TENTH CRISTOFOR I. SIMIONESCU SYMPOSIUM
FRONTIERS IN MACROMOLECULAR AND SUPRAMOLECULAR SCIENCE
8 – 14 June 2018

SYMPOSIUM PROGRAM

ROMANIAN ACADEMY

Calea Victoriei 125, Bucharest, Romania

This Symposium is part of a project that has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 667387 WIDESPREAD 2-2014 SupraChem Lab

The symposium is partially financial supported by the Romanian Academy

Friday, June 8

Registration of Participants

Team building activities

Monday, June 11

Location • *Academy Hall*, Romanian Academy, Bucharest, Romania

09^{30} – 10^{00}

Opening Ceremony

09^{30} – 09^{45} **Welcome Address**
Bogdan C. SIMIONESCU
Vice-President of Romanian Academy

09^{45} – 10^{00} **Evocation of Cristofor I. Simionescu**
Virgil PERCEC
University of Pennsylvania, Philadelphia, USA

10^{00} – 12^{30}

Session 1

Chair: Bogdan C. SIMIONESCU, Virgil PERCEC

10^{00} – 10^{50} **Wetting-Dewetting Transitions, Nature's Sensing Machines, and Unveiling the Molecular Mechanism of Pain****
Michael L. KLEIN
Temple University, Philadelphia, PA, USA
** In collaboration with: Daniele Granata, Marina A. Kasimova, Vincenzo Carneva

10^{50} – 11^{40} **Materials Made of Synthetic Polysaccharides**
Peter H. SEEBERGER
Max Planck Institute for Colloids and Surfaces, Potsdam, Germany

11^{40} – 12^{30} **Interfacial Activity of Microgels and Arborescent Polymers – Molecules or Colloids**
Martin MÖLLER
DWI – Leibniz-Institute for Interactive Materials and RWTH, Aachen, Germany

12^{30} – 14^{00} Lunch

14^{00} – 15^{30}

Session 2

Chair: Simona PERCEC, Valeria HARABAGIU

14^{00} – 14^{50} **Stimuli-Responsive Nanostructures and Hydrogels and Their Applications**
Itamar WILLNER
The Hebrew University of Jerusalem, Israel

14^{50} – 15^{30} **Conjugated Polymers in Biomedical Applications: The Modulation by Structural Design of the Materials' Properties ****
Ioan CIANGA
"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania
** In collaboration with: A. D. Bendrea, L. Cianga, L. J. del Valle, S. Timur, C. Aleman, Y. Yagci

15^{30} – 16^{00} Coffee brake

	16^{00} – 17^{00} **Session 3** Chair: Luminita MARIN, Peter H. SEEBERGER
16^{00} – 16^{40}	**Dynamic Systems with Tunable Properties for *in vitro* Nucleic Acids Delivery** **Lilia CLIMA, Bogdan CRACIUN, Dragos PEPTANARIU, Gabriela PRICOPE, Bogdan C. SIMIONESCU, Mariana PINTEALA** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
16^{40} – 16^{50}	**Supramolecular Host-Guest Assembly for Fluorescence Cell Imaging** **Gabriela PRICOPE, Laura URSU, Bogdan CRACIUN, Mariana PINTEALA, Alexandru ROTARU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
16^{50} – 17^{00}	**Supramolecular Citryl-Imino-Chitosan Hydrogels as Drug Delivery Systems** **Daniela AILINCAI, Luminita MARIN, Bogdan C. SIMIONESCU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
19^{00} – 22^{00}	Dinner

