

Europass Curriculum Vitae



Personal information

First name(s) / Surname(s) **Maria / Tomoaia-Cotisel**
Address(es) Babes-Bolyai University of Cluj-Napoca, Kogalniceanu Str., no. 1, 400084 Cluj-Napoca (UBB)
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Nationality Romanian
Date of birth September 6, 1948
Gender **Female**

Desired employment / Occupational field **University Professor, Scientific researcher (grade 1), Director of Physical Chemistry Center of Excellency/Teaching, Education, Research, Development and Innovation**

Work experience

Dates **2000- present**
Occupation or position held **University Professor of Physical Chemistry, Thermodynamics, Chemical structure, Biophysics, Nanoscience, Nanotechnology, Material science, Colloidal science, Nanostructured biomaterials**

University Professor at Doctoral School, Babes-Bolyai University of Cluj-Napoca (UBB), teaching the Course entitled *From Atoms, Molecules and Supramolecular Structures to Nanotechnology and Nanomedicine by Atomic Force Microscopy (AFM) and related modern techniques*

Ph. D. Supervisor, in the field of Chemistry, specialty: Physical Chemistry, Thermodynamics, Chemical Structure, Biophysics, Colloid and Surface Chemistry, Nanostructures, Biomaterials, Colloidal systems, Nanostructured Materials, at UBB, *Physical Chemistry Center of Scientific Research Excellency*

2006 – present
Founder, Scientific Research Center in Physical Chemistry (2006)
Director, Scientific Research Center in Physical Chemistry

Excellency: Scientific Research Center of Excellency in Physical Chemistry (2010)

Main activities and responsibilities **Teaching activities** in Physical Chemistry, Thermodynamics, Chemical structure, Biophysics, Nanoscience, Nanotechnology, Material science, Colloidal science, Modern technologies - the state of the art: level - AFM, STM, TEM, SEM imaging, LBT molecular and colloidal self - assemblies, DSC, advanced spectroscopy and related ones.
Projects management: *project manager* for research, development and innovation: 8 national projects, CEEEX, CNCSIS, Romanian Academy; one project at national and international level with World Bank; one project at European level through Impact Program, ANCS and European Structural Funds; *member of the research team* for more than 15 national projects.
Leader for seven international academic and scientific collaborations between Babes-Bolyai University of Cluj-Napoca (UBB) and University of London, King's College, U.K., UBB and University of Marburg, Germany; UBB and University of Moldova, Chisinau, Republic of Moldova; UBB and Aristotle University of Thessaloniki, Greece; UBB and University of Paris South, Paris, France; UBB and SUNY at Buffalo, NY, USA; UBB and Molecular/Structural Biotechnology, NIH, Bethesda, MD, USA.

