

## PERSONAL INFORMATION

Andrea Simion



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Sex female | Date of birth 05.09.1997 | Nationality Romanian

## WORK EXPERIENCE

July 2022 – present

### Research Assistant

**National Institute for Research and Development of Isotopic and Molecular Technologies (INCDTIM), Cluj-Napoca, Romania**

Research & Development – Solid State NMR  
Department: Molecular and Biomolecular Physics  
Research Group: Molecular and Biomolecular Complex Systems

Sept. 2021 – June 2022

### Research fellowship, granted by World Federation of Scientist (WFS), CERN, Geneva, Switzerland

**National Centre for Magnetic Resonance, Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania**

**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”

**Main activities:** Chemical synthesis, Solid-State NMR

Oct. 2021 – March 2022

### Research internship

**High Field NMR Center (CNRS/ENS/UCBL), Lyon, France**

**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”

**Main activities:** protein synthesis/labelling, solid-state NMR spectra acquisition under DNP condition, data analysis/assignments, numerical simulations

Feb. 2020 – Sept. 2021

### Research practice

**National Institute for Research and Development of Isotopic and Molecular Technologies (INCDTIM), Cluj-Napoca, Romania**

**Master’s thesis project:** “Heteronuclear decoupling pulse sequences design for ultra-fast MAS solid-state NMR”

**Bachelor’s thesis project:** “Stratified diffusion of pharmaceutical compounds inside COOH- and NH<sub>2</sub>- functionalized multi-walled carbon nanotubes studied by NMR spectroscopy”

**Main activities:** Spin dynamics calculations (AHT, Floquet) & simulations (SIMPSON, Spinevolution), solid-state NMR spectroscopy experimental work (1D and 2D ssNMR), Diffusion coefficients measurements using liquid-state NMR Spectroscopy

Oct. 2020 – Sept. 2021

### Research fellowship, granted by Babes Bolyai University, Cluj-Napoca, Romania

**National Centre for Magnetic Resonance, Faculty of Physics, Babes Bolyai University and Interdisciplinary Research Institute in Bio-Nano-Sciences, Cluj-Napoca, Romania**

**Project:** “New Contrast agents for Magnetic Resonance Imaging – synthesis and characterization”

**Main activities:** Chemical synthesis, Solid-State NMR measurements and data analysis

Dec.2019 – June 2021

**Student assistant / consultant**

**Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania**

Member in **project:** “Don’t give up, Say yes to physics!” grant. no. 209/SGU/NC II/17.09.2019

**Main activities:** teaching activities – “Mechanics” and “Differential equations of theoretical physics”, bachelor’s level seminars

Apr. 2017 – June 2020

**Research practice**

**National Centre for Magnetic Resonance, Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania**

Research practice during my bachelor’s studies, for my thesis.

Main activities: Liquid-State and Solid-State NMR Spectroscopy and Chemical Synthesis

EDUCATION AND TRAINING

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October 2022 – present

**PhD in Physics – Methodological Developments in Solid State NMR and Spintronics**

**Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania**

October 2020 – July 2022

**Master of Science – Solid State Physics**

**Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania**

October 2016 – July 2022

**Teaching module - Physics (level I and II)**

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

October 2016 – July 2020

**Bachelor’s Degree – Engineering Physics**

**Faculty of Physics, Babes Bolyai University, Cluj-Napoca, Romania**

September 2012 – June 2016

**High School Diploma – Mathematics and Computer Science**

**National College “Alexandru Papiu Ilarian”, Targu-Mures, Romania**

SUMMER SCHOOLS  
and WORKSHOPS

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19 – 25 June 2022

**Zakopane Ampere NMR School, Zakopane, Poland**

**Topics:** Solid-State NMR, Liquid-State NMR, MRI, Diffusometry and Relaxometry, Spin Dynamics

27 March – 2 Apr. 2022

**Theory of NMR Summer School, Leipzig, Germany**

**Topics:** Theory of Solid-State NMR

15 Feb. – 7 March 2022

**MOOC: Solid-State NMR, University of Lille, France**

**Topics:** Solid-State NMR Spectroscopy: Applications to spin 1/2 and quadrupolar nuclei, DNP-enhanced NMR

21-23 June 2021

**Zakopane Ampere NMR School, Poznan, Poland**

**Topics:** Solid-State NMR, Liquid-State NMR, MRI, Diffusometry and Relaxometry, Spin Dynamics

Jan. 2021 – June 2021

**Ampere Biological Solid-State NMR School, Leibniz-Forschungsinstitut für Molekulare and Pharmakologie (FMP), Berlin, Germany**

