



Andrea Simion

Personal Information

Education

PhD in Physics

2022 – 2026

Faculty of Physics, Babes-Bolyai University, Romania

Thesis: Methods development for solid state NMR and spintronics

Master of Science (Physics)

2020 – 2022

Specialization: Solid State Physics

Faculty of Physics, Babes-Bolyai University, Romania

Bachelor's degree (Physics)

2016 – 2020

Specialization: Engineering Physics

Faculty of Physics, Babes-Bolyai University, Romania

Pedagogical module (Physics)

(additional courses that you must have in Romania if you want to be a professor, even at the University)
2016 – 2022

Faculty of Psychology and Educational Sciences, Babes-Bolyai University, Romania

Work experience

Researcher, National Institute for Research and Development of Isotopic and Molecular Technologies, Cluj-Napoca, Romania

July 2022 – present

Research and Development in the field of solid-state NMR

Department: Molecular and Biomolecular Physics

Research group: Complex Molecular and Biomolecular Systems

Teaching Assistant, Faculty of Physics, Babes-Bolyai University, Cluj-Napoca, Romania

February 2025 – present

Teaching activities: Electricity and Magnetism, Electronics, Spintronics

Research activities with the students

Research Internships

Visiting Researcher, Taiwan Semiconductor Research Institute (TSRI), Tainan, Taiwan

(December 2025)

RF (radio-frequency) integrated circuits design: Programming/signal processing/circuit verification

Visiting Researcher, National High Magnetic Field Laboratory, Tallahassee, USA

(August 2025)

NMR instrumentation: design of shim coils and RF coils, DNP solid state NMR

Doctoral Internship, UK High-Field Solid-State NMR Facility, University of Warwick, Coventry, UK - PANACEA grant (August 2024)

Polarization transfer NMR experiments in high magnetic field (28.2 T) and at ultra-fast rotation frequencies (150 kHz) - **Supervisor: Prof. Steven P. Brown**

Doctoral Internship, Laboratorium für Physikalische Chemie, Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland (May 2023)

NMR experiments of heteronuclear decoupling in an intense magnetic field (28.2 T) and at fast rotation frequencies (100 kHz), calculations, and simulations of nuclear spin dynamics - **Supervisor: Prof. Matthias Ernst**

Skills:

- Computational skills: TopSpin, Mathematica, Matlab, C/C++, Python, LaTeX, Origin, Eagle, SolidWorks
- Development of pulse sequences for solid-state NMR
- Organizational/Managerial skills
- Public speaking
- Team Work

Languages:

Romanian (native)
English (fluent)
French (good)
Hungarian (fluent)

Publications, Scientific Conferences, and Awards: (mentioned in the publication, conferences, and awards list)

- **More than 10 ISI scientific publications**
- **More than 10 participations at international scientific conferences**
- **More than 10 scientific awards**

Advanced Doctoral Fellowship, a grant offered by Babeş Bolyai University, Cluj-Napoca, Romania (March-August 2023)

Project: "Methods development for ultra-fast magic angle spinning nuclear magnetic resonance and spintronics" – **Supervisors: Dr. Claudiu Filip and Prof. Dr. Coriolan Tiusan**

Research fellow, grant provided by the World Federation of Scientists (WFS), CERN, Geneva, Switzerland (September 2021 – June 2022)

Project: "New insights into nanostructured core-shell materials with potential applications as contrast agents in MRI - an original approach by using different Solid-State NMR Spectroscopy Methods" – **Supervisors: Dr. Claudiu Filip and Prof. Dr. Simion Simon**

Research Internship, High field NMR Center (CNRS/ENS/UCBL), Lyon, France (October 2021 – March 2022)

Project: "Development of new methods for the determination of structures and properties of biosolids by DNP enhanced Solid-State NMR at very high magnetic fields and very high rotation speed" - **Supervisors: Dr. Anne Lesage and Dr. Guido Pintacuda**

Research Internship, National Institute for Research and Development for Isotopic and Molecular Technologies (INCDTIM), Cluj-Napoca, Romania (February 2020 – September 2021)

Master's thesis project: "Heteronuclear decoupling pulse sequences design for ultra-fast MAS solid-state NMR" – **Supervisors: Dr. Claudiu Filip and Lect. Dr. Mihai Vasilescu**

Bachelor's thesis project: "Stratified diffusion of pharmaceutical compounds inside COOH- and NH₂-functionalized multi-walled carbon nanotubes studied by NMR spectroscopy" - **Supervisors: Dr. Adrian Pirnau and Lect. Dr. Mihai Vasilescu**

Main activities: Spin dynamics calculations (AHT, Floquet) & numerical simulations (SIMPSON, Spinevolution), NMR spectroscopy on solids (1D and 2D NMR experiments), Determination of diffusion coefficients using NMR spectroscopy on liquids

Research fellow, grant offered by Babeş Bolyai University, Cluj-Napoca, Romania (October 2020 – September 2021)

Project: "New Contrast agents for Magnetic Resonance Imaging – synthesis and characterization" - **Supervisors: Prof. Dr. Simion Simon and Lect. Dr. Mihai Vasilescu**

Research Internship, National Center for Magnetic Resonance, Faculty of Physics, Babeş Bolyai University, Cluj-Napoca, Romania (April 2017 – June 2020)

Main activities: chemical syntheses, liquid NMR spectroscopy - **Supervisor: Prof. Lect. Dr. Mihai Vasilescu**

Research projects

- **Project Director:** "Improved methodologies for quantum control in spintronics: solid-state NMR as an original toolbox", 2025-2026, L'Oréal UNESCO for Women in Science Fellowship, Romania.
- **Project member:** "Bio-inspired interfaces for the development of next generation degradable multi-phase materials", 2022-2025 M-ERA.NET, National Institute for Research and Development for Isotopic and Molecular Technologies (INCDTIM), Cluj-Napoca, Romania

- **Project Director:** "Methods development for ultra-fast magic angle spinning nuclear magnetic resonance and spintronics" - Advanced Doctoral Fellowship, March - August 2023, financial support provided in the form of a research fellowship granted by Babes Bolyai University, Cluj-Napoca, Romania

- **Project Director:** "New insights into nanostructured core-shell materials with potential applications as contrast agents in MRI – an original approach by using different Solid-State NMR Spectroscopy Methods", 2021-2022, financial support provided in the form of a research fellowship by the World Federation of Scientists (WFS), CERN, Geneva, Switzerland

- **Project Director:** "New Contrast agents for Magnetic Resonance Imaging – synthesis and characterization", 2020-2021, grant no. 35738/09.12.2020, financial support provided in the form of a research fellowship by Babes Bolyai University, Cluj-Napoca, Romania

- **Project member:** "Don't give up, Say yes to physics!", 2019-2021, grant. no. 209/SGU/NC II/17.09.2019, Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania