

## Maria Kolypadi Markovic

Assistant Professor, Ph.D.



University of Rijeka (UNIRI), Faculty of Physics,  
and Centre for Micro- and Nanosciences and Technologies (NANORI)  
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**Personal details:** Year and place of birth: 1980, Athens (Greece)  
Nationality: Greek  
Permanent Croatian residence and working permit

**Languages:** Greek (native speaker), English (fluent), French (very good command), Croatian (good command, certificate from the Faculty of Humanities and Social Sciences, University of Osijek, Croatia)

### Education:

2004- **Ph.D.** in organic chemistry, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland  
2010: under the supervision of Prof. Pierre Vogel

Title of doctoral dissertation: „*Synthesis of C-linked Disaccharides and Analogues as Biomimetics of the TF epitope*“, DOI: 10.5075/epfl-thesis-4808.

2004- **DEA** multinational de Chimie Moléculaire (European master's in molecular chemistry), Ecole  
2005: Polytechnique de Paris, Palaiseau, France

2001- **M.Sc.** in organic chemistry, Department of Chemistry, University of Athens, Greece

2003: under the supervision of Prof. Valentini Ragoussis

Master's project: semisynthesis of terpenoid marine natural products.

1997- **B.Sc.** in chemistry, Department of Chemistry, University of Athens, Greece

2001: Diploma project: synthesis of insect pheromones, substances useful for environment-friendly crop protection.

### Working experience:

2022- **Assistant professor**, University of Rijeka (UNIRI), Faculty of Physics, and Centre for Micro- and  
now: Nanosciences and Technologies, Croatia

Member of the Division of Experimental and Applied Physics

Member of the Laboratory for Synthesis of Functional Materials (Leader: Associate Prof. Gabriela Ambrožić)

Teaching subjects: Atmospheric chemistry, Ecotoxicology, Green synthesis of nanomaterials

Graduate study program in Physics, interdisciplinary module: Physics and Environmental Sciences.

Research interests: organic synthesis, surface chemistry and functionalization, hybrid organic-inorganic materials, vapor phase processes, catalysis, photocatalysis.

- 2021-2022: **Postdoctoral researcher** (1 year), University of Rijeka (UNIRI), Department of Biotechnology, Croatia  
 Participation in the multidisciplinary research project funded by the Croatian Science Foundation: „*In-silico aided design for CO<sub>2</sub> trapping substrates for catalyzed formation of carbonates and carbamates*“, Project leader: Prof. Dean Marković. <http://indicator.uniri.hr/>  
 CO<sub>2</sub> valorization, organic synthesis and catalysis, optimization of reaction conditions, preparation of derivatives, purification, and characterization (NMR, FTIR, MS, UPLC).  
 Collaboration with computational chemists.
- 2018-2021: **Postdoctoral researcher** (3 years), University of Rijeka (UNIRI), Department of Physics, and Centre for Micro- and Nanosciences and Technologies (NANORI), Croatia  
 Participation in the multidisciplinary research project funded by the Croatian Science Foundation: „*Preparation of porous thin-film materials for water purification using atomic layer deposition (ALD)*“. Project leader: Associate Prof. Gabriela Ambrožić.  
<http://www.phy.uniri.hr/hr/znanstveno-istrazivacki-rad/hrzz-projekt-watpur.html>  
 Chemical modification of metal oxides surfaces, synthesis of organic ligands and ALD precursors, analysis of surface characterization data (XPS, SEM, AFM, SIMS, etc), familiar with various ALD processes, studies of photocatalytic activities.  
 Collaboration with scientists from UNIRI and NANORI, and Prof. Mato Knez (CIC nanoGUNE i IKERBASQUE, Spain, and honoris professor UNIRI).  
 Participation in publishing the results in the top 10% journals in the field of materials science: *Chemical Communications, Journal of Colloid and Interface Science, Applied Surface Science, Journal of Environmental Chemical Engineering*.
- 2014: **Scientific collaborator** (6 months), Faculty of Pharmacy, University Paris Descartes, France  
 Participation in an industrial R&D project with the company LISAPHARM Laboratoires.  
 Improving the physical and organoleptic properties of a pharmaceutical gel-cream and stability studies.
- 2010-2012: **Postdoctoral researcher** (18 months), Department of Chemistry, University of Neuchâtel, Switzerland, under the supervision of Prof. Reinhard Neier  
 Participation in a multi-disciplinary research project aiming at the development of an optical biosensor detecting early protein aggregation stages in Alzheimer's disease. Collaboration with scientists from Microcity, EPFL in Neuchâtel.  
 Chemical modification studies of the sensor surface.
- 2004-2010: **Doctoral Assistant**, Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland  
 Under the supervision of Prof. Pierre Vogel  
 Research project on the synthesis of sugar mimics for the preparation of anti-cancer vaccines.  
 Synthesis of fluorinated carbohydrates, NMR conformational studies and interactions with carbohydrate recognizing proteins. Collaboration with the research group of Prof. Jesus Jiménez-Barbero (CIC bioGUNE i IKERBASQUE, Spain).