6 months online Solid-State NMR school, with weekly courses/seminars

**Topics:** Spin dynamics in solid-state NMR: analytical (anisotropic interactions, time-dependent hamiltonians, AHT, Floquet theory, linewidth/relaxation in NMR) and computational (SIMPSON), EPR, DNP NMR, assignment of protein NMR spectra

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**PERSONAL SKILLS**

Mother tongue(s) Romanian (native)  
Other language(s) English (fluent), Hungarian (fluent), French (good)

Communication skills

- good communication skills gained through my working experience in different research groups, teaching activities and volunteer activities in the Scientific and Educational department of Association of Physics students of Babes Bolyai University.

Organisational / managerial skills

- Managerial skills: Project Director of two research project gained in national and international competitions for MSc and PhD students (granted by Babes Bolyai University and WFS, CERN, Geneva, Switzerland, respectively)
- Leadership: academic year representative student; leader of different projects/activities in the Faculty of Physics
- Organisational skills: involvement in organizing the European School on Magnetism (ESM) 2021, Cluj-Napoca, Romania and the Physics contest "Dragomir Humuzescu" for students, 2018, Cluj-Napoca, Romania
- Teamwork: research internship or fellow in several research groups
- Public Speaking: scientific communication sessions/conferences and teaching activities, exhibitor in scientific public events ("Researcher's night", "Saturday of experiments")

Expertise and areas of interest

- Solid State NMR spectroscopy
- Methods development for Solid State NMR
- Spin dynamics: Analytical and Computational
- Precessional phenomena in Solid State NMR and Spintronics
- Structural characterization of complex (bio)molecular systems

Computer skills

- TopSpin, Mathematica, Matlab, C, Python, LaTeX, Origin, Eagle, SolidWorks

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**ADDITIONAL INFORMATION**

Projects

- Director of the 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", 2021-2022, financial support granted in the form of a research fellowship by World Federation of Scientists (WFS), CERN, Geneva, Switzerland
- Director of the project grant no. 35738/09.12.2020: "New Contrast agents for Magnetic Resonance Imaging – synthesis and characterization", 2020-2021, financial support granted in the form of a research fellowship by Babes Bolyai University, Cluj-Napoca, Romania
- Member in the project grant. no. 209/SGU/NC II/17.09.2019: "Don't give up, Say yes to physics!", 2019-2021

## Publications

- **Andrea Simion**, Tobias Schubeis, Tanguy Le Marchand, Mihai Vasilescu, Guido Pintacuda, Anne Lesage, Claudiu Filip, Heteronuclear decoupling with Rotor-Synchronized Phase-Alternated Cycle, *Journal of Chemical Physics*, 2022.
- Alexandru F. Farcasanu, Milica Todea, Marieta Muresan-Pop, Dina M. Petrisor, **Andrea Simion**, Adriana Vulpoi, and Simion Simon, Chemical synthesis and structural characterization of silica particles doped with paramagnetic Dy and Gd ions of Dy for enhanced MRI T1/T2 relaxivity, *Journal of Molecular Structure*, 2022.
- **Andrea Simion**, Mihai Vasilescu, Claudiu Filip, Milica Todea, Marieta Mureşan-Pop, Simion Simon, Structural characterization of interfaces in silica core – alumina shell by solid-state NMR spectroscopy, *Journal of Solid State Nuclear Magnetic Resonance*, 2022.
- Marieta Muresan-Pop, Adriana Vulpoi, Viorica Simon, Milica Todea, Klara Magyari, Zsolt Pap, **Andrea Simion**, Claudiu Filip, Simion Simon, Co-crystals of Etravirine by Mechanochemical activation, *Journal of Pharmaceutical Sciences*, 2021.
- **Andrea Simion**, Adrian Pîrnău, Flaviu R.V. Turcu, Adriana Vulpoi, Milica Todea, Monica Potara and Mihai Vasilescu, Stratified Diffusion of HOD-D2O inside COOH- and NH2-Functionalized Multi-Walled Carbon Nanotubes studied by NMR Spectroscopy, *Journal of Molecular Structure*, 2021.
- Milica Todea, Viorica Simon, Marieta Muresan-Pop, Adriana Vulpoi, Mihai M. Rusu, **Andrea Simion**, Mihai Vasilescu, Grigore Damian, Dina M. Petrisor, Simion Simon, Silica-based microspheres with aluminum-iron oxide shell for diagnosis and cancer treatment, *Journal of Molecular Structure*, 2021.

