

# Professor Dr. Ing. Gheorghe MARIA

University "POLITEHNICA" Bucharest  
Faculty of Applied Chemistry and Materials Science  
Department of Chemical Engineering



## Contact information

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## Education and training

Dates	1981-1987
Title of qualification awarded	PhD in Chemical Engineering
Principal subjects/occupational skills covered	Chemical and Biochemical Reactors, (Bio)chemical kinetics, Numerical and Statistical Methods, Optimization, Risk and sensitivity analysis
Name and type of organisation providing education and training	University Politehnica of Bucharest (Romania), Dept. of Chemical Engineering (Polizu Str. 1)
Level in national or international classification	PhD
Dates	1974-1979
Title of qualification awarded	Diplomat Engineer (Master of Science)
Principal subjects/occupational skills covered	Chemical engineering (Mathematics, Chemistry, Physics, Mechanics, Numerical calculus, Transport phenomena, Chemical and biochemical reaction engineering, Unit operations, Plant optimisation, etc.)
Name and type of organisation providing education and training	University Politehnica of Bucharest, Romania
Level in national or international classification	BSc and MSc
Dates	1970-1974
Title of qualification awarded	Baccalaureate
Principal subjects/occupational skills covered	High School (Lyceum) level
Name and type of organisation providing education and training	Lyceum "Gheorghe Lazar" in Bucharest, Romania
Level in national or international classification	High School

## Professional experience

Dates	2002-2003
Occupation or position held	Visiting Research Scientist
Main activities and responsibilities	Research and teaching activities in the molecular biology / metabolic engineering
Name and address of employer	Texas A&M University (College Station, Texas, USA), Dept. of Chemistry, Biochemistry, and Bioengineering
Type of business or sector	Research + Tutorship (Educational)
Dates	1999-in present
Occupation or position held	Professor in Chemical & Biochemical Reaction Engineering
Main activities and responsibilities	Teaching and research activities in the (bio)chemical engineering field
Name and address of employer	University Politehnica of Bucharest (Romania), Dept. of Chemical Engineering (Polizu Str. 1)
Type of business or sector	Education + Research
Dates	1997-1999

Occupation or position held	Associate Professor in Chemical & Biochemical Reaction Engineering
Main activities and responsibilities	Teaching and research activities in the (bio)chemical engineering field
Name and address of employer	University Politehnica of Bucharest (Romania), Dept. of Chemical Engineering (Polizu Str. 1)
Type of business or sector	Education + Research
Dates	1992-1997
Occupation or position held	Assistant Professor
Main activities and responsibilities	Teaching and research activities in the (bio)chemical engineering field
Name and address of employer	Swiss Federal Institute of Technology - ETH Zürich (Switzerland), Chemical Engineering Department, (UniversitatStrasse 6, CH-8092)
Type of business or sector	Education + Research
Dates	1990-1991
Occupation or position held	Lecturer in Chemical & Biochemical Reaction Engineering
Main activities and responsibilities	Teaching and research activities in the chemical engineering field
Name and address of employer	University Politehnica of Bucharest (Romania), Dept. of Chemical Engineering (Polizu Str. 1)
Type of business or sector	Education + Research
Dates	1982-1990
Occupation or position held	Research Engineer
Main activities and responsibilities	Research activities in the chemical engineering field (catalysis, biocatalysis, chemical reactors, process development and scale-up, plant design)
Name and address of employer	ICECHIM - Chemical & Biochemical Energetics Institute Bucharest, (Bio)Catalysis Group
Type of business or sector	Research, Design & Process Development
Dates	1979-1981
Occupation or position held	In-stage Chemical Engineer
Main activities and responsibilities	Plant engineer
Name and address of employer	Organic Chemical Enterprises in Bucharest ("Miraj", and "Dudesti"), Romania
Type of business or sector	Chemical industry

### Academic and research interests (keywords)

chemical engineering, bioengineering, chemical and biochemical reactors, kinetic / mathematical modelling, identification, statistical estimation, data numerical treatment, process analysis and optimization, protein synthesis, cell process modelling, enzymatic processes, catalysis, wastewater biological treatment, risk analysis and ecological impact, chemical energetics, chemical storage of energy, systems biology, metabolic engineering, computational biology, drug delivery.