### Scholarship:

2002-2003: Scholarship for postgraduate studies from the „State Scholarships Foundation, IKY“, Greece.

## Teaching experience:

- 2022-now: Atmospheric chemistry  
Ecotoxicology  
Green synthesis of nanomaterials  
(Graduate study program in Physics, interdisciplinary module: Physics and Environmental Sciences, University of Rijeka, Faculty of Physics)
- 2020: UV/Vis spectroscopy and photocatalysis -part of praktikum: Instrumental methods in environmental physics, Responsible: Prof. Mladen Petravić, Graduate study program in Physics (University of Rijeka, Department of Physics)
- 2011: General chemistry -praktikum for biology students (University of Neuchâtel)
- 2005-2006: Atoms, ions, molekules, functional groups -seminars (EPFL)
- 2005-2006: Preparative chemistry -praktikum for forensic science students (EPFL-University of Lausanne)
- 2004-2005: Organic chemistry -praktikum (EPFL)
- 2001-2003: Organic chemistry -praktikum (Department of Chemistry, University of Athens)

## Participation in scientific projects as associate:

- 2020-2024: „*In-silico aided design for CO<sub>2</sub> trapping substrates for catalyzed formation of carbonates and carbamates*“ – INDICATOR (IP-2019-04-8846), Croatian Science Foundation, Project leader: Prof. D. Marković, University of Rijeka, Department of Biotechnology, Croatia.
- 2019-2021: „*The development of new nanotechnology – enhanced materials resistant to the creation of bacterial biofilms*“ (uniri-prirod-18-102-1237), University of Rijeka, Project leader: Prof. D. Marković, University of Rijeka, Department of Biotechnology, Croatia.
- 2017-2021: „*Preparation of porous thin-film materials for water purification using atomic layer deposition (ALD)*“ – WATPUR (IP-2016-06-3568), Croatian Science Foundation, Project leader: Associate Prof. G. Ambrožić, University of Rikeja, Department of Physics, and Centre for Micro- and Nanosciences and Technologies, Croatia.
- 2014: Scientific-professional project in collaboration with LISAPHARM Laboratoires, Project leader: Assistant Prof. N. Zerrouk, Faculty of Pharmacy, Université Paris Descartes, France.
- 2011-2012: „*Use of novel photonic methods for the detection and diagnosis of Alzheimer's disease*“ (Overhead Grant U.01851.01), Swiss National Science Foundation, Project leader: Prof. R. Neier, University of Neuchâtel, Switzerland.
- 2007-2009: „*New organic reactions and their application to the synthesis of natural compounds and analogues of interest for the chemotherapy of cancer and infectious diseases*“ (Grant 116212), Swiss National Science Foundation, Project leader: Prof. P. Vogel, EPFL, Switzerland.
- 2005-2007: „*Synthesis of natural products and analogues of biological interest*“ (Grant 108103), Swiss National Science Foundation, Project leader: Prof. P. Vogel, EPFL, Switzerland.
- 2004-2005: „*a) New Organic Chemistry with Sulfur Dioxide b) Asymmetric Synthesis of Glycomimetics and of Natural Products of Biological Interest*“ (Grant 100002), Swiss National Science Foundation, Project leader: Prof. P. Vogel, EPFL, Switzerland.