## Oral and poster presentations at scientific conferences

- Poster presentation: *Heteronuclear decoupling for ultra-fast MAS: Robustness toward 1H offset and radio-frequency power*, **A. Simion**, M. Ernst, and C. Filip, Zakopane Ampere NMR School, 19-25 June 2021, Zakopane, Poland
- Poster presentation: *Structural changes in nanostructured silica core-alumina shell microspheres doped with iron and gadolinium investigated by Solid-State NMR Spectroscopy*, **A. Simion**, M Vasilescu, M Todea, M Mureşan-Pop, A Vulpoi, and S Simon, PIM 2021 International Conference, 22-24 September 2021, Cluj-Napoca, Romania
- Poster presentation: *Structural effects induced by gadolinium ions in aluminosilicate core-shell structures studied by Solid-State NMR and EPR spectroscopies*, **A. Simion**, C. Filip, D. M. Petrişor, M.Todea, M. Vasilescu and S. Simon, Zakopane Ampere NMR School, 21-23 June 2021, Pozan, Poland
- Oral presentation: *Analysis of the influence of carbon nanotube's purity on their transport properties using NMR spectroscopy*, **A. Simion**, Section Advanced Applied Physics, Scientific Communication Session organized by Technical University of Bucharest, 19 may 2019, Bucharest, Romania
- Oral presentation: *Use of NMR spectroscopy to determine the diffusion coefficients of solutions with carbon nanotubes*, **A. Simion**, National Physics contest "Dragomir Hurmuzescu" - Scientific Communication Session organized by University of Vest Timisoara, April 2019, Timisoara, Romania

## Honours and awards

- Best poster award, Zakopane Ampere NMR School, 19-25 June 2021, Zakopane, Polonia pentru posterul: "*Heteronuclear decoupling for ultra-fast MAS: Robustness toward 1H offset and radio-frequency power*"
- Best poster award, Processes in Isotopes and Molecules (PIM) Conference, 22-24 September 2021, Cluj-Napoca, Romania for the poster: "*Structural Changes In Nanostructured Silica Core-Alumina Shell Microspheres Doped With Iron And Gadolinium Investigated By Solid-State NMR Spectroscopy*"
- Internship Award, for the results obtained during my research internship at INCDTIM

Research Institute, within the project "Skills adapted to the labor market for students at the Faculty of Chemistry and Chemical Engineering, Physics, Biology and Geology (CompetentCFB)", POCU / 90/6/13/6/14/109175 (July 2020)

- 1<sup>st</sup> Prize: Scientific Communication Session organized by Technical University of Bucharest, Section: Applied Physics – Advanced, May 2019, Bucharest, Romania, for the oral presentation: "*Analysis of the influence of carbon nanotube's purity on their transport properties using NMR spectroscopy*"
- Honourable Mention - National Physics Contest "Dargomir Hurmuzescu" (Theoretical Physics Contest), organized by West University of Timișoara, April 2019, Timișoara, Romania;
- Honourable Mention - National Physics Contest "Dargomir Hurmuzescu" (Theoretical Physics Contest), organized by Babes Bolyai University, April 2018, Cluj-Napoca, Romania
- 2<sup>nd</sup> Prize - International Competition of Physics and Chemistry SCHW, Nov. 2017, Oradea, Romania
- Academic Excellence Award, granted by Babes Bolyai University, at the proposal of the Faculty of Physics, as a sign of appreciation and gratitude for the academic performance, for the implication and dedication proven in the academic community
- Honourable Mention - National Physics Contest "Dargomir Hurmuzescu" (Theoretical Physics Contest), organized by Alexandru Ioan Cuza University, April 2017, Iasi, Romania

#### Memberships

- Groupement AMPERE
- ISMAR
- Scientific and Educational Department, Association of Physics Students of Babes Bolyai University