### Teaching activity

<i>Type</i>	<i>Specialization (Code)</i>	<i>UPB Code</i>	<i>Course title</i>	<i>Activity type</i>
BSc	Food chemistry and biochemical technologies (4)	UPB.11.S.08.O.415	Statistical treatment of chemical experimental data	course
BSc	Chemical and biochemical process engineering (5)	UPB.11.S.06.O.521	Risk assessment of chemical plants	course
BSc	Industrial management (8)	UPB.11.T.07.O.801	Chemical reactors	course, seminars, applications (reactor design project)
MSc	Food chemistry (4)	MA3S3C4 UPB.11.S.11.O.0407	Metabolic engineering	course
MSc	Environmental engineering (12)	MA6S3C1 UPB.11.S.11.O.1201	Chemical hazard assessment	course, applications

### Publication (selective): (*h-index* = 12)

#### **Books** (selected from 8 books, monographs, and teaching notes published in Romania)

- Iordache, O., Maria, G., Corbu, S., Modelarea statistica si estimarea parametrilor proceselor chimice (Statistical Modelling and Estimation of Chemical Process Models), Ed. Academiei, Bucuresti, 1991.
- Maria, G., Evaluarea cantitativa a riscului proceselor chimice si modelarea consecintelor accidentelor (Chemical Process Quantitative Risk Analysis and Modelling of Accident Consequences), Ed. Printech, Bucuresti, 2007.

- Maria, G., *Analiza statistica si corelarea datelor experimentale (bio)chimice. Repartitii si estimatori statistici (Statistical data analysis and correlations. Distributions and estimators)*, Ed. Printech, Bucuresti, 2008.

### **Articles** (selected from about 90 papers published in ISI journals)

- Maria, G., Rippin, D.W.T., Modified Integral Procedure (MIP) as a Reliable Short-Cut Method in Mechanistical Based ODE Kinetic Model Estimation: Non-Isothermal and Semi-Batch Process Cases, *Computers & Chemical Engineering* 19, S709-S714 (1995). doi:10.1016/0098-1354(95)87118-7.
- Maria, G., A Review of Algorithms and Trends in Kinetic Model Identification for Chemical and Biochemical Systems, *Chemical and Biochemical Engineering Quarterly* 18(3), 195-222 (2004)
- Maria, G., Relations between Apparent and Intrinsic Kinetics of Programmable Drug Release in Human Plasma, *Chemical Engineering Science* 60, 1709-1723 (2005). doi:10.1016/j.ces.2004.11.009
- Maria, G., Modular-Based Modelling of Protein Synthesis Regulation, *Chemical and Biochemical Engineering Quarterly* 19, 213-233 (2005).
- Maria, G., Lumped dynamic model for a bistable genetic regulatory circuit within a variable-volume whole-cell modeling framework, *Asia Pacific Journal of Chemical Engineering* 4, 916-928 (2009). DOI:10.1002/apj.297
- Maria, G., Enzymatic reactor selection and derivation of the optimal operation policy by using a model-based modular simulation platform, *Computers & Chemical Engineering* 36(1), 325-341 (2012). DOI: 10.1016/j.compchemeng.2011.06.006.
- Maria, G., Dan, A., Derivation of critical and optimal operating conditions for a semi-batch reactor under parametric uncertainty based on failure probability indices, *Asia-Pacific Journal of Chemical Engineering*, 7, 733-746 (2012). DOI: 10.1002/apj.625.
- Maria, G., Dan, A., Failure probability indices used for selecting optimal operating conditions of a tubular catalytic reactor for butane oxidation, *Jl. Loss Prevention in the Process Industries*, 25(6), 1033-1043, 2012. DOI: 10.1016/j.jlpi.2012.06.007.