## List of publications:

1. S. Mežnarić, I. Jelovica Badovinac, I. Šarić, R. Peter, **M. Kolympadi Markovic**, G. Ambrožić, I. Gobin, „*Superior UVA-photocatalytic antibacterial activity of a double-layer ZnO/Al<sub>2</sub>O<sub>3</sub> thin film grown on cellulose by atomic layer deposition (ALD)*“, *J. Environ. Chem. Eng.* **2022**, 10(3), 108095. DOI: 10.1016/j.jece.2022.108095
2. F. Vranješević, **M. Kolympadi Markovic**, D. Matulja, G. Ambrožić, J. Á. Sordo, S. Laclef, V. Vrčec, D. Marković, „*Recent Advances in the Synthesis of Five-Membered Cyclic Carbonates and Carbamates from Allylic or Propargylic Substrates and CO<sub>2</sub>*“, *Catalysts* **2022**, 12(5), 547. DOI: 10.3390/catal12050547
3. D. Matulja, F. Vranješević, **M. Kolympadi Markovic**, S. Kraljević Pavelić, D. Marković, „*Anticancer Activities of Marine-Derived Phenolic Compounds and Their Derivatives*“, *Molecules* **2022**, 27(4), 1449. DOI: 10.3390/molecules27041449
4. I. Šarić, **M. Kolympadi Markovic**, R. Peter, P. Linić, K. Wittine, I. Kavre Piltaver, I. Jelovica Badovinac, D. Marković, M. Knez, G. Ambrožić, „*In-situ multi-step pulsed vapor phase surface functionalization of zirconia nanoparticles via copper-free click chemistry*“, *Appl. Surf. Sci.* **2021**, 539, 148254. DOI: 10.1016/j.apsusc.2020.148254
5. **M. Kolympadi Markovic**, D. Marković, S. Laclef, „*Amide Synthesis by Transamidation of Primary Carboxamides*“, *Synthesis* **2020**, 52 (21), 3231-3242. DOI: 10.1055/s-0040-1707133
6. **M. Kolympadi Markovic**, R. Peter, I. Jelovica Badovinac, I. Saric, M. Perčić, R. Radičić, D. Marković, M. Knez, G. Ambrožić, „*'Sandwich'-like hybrid ZnO thin films produced by a combination of atomic layer deposition (ALD) and wet-chemistry using a mercapto silane as single organic precursor*“, *Nanotechnology* **2020**, 31(18), 185603. DOI: 10.1088/1361-6528/ab70ce
7. G. Ambrožić, **M. Kolympadi Markovic**, R. Peter, I. Kavre Piltaver, I. Jelovica Badovinac, D. Čakara, D. Marković, M. Knez, „*Building organosilica hybrid nanohemispheres via thiol-ene click reaction on alumina thin films deposited by atomic layer deposition (ALD)*“, *J. Colloid Interface Sci.* **2020**, 560, 303-311. DOI: 10.1016/j.jcis.2019.10.074
8. D. Matulja; **M. Kolympadi Markovic**; G. Ambrožić; S. Laclef; S. Kraljević Pavelić; D. Marković, „*Secondary metabolites from Gorgonian corals of the genus Eunicella: Structural characterizations, biological activities, and synthetic approaches*“, *Molecules* **2020**, 25(1), 129. DOI: 10.3390/molecules25010129
9. D. Matulja; K. Wittine; N. Malatesti; S. Laclef; M. Turks; **M. Kolympadi Markovic**; G. Ambrožić; D. Marković, „*Marine natural products with high anticancer activities*“, *Curr. Med. Chem.* **2020**, 27 (8), 1243-1307. DOI: 10.2174/0929867327666200113154115
10. I. Saric, R. Peter, **M. Kolympadi Markovic**, I. Jelovica Badovinac, C. Rogero, M. Ilyn, M. Knez, G. Ambrožić, „*Introducing the concept of pulsed vapor phase copper-free surface click-chemistry using the ALD technique*“, *Chem. Comm.* **2019**, 55, 3109-3112. DOI: 10.1039/C9CC00367C
11. K. Cottet, **M. Kolympadi**, D. Marković, M.-C. Lallemand, „*Natural Products Biosynthesis involving a Putative Diels-Alder Reaction*“, *Curr. Org. Chem.* **2016**, 20, 2421-2442. DOI: 10.2174/1385272820666160331234709