Tuesday, June 12

Location • *Academy Hall*, Romanian Academy, Bucharest, Romania

	10^{00} – 12^{30}
	Session 4
	Chair: Mariana PINTEALA, Michael L. KLEIN
10^{00} – 10^{50}	**Colloidal Crystal Engineering with DNA** **Chad MIRKIN** *Northwestern University, Evanston, IL, USA*
10^{50} – 11^{40}	**In Pursuit of the Perfect Plastic** **Geoffrey W. COATES** *Cornell University, Ithaca, NY, USA*
11^{40} – 12^{30}	**Alginate Polymers and Gels for Stabilization of Nanoparticles and Non-invasive Refillable Therapeutics** **Michael AIZENBERG** *Harvard University, Cambridge, MA, USA*
12^{30} – 14^{00}	Lunch
	14^{00} – 15^{30}
	Session 5
	Chair: Marcela MIHAI, Michael AIZENBERG
14^{00} – 14^{40}	**Chitosan Hydrogelation with Monoaldehydes. A Straight Pathway to Biomaterials** **Luminita MARIN, Daniela AILINCAI, Bogdan C. SIMIONESCU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
14^{40} – 15^{20}	**Preliminary Approaches in Designing and Investigation of Materials Inspired by Mussel Adhesive Protein** **Ana-Maria ALBU** *Politehnic University of Bucharest, Bucharest, Romania*
15^{20} – 15^{30}	**New Ligands and Materials Developed on Silicone Substrates** **Georgiana-Oana TURCAN-TROFIN, Mirela-Fernanda ZALTARIOV, Sergiu SHOVA, Maria CAZACU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
15^{30} – 16^{00}	Coffee Break
	16^{00} – 17^{10}
	Session 6
	Chair: Geoffrey W. COATES, Ioan CIANGA
16^{00}– 16^{40}	**New Liquid Crystalline Water Self-assembling Systems** **Elisabeta I. SZERB** *Institute of Chemistry of Romanian Academy, Timisoara, Romania*
16^{40} – 17^{20}	**Smart Polymeric Materials for Programmable Drug Delivery** **Gheorghe FUNDUEANU, Marieta CONSTANTIN, Sanda BUCATARIU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
19^{00} – 21^{00}	Dinner

Wednesday, June 13

Location • *Academy Hall*, Romanian Academy, Bucharest, Romania

10^{00} – 12^{20}

Session 7

Chair: Chad MIRKIN, Gheorghe FUNDUEANU

10^{00} – 10^{50}	**From Synthetic Methods to Synthetic Cells** **Virgil PERCEC** *University of Pennsylvania, Philadelphia, PA, USA*
10^{50} – 11^{40}	**Moving HAIRS, or Designing Hydrogel-Actuated Integrated Responsive Systems** **Joanna Aizenberg** *Harvard University, Cambridge, MA, USA*
11^{40} – 12^{20}	**Versatility of Silane/Siloxane Building Blocks in Coordination Driven Self-assembling** **Mirela-Fernanda ZALTARIOV, Georgiana-Oana TURCAN-TROFIN, Sergiu SHOVA, Carmen RACLES, Maria CAZACU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*

12^{20} – 12^{40}

Closing of the Symposium

12^{20} – 12^{30}	**Virgil PERCEC** *University of Pennsylvania, Philadelphia, USA*
12^{30} – 12^{40}	**Valeria HARABAGIU** *"Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania*
19^{00} – 21^{00}	Dinner

Thursday, June 14

Team building activities

INVITED SPEAKERS

(ALPHABETICAL ORDER)

Joanna AIZENBERG, Amy Smith Berylson Professor of Materials Science and Professor of

Chemistry and Chemical Biology at Harvard University, pursues a broad range of research interests that include biomimetics, self-assembly, surface chemistry, nanofabrication, bio-nanointerfaces, crystal engineering, smart materials, biomineralization, biomechanics and biooptics. She received the B.S. degree in Chemistry in 1981, the M.S. degree in Physical Chemistry in 1984 from Moscow State University, and the Ph.D. degree in Structural Biology from the Weizmann Institute of Science in 1996. Joanna is the Director of the Kavli Institute for Bionano Science and Technology and Platform Leader in the Wyss Institute for Bioinspired Engineering at Harvard University. She has served at the Board of Directors of the Materials Research Society and at the Board on Physics and Astronomy of the National Academies. She served on the Advisory Board of Langmuir and Chemistry of Materials, on Board of Reviewing Editors of Science Magazine, and is an Editorial Board Member of Advanced Materials. Aizenberg is elected to the American Academy of Arts and Sciences, American Association for the Advancement of Science; and she is a Fellow of American Physical Society and Materials Research Society. Dr. Aizenberg received numerous awards from the American Chemical Society and Materials Research Society, including Fred Kavli Distinguished Lectureship in Nanoscience, Ronald Breslow Award for the Achievement in Biomimetic Chemistry, Arthur K. Doolittle Award in Polymeric Materials, ACS Industrial Innovation Award, and was recognized with two R&D 100 Awards for best innovations for the invention of a novel class of omniphobic materials and watermark ink technologies.

