



Curriculum vitae

Personal information

First name / Surname **Maria Bercea**
Address 4, Ciomei Str., 700350, Iași, Romania
Telephone ++40332 880 050
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Nationality Romanian
Date of birth 06.07.1961
Gender female

Employment field **Senior Researcher / Research Activities**

Work experience

Occupation or position held Since 2003: Senior Researcher (CS I); 1988 – 2003: Scientific Researcher
Main activities and responsibilities Research activities in the field of rheology and thermodynamics of polymer based systems
Name and address of employer Petru Poni Institute of Macromolecular Chemistry, 41-A, Gr. Ghica Voda Alley, Iași, Romania
Main area of research Smart polymeric materials; Self-healing hydrogels and soft materials; Rheology of complex fluids including solutions, suspensions and gels; Thermodynamics of polymer solutions; Polymer blends
Dates, occupation or position held 1985 – 1988, Chemical Engineer
Main activities and responsibilities Training activities and solving production line problems; Quality control of the finite products
Sector, name and address of employer Industry, Pulp and Paper Factory, Suceava

Education and training

Dates, fellowships **2000-2016** – 14 postdoctoral research fellowships (36 months in total) in Germany working in the fields of thermodynamics and rheology of polymer solutions at Institut für Physikalische Chemie, Johannes Gutenberg Universität, Mainz, in the team of Prof. Bernhard A. Wolf; financed by 5 DFG projects (coordinator of the Romanian side) and 1 POSTDRU project
Name and type of organisation providing education and training **1999-2013** – 6 postdoctoral research fellowships (6 months in total) working in the field of rheology at Ecoles des Mines de Paris, CEMEF Sophia-Antipolis (France), in the teams of Prof. Patrick Navard and Dr. Tatiana Budtova, financed by EU projects and European Society of Rheology
2000 – invited researcher at INSA Lyon (1 month) in the team of Prof. Daniel Nélias
1995 – postdoctoral research fellowship (12 months) in the field of rheology and rheo-optics of nanocomposites at CERMAV Grenoble (Prof. Jean-Yves Cavaille) and CEMEF Sophia-Antipolis (Prof. Patrick Navard), financed by Elf-Atochem (France)
1992 – a doctoral research fellowship (4 months) in the field of rheology at CEMEF Sophia-Antipolis (France) in the group of Prof. Patrick Navard, financed by Ecole des Mines de Paris
Dates, Title of qualification awarded **2017, Habilitation Thesis**
Principal subject *Complex fluids: from thermodynamic and rheological approaches to the design of new polymeric materials*
Name and type of organisation providing education and training School of Advanced Studies of the Romanian Academy
Dates, Title of qualification awarded **October 1990 – April 1994, PhD Thesis**, “Gh. Asachi” Technical University, Iași
Principal subject *Thermodynamic aspects of ultrahigh molecular weight polymers in solution*, PhD Supervisor: Prof. Bogdan C. Simionescu
Name and type of organisation providing education and training **1980-1985** – Chemical Engineer, speciality: Technology of Macromolecular Compounds “Gh. Asachi” Technical University, Department of Macromolecules, Iași, Romania

Researcher ID: C-8378-2011; <https://publons.com/researcher/C-8378-2011>
 ORCID: <https://orcid.org/0000-0003-0962-0372>
 Scopus Author ID: 7003694548
 Brainmap profile address: U-1700-038T-7585, <https://www.brainmap.ro/maria-bercea>
 Web page: <https://scholar.google.ro/citations?user=MsaasbwAAAAJ&hl=en>

Research topics

Complex fluids, theoretical and experimental investigations of their dynamics during flow:

- Newtonian and non-Newtonian polymer fluids
- viscoelastic fluids (polymer solutions/suspensions, melts, polymer containing mixtures)

Polymer networks (physical, chemical, double interpenetrated networks)

- hybrid hydrogels and structured fluids, self-assembling systems
- stimuli-responsive materials and biomaterials
- self-healing, injectable hydrogels and 3D printing materials

Thermodynamics of polymer solutions, theory and experiment:

- conformational characteristics of polymers in solution
- a better understanding of cosolvency and co-nonsolvency phenomena
- determination of polymer/solvent and polymer/polymer interaction parameters
- an adequate thermodynamic description of polymer containing mixtures