Main activities and responsibilities (continuation)	<p><i>Scientific research</i> in development and innovation for <i>advanced nanostructured materials</i> and applied <i>drug delivery systems</i> (e.g., transport vectors to the central nervous system through blood brain barrier)</p> <ul style="list-style-type: none"> - preparation of <i>intelligent (smart) nano composites</i> similar to natural bone in structure and properties by innovative manufacturing processes and physical, chemical and biological characterization in cell culture of osteoblasts (bone forming cells); characterization by XRD, FTIR, NMR, DSC, TG, DTA, total surface area and porosity (BET method), zeta potential; - preparation of <i>nano powders of calcium phosphates</i> and physical and chemical characterization by XRD, FTIR, NMR, DSC, TG, DTA, total surface area and porosity (BET method), zeta potential; - <i>metal nanoparticles of gold and silver</i>, preparation, size characterization by TEM, SEM and AFM; zeta potential, UV-Viz spectroscopy and surface plasmon technique; their interactions with biomolecules, like amino acids, proteins and carbohydrates; - preparation of <i>nano structured biomaterials</i> made by self-assembly technique, layer by layer deposition, Langmuir-Blodgett assembly and physical and chemical characterization by FTIR; imaging techniques; NMR; calorimetry applied on biomaterials based on collagen and various nano powders - preparation and characterization of <i>collagen fibers</i> obtained by self-assemblies at the air-water interface or by deposition technique on solid surface from aqueous dispersion of collagen in the absence or in the presence of <i>anti-cancer drugs</i>, like 5-fluoro uracyl and doxorubicin; pioneering work at national and international level; force distance curves and AFM images; - preparation and characterization of various <i>composite materials</i> based on inorganic nano powders and different polymers, like chitosan or collagen - preparation of <i>scaffolds made from nanostructured materials</i> and their biological characterization in cell culture media, in the presence of <i>osteoblast cells</i>; biophysical activity of osteoblasts is evaluated by cell collagen production and new bone development on the scaffold surface in cell culture - <i>supramolecular associations</i> by molecular recognition between cyclodextrins and various biomolecules, such as quercetin or alpha lipoic acid; - monolayers, vesicles and liposomes as membrane models - the interaction of red blood cells and procaine by AFM imaging techniques – pioneering work at national and international level - the physical, chemical and morphological characterization of <i>starch from potatoes and maize</i> used for packaging material preparation by green chemistry methods; thermal transformations within starch granules and their correlation with gelatinization characteristics in the advanced process of packaging material production
Name and address of employer	Babes-Bolyai University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering, Physical Chemistry Department (UBB)
Type of business or sector	Education, Research, Development and Innovation, Governmental public sector
Dates	1998 - 1999
Occupation or position held	<i>Reader in Physical Chemistry</i> , at UBB, Physical Chemistry Department, Division of <i>Thermodynamics, Biophysics, and Colloid and Surface Chemistry</i>
Main activities and responsibilities	<p><i>Teaching activities</i> in Physical Chemistry, Thermodynamics, Chemical structure, Biophysics, Nanoscience, Nanotechnology, Material science, Colloidal and Interfacial science;</p> <p><i>Project management; project manager</i> for research, development and innovation in thin films as membrane models, national projects; drug chemistry and biophysics;</p> <ul style="list-style-type: none"> -preparation and characterization of <i>lipid monolayers</i> at the air-water interface; thin solid films of lipids and anesthetics; Langmuir-Blodgett self-assembly of lipids; phase transition characterization; elastic properties
Name and address of employer	Babes-Bolyai University of Cluj-Napoca, Physical Chemistry Department (UBB)
Type of business or sector	Education, Research, Development and Innovation, Governmental public sector
Dates	1989 - 1997
Occupation or position held	<i>Associated Professor in Physical Chemistry</i> at UBB, Physical Chemistry Department
Main activities and responsibilities	Research and teaching activities in physical chemistry and biophysics through academic international cooperation between UBB and other prestigious Universities and Research Institutions; long term international collaboration.
Name and address of employer	Babes-Bolyai University of Cluj-Napoca, Physical Chemistry Department (UBB)
Type of business or sector	Education, Research, Development and Innovation, Governmental public sector
Dates	1993 – 1997
Occupation or position held	Visiting scientist/ visiting professor

- Main activities and responsibilities Research, development and innovation and teaching activities in physical chemistry and biophysics through academic international cooperation; director of the research and development (R & D) section, innovation and patent applications; drug delivery to the brain; drug development.
- Name and address of employer Molecular/structural Biotechnology, NIH, Bethesda, MD, USA
- Type of business or sector Research and teaching / Governmental public sector
- Dates **1991 – 1993**
- Occupation or position held Visiting scientist/ visiting professor
- Main activities and responsibilities Research, development and innovation and teaching activities in chemical physics and physical chemistry and biophysics, membrane research and development, through academic international cooperation; career perfection in biological systems; liposomal drug delivery systems; thermodynamics approach of interaction between drugs and liposomal membranes; unilamellar liposomes; multilamellar vesicles, DSC of main phase transition in lipidic (DPPC) dispersed systems; self-assembled monolayers at gas/liquid and liquid/liquid interfaces as membrane models, that offer selective methods of great practical significance for investigations in thermodynamics and biophysics of membranes and thin layers with industrial and medical applications, like medical devices and biosensors.
- Name and address of employer National Institutes of Health, NIH, Bethesda, MD, USA
- Type of business or sector Research and teaching / Governmental public sector
- Dates **1990 – 1991**
- Occupation or position held Visiting scientist/ visiting professor
- Main activities and responsibilities Research, development and innovation and teaching activities in physical chemistry and biophysics, membrane research and development, through academic international cooperation; a series of studies of nucleation and stability of thin films at fluid interfaces, that led to a kinetic model for quantitative investigations of relaxation phenomena and of collapse mechanism in oriented layers, Langmuir-Blodgett layers with sensor applications; innovative methods for calibration of lasers; nonlinear properties of carotenoid pigments.
- Name and address of employer State University of New York, SUNY, at Buffalo, Department of Chemistry and Photonics
- Type of business or sector Research and teaching / Governmental public sector
- Dates **1989 – 1990**
- Occupation or position held Humboldt visiting researcher
- Main activities and responsibilities Research, development and innovation and teaching activities in physical chemistry and biophysics, membrane and interfacial film research and development of thin layers of lipids and anesthetics, through academic international cooperation; developed new thermodynamic models of adsorption; biophysical characterization of surfactant self-assemblies in various media, containing electrolytes.
- Name and address of employer Philipps University of Marburg, Physical Chemistry Department, Marburg, Germany
- Type of business or sector Research and teaching / Governmental public sector
- Dates **June – September, 1989**
- Occupation or position held Visiting researcher/visiting professor
- Main activities and responsibilities Research, development and innovation in chemical physics and physical chemistry and biophysics, membrane research and development, through academic international *long-term cooperation* and *international contract* between **UBB** and University of London on my Ph.D. thesis (since 1980).
- Name and address of employer King's College, *Biochemistry and Biophysical Chemistry* Departments, University of London, U.K.
- Type of business or sector Governmental and private sector, British Council fellowship.
- Dates **1984 – 1989**
- Occupation or position held Senior Lecturer in Physical Chemistry, Thermodynamics, Chemical Structure, Colloidal Chemistry and Interfacial Phenomena, Membrane science
- Main activities and responsibilities Research, development and innovation and teaching activities in physical chemistry, thermodynamics and chemical structure; membrane models at fluid interfaces; Marangoni instability; hydrodynamics of thin liquid films in microgravity conditions; research and development in thin films of biomolecules. *International contract* between **UBB** and NASA of USA (**1978-1985**) on "**the flow of liquid surfaces in the absence of gravity**", accepted by NASA to be implemented on spatial laboratories of Columbia. This contract was the first international contract of UBB.
- Name and address of employer Babes-Bolyai University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering, Physical Chemistry Department
- Type of business or sector Research and teaching / Governmental public sector