Michael AIZENBERG, Harvard University, Cambridge, MA, USA. Having worked extensively

in both academic research and industrial development, Aizenberg has broad synthetic chemistry experience - from organic and polymer to organometallic, inorganic, and even nuclear. His main research interests are in using synthetic chemistry tools to design active and programmable materials and drug-delivery systems, in tissue engineering, nanoparticle synthesis, microfabrication, and in developing energy-efficient materials and devices.

Ana-Maria ALBU, Assistant professor at University POLITEHNICA of Bucharest, Faculty of

Industrial Chemistry, Dept. of Macromolecular Compounds Technology. Her research activity is oriented on Polymer Science, accomplishing expertise in the connective fields: organic synthesis, smart materials of specific architectures and peculiar application in optics, opto-electronics, micro-electronics, and photonics. Major research directions: synthesis of macromolecular compounds and polymeric materials for non-conventional applications.

Ioan CIANGA, Senior Researcher I - "Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania**.** *Professional competences:* synthesis and application of conjugated polymers; controlled polymerization methods (ATRP, ROP); synthesis of polymers with designed architectures (comb, graft, star, cylindrical polymer brushes) and low molecular weight organic compounds used as intermediate, catalysts, initiators or monomers; electroactive and semiconducting polymers for electro-optical and bio-applications; structural, morphological, thermal, photophysical characterization of low molecular weight organic compounds and polymers. *Award and Honours:* 2006: Excellency Award of Romanian National Foundation for Science and Art; 1996: "Nicolae Teclu" Award of Romanian Academy for a group of papers on conductive polymers.

Lilia CLIMA, chemist; PhD; junior researcher at "Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania; graduated from Moldova State University, Republic of Moldova in 2000; received her PhD in 2007 from "Albert-Ludwigs" University Freiburg, Germany; followed two postdoctoral research stays one in the group of Prof. Dr. R. Krämer, Inorganic Chemistry Institute, Ruprecht-Karls University Heidelberg, Germany (2007-2008) and second in the group of Prof. Dr. K. Gothelf, Centre for DNA Nanotechnology, Aarhus, Denmark (2008-2010); three research stages at Institut Européen des Membranes, Montpellier, France. *Scientific interests*: organic synthesis, nucleic acids chemistry, supramolecular chemistry, dynamic chemistry. *Research topics:* design, synthesis, characterization and testing of new dynamic combinatorial multivalent networks for DNA binding and transfection, design and synthesis of ligands for metal organic frameworks (MOF) and its applications.

Geoffrey W. COATES, is the Tisch University Professor in the Department of Chemistry and Chemical Biology at Cornell University. His teaching and research interests involve science at the interface of organic, inorganic, and materials chemistry. The broader impacts of his research include benign polymers and chemical synthesis, the utilization of renewable resources, and materials safe and economical energy storage and conversion. The research focus of his group is the development of new synthetic strategies for producing polymers of defined structure. The control of polymer composition, architecture, stereochemistry, and molecular weight allows the indirect control of polymer properties via polymer morphology. Interdisciplinary research projects, addressing organic, inorganic, organometallic, and polymer chemistry.

Gheorghe FUNDUEANU, Head of the Department of Natural Polymers, Bioactive and Biocompatible Materials, "Petru Poni" Institute of Macromolecular Chemistry. *Expertise:* synthesis and characterization of drug delivery systems based on polymers; hydrogels; cell culture; *in vitro* and *in vivo* testing of the polymeric biomaterials; protocols for the determination of the pharmaceuticals in biological fluids and pharmaceutical preparations. *Member of editorial board* for Journal of Clinical Rehabilitative Tissue Engineering Research, Journal of Hydrogels, Jacobs Journal of Nanomedicine and Nanotechnology. *Fellowships*: "Centre de Recherches sur les Macromolecules Vegetales", Grenoble, France; Department of Pharmaceutical Science, University of Ferrara, Italy; Aristotle University of Thessaloniki, Greece. *Romanian Academy Prize* for Chemistry “Costin D. Nenitescu”, 2011.