Modeling the behavior of macromolecules in solution

Scientific achievements

190 papers indexed by Web of Science (physico-chemistry of polymers, material science)
 More than 200 participations at Romanian and international conferences
 42 research projects obtained through national competitions (12 as project leader)
 14 grants/contracts financed from abroad, at 7 projects as responsible from the Romanian side
Hirsh index = 30, more than 2700 citations (Web of Science, all data excluding self-citations), most of them in prestigious journals

Awards

1995 – „Nicolae Teclu” Prize accorded by Romanian Academy of Science
 2009 – „Emilian Bratu” Medal accorded by Romanian Chemical Society

Mother tongue(s)

Romanian

European level (*)

English

French

Understanding				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
C1	Proficient user	C1	Proficient user	C1	Proficient user	B1	Independent user	C1	Proficient user
C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user

Technical skills and competences

Advanced knowledge and very good skills in using the following experimental techniques:

1. Rheometry/Viscometry
2. Light scattering – static (SLS) and dynamic (DLS) methods
3. Osmometry
4. Headspace gas-chromatography (HGC)

Driving licence

B category

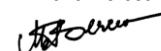
Additional information

Professional Affiliation

- Founding member of the Romanian Society of Rheology, President since 2019
- Member of the Romanian Chemical Society, since 1992

June 28th, 2024

Dr. Maria Bercea



Relevant publications

1. [Bercea M.*](#), Masuelli M., Wolf B.A.* [Rheology of aqueous solutions of brea gum: Bimodal flow curves and \(apparent\) negative activation energies](#). *Food Hydrocolloids* 146(Part A), 109217 (2024).
2. Nita L.E.*, Nacu I., Ghilan A., Rusu A.G., Serban A.M., [Bercea M.](#), Verestiuc L., Chiriac A. [Evaluation of hyaluronic acid-polymacrolactone hydrogels with 3D printing capacity](#). *International Journal of Biological Macromolecules* 256, Part 2, 128279 (2024) .
3. Chiriac A.*, Ghilan A.; Croitoriu, A., Serban A., [Bercea M.](#), Stoleru E., Nita L.E., Doroftei F., Stoica I., Bargan A., Rusu A., Chiriac V.M. [Study on cellulose nanofibrils/copolyacrolactone based nanocomposites with hydrophobic behaviour, self-healing ability and antioxidant activity](#). *International Journal of Biological Macromolecules*, Volume 262, Part 1, 130034 (2024).
4. Nacu, I., [Bercea, M.](#), Nita, L.E., Peptu, C.A., Butnaru M., Verestiuc L.* [3D Bioprinted scaffolds based on functionalized gelatin and PEGDA for soft tissue engineering](#). *Reactive and Functional Polymers*, 2023, **190**, 105636.
5. [Bercea M.*](#), [Rheology as a tool for fine-tuning the properties of printable bioinspired gels](#). *Molecules* 2023, **28**(6), 2766.
6. [Bercea M.*](#), Plugariu I.A., Gradinaru L.M., Avadanei M., Doroftei F., Gradinaru V.R. [Hybrid hydrogels for neomycin delivery: Synergistic effects of natural/synthetic polymers and proteins](#). *Polymers*, 2023, **15**, 630.
7. Biliuta G.* , Dascalu A., Stoica I., Baron R.I., Bejan D., [Bercea M.](#), Coseri S.* [Structural and rheological insights of oxidized cellulose nanofibers in aqueous suspensions](#). *Wood Science and Technology* (2023) 57, 1443–1465.
8. Ailincai D.* ,[Bercea M.](#), Mititelu Tartau L., Marin L., [Biocompatible drug delivery systems able to co-deliver antifungal and antiviral agents](#), *Carbohydrate Polymers*, **298**, 120071 (2022).
9. Gradinaru L.M.* , [Bercea M.](#), Vlad S., Barbalata Mandru M., Drobotu M., Aflori M., Ciobanu R.C. [Preparation and characterization of electrospun magnetic poly\(ether urethane\) nanocomposite mats: relationships between the viscosity of the polymer solutions and the electrospinning ability](#), *Polymer* **256**, 125186 (2022).
10. [Bercea M.*](#), Constantin M., Plugariu I.A., Daraba M.O., Ichim D.L. [Thermosensitive gels of pullulan and Poloxamer 407 as potential injectable biomaterials](#), *Journal of Molecular Liquids* **362**, 119717 (2022).
11. [Bercea M.*](#), [Bioinspired Hydrogels with Tunable Properties for Targeted Applications: Challenges and Opportunities](#), *Polymers* **14**(12), 2365 (2022).
12. [Bercea M.*](#), Wolf B.A.* , Solutions of polymer blends in highly saline water: Salt-induced inversions of viscosity effects for poly(ethylene oxide) + poly(sodium 4-styrenesulfonate), *Polymer* **241**, 124510 (2022).
13. [Bercea M.*](#), [Self-Healing Behavior of Polymer/Protein Hybrid Hydrogels](#), *Polymers* **14**, 130 (2022).
14. [Bercea M.*](#), L.-M. Gradinaru, S. Morariu, I.-A. Plugariu, R.V.Gradinaru, [Tailoring the properties of PVA/HPC/BSA hydrogels for wound dressing applications](#), *Reactive and Functional Polymers* **170**, 105094 (2022).