### **Research projects** (selected from more than 35 national and international projects)

- SNSF Swiss-Romanian Project on: 'Ecological Design and Operation of Chemical Processes', at ETH Zürich, Switzerland, Chem. Eng. Dept., granted by the Swiss National Science Foundation, 1997-1998).
- NATO Grant no. 974850-99/1999-2001 on 'Identification, Optimal Monitoring and Risk Limits for a Wastewater Biological Treatment Plants', at Universidade da Porto, Portugal, Chem. Eng. Dept. (1999-2001).
- DAAD Research Grant no. 324-ro-99/1999 on: 'Testing Novel Short-Cut Methods for Kinetic Characterisation of Biochemical Processes', at Universität des Saarlandes, Germany, Bioengineering Lab. (1999).
- European TEMPUS-S-JEP 11219-1996/1999 Project on 'Centre of PC Assisted Education in Chemistry', sub-theme: 'Simulation of a Wastewater Biological Treatment Plant under Steady-State and Dynamic Conditions', at Ecole Nationale Polytechnique de Grenoble, France, Chem. Eng. Dept. (1996-1999).
- Dept. Project on: 'Kinetics Identification and Process Simulation for the Drinking Water Denitrification via a Three-Phase Catalytic Membrane Reactor', at Techn. University Erlangen, Germany, Chem. Eng. Dept. (2000).
- National Institute of Health Project no. PAL-GM63958/2002-2003, Department of Chemistry and Biochemistry, Texas A&M University (College Station, USA), on the theme: 'Methodology to construct and simulate molecular-level mechanisms by which living systems grow and divide', and NIH Project EES-GM64650/ 2002-2003 on 'Kinetics of Programmable Drug Release in Human Plasma'.
- Coordinator ERASMUS Mobility Project / 2007-2012 on Bioengineering, Univ. Politehnica Bucharest and Univ. des Saarlandes, Technische Biochemie (Germany).
- Coordinator ERASMUS Mobility Project / 2010-2015 on Bioengineering, Univ. Politehnica Bucharest and Technical University of Hamburg-Harburg, Institute of Bioprocess & Biosystems Engineering (Germany).
- DFG Grant SFB-578/2006, Development of biotechnological Processes by Integrating Genetic and Engineering Methods (Technische Universität Braunschweig, Germany).
- DAAD Research Grant no. A/09/02572 / 2009, on: 'Dynamic modelling of some genetic regulatory circuits to simulate the bacterial resistance in a polluted environment by using the whole-cell modelling approach', Technical University of Hamburg-Harburg (TUHH), Institute of Bioprocess & Biosystems Engineering (Germany, 2009).
- National CNCSIS Project 1490/2004-2005 on: 'Kinetic modelling studies on the homeostatic cell regulation of the protein synthesis' ('Studii de modelare cinetica a proceselor de reglare homeostatica a sintezei proteinelor celulare - Aplicatii la simularea metabolismului fierului si a unor interactiuni proteice in celulele eucariote') (Univ. Politehnica Bucharest, 2004-2005).
- National CNCSIS Project 54/2006-2008 on: 'Educational platform for interdisciplinary research and development on Bioengineering and Biotechnology' ('Platforma de cercetare, dezvoltare si formare profesionala interdisciplinara in Bioinginerie si Biotehnologie') (Univ. Politehnica Bucharest, 2006-2008).
- National PNCDI2 2077/2007-2010 Project on: 'Elaboration of advanced biotechnologies to produce antioxidant drugs with thorularhodine' ('Elaborarea biotehnologiilor avansate de preparare a produselor farmaceutice antioxidante cu torularhodina si studiul potentialelor aplicatii terapeutice') (INCD Microbiology and Immunology "Cantacuzino", 2006-2009).
- National CNCSIS Project nr. 1543/2008-2011 (IDEI) on: 'A nonlinear approach to conceptual design and safe operation of chemical processes' ('O abordare neliniara a problemelor de proiectare conceptuala si de operare in conditii de siguranta a proceselor chimice').
- European Commission Project through European Regional Development Fund and of the Romanian state budget, project POSCCE-O2.1.2-2009-2, ID 691 / 2010-2013, "New mesoporous aluminosilicate materials for controlled release of biological active substances" (Noi materiale din clasa aluminosilicatilor mezoporosi pentru eliberare controlata de substante biologice active).
- International project COST Action ES1103 / 2011, "Earth System Science and Environmental Management" "Microbial ecology & the earth system: collaborating for insight and success with the new generation of sequencing tools", Working Group 7, Chair of action Newcastle University.

### **Other information**

PhD supervisor in Chemical & Biochemical engineering (from 2008)

### Stages abroad, Fellows, and Guest Positions

- 2010 (July-August). Visiting Professor on the project "Simulation and applications of integrated cellular networks ", at Tianjin Institute of Industrial Biotechnology, Chinese Academy of Sciences, (China).
- 2009 (July-August). DAAD guest Professor on the grant 'Dynamic modelling of some genetic regulatory circuits to simulate the bacterial resistance in a polluted environment by using the whole-cell modelling approach', TU Hamburg (TUHH), Institute of Bioprocess & Biosystems Engineering (Germany)
- 2006 (July). DFG visiting Professor at TU Braunschweig (Germany), Dept. of Biochemical Engineering, on the project: 'Development of biotechnological processes by integrating genetic and engineering methods'
- 2002(Jan)-2003(March). Guest Research Scientist with Texas A&M University (College Station, USA), on the National Institute of Health (NIH) Project 'Kinetic modelling of regulatory processes during a cell life-cycle', and on the NIH Project 'Kinetics of Programmable Drug Release in Human Plasma'.
- 2000(June-Aug). Guest Professor at University Erlangen on the topics: 'Kinetics identification and process simulation for the drinking water denitrification via a three-phase catalytic membrane reactor'.
- 2000 (Feb-March, Nov-Dec). Guest Professor at University of Porto (Portugal), Dept. Engenharia Quimica, on the NATO Grant: 'Identification of optimal operating conditions and risk limits for biological wastewater treatment plants'.
- 1999 (July-Aug). DAAD guest Professor on the grant: 'Novel shortcut methods for kinetic characterisation of biochemical processes', University of Saarlandes (Germany), Technische Biochemie Dept.
- 1997 (Aug-Oct). Guest researcher on the SNSF grant: 'Ecological and risk analysis in chemistry', ETH Zürich, Switzerland.

### More than 30 invited Lectures in the field of chemical & biochemical engineering presented at:

ETH Zürich (CH) (1992,1993,1997); Univ. of Porto (P) (1993,2000); Ecole Polytechnique Lausanne (CH) (1994,1996,1997); Queen's Univ. Kingston (Canada) (1994); TU Erlangen (D) (1996,2000); BASF (1996); Univ. Politecnica de Catalunya, Barcelona (ES) (1996); Univ. des Saarlandes (D) (1999,2009); TU Stuttgart (D) (1999); Ecole Nationale Polytechnique de Grenoble (F) (1999), Ecole Nationale Polytechnique Montpellier (F) (2000); Texas A&M Univ. (USA) (2002); RWTH Aachen (D) (2004), TU Braunschweig (D) (2006), TU Hamburg (D) (2006,2009); Univ. of Zagreb (HR) (2007), Tianjin Institute of Industrial Biotechnology (China) (2010).