Michael L. KLEIN is Laura H. Carnell Professor of Science and Director of the Institute for Computational Molecular Science in the College of Science and Technology at Temple University in Philadelphia, USA. He was previously the Hepburn Professor of Physical Science in the Center for Molecular Modeling at the University of Pennsylvania. Klein obtained a B.Sc. from the University of Bristol in 1961, followed by a Ph.D. in 1964. He was a researcher at the National Research Council 1968-1987, and joined the faculty of the University of Pennsylvania in 1987. Professor Klein's research in computational chemistry, particularly statistical mechanics, intermolecular interactions, and modelling of condensed phases and biophysical systems, is among the most highly cited in the field. He received the Aneesur Rahman prize in 1999, which is the highest honor given by the American Physical Society for work in computational physics, and was elected to the United States National Academy of Sciences in 2009.

Luminita MARIN is a Senior Researcher at the "Petru Poni" Institute of Macromolecular Chemistry Iasi, Romania. She defended her PhD thesis in 2007 in the field of liquid crystals based on imine bonds. In 2006 she performed a doctoral stage at Instituto per lo Studio delle Macromolecole, Milan, Italy in the field of highly conjugated compounds for optoelectronics, and two postdoctoral stages at Institute Europeen des Membranes, Montpellier, France in the field of dynamic materials based on the reversibility of the imine linkage. Currently she is the team leader of a young research group whose research focus on the *developing of a new strategy of chitosan hydrogelation* with monoaldehydes, targeting multifunctional materials with eco-design for applications of contemporary interest in bio-engineering and optoelectronics.

Chad MIRKIN, Northwestern University, Evanston, IL, USA. Mirkin has pioneered the use of nanoparticle-biomolecule conjugates as synthons in materials science and the development of many nanoparticle-based extra- and intracellular biodiagnostic and therapeutic tools. He is one of very few scientists elected into all three branches of the US National Academies (Medicine, Science, and Engineering). He has been recognized for his accomplishments with more than 130 national and international awards, including: the Raymond and Beverly Sackler Prize in Convergence Research, the Dan David Prize, the Wilhelm Exner Medal, the RUSNANOPRIZE, the Dickson Prize in Science, the American Institute of Chemists Gold Medal, and the Lemelson-MIT Prize. He has served on the editorial advisory boards of more than 20 scholarly journals; is the current associate editor of the Journal of the American Chemical Society (JACS); and the founding editor of the journal Small, one of the premier international nanotechnology journals. Mirkin has co-edited multiple bestselling books.

Martin MÖLLER is Scientific Director, Chair of Textile and Macromolecular Chemistry, at the Institute for Textile Chemistry and Macromolecular Chemistry at RWTH Aachen University and is known for his research into polymer chemistry and functional nanotechnology. Möller studied chemistry in Hamburg and Freiburg and the doctorate 1981 in Freiburg. As post-doctoral candidate, he was a Fedor-Lynen student at the University of Massachusetts at Amherst. He then returned to Freiburg as a research associate at the Institute for Macromolecular Chemistry, where he habilitated in 1989 and subsequently became professor of Polymer Technology and Macromolecular Materials at the University of Twente, professor and head of the Department of Organic and Macromolecular Chemistry at the University of Ulm (1993) and professor of Textile Chemistry and

Macromolecular Chemistry at RWTH Aachen University (2002). Since 2003 he is the director of the Deutsches Wollforschungsinstitut (DWI). The research of Möller's group is directed towards oligomer and polymer building blocks that can undergo self-assembly to complex nanostructures and functional systems. Emphasis is laid on water-soluble and water-born polymers. This involves the synthesis of ultra-small particles, as well as synthesis of uniform linear and branched macromolecules with functional and reactive side and end groups. He is a member of the Academy of Sciences of North Rhine-Westphalia (since 2005) and the German Academy of Engineering (Acatech). In 2003, he received the Körber Prize for European Science for working on a light-driven molecular engine, focusing on surfaces. For 2014 Möller was awarded the Hermann-Staudinger-Prize.