15. [Bercea M.*](#), Wolf B.A.*, [Detection of polymer compatibility by means of self-organization: poly\(ethylene oxide\) and poly\(sodium 4-styrenesulfonate\)](#), *Soft Matter*, **17**(20), 5214-5220 (2021).
16. [Bercea M.*](#), Gradinaru L.M., Mandru M., Vlad S., Nita L.E., Plugariu I.A., Albulescu R., [Shear flow of associative polymers in aqueous solutions](#), *Journal of Molecular Structure* **1238**, 130441 (2021).
17. Brunchi C.-E.*, Morariu S., [Bercea M.](#), [Impact of ethanol addition on the behavior of xanthan gum in aqueous media](#), *Food Hydrocolloids*, **120**, 106928 (2021).
18. [Bercea M.*](#), Plugariu I.-A., [Associative interactions between pullulan and negatively charged bovine serum albumin in physiological saline solutions](#), *Carbohydrate Polymers* **246**, 116630 (2020).
19. [Bercea M.*](#), Morariu S., [Real-time monitoring the order-disorder conformational transition of xanthan gum](#), *Journal of Molecular Liquids*, 309, 113168 (2020).
20. [Bercea M.*](#), Gradinaru L.M., Plugariu I.A., Mandru M., Tigau D.L. [Viscoelastic behaviour of self-assembling polyurethane and poly\(vinyl alcohol\)](#), *Polymer International*, 69 (2), 149-155 (2020).
21. [Bercea M.*](#), Wolf B.A., [Associative behavior of \$\kappa\$ -carrageenan in aqueous solutions and its modification by different monovalent salts as reflected by viscometric parameters](#), *International Journal of Biological Macromolecules*, 140 (2019) 661–667.
22. Rusu A., Nita L.E., [Bercea M.](#), Tudorachi N., Diaconu A., Pamfil D., Rusu D., Ivan F.E., Chiriac A.*, [Interpenetrated polymer network with modified chitosan in composition and self-healing properties](#), *International Journal of Biological Macromolecules*, 132 (2019) 374–384.
23. [Bercea M.*](#), Biliuta G., Avadanei M., Baron R.I., Butnaru M., Coseri S. [Self-healing hydrogels of oxidized pullulan and poly\(vinyl alcohol\)](#), *Carbohydrate Polymers*, **206**, 210–219 (2019).
24. Teodorescu M.* , [Bercea M.](#), Morariu S. [Biomaterials of PVA and PVP in medical and pharmaceutical applications: Perspectives and challenges](#), *Biotechnology Advances*, **37**, 109–131 (2019).
25. [Bercea M.*](#), Gradinaru L.M., Mandru M., Ciobanu C., Tigau D.L. [Intermolecular interactions and self-assembling of polyurethane with poly\(vinyl alcohol\) in aqueous solutions](#), *Journal of Molecular Liquids*, **274**, 562–567 (2019).
26. [Bercea M.*](#), Wolf B.A.* [Intrinsic viscosities of polymer blends: sensitive probes of specific interactions between the counterions of polyelectrolytes and uncharged macromolecules](#), *Macromolecules*, **51**, 7483–7490 (2018) .
27. Teodorescu M.* , [Bercea M.](#), Morariu S. [Biomaterials of poly\(vinyl alcohol\) and natural polymers](#), *Polymer Reviews*, **58** (2), 247–287 (2018).
28. Nita L.E.* , Chiriac A.P., Rusu A.G., [Bercea M.](#), Diaconu A., Tudorachi N. [Interpenetrating polymer network systems based on poly\(dimethylaminoethyl methacrylate\) and a copolymer containing pendant spiroacetal moieties](#), *Materials Science & Engineering C*, **87**, 22–31 (2018).
29. [Bercea M.*](#), Wolf B.A.* [Viscometry of polyelectrolyte solutions: Star-like versus linear poly\[\[2-\(methacryloyloxy\) ethyl\] trimethylammonium iodide\] and specific salt effects](#), *European Polymer Journal*, **93**, 148–157 (2017) .
30. [Bercea M.*](#), Morariu S., Wolf B.A.* [Consequences of linking charged and uncharged monomers to binary copolymers studied in dilute solution. Part I: Viscometric behavior of the homopolymers, the](#)

