

PERSONAL INFORMATION

Alexandra Farcas



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WORK EXPERIENCE

01/2019–Prezent

Scientific Researcher

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

11/2013–11/2018

Research Assistant

Babeş-Bolyai University, UBB, Cluj-Napoca (Romania)

01/2016–01/2019

Research Assistant

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

EDUCATION AND TRAINING

10/2015–10/2018

PhD in Physics

Babes-Bolyai University UBB, Faculty of Physics, Cluj-Napoca (Romania)

Scientific methods and research ethics, Theoretical Physics, Atomic and molecular physics

10/2013–07/2015

Master of Science in Computational Physics

Babes-Bolyai University UBB, Faculty of Physics, Cluj-Napoca (Romania)

Object Oriented Programming in Java, Molecular Dynamics Simulations, Stochastic Simulation methods in physics

10/2010–07/2013

Bachelor of Science in Physics

Babes-Bolyai University UBB, Faculty of Physics, Cluj-Napoca (Romania)

Numerical Methods in Python, Mathematical analysis, Linear algebra, Mechanics and dynamics

PERSONAL SKILLS

Organisational / managerial skills

- Founder member of the Physics Student Association Babes-Bolyai- University (ASFUBB)
- Babes-Bolyai University Senate Member

Digital skills

- *Programming*: C, C++, parallel programming (MPI)
- *Shell Scripting*: csh, tcsh, bash, tcl/tk
- *Editing/Presenting*: MSOffice, LaTeX, Emacs, Adobe Acrobat
- *OS's*: Windows (XP, 7, 8), Linux (Ubuntu, openSUSE)

Publications

1. M S Swapna, C. Tripon A. Farcas, D. N. Dadarlat, D. A. Korte, S. I.Sankararaman, "Tuning the Dynamic Thermal Parameters of Nanocarbon Ionanofluids: A Photopyroelectric Study", **Journal of Carbon Research**, 10 (2) , 40 (2024).
2. A Farcas, L Janosi, "GTP-Bound N-Ras Conformational States and Substates Are Modulated by Membrane and Point Mutation", **International Journal of Molecular Sciences**, 25 (3), 1430, (2024).
3. M. N. S. Swapna, C. Tripon, R. Gutt, A. Farcas, M. Bojan, D. Korte, I. Kacso, M. Franko and D. Dadarlat, "Non-Contact and Self-Calibrated Photopyroelectric Method for Complete Thermal Characterization of Porous Materials", **Materials** 16 (15), 5242 (2023).
4. A. Farcas, L. Janosi and S. Astilean, "Size and surface coverage density are major factors in determining thiol modified gold nanoparticles characteristics", **Computational and Theoretical Chemistry**, 1209, 113581 (2022).
5. T. A. Beu, A. E. Ailenei, A. Farcas, "Atomistic and Coarse-Grained Modeling of Polyethyleneimine", **Chem. Phys. Lett.**, 714, 94-98 (2019).
6. T. A. Beu, A. E. Ailenei, A. Farcas, "CHARMM Force Field for Protonated Polyethyleneimine", **J. Comput. Chem.**, 39(31):2564-2575. (2018).
7. A. Farcas, T. A. Beu, "Complexation of DNA with Cationic Polymers", **Studia UBB Chemia**, LXIII, 2, 165 (2018).
8. T. A. Beu, A. Farcas, "Structure and Dynamics of Solvated Polyethyleneimine Chains", **AIP Conference Proceedings** 1916, UNSP 020001 (2017).
9. T. A. Beu, A. Farcas, "CHARMM force field and molecular dynamics simulations of protonated polyethyleneimine", **J. Comput. Chem.** 38 (27), 2335 (2017).
10. T. A. Beu, A. Farcas, "Tight-binding normal mode analysis of suspended single-wall carbon nanotubes", **EPL** 113, 37004 (2016).
11. T. A. Beu, A. Farcas, "Tight-binding vibrational analysis of single-wall carbon nanotubes", **AIP Conference Proceedings** 1694, 020001 (2015).