Dates **June – September, 1986**
 Occupation or position held *Visiting Researcher/Visiting Professor*
 Main activities and responsibilities Research and teaching activities in physical chemistry and biophysics through academic international cooperation; advanced studies on Langmuir monolayers of various lipids – extracted from natural membranes; surface pressure and surface potential measurements related with elasticity of self-assemblies of lipids at fluid interfaces. Collapse mechanisms in lipid films. Academic international *long-term cooperation* and *international contract* between **UBB** and University of London on my Ph.D. thesis (since 1980).
 Name and address of employer King's College, *Biochemistry and Biophysical Chemistry* Departments, University of London, London, U.K.
 Type of business or sector Education, Research, Governmental public and private sector; British Council fellowship.

Dates **June – September, 1981**
 Occupation or position held *Post-doctoral appointment ./ Visiting researcher*
 Main activities and responsibilities Research activities in physical chemistry and biophysics of lipid membranes; *My Ph D thesis* was contracted by the University of London, through academic international cooperation between UBB and University of London (*first international contract* of UBB and long term collaboration with University of London, since 1980). Phase diagrams of thin lipid films at collapse. Relaxation phenomena in lipid thin films followed by interfacial tension measurements.
 Name and address of employer King's College, *Biochemistry and Biophysical Chemistry* Departments, University of London, London, U.K.
 Type of business or sector Education, Research, Governmental public and private sector

Dates **1971 - 1984**
 Occupation or position held *Assistant Professor of Physical Chemistry*
 Main activities and responsibilities Research and teaching activities in physical chemistry, kinetics, chemical structure, quantum chemistry, thermodynamic, molecular structure and symmetry as well as colloid and surface chemistry. Developed new methods to measure surface tension with high precision at fluid interfaces. Important results on the thin films of carotenoids at fluid interfaces, prepared by self-assembly Langmuir and Langmuir-Blodgett techniques are incorporated into my Ph. D. thesis.
 Name and address of employer Babes-Bolyai University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering, Physical Chemistry Department
 Type of business or sector Education, Research, Development and Innovation, Governmental public sector

Education and training

Dates **1980**
 Title of qualification awarded **Ph.D. Diploma** in Chemistry, specialty in Physical Chemistry.
 Principal subjects/occupational skills covered **Ph.D. Thesis** on "The study of some films of natural pigments and lecithins", presented on December 1979.
 Theoretical and experimental ability to build thin films of lecithins and carotenoids, as natural membranes models. Structural and thermodynamic characterization of spread Langmuir layers and adsorbed Gibbs layers at different interfaces. Developed new modern techniques, based on pendant drop method and Wilhelmy plate method, to measure surface tension with high precision at fluid interfaces in the presence of biomolecules. Thin films of carotenoids at fluid interfaces prepared by self-assembly Langmuir and Langmuir-Blodgett techniques. This work remains a *pioneering work* in the world community. *My Ph. D. thesis* is the basis of the first *international contract* between UBB and the University of London, and generated the academic international long term collaboration with University of London, since 1980.

Name and type of organisation providing education and training Babes-Bolyai University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering, Arany J. Str., no. 11. 400028 Cluj-Napoca

Level in national or international classification **ISCED 6**

Dates **1966-1971**
 Title of qualification awarded **Bachelor of Science, Licence Diploma (1971)** in Chemistry; plus two years for specialty in Physical Chemistry

Principal subjects/occupational skills covered Chemical science and physical chemistry / theoretical and experimental solid knowledge in thermodynamics and quantum chemistry as well as strong practical skills in kinetics approach of hydrolysis of organic molecules both in acid and basic medium.