- effects of charging, and uncommon salt effects, *European Polymer Journal*, **88**, 412–421 (2017).
31. Bercea M.*, Wolf B.A.* Consequences of linking charged and uncharged monomers to binary copolymers studied in dilute solution. Part II: Non-additivity effects in the viscometric behavior, *European Polymer Journal*, **88**, 422–432 (2017) .
 32. Nita L.E.*, Chiriac A.P., Bercea M., Asanduleasa M., Wolf B.A. Self-assembling of poly(aspartic acid)/BSA mixtures in aqueous solutions, *International Journal of Biological Macromolecules*, **95**, 412–420 (2017).
 33. Bercea M.*, Morariu S., Teodorescu M. Rheological investigation of poly(vinyl alcohol)/poly(N-vinyl pyrrolidone) mixtures in aqueous solution and hydrogel state, *Journal Polymer Research*, **23**, 142(2016).
 34. Bercea M., Navard P.* Comparison of elasticity contributions during the flow of a cellulose derivative solution, *Cellulose Chemistry and Technology*, **50**(5-6), 601–607 (2016).
 35. Bercea M.*, Wolf B.A.* Dependence of solvent quality on the composition of copolymers: Experiment and theory for solutions of P(MMA-*ran-t*-BMA) in toluene and chloroform, *Soft Matter*, **11**, 615–621 (2015).
 36. Bercea M.*, Bibire L.E., Morariu S., Teodorescu M., Carja G. pH influence on rheological and structural properties of chitosan/poly(vinyl alcohol)/layered double hydroxide composites, *European Polymer Journal*, **70**, 147–156 (2015).
 37. Bercea M.*, Morariu S., Bibire L.E., Carja G. Chitosan/poly(vinyl alcohol)/LDH biocomposites with pH-sensitive properties, *International Journal of Polymeric Materials and Polymeric Biomaterials*, **64**(12), 628–636 (2015).
 38. Bercea M.*, Wolf B.A. Thermodynamics of copolymer solutions: How the pair of interactions contribute to the overall effect, *Journal of Physical Chemistry B*, **118**(31), 9414–9419 (2014).
 39. Spatareanu A., Bercea M., Budtova T., Harabagiu V., Sacarescu L., Coseri S.* Synthesis, characterization and solution behaviour of oxidized pullulan, *Carbohydrate Polymers*, **111**, 63–71 (2014).
 40. Brunchi C.E.*, Morariu S., Bercea M. Intrinsic viscosity and conformational parameters of xanthan in aqueous solutions, *Colloids and Surfaces B: Biointerfaces*, **122**, 512–519 (2014).
 41. Bercea M.*, Morariu S., Rusu D. In-situ gelation of aqueous solutions of entangled poly(vinyl alcohol), *Soft Matter*, **9**(4), 1244–1253 (2013).
 42. Bercea M., Nita L.E., Eckelt J., Wolf B.A.* Polyelectrolyte complexes: phase diagram and intrinsic viscosities of the system water/poly(2-vinylpyridinium-Br)/poly(styrene sulfonate-Na), *Macromolecular Chemistry and Physics*, **213**(23), 2504–2513 (2012).
 43. Bercea M., Nichifor M., Eckelt J., Wolf B.A.* Dextran-based polycations: thermodynamic interaction with water as compared with unsubstituted dextran, 2. Flory-Huggins interaction parameter, *Macromolecular Chemistry and Physics*, **212**(17), 1932–1940 (2011).
 44. Bercea M.*, Darie R.N., Nita L.E, Morariu S. Temperature responsive gels based on Pluronic F127 and poly(vinyl alcohol), *Industrial & Engineering Chemistry Research*, **50**, 4199–4206 (2011).
 45. Bercea M., Eckelt J., Morariu S., Wolf B.A.* Islands of immiscibility for solutions of compatible polymers in a common solvent: experiment and theory, *Macromolecules*, **42**(10), 3620–3626 (2009).

