical use. This led me to pursue a PhD under the supervision of Dr Constantina Papatriantafyllopoulou at the University of Galway.

Q3: How did you hear about the PANACEA transnational access scheme?

We heard about the PANACEA transnational access scheme through Dr Andrew Pell and Dr Wassilis Papawassiliou, who we had previously collaborated with. They mentioned it as a great way for researchers who are not specialists in certain techniques to build a better understanding with the support of experienced partners.

Q4: What was the purpose of your visit? Could you describe what you measured, how and within what project?

The purpose of my visit was to characterise a novel metal-organic framework (MOF) I had synthesised, which demonstrated exceptional drug loading capacity across a library of chemotherapeutic agents. Since solid-state NMR (ssNMR) is not commonly employed in drug delivery research to investigate drug-carrier interactions, I aimed to utilise this technique to gain deeper insight into the molecular interactions driving the high drug loading. Understanding these interactions could inform structure-activity relationships (SAR) that help design more effective drug delivery systems.

During the visit, we measured my pure MOF as well as the MOF loaded with two different drugs: doxorubicin and paclitaxel. The experiments performed included cross-polarisation (CP), BABA, EXSY, HECTOR, and other advanced ssNMR techniques, which allowed us to probe the local environments and dynamics within the drug-loaded MOFs.

Q5: Overall, did you enjoy this access opportunity?

I thoroughly enjoyed having access to solid-state NMR (ssNMR) through Panacea. As someone who initially had little to no knowledge of this technique, it was incredibly rewarding to learn directly from leading experts in the field. The hands-on experience I gained, particularly under the guidance of Wassilis, gave me not only a practical understanding but also a deep appreciation for the intricacies and artistry involved in ssNMR.

User highlight - Wouter Remmerswaal, Uppsala SE

Q1: Can you present yourself?

My name is Wouter Remmerswaal, and I am from the Netherlands. Currently I am doing my research in Uppsala Sweden. There I am working in the halogen bonding group led by Prof. Dr. Máté Erdélyi. I am developing synthetic routes towards halonium ion complexes that can act as halogen transfer reagents in asymmetric halogenation reactions, and spectroscopically and computationally investigating the reaction mechanisms involved.

Q2: Could you tell us a bit more about your scientific academic journey?

I obtained my Ph.D. in 2024 from Leiden University, The Netherlands, under the supervision of Prof. Dr. Jeroen D. C. Codée. After handing in the thesis I joined the group of Máté Erdélyi after applying for a position at the Centre for Chemical Mechanisms of Life (CML) for one year. While here, I was awarded a Rubicon grant from the Dutch Research Council (NWO) to continue my work as a research fellow.

Q3: How did you hear about the PANACEA transnational access scheme?

Last year Guido Pintacuda was invited to Uppsala University to give a lecture on solid-state NMR. Whilst there, we discussed PANACEA.

Q4: What was the purpose of your visit? Could you describe what you measured, how and within what project?

We have been working on the construction of halonium bonded organic frameworks (XOF). These XOFs are likely highly disordered, making identification by crystallography or cryo-EM very challenging. Solid state NMR, especially on high field machines, allows us to characterize the halonium bonds in a way that is simply not possible using any other method.

Q5: Overall, did you enjoy this access opportunity?

I enjoyed my stay and access very much. It was incredible to get the opportunity to get access to high field NMR, but perhaps more importantly access to the immense knowledge of solid state NMR of the people at Lyon.