Name and type of organisation providing education and training Babes-Bolyai University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering, Arany J. Str., no. 11. 400028 Cluj-Napoca

Level in national or international classification **ISCED 6**

Dates 1962-1966

Title of qualification awarded High School, Baccalaureate, Diploma (1966); Theoretical Lyceum, mathematics and physics.

Principal subjects/occupational skills covered Advanced knowledge of mathematics and physics as well as literature.

Personal skills and competences

Mother tongue(s) Romanian

Other language(s)

Self-assessment

European level (*)

English

French

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
French	C1	C1	B2	B2	B1

(*) Common European Framework of Reference for Languages

Social skills and competences Sociable; friendly personality; honest speaking; open mind; team work experience (planning, organizing, problems solver); communicative at work; large experience in working in national and international research teams

Excellent ability to adapt to multicultural environment; good leader; manager skills and ability; communication and public speech skills, gained from teaching activities and from participating in conferences and symposia or from different public events.

Organisational skills and competences Problem-solving attitude; optimist and positive thinking person; extraordinary ability in science and teaching; ability to schedule and meet the deadlines for any type of activity, including project activities

Capable to manage various tasks in a given period of time; reliable person in a research team. Organizational skills gained from advisor for diploma projects

Technical skills and competences Valuable expertise in leading national projects and international collaborative scientific work; expert at national and international level in nanoscience, nanostructured materials, nano composites, nanotechnology, material science; membrane models, drug design, drug transport carriers; efficient scientist both in theoretical field of physical chemistry and biophysics, and in experimental techniques; able to design medical devices based on sensing surfaces for amino acids and proteins; great skills to design new composites for bone substitutes; skills for experimental physical chemistry.

Computer skills and competences Editing: Microsoft word; Power point; Microsoft excel, Internet technology, MedLine, Pub Med; Scopus.

Artistic skills and competences Literature and music, both for leisure

Other skills and competences - good manager leading well and efficiently the research team in stressful situations; responsible

- **2001 "Mini-Med School", Certificate of Achievement** awarded in recognition of successful completion, **NIH, SUA.**

- Other skills and competences - Important expertise in patent search and classification; ability to make inventions and writing patents
- Scientific expert to evaluate project proposals at national and international levels
 - Scientific referee at national (Revue Roumaine Chimie, Studia, Babes-Bolyai University, Chemistry) and international peer review journals (Journal of Colloid and Interface Science (USA), Colloids and Surfaces A: Physicochemical and Engineering Aspects (Elsevier), Colloids and Surfaces B. Biomembranes (Elsevier), Central European Journal of Chemistry, Annali di Chimica (Italy), Langmuir, Thin solid films (Elsevier).
 - Member in many professional societies: Humboldt Association of Scientists in Transylvania, Romania, Humboldt Association of Scientists in North America, American Chemical Society, Romanian Physical Chemistry Association of Colloid and Surface Science, Romanian Physical Chemistry Association, American Biophysical Society, American Association for the Advancement of Science, Romanian Chemical Society, Romanian Society of Biomaterials, Romanian Society of Pure and Applied Biophysics
 - Well recognized scientist and university professor in the scientific community.

Driving Licence No

Awards, honors, and other special scientific recognition -1983: Prestigious *Gheorghe Spacu Award* of the Academy of Sciences in Romania for **“Physical chemistry of interfacial films”**; **scientific collaboration with NASA of USA**;

International (9) and national (1) prizes. -1986: Prestigious *Alexander von Humboldt Fellowship/Award* (research program done in 1989/1990); *specialty in biophysics*, at the Philipps University of Marburg, Germany, for “Thermodynamics of adsorption and biophysical characterization of surfactant self-assemblies in various media, containing electrolytes”.

-1988: *Meritorius Professorship Award of Japan Society for Promotion of Science and Technology* for “Molecular orientation and packing in the Surface lattice, supramolecular associations and thin films”

-1990: *Visiting Professor/Scientist* in State University of New York (SUNY) at Buffalo, USA, for “A series of studies of nucleation and stability of thin films at fluid interfaces, that led to a kinetic model for quantitative investigations of relaxation phenomena and of collapse mechanism in oriented layers”

-1991: Prestigious *Visiting Scientist Award of Fogarty, International Center at National Institutes of Health (NIH)*, Bethesda, Maryland, USA, for “Self-assembled monolayers at gas/liquid and liquid/liquid interfaces as membrane models, that offer selective methods of great practical significance for investigations in thermodynamics and biophysics of membranes and thin layers”.

