

## 258<sup>th</sup> ACS National Meeting & Exposition, August 25-29, 2019, San Diego, CA

ACS Meeting Theme: Chemistry of Water

Program Chair: Ramanathan Nagarajan (NAGU) [Ramanathan.Nagarajan.Civ@mail.mil](mailto:Ramanathan.Nagarajan.Civ@mail.mil)

### Deadline for online submission of abstracts X March 2019

Go to <http://abstracts.acs.org> select the Boston meeting and then follow instructions to submit your abstract to the selected COLL Division symposium

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### Sci-Mix

Authors submitting abstracts online, whether for oral or poster presentation, will be asked to indicate during abstract submission, their interest in participating in Sci-Mix. Sci-Mix is a poster session involving all Divisions of ACS, with the Divisions selecting what presentations to include in the Sci-Mix. If you are making an oral presentation in the Division but have been selected to the Sci-Mix. You will also have to prepare the work for the poster presentation at Sci-Mix.

Sci-Mix is traditionally held on Monday evening at 8:00 PM. The number of posters at Sci-Mix to be selected by a Division is limited to 10% of the total number of papers presented in that Division. Therefore, selection to present Sci-Mix posters is a special recognition conferred by the Division to the authors. Sci-Mix poster presentations are duplicates of the presentations made at the oral or poster sessions of the Division. Please note that this is the only kind of duplicate presentation allowed by ACS.

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### Technical Symposia Scheduled

Symposium Organizer	Symposium Title
Dan Killelea, Department of Chemistry & Biochemistry, Loyola University, Chicago IL; (773) 508-3136; <a href="mailto:dkillelea@luc.edu">dkillelea@luc.edu</a> Sharani Roy, Department of Chemistry, The University of Tennessee – Knoxville, TN; <a href="mailto:sharani.roy@utk.edu">sharani.roy@utk.edu</a>	Dynamics and Mechanisms of Surface Catalyzed Reactions
Filippo Mangolini Texas Materials Institute, The University of Texas at Austin, TX 78712; 512-471-3244; <a href="mailto:Filippo.Mangolini@austin.utexas.edu">Filippo.Mangolini@austin.utexas.edu</a> Marina Ruths, Department of Chemistry, University of Massachusetts Lowell, Lowell, MA 01854, 978-934-3692; <a href="mailto:Marina_Ruths@uml.edu">Marina_Ruths@uml.edu</a>	Water and Tribological Interfaces
Wolfgang Parak, Department of Physics, University of Hamburg, Hamburg, Germany, and Bioengineered Particles Laboratory, CIC biomaGUNE, Donostia – San Sebastián, Spain. Email: <a href="mailto:wolfgang.parak@uni-hamburg.de">wolfgang.parak@uni-hamburg.de</a> Neus Feliu, Department of Physics, University of Hamburg, Hamburg, Germany. Email: <a href="mailto:nfeliu@physnet.uni-hamburg.de">nfeliu@physnet.uni-hamburg.de</a>	Targeted delivery of nanomedicines in vivo

Pablo del Pino, BioNanoTools Laboratory, Center for Research in Biological Chemistry and Molecular Materials (CiQUS), Universidade de Santiago de Compostela, Santiago de Compostela. Email: <a href="mailto:pablo.delpino@usc.es">pablo.delpino@usc.es</a>	
Mingdong Dong, Aarhus University, Denmark, <a href="mailto:dong@inano.au.dk">dong@inano.au.dk</a> Shuai Zhang, Pacific Northwest National Laboratory, US, <a href="mailto:shuai.zhang@pnl.gov">shuai.zhang@pnl.gov</a>	Hierarchical assembly of peptide and protein-from interaction, structure to application
Jennifer A. Hollingsworth, Materials Physics & Applications Division - Center for Integrated Nanotechnologies, Los Alamos National Laboratory; <a href="mailto:jenn@lanl.gov">jenn@lanl.gov</a> Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; <a href="mailto:Ramanathan.Nagarajan.Civ@mail.mil">Ramanathan.Nagarajan.Civ@mail.mil</a>	Nanomaterials
Steven Tait, Dept. of Chemistry, Indiana University; <a href="mailto:tait@indiana.edu">tait@indiana.edu</a>	Surface Chemistry
Andrew Goodwin, Department of Chemical and Biological Engineering, University of Colorado, Boulder, CO; <a href="mailto:andrew.goodwin@colorado.edu">andrew.goodwin@colorado.edu</a> Vernita Gordon, Center for Nonlinear Dynamics, Institute for Cellular and Molecular Biology, University of Texas at Austin, Austin, TX; <a href="mailto:gordon@chaos.utexas.edu">gordon@chaos.utexas.edu</a>	Biomaterials and Biointerfaces
Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; <a href="mailto:Ramanathan.Nagarajan.Civ@mail.mil">Ramanathan.Nagarajan.Civ@mail.mil</a>	Basic Research in Colloids, Surfactants and Interfaces
Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; <a href="mailto:Ramanathan.Nagarajan.Civ@mail.mil">Ramanathan.Nagarajan.Civ@mail.mil</a>	Langmuir Lectures, NanoLetters Award Lecture, ACS Materials and Interfaces Award Lecture (Invited Only)
Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; <a href="mailto:Ramanathan.Nagarajan.Civ@mail.mil">Ramanathan.Nagarajan.Civ@mail.mil</a>	Fundamental Research in Colloids, Surfaces and Nanomaterials (POSTER SESSION)