46. [Bercea M.](#), Eckelt J., Wolf B.A.* [Vapor pressures of polymer solutions and the modeling of their composition dependence](#), *Industrial & Engineering Chemistry Research*, **48**(9), 4603–4606 (2009).
47. [Bercea M.](#)*, Morariu S., Brunchi C.E. [Rheological Investigation of thermal induced gelation of poly\(acrylonitrile\) solutions](#), *International Journal of Thermophysics*, **30**, 1411–1422 (2009).
48. [Bercea M.](#)*, Bercea M. [Friction reduction in rolling bearing by using polymer additives](#), *Lubrication Science*, **21**, 321–330 (2009).
49. [Bercea M.](#), Eckelt J., Wolf B.A.* [Random copolymers: their solution thermodynamics as compared with that of the corresponding homopolymers](#), *Industrial & Engineering Chemistry Research*, **47**(7), 2434–2441 (2008).
50. [Bercea, M.](#), Wolf, B.A.* [Vitrification of polymer solutions as a function of solvent quality, analyzed via vapor pressures](#), *The Journal of Chemical Physics*, **124**(17), 174902 (7 pages) (2006).
51. [Bercea, M.](#), Wolf, B.A.* [Enthalpy and entropy contributions to solvent quality and inversions of heat effects with polymer concentration](#), *Macromolecular Chemistry and Physics*, **207**, 1661–1673 (2006).
52. [Bercea M.](#)*, Airinei A., Hamciuc V., Ioanid A. [Conformation of polysulfone-*b*-polydimethylsiloxane chains in solution and solid state](#), *Polymer International*, **53**(11), 1860–1865 (2004).
53. [Bercea M.](#), Paleu V., Bercea I. [Lubricant oils additived with polymers in EHD contacts: Part 1 – Rheological behaviour](#), *Lubrication Science*, **16**(2), 3–24 (2004).
54. [Bercea M.](#), Cazacu M., Wolf B.A.* [Conformational variability of polymers and mixing thermodynamics I: Dilute solutions](#), *Macromolecular Chemistry and Physics*, **204**, 1371–1380 (2003).
55. [Bercea M.](#)*, Bercea I. [A Rheological model based on primary laboratory data of the lubricants additived with polymers](#), *Macromolecular Symposia*, **181**, 353–362 (2002).
56. [Bercea M.](#), Bercea I., Nelias D., Flamand L. [Polyethylene as additive for mineral oils. Part II. EHD traction behavior](#), *Tribology Transactions*, **45**(2), 145–152 (2002).
57. [Bercea M.](#), Navard P.* [Shear dynamics of aqueous suspensions of cellulose whiskers](#), *Macromolecules*, **33**, 6011–6016 (2000).
58. [Bercea M.](#), Ioan C., Ioan S., Simionescu B.C.* , Simionescu C.I. [Ultrahigh molecular weight polymers in dilute solutions](#), *Progress in Polymer Science*, **24**, 379–424 (1999).
59. [Bercea M.](#), Morariu S., Ioan C., Ioan S., Simionescu B.C.* [Viscometric study of extremely dilute polyacrylonitrile solutions](#), *European Polymer Journal*, **35**(11), 2019–2024 (1999).
60. [Bercea M.](#), Bercea I., Nelias D., Olaru N.D. [Polyethylene as additive for mineral oils. Part I. Influence of the polymer concentration on the film forming properties in rolling bearing](#), *Tribology Transactions*, **42**(4), 851–859 (1999).
61. [Bercea M.](#)*, Bercea I., Nelias D., Olaru N.D. [Tribological behavior of mineral oils additived with polyethylene](#), *Lubrication Science*, **11**(3), 247–270 (1999).
62. [Bercea M.](#), Peiti C., Navard P.* , Simionescu B.C. [Shear rheology of semidilute poly\(methyl methacrylate\) solutions](#), *Macromolecules*, **26**, 7095–7096 (1993).