-1991: *International Scientific Exchange Award from Natural Sciences and Engineering Research Council (NSERC) of Canada* for “Surface characteristics of complex lipids extracted from *Halobacterium cutirubrum*”.

- 1994: *International prize, Visiting Scientist of Extraordinary Ability*, obtained in USA.

--1981, 1986, 1989: **International Collaboration (joint studies and research)** (Post Doctoral and Visiting Professor Fellowship from British Council at University of London, King's College, U.K.; international contract since 1980).

1987, 1989: *Curriculum Vitae* in “The International Register of Profiles”, International Biographical Center, (CBI), Cambridge, UK, Vol. **9** (page 798) and **11** (page 697);

-1988: *Curriculum Vitae* in “Foremost Women of the Twentieth Century”, International Biographical Center, (CBI), Cambridge, UK, First Edition, page 500;

1988: *Curriculum Vitae* in “The World Who's Who of Women”, International Biographical Center, (CBI), Cambridge, UK, First Edition, page 500.

-2009: *Curriculum Vitae* in “Who is Who”, *Enciclopedia Personalităților din România*, Ed. a 4-a, Verlag für Personnenzyklopadien AG, CH-6304 Zug, Alpenstrasse 16 (2009).

Additional information ♦ In the last 10 years: over 100 publications, in ISI quoted Journals; 8 books; over 50 invited lectures and seminars at prestigious Universities and research Institutions or Symposia and Conferences

♦ <http://www.chem.ubbcluj.ro/romana/ANEX/cf/pcas/index.htm>

♦ **Some examples of papers ISI:**

- 1) U. V. Zdrenghia, Gh. Tomoaia, D.-V. Pop-Toader, A. Mocanu, O. Horovitz and **M. Tomoaia-Cotisel**, "Procaine effect on human erythrocyte membrane explored by atomic force microscopy", *Combinatorial Chemistry & High Throughput Screening*, **14** (4), 237-247 (2011).
- 2) Gh. Tomoaia, P. T. Frangopol, O. Horovitz, L.-D. Bobos, A. Mocanu and **M. Tomoaia-Cotisel**, "The effect of arginine on gold nanoparticles in colloidal solutions and in thin films", *Journal of Nanoscience and Nanotechnology*, **11**, 7762-7770 (2011).
- 3) A. Avranas, A. Konstantinou, A. Mocanu and **Maria Tomoaia-Cotisel**, "Adsorption of procaine at the mercury/electrolyte solution interface", *Colloids and Surfaces A: Physicochem. Eng. Aspects*, **332**, 36-42 (2009).
- 4) A. Mocanu, I. Cernica, Gh. Tomoaia, L.-D. Bobos, O. Horovitz and **M. Tomoaia-Cotisel**, "Self-assembly characteristics of gold nanoparticles in the presence of cysteine", *Colloids and Surfaces A: Physicochem. Eng. Aspects*, **338**, 93-101 (2009).
- 5) P. Joos, A. Tomoaia-Cotisel, A. J. Sellers and **M. Tomoaia-Cotisel**, "Adsorption kinetics of some carotenoids at the oil/water interface", *Colloids and Surfaces. B. Biointerfaces*, **37**, 83-91 (2004).
- 6) Gh. Tomoaia, A. Tomoaia-Cotisel, **M. Tomoaia-Cotisel**, and A. Mocanu, "Kinetic study of adsorption of some biocompounds at the oil/water interface", *Centr. Eur. J. Chem.*, **3**(2), 347-360 (2005).
- 7) O. Horovitz, Gh. Tomoaia, Cs. Racz, A. Mocanu, L. Bobos and **M. Tomoaia-Cotisel**, "Surface properties of some carotenoids spread in monolayers at the air/water interface. Experimental and computational approach", *Centr. Eur. J. Chem.*, **4**(3), 489-501 (2006).
- 8) R. Katz, **M. Tomoaia-Cotisel**, M. C. Rattazzi and P. Fishman, "Docosahexaenoic acid/poly-L-lysine conjugates bind to the cerebrovascular endothelium", *J. Mol. Neurosci.*, **33**, 133-134 (2007).
- 9) O. Cozar, N. Leopold, C. Jelic, V. Chis, L. David, A. Mocanu, and **M. Tomoaia-Cotisel**, "IR, Raman and surface-enhanced Raman study of desferrioxamine B and its Fe (III) complex, ferrioxamine B", *J. of Molecular Structure*, **788**, 1-6 (2006).
- 10) O. Horovitz, Gh. Tomoaia, A. Mocanu, T. Yupsanis and **M. Tomoaia-Cotisel**, "Protein binding to gold colloids", *Gold Bulletin*, **40** (3), 213-218 (2007).
- 11) O. Horovitz, Gh. Tomoaia, A. Mocanu, T. Yupsanis and **M. Tomoaia-Cotisel**, "Protein binding to gold auto-assembled films", *Gold Bulletin*, **40** (4), 295-304 (2007).