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## Dynamics and Mechanisms of Surface Catalyzed Reactions

### Organizers:

Dan Killelea, Department of Chemistry & Biochemistry, Loyola University, Chicago IL; (773) 508-3136; [dkillelea@luc.edu](mailto:dkillelea@luc.edu)

Sharani Roy, Department of Chemistry, The University of Tennessee – Knoxville, TN;  
[sharani.roy@utk.edu](mailto:sharani.roy@utk.edu)

The structure-function relationship between surface structures and their reactivity in heterogeneously catalyzed reaction schemes has attracted much interest from several fields over the past few decades. Recent advances have arisen from combined efforts between theoreticians and experimentalists, and are most fruitful when organically combined, rather than when one aspect is used to only complement the other. This symposium will highlight significant advances in our understanding of the chemistry of reactive surfaces and how selective control of reactions emerges from a fundamental, atomistic description of the reaction. We wish to highlight this synergy, while providing a forum for both experimentalists and theoreticians to discuss how the advances pertain to their field. Below is a list of tentative topics for the five sessions, with potential invited speakers:

- Recent advances in theory and simulation of heterogeneously catalyzed reactions
- Advances in experimental control of surface chemistry
- The role of nanostructures in heterogeneous catalysis
- Structures and mechanisms in heterogeneously catalyzed reactions
- Fundamental studies of dynamics and atomic level phenomena in heterogeneous catalysis

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## Water and Tribological Interfaces

### Organizers:

Filippo Mangolini, Texas Materials Institute, The University of Texas at Austin, TX 78712; 512-471-3244;  
[Filippo.Mangolini@austin.utexas.edu](mailto:Filippo.Mangolini@austin.utexas.edu)

Marina Ruths, Department of Chemistry, University of Massachusetts Lowell, Lowell, MA 01854; 978-934-3692; [Marina\\_Ruths@uml.edu](mailto:Marina_Ruths@uml.edu)

The elusive nature of water at tribological interfaces has attracted the attention of scientists and engineers for the past two decades. Even though water molecules play a pivotal role in the lubrication of biological systems and can act as environmentally-friendly lubricants in a range of mechanical systems, the friction and wear response of several material couples has been shown to be negatively impacted by the presence of water in the environment. In spite of decades of research, fundamental explanations of the effects of water on friction, lubrication, and wear phenomena are still lacking and require a detailed understanding of surface chemistry, materials science, physics, and biology. The complex, non-equilibrium interactions at buried sliding interfaces make tribology a scientifically rich but challenging field.

Recent years have seen advancements in tribology thanks to the introduction of novel analytical methods with enhanced surface sensitivity and lateral resolution available to experimentalists as well as the development of advanced computational methods. This has allowed scientists to progressively shift the state of knowledge in tribology from being phenomenologically-based to having a rigorous scientific basis. Recent advances include a deeper knowledge of the effects of chemical bond formation and surface microstructure, adhesion, surface roughness and deformation, phononic and electronic excitations, and biomimetic and bioinspired structures and coatings.

To promote further development of a cohesive understanding of the physico-chemical phenomena occurring at sliding interfaces, the symposium will bring together researchers with diverse backgrounds, but with a common interest in gaining insights into the origins and modeling of friction, lubrication, and wear of materials of technological interest, especially in situations where water molecules are present.