Presentations

1. Alexandra Farcas, Lorant Janosi, Simion Astilean, Enhancing Computational Design for Nanoparticle-Based Delivery Vectors in the CRISPR/Cas9 System (**MOSBRI 2024**), 10-13 June, Ljubljana, Slovenia (poster presentation).
2. Alexandra Farcas, *The Effect of Surface Coverage Density and Size on the Properties of DNA-functionalized Gold Nanoparticles* (**Hunefeld 2024**), 19-20 April, 2024, Germany (poster presentation).
3. Alexandra Farcas, *The Influence of Size and Surface Coverage Density on the Characteristics of DNA functionalized Gold Nanoparticles* (**AttoChem-2024**), 28 February - 1 March 2024, AttoChem, Tenerife, Canary Islands (poster presentation).
4. Alexandra Farcas, *Genetica si Oncologia*, 16-17 February, Bucharest, Romania.
5. A. Farcas, L. Janosi and S. Astilean, Computational optimization of non-viral CRISPR/Cas9-Gold-based delivery vehicle design, 14th EBSA Congress (**EBSA-2023**), 30th July - 4th August, 2023, Stockholm, Sweden.
6. A. Farcas, L. Janosi and S. Astilean, *DNA-conjugated gold nanoparticles as key components in the design of non-viral CRISPR/Cas9-Gold-based delivery vehicles*, Sixth Edition of International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences (**IC-ANMBES 2022**), 8-10 June 2022, Brasov, Romania.
7. L. Janosi, G. Necula, A. Farcas, I. Turcu, *In Silico Modeling of a Short Arginine and Tryptophan-based Antimicrobial Peptide's Interaction with Bacterial and Mammalian Membranes* (**IC-ANMBES 2022**), 8-10 June 2022, Brasov, Romania.
8. A. Farcas, L. Janosi and S. Astilean, *Optimizing the surface coverage density of thiol-coated gold nanoparticles*, TIM 20-21 Physics Conference (**TIM20-21**), 11-13 November 2021, Timisoara, Romania.
9. A. Farcas, L. Janosi and S. Astilean, *Molecular dynamics investigation of oligonucleotide-functionalized gold nanoparticles*, 13th International Conference Processes in Isotopes and Molecules (**PIM2021**), 22-24 September 2021, Cluj-Napoca, Romania.
10. A. Farcas, L. Buimaga-Iarinca, T. Szoke-Nagy, A. Colnita, B. Cozar and L. Janosi, *Theoretical prediction and experimental validation of novel antimicrobial peptides*, Young Researchers' International Conference on Chemistry and Chemical Engineering (**YRICCCE**

- III), 4-5 iunie 2021, Cluj-Napoca, Romania (poster presentation).
11. L. Buimaga-larinca, A. Farcas, C. Floare, L. Janosi, *Design of novel antimicrobial peptides in a three-stage in silico approach*, 12th International Conference Processes in Isotopes and Molecules (**PIM**), 25-27 September 2019, Cluj-Napoca, Romania (poster presentation).
 12. A. Farcas, L. Janosi, *Simple models that mimic the lipid composition in the mammalian and bacterial membranes*, 12th International Conference Processes in Isotopes and Molecules (**PIM**), 25-27 September 2019, Cluj-Napoca, Romania (poster presentation).
 13. L. Buimaga-larinca, A. Farcas, L. Janosi, *Combining molecular docking and molecular dynamics simulations to propose novel antimicrobial peptides*, 12th EBSA European Biophysics Congress / 10th IUPAP International Conference on Biological Physics (**ICBP 2019**), July 20-24, 2019, Madrid, Spain (poster presentation).
 14. A. Farcas, I. Turcu, L. Janosi, *Simple vs. complex lipid bilayers: Balancing compositional simplicity and behavioral complexity of mammalian and bacterial membrane models*, 12th EBSA European Biophysics Congress / 10th IUPAP International Conference on Biological Physics (**ICBP 2019**), July 20-24, 2019, Madrid, Spain (poster presentation).
 15. T. A. Beu, A. Farcaș, A. E. Ailenei, *Coarse-grained modeling of polyethyleneimine*, Molecular Modeling in Chemistry and Biochemistry Conference 2018 (**MolMod 2018**), 28-30 October 2018, Cluj-Napoca, Romania, oral presentation.
 16. T. A. Beu, A. Farcaș, A. E. Ailenei, *Atomistic and Coarse-Grained Modelling of Polyethyleneimine for Gene Delivery Applications*, Polymer World Congress 2018 (**PWC 2018**), 3-6 September 2018, Stockholm, Sweden, oral presentation.
 17. T. A. Beu, A. Farcaș, A. E. Ailenei, *Atomistic and Coarse-Grained Modelling of Gene Delivery Polymers*, 12th Joint Conference on Mathematics and Computer Science (**12th MaCS**), 14 June-17 June 2018, Săcuieu, Romania, oral presentation.
 18. A. Farcaș, L. Buimaga larinca, A. S. Porav, C. Floare, L. Janosi, *Structural Features and Aggregation of NRas Proteins and its Oncogenic Mutations*, International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences (**IC-ANMBES**), 23 May-25 May 2018, Brasov, Romania, poster presentation.
 19. A. Farcaș, T. A. Beu, *Cationic Polymers as Drug Delivery Systems*, International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences (**IC-ANMBES**), 23 May-25 May 2018, Brasov, Romania, oral presentation.
 20. L. Buimaga larinca, A. Farcaș, L. Janosi, *Use of Molecular Docking as a Tool for Comparative Binding Analysis of Large Peptides to Ras Wild Type and Oncogenic Proteins*, International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences (**IC-ANMBES**), 23 May-25 May 2018, Brasov, Romania, poster presentation.
 21. A. Farcaș, L. Buimaga larinca, C. Floare, L. Janosi, *Multiscale Models of Wildtype and G12V Mutant NRas Oncogenic Systems*, 11th International Conference on Processes in Isotopes and Molecules (**PIM**), 27-29 September 2017, Cluj-Napoca, Romania, poster presentation.
 22. T. A. Beu, A. Farcaș, *CHARMM force field and molecular dynamics simulations of polyethyleneimine chains*, 4th International Conference on Physical and Theoretical Chemistry, 18-19 September 2017, Dublin, Ireland, oral presentation.
 23. L. Buimaga larinca, C. Floare, A. Farcaș, A. S. Porav, L. Janosi, *Use of complementary molecular modeling approaches in search of peptides binding to oncogenic Ras*, 19th International Union of Pure and Applied Biophysics (IUPAB) and 11th European Biophysical Societies' Association (**EBSA**) Congress, 16-20 July 2017, Edinburgh, UK, poster presentation.
 24. L. Janosi, C. Floare, A. Farcaș, L. Buimaga larinca, *In silico study of Ras-binding peptides self-association*, 19th International Union of Pure and Applied Biophysics (IUPAB) and 11th European Biophysical Societies' Association (**EBSA**) Congress, 16-20 July 2017, Edinburgh, UK, poster presentation.
 25. A. Farcaș, L. Buimaga larinca, C. Floare, L. Janosi, *Influence of G12V mutation on NRas proteins' aggregation*, 19th International Union of Pure and Applied Biophysics (IUPAB) and 11th European Biophysical Societies' Association (**EBSA**) Congress, 16-20 July 2017, Edinburgh, UK, poster presentation.
 26. A. Farcaș, T. A. Beu, *Molecular Dynamics Simulations of Cationic Polymers*, 19th International Union of Pure and Applied Biophysics (**IUPAB**) and 11th European Biophysical Societies' Association (**EBSA**) Congress, 16-20 July 2017, Edinburgh, UK, poster presentation.
 27. T. A. Beu, A. Farcaș, *Force Field Modeling and Molecular Dynamics Simulations of Cationic Polymers*, Molecular Modeling in Chemistry and Biochemistry (**MOLMOD**), 13-15