Virgil PERCEC received his B.S. in organic and macromolecular chemistry from the

Polytechnic Institute in Iasi and his PhD in macromolecular chemistry from "P. Poni" Institute of Macromolecular Chemistry, Iasi, Romania. He joined the Department of Macromolecular Science of Case Western Reserve University, Cleveland, USA in March, 1982 as an Assistant Professor, promoted to Associate Professor in 1984, to Full Professor in 1986 and to Leonard Case Jr. Chair in 1993. In 1999 he joined the Department of Chemistry at the University of Pennsylvania, Philadelphia as the inaugural P. Roy Vagelos Chair and Professor of Chemistry where he is leading a research group performing fundamental studies at the interface between organic, catalysis, supramolecular, macromolecular chemistry, liquid crystals, nanoscience and biology. Editor of the Journal of Polymer Science: Part A: Polymer Chemistry (since 1996) and of the Book Series "Liquid Crystals" (since 2007). Percec serves on the Editorial and Advisory Boards of 20 International Journals, on the Scientific Advisory Board of Symyx Company, Henkel Company, Molecular Foundry, Berkeley and Lawrence Berkeley National Laboratory. He is a consultant to numerous US and International Companies and Governmental Offices.

Peter H. SEEBERGER studied chemistry in Erlangen (Germany) and completed a PhD in

biochemistry in Boulder (USA). After performing research at the Sloan-Kettering Cancer Center Research in New York he built an independent research program at MIT where he was promoted to Firmenich Associate Professor of Chemistry with tenure. After six years as Professor at the Swiss Federal Institute of Technology (ETH) Zurich he assumed positions as Director at the Max-Planck Institute for Colloids and Surfaces in Potsdam and Professor at the Freie University of Berlin in 2009. He is honorary Professor at the University of Potsdam. Professor Seeberger's research on the chemistry and biology of carbohydrates, carbohydrate vaccine development and continuous flow synthesis of drug substances spans a broad range of topics from engineering to immunology and has been documented in over 400 peer-reviewed journal articles, four books, more than 35 patents, and more than 700 invited lectures. This

work was recognized with more than 25 international awards from the US (e.g. Arthur C. Cope Young Scholar Award, Horace B. Isbell Award, Claude S. Hudson Award from the American Chemical Society), Germany (e.g. Körber Prize for European Sciences), Holland (Havinga Medal), Israel (Honorary Lifetime Member Israel Chemical Society), Japan (Yoshimasa Hirata Gold Medal), Switzerland ("The 100 Most Important Swiss") and international organizations (Whistler Award 2012, Int. Carboh. Soc.). In 2013 he was elected to the Berlin-Brandenburg Academy of Sciences.

Itamar WILLNER, The Hebrew University of Jerusalem, Israel. Prof. Willner was born in

Romania in 1947, and immigrated to Israel in 1950. He completed his studies in chemistry at The Hebrew University of Jerusalem, where he received his Ph.D. degree in 1978. Following postdoctoral research training at the University of California, Berkeley, he joined the Institute of Chemistry at The Hebrew University of Jerusalem in 1981, where he was appointed full professor in 1986. His research focuses on the development of molecular and biomolecular electronic systems aiming to establish fundamental principles for the construction of optical and electronic sensors, the self-assemby of functional nanoscale structures, and the design of materials and modified surfaces exhibiting unique optical, electronic and catalytic properties. His scientific activities represent an interdisciplinary effort to bridge chemistry, biology and materials science, and his research pioneered the development of nanobiotechnology. His studies led to the development of a large variety of applications, ranging from sensors for clinical diagnostics and for the detection of explosives, to the construction of biofuel cells and the design of solar energy conversion and fuel production systems. His accomplishments have been recognized with numerous awards and honors, among them the Israel Prize in Chemistry, the Rothschild Prize, the Kolthoff Prize, the Israel Chemical Society Award and the Max Planck Award for International Cooperation. He is a member of The Israel Academy of Sciences and Humanities and of The European Academy of Sciences and Arts.

Mirela-Fernanda ZALTARIOV, Scientific Researcher, Department of Inorganic Polymers,

Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania. She get experience in organic and inorganic chemistry, synthesis of ligands (Schiff bases and carboxylic acids), metal complexes, coordination polymers and networks based on siloxane and silane ligands during the PhD training at "Petru Poni" Institute of Macromolecular Chemistry. Her research activities are focused on the synthesis, crystallization and characterization of metal-organic structures containing flexible siloxane and silane units in their structures, thiosemicarbazone derivatives and their metal complexes with antiproliferative activity.

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