### Plenary lectures in Conferences:

- 5<sup>th</sup> European Symp. Computer Aided Process Engineering, June 11-14, 1995, Bled (Slovenia);
- 20<sup>th</sup> Croatian Meeting of Chemists & Chemical Engineers, Feb. 2007, Zagreb (HR);
- 12<sup>th</sup> National Conference of Academic Days, Timisoara (RO), 26-27 May 2011;
- 15<sup>th</sup> ROMPHYSICHEM, International Conference of Physical Chemistry, 11-13 September, 2013, Bucharest.

### Member of the International Conferences' Scientific Committees:

- co-chairman Bioengineering Section of *ESCAPE17 - 17th European Symposium on Computer Aided Process Engineering*, May 9-13, 2007, Bucharest (Romania);
- co-chairman of the Chemical Engineering section of the 29<sup>th</sup> (4-6 Oct. 2006) and 30<sup>th</sup> (8-10 Oct. 2008) *National Conference of Chemistry* Calimanesti (Romania);
- co-chairman bioengineering section, *1st International Congress on Food Technology*, Antalya (Turkey), November 3-6, 2010;
- member of Scientific Committee of *5th Conference of Contemporary Chemistry*, June 24, 2011, Bucharest (Romania);
- co-chairman chemical engineering section, *Romanian International Conference on Chemistry and Chemical Engineering RICCCE-17*, Sinaia (RO), 7-10 Sept. 2011;
- co-chairman "Emergency situations and disaster management" Section and member of Scientific Committee of *ELSEDIMA International Conference* (Environmental Legislation, Safety Engineering and Disaster Management), 25-27 October 2012, Cluj-Napoca (RO);
- member of the Scientific Committee of the Romanian *International Conference on Chemistry and Chemical Engineering RICCCE-18*, Sinaia, 4-8 Sept. 2013;
- member of the Scientific Committee of the *5th Int. Conference on Computational Bioengineering (ICCB-5)*, 11-13 September, 2013, Leuven (Belgium);
- member of the Organizing Committee of the *ROMPHYSICHEM-15, 15-th International Conference of Physical Chemistry*, 11-13 September, 2013, Bucharest.

### Scientific Expert / Evaluator for:

- EC-FP6 Programme (Group Rapporteur).
- Research Program of Ministry of Science & Education of the Republic of Croatia.
- SNF Scientific Expert (Switzerland).
- Head of Panel (Bioengineering) for the BIOTECH National Scientific Program (RO)

### Member of:

Romanian Society of Chemical Engineering,  
Romanian Society of Chemistry,  
Romanian Society of Bioengineering and Biotechnology,  
DAAD Alumni Fellow Association (Germany),  
National Society of Science and Environmental Engineering (Romania)

**Reviewer for:** *Analytica Chimica Acta, Bioprocess and Biosystems Engineering, Canadian Journal of Chemical Engineering, Chemical Engineering Science, Chemical Engineering Journal, Chemical & Biochemical Engineering Quarterly, Chemical Engineering Communications, Computers & Chemical Engineering, Environmental Science and Technology, Food Technology and Biotechnology, Ind. Engineering Chemistry Research, Journal of Process Control, JI. Biotechnology, JI. of Bioscience & Bioeng., Journal of Molecular Catalysis B: Enzymatic, Journal of Petroleum and Gas Engineering, Revista de Chimie (Bucharest), Sc. Bull. Univ. Politehnica Bucharest.*

**.Editorial activity:**

member in the Scientific board of *Chemical & Biochemical Engineering Quarterly* (Croatian, Slovenian, Austrian Soc. of Chemical Eng. and Bioprocess Technology)

member in the Editorial board of *Revista de Chimie (Bucharest)* (Romanian Society of Chemistry).

**Awards:**

'Nicolae Teclu' Prize of the Romanian Academy for kinetic studies on selective conversion of methanol to olefins (1985).

Diploma of excellence in research of the Romanian Federation of Biomedical Engineering, 2006.

included in *"Who's Who in the World in Science & Technology"* (1996 - in present)

First classified at the European Olympiad of Chemistry for high-school graduates, 1974