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Secondment of one PhD Student from POLITEHNICA Bucharest, Romania and one Assistant Professor from the University of Zaragoza at Conditions Extrêmes et Matériaux: Haute Température et Irradiation CNRS-CEMHTI

June 2026

Hîrjanu (Oprea) Gianina Gabriela, a PhD candidate at the National University of Science and Technology POLITEHNICA Bucharest, and Prof. Paula Vera Estacho from the University of Zaragoza carried out an interdisciplinary secondment at CNRS–CEMHTI in France. The secondment was intended to encourage collaboration between research groups, support knowledge exchange, and strengthen advanced scientific skills.

During their stay, PhD Student Gianina Gabriela and Prof. Paula Vera deepened their expertise in the characterization of advanced materials, gaining practical experience with innovative analytical techniques while working in a highly interdisciplinary environment. This experience not only enhanced their technical skills but also broadened their scientific outlook, enabling them to approach research challenges with greater confidence and flexibility.

Throughout their secondment, they were supervised and mentored by Lavinia BALAN, Research Director at CNRS–CEMHTI, whose guidance was instrumental in their integration into the host institution and in the successful completion of their activities. The secondment also helped them build long-lasting professional connections, further reinforcing the collaborative ethos of the MSCA programme.

Over the secondment, PhD Student Gianina Gabriela and Prof. Paula Vera had hands-on training on three characterization techniques, alongside conference attendance: Raman spectroscopy, solid-state NMR and X-ray diffraction. For each one, PhD Student Gianina Gabriela and Prof. Paula Vera learned how the instrument works and how to operate it by themselves, and they obtained concrete results on the precursors and PMOs.

They were trained on the Raman spectroscopy platform — a Renishaw inVia Raman Microscope equipped with a CCD detector and WiRE acquisition software — and they carried out measurements on all 14 materials from Gianina's set: the ISE-type precursors, the Schiff-base-functionalized MCM-41 samples, the HCCP-APTES derivatives, the HG-based materials, and the metal complexes obtained after coordination with Cd^{2+} , Zn^{2+} and Pb^{2+} ions (WP2).

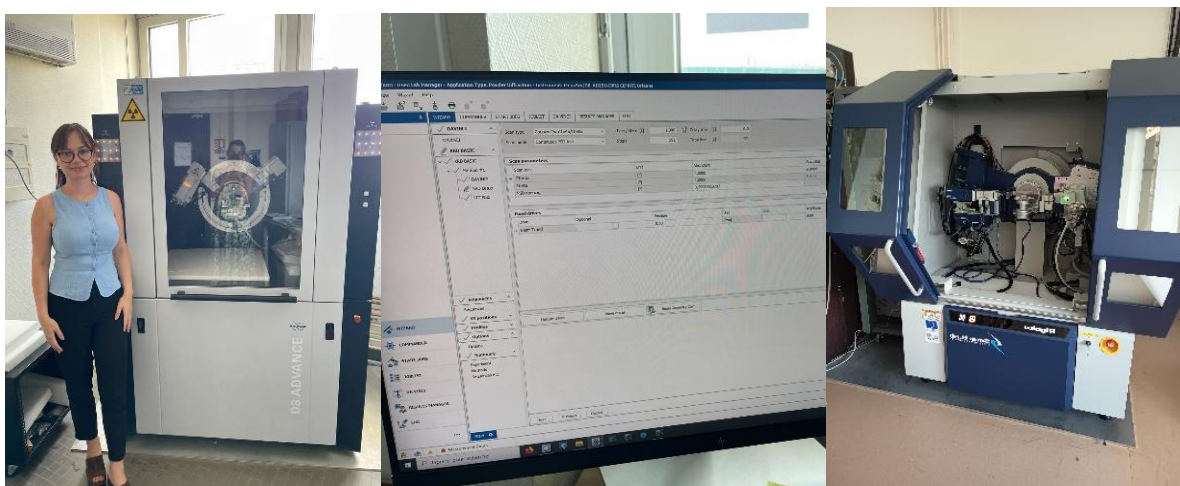


They were also trained on the solid-state NMR platform — learned the operating principles, and how samples are prepared and loaded — and obtained ^{13}C and ^{29}Si CP/MAS NMR results on **MCM-41**, **MCM-41 APTES** and **MCM-41 HG** from some of the PMOs samples prepared at POLITEHNICA Bucharest.



This training was directly connected to the seminar they attended on June 22, “From Isotopic Enrichment to 150 kHz MAS: Developing New Capabilities in Solid-State NMR” (see Section 4), which provided a broader perspective on how the methodologies covered in the training are being advanced in current research—from isotopic enrichment strategies to ultrafast magic-angle spinning applied to increasingly complex materials.