Over 40 scientific papers were published in collaboration with foreign scientists from UK (27 papers), USA (9 papers and 4 patents), Germany (two papers) and from Greece (6 papers). Relative Impact Factor per Journals, IF is 38.227 and Relative Score of influence per journals, RS is 63.866.

♦ **Selected ISI Papers published in collaboration with foreign scientists**

- 12) **M. Tomoaia-Cotisel**, A. Sen and P. J. Quinn, "Surface active properties of 1,2-distearoylgalactosylglycerols", *J. Colloid Interface Sci.*, **94**, 390-398 (1983). **Cited 15**
- 13) **M. Tomoaia-Cotisel**, J. Zsakó, E. Chifu and P. J. Quinn, "Influence of electrolytes on the monolayers properties of saturated galactolipids at the air/water interface", *Chem. Phys. Lipids*, **34** (1), 55-64 (1983). **Cited 20**
- 14) **M. Tomoaia-Cotisel**, J. Zsakó, A. Mocanu, M. Lupea and E. Chifu, "Insoluble mixed monolayers. III. The ionization characteristics of some fatty acids at the air/water interface", *J. Colloid Interface Sci.*, **117** (2), 464-476 (1987). **Cited 50**
- 15) **M. Tomoaia-Cotisel**, J. Zsakó, E. Chifu and P. J. Quinn, "Intermolecular interactions in lipid-carotenoid monolayers", *Biochem. J.*, **248**, 877-882(1987). **Cited 10**
- 16) **M. Tomoaia-Cotisel**, J. Zsakó, A. Mocanu, E. Chifu and P.J. Quinn, "Monolayer properties of membrane lipids of the extreme halophile *Halobacterium cutirubrum* at the air/water interface", *Biochim. Biophys. Acta*, **942**, 295-304 (1988). **Cited 15**
- 17) P. J. Quinn, M. Kates, J. F. Toccanne and **M. Tomoaia-Cotisel**, "Surface characteristics of phosphatidylglycerol phosphate from the extreme halophile *Halobacterium cutirubrum* compared with those of its deoxy analogue at the air/water interface", *Biochem. J.*, **261**, 377-381 (1989). **Cited 17**
- 18) **M. Tomoaia-Cotisel**, J. Zsakó, E. Chifu and D. A. Cadenhead, "Relaxation phenomena in apocarotenoid monolayers", *Langmuir*, **6** (1), 191-197 (1990). **Cited 15**
- 19) J. Zsakó, **M. Tomoaia-Cotisel**, E. Chifu, A. Mocanu and P. T. Frangopol, "Influence of stearic acid monolayers upon the procaine adsorption from underlying alkaline aqueous solutions", *Biochim. Biophys. Acta*, **1024**, 227-232 (1990). **Cited 10**

Additional information

- 20) **M. Tomoaia-Cotisel**, "On the mechanism of procaine penetration into stearic acid monolayers spread at the air/water interface", *Progr. Colloid Polym. Sci.*, **83**, 155-166 (1990). **Cited 12**
- 21) **M. Tomoaia-Cotisel** and D. A. Cadenhead, "Interaction of procaine with stearic acid monolayers at the air/water interface", *Langmuir*, **7**, 964-974 (1991). **Cited 27**
- 22) L. J. Noe, **M. Tomoaia-Cotisel**, M. Casstevens and P. N. Prasad, "Characterization of Langmuir-Blodgett films of 3,4-didecyloxy-2,5-di(4-nitrophenylazomethine) thiophene in a stearic acid matrix", *Thin Solid Films*, **208**, 274-279 (1992). **Cited 8**
- 23) M. E. Orczyk, M. Samoc, J. Swiatkiewicz, N. Manickam, **M. Tomoaia-Cotisel** and P. N. Prasad, "Optical heterodyning of the phase-tuned femtosecond optical Kerr gate signal for the determination of complex third-order susceptibilities", *Appl. Phys. Lett.*, **60** (23), 2837-2839 (1992); **Cited 16**
- 24) **M. Tomoaia-Cotisel**, E. Chifu, J. Zsakó, A. Mocanu, P. J. Quinn and M. Kates, "Monolayer properties of archaeol and caldarchaeol polar lipids of a methanogenic archaeobacterium, *Methanospirillum hungatei*, at the air/water interface", *Chem. Phys. Lipids*, **63**, 131-138 (1992). **Cited: 17**
- 25) B. Asgharian, D. A. Cadenhead and **M. Tomoaia-Cotisel**, "An epifluorescent microscopy study of the effects of procaine on model membrane systems", *Langmuir*, **9**, 228-232 (1993). **Cited 11**
- 26) **M. Tomoaia-Cotisel** and I.W. Levin, "Thermodynamic study of the effects of ursodeoxycholic acid and ursodeoxycholate on aqueous dipalmitoyl phosphatidyl choline bilayer dispersions", *J. Phys. Chem., B*, **101** (42), 8477-8485 (1997). **Cited 10**

Monograph or edited book at prestigious international publishing houses.