12. K. Cottet, **M. Kolympadi**, M.-C. Lallemand, D. Marković, „*Artificial Enzyme-Catalyzed Diels-Alder Cycloadditions*“, *Curr. Org. Chem.* **2016**, *20*, 2254-2281. DOI: 10.2174/1385272820666160331234851
13. I. Mierina, E. Gudelis, D. Stepanovs, M. Jure, A. Mishnev, **M. Kolympadi**, D. Marković, „*Crystal structure of 3-(4-hydroxy-3-methoxyphenyl)-N-phenylpropanamide*“, *C<sub>16</sub>H<sub>17</sub>NO<sub>3</sub>*, *Z. Kristallogr. NCS* **2016**, *231(2)*, 657-659. DOI: 10.1515/ncrs-2015-0235
14. D. Marković, **M. Kolympadi**, B. Deguin, F.-H. Porée, M. Turks, „*The isolation and synthesis of neodolastane diterpenoids*“, *Nat. Prod. Rep.* **2015**, *32*, 230-255. DOI: 10.1039/C4NP00077C
15. L. Awad, R. Madani, A. Gillig, **M. Kolympadi**, M. Philgren, A. Muhs, C. Gérard, P. Vogel, „*A C-Linked Disaccharide Analogue of Thomsen-Friedenreich Epitope Induces a Strong Immune Response in Mice*“, *Chem. Eur. J.* **2012**, *18*, 8578-8582. DOI: 10.1002/chem.201200364
16. **M. Kolympadi**, M. Fontanella, C. Venturi, S. André, H.-J. Gabius, J. Jiménez-Barbero, P. Vogel, „*Synthesis and conformational analysis of ( $\alpha$ -D-galactosyl)phenyl methane and  $\alpha$ , $\beta$ - difluoromethane analogues. Interactions with the plant lectin viscumin*“, *Chem. Eur. J.* **2009**, *15*, 2861-2873. DOI: 10.1002/chem.200801394
17. **M. Kolympadi**, M. Liapis, V. Ragoussis, „*Synthesis of the marine furanoditerpene (-)-marginatone*“, *Tetrahedron* **2005**, *61*, 2003-2010. DOI: 10.1016/j.tet.2005.01.007
18. V. Ragoussis, Ek. Vamvaka, **M. Kolymbadi**, „*Short and stereoselective synthesis of (E)-3-alkenyl acetates, insect sex pheromone constituents of Lepidoptera; Gelechiidae*“, *J. Chem. Res. (S)* **2002**, 398-399. DOI: 10.3184/030823402103172446

### Participation in conferences:

- Poster: **M. Kolympadi Markovic**, F. Vranješević, G. Ambrožić, V. Vrček, D. Marković, „*Catalytic Coupling of CO<sub>2</sub> with Propargyl Alcohol Substrates*“  
IV. Symposium on Supramolecular Chemistry, 10.12.2021, PMF-Chemistry, University of Zagreb, Croatia
- Posters: **M. Kolympadi Markovic**, F. Vranješević, T. Pavlešić, G. Ambrožić, V. Vrček, D. Marković, „*Experimental and computational approach to catalyzed domino reactions between propargyl alcohols and CO<sub>2</sub>*“,  
**M. Kolympadi Markovic**, R. Peter, I. Jelovica Badovinac, I. Saric, M. Perčić, R. Radičić, D. Marković, M. Knez, G. Ambrožić, „*Preparation of ZnO/organosilane/ZnO hybrid thin films via atomic layer deposition (ALD) and solution surface modification*“  
27th Croatian Meeting of Chemists and Chemical Engineers (27HSKIKI), 05-08.10.2021, Veli Lošing, Croatia
- Online seminar: **M. Kolympadi Markovic**, „*Application of atomic layer deposition (ALD) in the preparation of functional hybrid nano-materials*“, 21.10.2020, University of Rijeka, Department of Physics, Croatia.
- Workshop: Atomic Layer Deposition: Fundamentals and Applications  
EU Herald Cost Action, 21-22.09.2017, University of Rijeka, Croatia
- Poster: **M. Kolympadi**, V. Musi, R. Neier, „*Towards the synthesis of new thioflavin T dimers*“  
Summer school: Challenges in Organic Synthesis  
CUSO 3ème cycle, 28.08-01.09.2011, Villars-sur-Ollon, Switzerland.