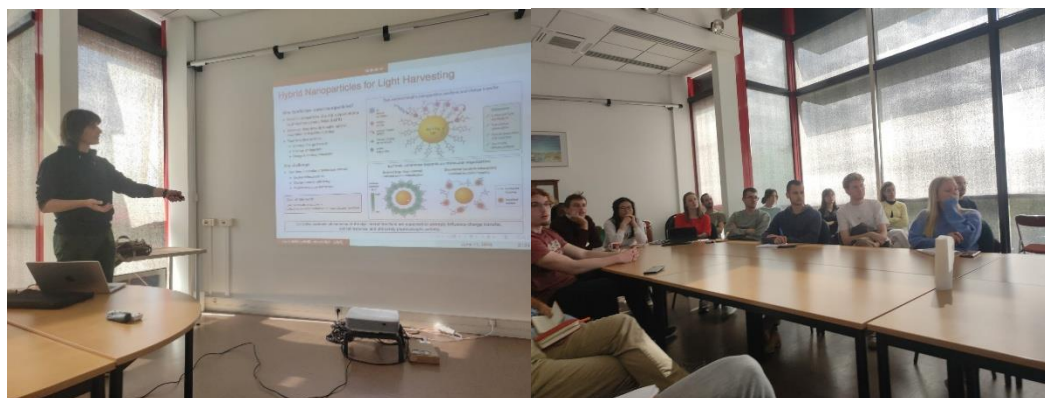
They were also trained on the XRD instrumentation used at CEMHTI, including an introduction to the operating principles of both the Bruker D8 Advance and Rigaku SmartLab diffractometers.



During their stay, PhD Student Gianina Gabriela and Prof. Paula Vera attended three scientific seminars/conferences:

1. June 10 — Collective Excitonic Phenomena in Dye-Coated Metallic Nanoparticles

A seminar on *“Collective Excitonic Phenomena in Dye-Coated Metallic Nanoparticles: Implications for Charge Transfer and Photocatalysis,”* delivered by David Dell’Angelo (University of Artois). The talk looked at hybrid assemblies of metallic nanoparticles and photoactive dye molecules as platforms for photocatalysis and energy conversion, and how the way the dye molecules are organized on the nanoparticle surface (ordered rings, coronas, or disordered arrangements) affects charge and energy transfer.

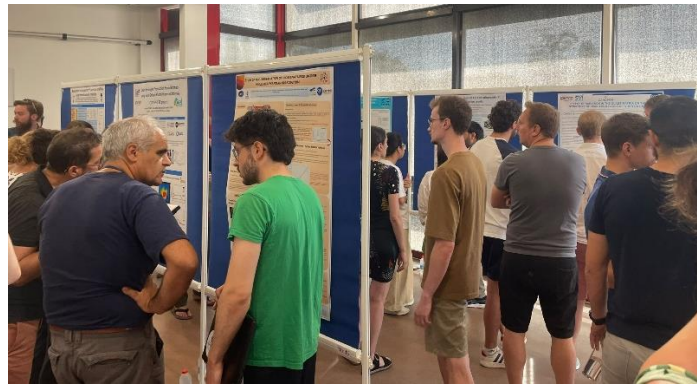


2. June 22 — Solid-State NMR: From Isotopic Enrichment to 150 kHz MAS

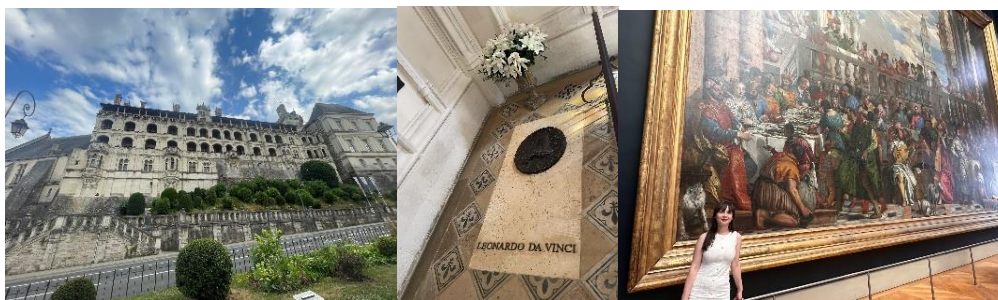
A seminar on *“From Isotopic Enrichment to 150 kHz MAS: Developing New Capabilities in Solid-State NMR.”* This one connected directly with my own NMR training (see Section 3): it covered isotopic enrichment strategies for biological and bio-inorganic materials, real-time solid-state NMR methods for studying biomineralization, and the use of ultrafast magic-angle spinning (150 kHz MAS and beyond) to push the technique further for complex systems.

3. Participation in the Journée des Doctorants (JDD 2026) organized by CEMHTI (CNRS)

An event bringing together PhD students and researchers from across CEMHTI's research groups to present and discuss ongoing work. I attended the scientific sessions and took part in discussions on current research carried out within the different groups of the institute, which gave me a broader view of the research directions pursued at CEMHTI beyond my own project.



Beyond the lab work, the secondment also gave the chance to explore the Orléans area and the Loire Valley. On weekends, they travelled to Amboise, a town deeply tied to the final years of Leonardo da Vinci's life. There, they visited the Château d'Amboise, a royal residence with sweeping views over the Loire, and paid a visit to the Saint-Hubert Chapel within its grounds, where da Vinci's tomb is located — a particularly memorable stop, given how much of his work I had studied over the years. They also spent a day in Blois, walking through its historic town center and visiting the Château de Blois, known for its mix of architectural styles spanning several centuries of French royal history. Finally, they took a weekend to explore Paris, taking in some of its most iconic landmarks. Altogether, these visits added a valuable personal dimension to the time they spent here, allowing them to connect the scientific experience with the rich history and culture of the region.



Attending conferences and taking part in the lab's activities, together with exploring the Loire Valley, made this an experience that was rich both scientifically and personally.