M. Tomoaia-Cotisel and P.J.Quinn, "Chapter 10: Biophysical Properties of Carotenoids" in "Subcellular Biochemistry, Vol. 30: Fat-Soluble Vitamins" Editors: P.J. Quinn and V. Kagan, **Plenum Press**, New York, **1998**, pp. 219-242; this monograph is held at many well known universities (e.g., King's College, Imperial College, Chelsea College, University of London, Philipps University of Marburg, Stanford University, Harvard University, George Town University, George Washington University, Johns Hopkins University, Pennsylvania University, Cambridge University and research institutes (e.g., NIH).

◆ **Hirsch index** is **16** for articles, indexed in the Web of Science data base on project leader name (M. Tomoaia and M. Tomoaia-Cotisel).

◆ **HIRSCH INDEX** becomes **19** (including citations on patents)

◆ **Total Citations** are **764** - for original ISI articles and including citations on patents become **862**.

◆ **Intellectual property PATENTS**: ◆Three **USPTO** and one **WIPO** (TTPC: transfer technology to pharmaceutical companies) all active patents for 17 years from their publication and one patent application OSIM (Romania).

1) R. Katz and **M. Tomoaia-Cotisel**, "Lipophilic-polycationic delivery systems", United States Patent Number 6,005,004, Dec. 21, 1999. **Cited 43** (TTPC)

2) R. Katz and **M. Tomoaia-Cotisel**, "Method for delivering active agents to mammalian brains in a complex with eicosapentaenoic acid or docosahexaenoic acid-conjugated polycationic carrier", United States Patent Number 5,716,614, Feb. 10, 1998. **Cited 33** (TTPC)

3) R. Katz and **M. Tomoaia-Cotisel**, "Carrier compositions for anti-neoplastic drugs", United States Patent Number 5,925,669, Jul. 20, 1999. **Cited 20** (TTPC)

4) R. Katz and **M. Tomoaia-Cotisel**, "Site-specific biomolecular complexes", World Intellectual Property Organization (WIPO), WO 96/04001, 1996. **Cited 2** (TTPC)

5) Gh. Tomoaia, **M. Tomoaia-Cotisel**, L. B. Pop, A. Mocanu si A. Pop, "Nanopowders of hydroxyapatite and its substituted derivatives with medical applications and their fabrication procedure. Romanian Patent application, OSIM/ Bucharest, Romania, nr. A00523, June 14, 2010.

◆ **Total Citations – over 1000 citations** - including original articles, indexed in the Web of Science database, patents, **CNCSIS** articles and citations of **books**.