- Poster: **M. Kolympadi**, P. Vogel, „*Synthetic approach to a CH<sub>2</sub>-glycosyl mimic of TF epitope*“  
Fall Meeting of the Swiss Chemical Society, 04.09.2009, Lausanne, Switzerland.
- Poster: **M. Kolympadi**, M. Fontanella, C. Venturi, J. Jiménez-Barbero, P. Vogel, „*Synthesis and conformational analysis of phenyl- $\alpha$ -CH<sub>2</sub> and CF<sub>2</sub>-galactosides. Interactions with the plant lectin viscumin*“, Fall Meeting of the Swiss Chemical Society, 11.09.2008, Zurich, Switzerland.
- Poster: **M. Kolympadi**, P. Vogel, „*Synthesis of phenyl-CF<sub>2</sub> and CH<sub>2</sub>-galactosides, Potential Galectin Inhibitors*“, Chemistry Day, 30.05.2008, EPFL, Switzerland.
- Summer school: Target Synthesis: Challenges, Strategies and Methods  
CUSO 3ème cycle, 2-6.11.2007, Villars-sur-Ollon, Switzerland.
- P. Vogel, S. Gerber-Lemaire, L. Awad, C. Bello, H. Fiaux, L. Juillerat-Jeanneret, A. Gillig, **M. Kolympadi**, „*C-Disaccharides and analogues: The search for anticancer agents*“, 233<sup>rd</sup> ACS National Meeting, 25-29.03.2007, Chicago, IL, USA.
- Summer school: Chemical biology II  
CUSO 3ème cycle, 3-7.11.2006, Villars-sur-Ollon, Switzerland.
- Poster: **M. Kolymbadi**, M. Liapis, V. Ragoussis, „*Synthesis of the furanoditerpene (-)-marginatone*“  
1<sup>st</sup> Hellenic Symposium of organic synthesis: From Chemistry to Biology, Medicine and Materials Science, 4-6.11.2004, Athens, Greece.

### Member of conference organizing committees:

- Member of local organizing committee: 27th Croatian Meeting of Chemists and Chemical Engineers (27HSKIKI), 05-08.10.2021, Hotel Punta, Veli Lošing, Croatia
- Mini-Symposium of the Croatian Chemical Society, 04.07.2022, University of Rijeka, Department of Biotechnology, Croatia

### Laboratory supervision of diploma and master's students:

- 2020: Rafaela Radičić, master's thesis: „*Photocatalytic properties of zinc oxide prepared by thermal degradation of the cellulose template*“, Mentor: Associate Prof. G. Ambrožić, University of Rijeka, Department of Physics.
- 2019: Petra Linić, master's thesis: „*Preparation of compounds by click chemistry of bis(alkynes) and bis(azides) for inorganic material functionalization*“, Mentors: Associate Prof. K. Wittine and Associate Prof. G. Ambrožić, University of Rijeka, Department of Biotechnology.
- 2018: Rafaela Radičić, diploma thesis: „*UV/VIS spectroscopy and its application in the analysis of photocatalytic properties of ZnO thin films*“, Mentor: Associate Prof. G. Ambrožić, University of Rijeka, Department of Physics.
- 2006: Axel Fanget, diploma thesis: „*Synthesis of isolevoglucosenone*“, Mentor: Prof. P. Vogel, EPFL.