Topics that will be covered include:

- Biotribology, biomimetic systems, and lubrication in aqueous media
- Tribology of ionic liquids
- Lubricants and lubrication: from macro to nano
- Chemistry and physics of solid lubricants
- Mechanochemistry of lubricant additives
- Tribology in extreme environments
- Theoretical and computational advances in tribology

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## Targeted delivery of nanomedicines in vivo (Oral)

### Organizers:

Wolfgang Parak, Department of Physics, University of Hamburg, Hamburg, Germany, and Bioengineered Particles Laboratory, CIC biomaGUNE, Donostia – San Sebastián, Spain. Email: [wolfgang.parak@uni-hamburg.de](mailto:wolfgang.parak@uni-hamburg.de)

Neus Feliu, Department of Physics, University of Hamburg, Hamburg, Germany. Email: [nfeliu@physnet.uni-hamburg.de](mailto:nfeliu@physnet.uni-hamburg.de)

Pablo del Pino, BioNanoTools Laboratory, Center for Research in Biological Chemistry and Molecular Materials (CiQUS), Universidade de Santiago de Compostela, Santiago de Compostela. Email: [pablo.delpino@usc.es](mailto:pablo.delpino@usc.es)

In the past decade, the nanomedicine field have experienced dramatic progress, which will help us find better solutions to fight manifold diseases. Many of the proposed solutions would likely entail safe and efficient delivery of pharmaceutical formulations to targeted cells and/or tissues. In this way, many secondary and off-target effects could be minimized or even fully avoided. On the other hand, although the nanotechnology has brought the concept of “smart” delivery nanopatforms, most of the current nanomedicines have very low specificity in vivo. For instance, no matter which functionalization strategy is chosen, passive or active targeting, more than 99% of the nanoparticles administered in vivo end up in the mononuclear phagocytic system (MPS), mainly sequestered by macrophages in the liver and the spleen, in general wasting their therapeutic function. Therefore, the development of truly efficient solutions for the targeted delivery of nanomedicines in vivo, thereby improving their bioavailability, remains among the most crucial challenges in the field of nanotechnology and medicine. This symposium will address this topic by discussing different approaches for targeted therapies based on nanomaterials. Appropriate topics include, but are not limited to:

- Biofunctionalization of nanomaterials
- Bioactive nanomaterials
- Bio-inspired nanomaterials
- Biomimetic nanomaterials
- Theranostic nanosystems
- Spatially controlled activation of nanomaterials
- “Smart” drug delivery nanosystems
- Self-assembled supramolecular nanosystems

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## Hierarchical assembly of peptide and protein-from interaction, structure to application

### Organizers:

Mingdong Dong, Aarhus University, Denmark, [dong@inano.au.dk](mailto:dong@inano.au.dk)

Shuai Zhang, Pacific Northwest National Laboratory, US, [shuai.zhang@pnnl.gov](mailto:shuai.zhang@pnnl.gov)

Living organisms produce hierarchical structures of peptide and proteins, from nanoscale to macroscale, with high yields and highly reproducible manner. These peptide and protein can express versatile functions, like transport protein to regulate species transportation across membrane, and collagen and amelogenin peptides to template the growth of bone and tooth. In recent years, significant efforts have been made to mimic those structures and functions of secreted nature peptides and proteins. And novel properties and applications of nature inspired artificial peptide and protein have also been explored. These efforts address one challenge-to elucidate the interaction between peptide and protein that drives the formation of hierarchical structures in an energy-efficient path. On the other hand, peptide and protein may also mis-assemble into the structures that are toxic to living organisms, like amyloid insoluble aggregates to cause Alzheimer's Disease and Parkinson Disease. Understanding the interactions between disease-related peptides and proteins will help to design corresponding medical treatments.

This symposium intends to bring together a group of chemists, biologists, physicists, and engineers actively to characterize hierarchical structure and properties of peptide/protein assembly, and to further understand the driving interaction at molecular level. Theoretical and computational considerations will also be included

This symposium will highlight:

- fundamental insights obtained in the principles underlying the interactions and corresponding structures of peptide and protein hierarchical assembly;
- synthesis of artificial peptide and protein to mimic in vivo function
- self-assembly of peptide and protein with hierarchical structures and novel applications in biotechnology, material science and energy science;
- techniques to characterize the interactions and structures of peptide and protein

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Nanomaterials

Organizers:

Jennifer A. Hollingsworth, Materials Physics & Applications Division - Center for Integrated Nanotechnologies, MS-K771, Los Alamos National Laboratory; (505) 665-0399; [jenn@lanl.gov](mailto:jenn@lanl.gov)

Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; [Ramanathan.Nagarajan.Civ@mail.mil](mailto:Ramanathan.Nagarajan.Civ@mail.mil)