Additional information

- **Books and contributions to books (11 books)**

- 1) **M. Tomoaia-Cotisel**, O. Horovitz and A. Mocanu, "Applied Chemical Thermodynamics in Engineering and Material Science", University Press, Cluj-Napoca, **2009**, ISBN: **978-973-610-942-3**.
- 2) **M. Tomoaia-Cotisel**, I. Albu and E. Chifu, "Chemical Thermodynamics", The 2nd Edition, University Press, Cluj-Napoca, **2009**; ISBN: **978-973-610-941-6**.
- 3) **M. Tomoaia-Cotisel**, I. Albu and E. Chifu, "Chemical Thermodynamics", The First Edition, University Press, Cluj-Napoca, **2009**; ISBN: **978-973-610-892-1**.
- 4) **M. Tomoaia-Cotisel**, O. Horovitz, A. Mocanu, I. Albu and Cs. Racz, "Chemical Thermodynamics in Numerical Applications, Diagrams and Tests", The 2nd *Edition*, University Press, Cluj-Napoca, **2008**; ISBN: **978-973-610-691-0**.
- 5) **M. Tomoaia-Cotisel**, O. Horovitz, A. Mocanu, I. Albu and Cs. Racz, "Chemical Thermodynamics in Numerical Applications, Diagrams and Tests", The First Edition, University Press, Cluj-Napoca, **2007**; ISBN: **978-973-610-550-0**.
- 6) M.-I. Salajan, A. Mocanu and **M. Tomoaia-Cotisel**, "*Progresses in Thermodynamics, Hydrodynamics and Biophysics of Thin Layers*", University Press, Cluj-Napoca, **2004**; ISBN: **973-610-235-1**. Received a *book award* in 2005 from Scientific Committee at "Babes-Bolyai" University in Cluj-Napoca.
- 7) E. Chifu, **M. Tomoaia-Cotisel**, I. Albu, A. Mocanu, M.-I. Salajan, Cs. Racz and V.D. Pop, "*Experimental Methods in Chemistry and Biophysics of Colloids and Interfaces*", University Press, Cluj-Napoca, **2004**; ISBN: **973-610-242-4**.
- 8) E. Chifu, "*Chemistry of Colloids and Interfaces*", Editors: **M. Tomoaia-Cotisel**, I. Albu, A. Mocanu, M. Salajan, E. Gavrilă and Cs. Racz, University Press, Cluj-Napoca, **2000**; ISBN: **973-8095-08-5**.
- 9) **M. Tomoaia-Cotisel** and P.J. Quinn, "*Chapter 10: Biophysical Properties of Carotenoids*" in "*Subcellular Biochemistry, Vol. 30: Fat-Soluble Vitamins*" Editors: P.J. Quinn and V. Kagan, Plenum Press, New York, **1998**, pp. 219-242. ISBN: **0-306-45846-2**.
- 10) J. Zsako and **M. Tomoaia-Cotisel**, "*Symmetry and Molecular Structure*", University Press, Cluj-Napoca, **1998**; ISBN: **973-9354-60-2**.
- 11) **M. Tomoaia-Cotisel**, "The nanostructure formation of the globular seed storage protein on different solid surfaces studied by atomic force microscopy", in *Convergence of Micro-Nano-Biotechnologies*, Series in *Micro and Nanoengineering*, **Volume 9**, Editors: Maria Zaharescu, Emil Burzo, Lucia Dumitru, Irina Kleps and Dan Dascalu, *Romanian Academy Press*, Bucharest, **2006**, pp. 147 - 161. ISBN: (10) 973-27-1422-0; ISBN: (13) 978-973-27-1422-5.

◆ The said 11 books are also important and relevant to the project subject covering science from atoms, molecules, biomaterials, nanoparticles to self assemblies and nanostructures of biophysical and medical interest.

Monograph – book 9 – is held at many prestigious universities and research institutes

The **books 1-8**, as well as **10 and 11** are held at well known university libraries in Romania and/or donated to prestigious universities and research institutes abroad.

◆ **Foreign experience of the project leader:** Total period of time employed abroad as a researcher or benefiting more scholarships or fellowships: **8 years and 8 months**

◆ Over **100 invited talks** at prestigious international conferences and at foreign famous universities and/or well known research institutes, particularly in the frame of bilateral collaborations.

◆ In recognition of my scientific activity, I am a member in 10 professional societies, four international and six national ones, related to chemistry, physical chemistry, biophysics, biomaterials, nanostructures, surface science, nanotechnology and nanoscience.

◆ I am the founder and the director of the **Research Center of Excellency in Physical Chemistry** at my university in Cluj-Napoca (<http://chem.ubbcluj.ro/romana/ANEX/cf/pcas/>).

◆ From **2005**, I am a *National and an International Expert* in Physical Chemistry, Science of nanostructured biomaterials, Nanoscience and Nanobiotechnology.

◆ **2010** in the quality of *Evaluator/Expert* International in European Community, I evaluated several scientific project proposals within the Operational Programme Research and Development for Innovations, European Structural Funds, (priority axis 2) in Prague, Czech Republic.

Additional information

- **Relevant projects**

- ***Project manager***

5 (CEEX) /2005 - Strategies of interfacial nanofabrication in research and development of some novel functional nanomaterials and plan supramolecular structures for nanotechnology and nanodevices

127 (Academy) /2005 - Thermodynamic and kinetic study of the formation of nanostructured systems at interfaces. Theory and experiments.

1312 (CNCSIS) /2006 - Research and development of some nanostructures of biological interest. Organization of nanoparticles in complex superstructures with applications in nanosciences.

994 / 2007 - Impact program - ANCS – European structural funds – Research, development and innovation for nanobiostructures and multifunctional supramolecular systems

- ***Project scientific responsible:***

B.50 / 2000 international grant, World Bank and CNCSIS, Realization of a scientific platform with modern techniques for multiple users

591 (CEEX) / 2006 - New ionomer biocomposites based on modified polialchenoic acids with resins and surface active glasses with multiple applications in medicine

41-050 / 2007 - Methods and technologies based on molecular and cellular medicine with applications in surgery and treatment of bone cancer, bone metastases and osteo-articular lesions.

31– 039 / 2007 - The development of ecological products from biodegradable materials, designated for realization of packages and protection elements.

Here, I certify that the above statement is true.

Date: October 30, 2011

Univ. Prof. Dr. Maria Tomoaia-Cotisel