November 2016, Cluj-Napoca, Romania, oral presentation.

28. A. Farcaș, L. Buimaga Iarinca, C. Floare, L. Janosi, *Plasma membrane model dynamics in the presence of Ras protein nanoclusters*, International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences (**IC-ANMBES**), 29 June-1 July 2016, Brasov, Romania, poster presentation.
29. A. Farcaș, L. Buimaga Iarinca, C. Floare, L. Janosi, *Ras proteins-Mammalian membrane interactions and dynamics using coarse-grained models*, National Conference in Biophysics (**CNB**), 2-4 June 2016, Cluj-Napoca, Romania, poster presentation.

Workshops

1. Hünfeld 2023: Hybrid Workshop on Computer Simulation and Theory of Macromolecules, April 28-29, 2023, Hünfeld Monastery, Germany (hybrid workshop).
2. 5th Annual CRISPR Virtual Event, 2 November 2022, Labroots. (online workshop).
3. Hünfeld 2022: Workshop on Computer Simulation and Theory of Macromolecules, 28-29 April 2023, Göttingen, Germany (hybrid workshop).
4. 4th Annual CRISPR Virtual Event, 29 September 2021, Labroots. (online workshop).
5. Martini 3.0 online workshop, 1-3 September 2021, Groningen, The Netherlands (online workshop).
6. Hünfeld 2021: Workshop on Computer Simulation and Theory of Macromolecules, 23-24 April 2021, Göttingen, Germany (online workshop).

Professional Accomplishments

- MOSBRI Bursary, Ljubljana, Slovenia (2024)
- IUPAB Bursary, Stockholm, Sweden (2023)
- EBSA Bursary, Madrid, Spain (2019)
- *Physics of Cancer Session*, Edinburgh, UK, Poster Presentation, **best poster award** (2017).

Scientific Interests

A. Force field development

- *Atomistic and coarse-grained* modelling of biopolymers, which enable realistic simulations in very diverse contexts of practical relevance

B. Application of computational methods in (bio-) molecular physics

- Cellular *membrane modelling* (bacterial and mammalian)
- Study of *association of molecules*, ligand-receptor type of interaction
- Investigation of dynamical structuring and functionalities of *biopolymers*
- Rational design and investigation of novel antimicrobial / anticancer peptides

Reviewer of Journals

- American Chemical Society: **ACS Omega**

Research projects

- PN-III-P1-1.1-PD-2019-0292, In silico optimization of CRISPR/Cas9-Gold nanovehicle design, (2020-2022)
- PN-III-P1-1.1-TE-2016-0032, Design of highly efficient antimicrobial peptides: in silico prediction and experimental validation, (2018-2020)
- PN-III-P4-ID-PCE-2016-0474, Computational design of cationic polymers as gene delivery vectors, (2017-2019)
- PN-II-RU-TE-2014-4-2418, Design of new lipid-modified peptides to destabilize ras nanoclusters - a novel therapeutic approach for targeting oncogenic ras proteins, (2015-2017)
- PN-II-ID-PCE-2012-4-0028, Alkali and silver halides based magnetic tunnel junctions (2013-2016)