Nanoscale confinement of dimensionality in three, two and even only one dimension affords new and emergent properties that impact the fundamental chemistry and physics of nanomaterials. Basic research in nanomaterials synthesis, interactions and properties, especially those related to the colloidal nature of the nanomaterial or to effects governed by chemistry at nanoscale surfaces and interfaces will be appropriate for this symposium. Topics of interest include but are not limited to:

- Fundamentals of nanomaterials synthesis
- Surface modification
- Self-assembly: influences of surface chemistry, shape, solution additives
- Directed assembly: influences of functionalization, shape and structure-directing/ templating agents, and substrate effects
- Advanced characterization techniques to probe nanomaterials synthesis and assembly
- Basic research into functional properties of nanomaterials
- Multi-component nanomaterials, e.g., heterostructured (comprising semiconducting, metallic and/or dielectric segments) and doped nanocrystals
- 0-dimensional materials (e.g., quantum dots, metal nanoparticles), 1-dimensional materials (e.g., nanowires, nanotubes), and 2-dimensional materials (e.g., graphene, transition metal dichalcogenides, nanoplatelets, nanosheets, colloidal quantum wells)

Topics covered by other nanomaterials related thematic symposia within the COLL Division will not be emphasized in this symposium.

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## Surface Chemistry

Organizer:

Steven Tait, Dept. of Chemistry, Indiana University, Bloomington, IN 47405; (812) 855-1302;  
[tait@indiana.edu](mailto:tait@indiana.edu)

This symposium will consist of oral presentations on new advances in surface chemistry, including reactions at surfaces, chemisorption, adsorption/desorption, deposition and growth, kinetics of surface processes, surface structure, nanomaterials at surfaces, advances in surface analysis, manipulation of surface structure and chemistry, self-assembly at surfaces, and other topics related to surface chemistry. These sessions will include interdisciplinary topics relevant to fundamental surface chemistry, as well as to a range of chemical and materials applications.

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## Biomaterials and Biointerfaces

Organizers:

Andrew Goodwin, Department of Chemical and Biological Engineering, University of Colorado, Boulder, CO; [andrew.goodwin@colorado.edu](mailto:andrew.goodwin@colorado.edu)

Vernita Gordon, Center for Nonlinear Dynamics, Institute for Cellular and Molecular Biology, University of Texas at Austin, Austin, TX; [gordon@chaos.utexas.edu](mailto:gordon@chaos.utexas.edu)

This symposium will cover all topics of interest to biologically relevant research in colloid and surface science focusing on biological interfaces and the interaction of abiotic material surfaces with biological systems. Areas of interest include the theory, principles, design, and synthesis of biomaterials; the use of biomaterials in tissue engineering; characterization of new or existing biomaterials; and the interactions of biomaterials with proteins, membranes, cells, and tissues.

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## Basic Research in Colloids, Surfactants and Interfaces

Organizer:

Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; [Ramanathan.Nagarajan.Civ@mail.mil](mailto:Ramanathan.Nagarajan.Civ@mail.mil)

This symposium will accept papers in all areas of colloids, surfactants and interfaces. Topics include surfactant, block copolymer, lipid and other amphiphilic materials and their self-assembly, emulsions, foams, dispersions, interfacial phenomena including wetting, adhesion, colloidal glasses and gels, and colloidal and interfacial phenomena of interest to biological, environmental, material and medical

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technologies not covered by any of the thematic symposia. Experimental, theoretical and computational studies in all areas are encouraged for submission. Papers addressing industrial applications are also strongly encouraged.

## Langmuir Lectures, NanoLetters Award Lecture, ACS Materials and Interfaces Award Lecture (Invited Papers Only)

Organizer:

Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; [Ramanathan.Nagarajan.Civ@mail.mil](mailto:Ramanathan.Nagarajan.Civ@mail.mil)

This is a plenary session where award lectures will be presented.

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## Fundamental Research in Colloids, Surfaces and Nanomaterials (Poster Session)

Organizer:

Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; [Ramanathan.Nagarajan.Civ@mail.mil](mailto:Ramanathan.Nagarajan.Civ@mail.mil)

Posters addressing any aspect of colloids, surfaces and nanomaterials will be appropriate for submission to this symposium. All posters presented by graduate and undergraduate students will be judged by a panel of scientists. Student poster presenters should be prepared to give a 3 minute pitch to the judges who may

come to review the posters. Based on the technical content of the poster and the effectiveness of the pitch, the judges will select the best 4 or 5 poster presentations for the COLL Division awards. Awards will be given for graduate students and for undergraduate students.

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