257th ACS National Meeting & Exposition, March 31-April 4, 2019, Orlando, FL

ACS Meeting Theme: Chemistry for New Frontiers

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

Deadline for online submission of abstracts 5 November 2018

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

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.

Technical Symposia Scheduled

Symposium Organizer	Symposium Title
Subra Muralidharan, Office of Chancellor and Provost, University of California, Davis, CA 95616; subra.murali@ucdavis.edu; Atul Parikh, Department of Biomedical Engineering, University of California, Davis, CA 95616; anparikh@ucdavis.edu; Mu-Ping Nieh, Department of Chemical & Biomolecular Engineering, University of Connecticut, Storrs, CT 06269; mu-ping.nieh@uconn.edu; John Katsaras, Neutron Sciences Directorate, ORNL, Oak Ridge, TN; katsarasj@ornl.gov	Biomembrane Synthesis, Structure, Mechanics, and Dynamics
Hedi Mattoussi, FSU Chemistry and Biochemistry, Tallahassee, FL 321306; mattoussi@chem.fsu.edu Vincent Rotello, Department of Chemistry, University of Massachusetts Amherst, MA; rotello@chem.umass.edu	Understanding the Inorganic-organic Interface in Colloidal Nanomaterials
Hongyou Fan, Sandia National Laboratories, Albuquerque, NM 87106; hfan@sandia.gov	Colloidal Nanoparticle Synthesis and Assembly

Tao Li, Department of Chemistry and Biochemistry, Northern Illinois University, Dekalb IL 60115; tli4@niu.edu Ou Chen, Department of Chemistry, Brown University, Providence, RI, 02912; ouchen@brown.edu Feng Bai, Henan University, China; 86-371-2388-5808; baifengsun@126.com	
Dong Qin, School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA 30332; dong.qin@mse.gatech.edu Svetlana Neretina, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN 46556; sneretina@nd.edu Jingyi Chen, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR 72701; chenj@uark.edu Xiaohu Xia, Department of Chemistry, University of Central Florida, Orlando, FL 32816; xiaohu.xia@ucf.edu	Surface Chemistry of Colloidal Nanocrystals
Wolfgang Parak, Department of Physics, University of Hamburg, Hamburg, Germany, and CIC biomaGUNE, Donostia – San Sebastián, Spain. wolfgang.parak@uni-hamburg.de Luis M. Liz-Marzán, CIC biomaGUNE, Donostia – San Sebastián, Spain; llizmarzan@cicbiomagune.es Neus Feliu, Department of Physics, University of Hamburg, Hamburg, Germany; nfeliu@physnet.uni-hamburg.de	Quantitative particle cell interaction
Molly Richards, Chemical/Biological Innovative Materials & Ensemble Development Team, Natick Soldier Research, Development, & Engineering Center, General Greene Avenue, Natick, MA 01760; 508-233-4310; Molly.N.Richards2.civ@mail.mil Natalie Pomerantz, Chemical/Biological Innovative Materials & Ensemble Development Team, Natick Soldier Research, Development, & Engineering Center, General Greene Avenue, Natick, MA 01760; 508-233-4047; Natalie.l.pomerantz.civ@mail.mil	Novel Functionalization Methods for Textiles & Fibers
Bhanu P. S. Chauhan, Engineered Nanomaterials Laboratory, Department of Chemistry, William Paterson University, 300, Pompton Road, Wayne, New Jersey 07470; 973-720-2470; chauhanbps@wpunj.edu	New Frontiers in Hybrid Nanosized Metallic and Semiconductor Materials
Jennifer A. Hollingsworth, Materials Physics & Applications Division - Center for Integrated Nanotechnologies, Los Alamos National Laboratory; jenn@lanl.gov Ramanathan Nagarajan (NAGU), Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; Ramanathan.Nagarajan.civ@mail.mil	Nanomaterials
Steven Tait, Dept. of Chemistry, Indiana University; tait@indiana.edu	Surface Chemistry
Andrew Goodwin, Department of Chemical and Biological Engineering, University of Colorado, Boulder, CO; andrew.goodwin@colorado.edu	Biomaterials and Biointerfaces

Vernita Gordon, Center for Nonlinear Dynamics, Institute for Cellular and Molecular Biology, University of Texas at Austin, Austin, TX; gordon@chaos.utexas.edu	
Ramanathan Nagarajan (NAGU), Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; Ramanathan.Nagarajan.civ@mail.mil	Basic Research in Colloids, Surfactants and Interfaces
Ramanathan Nagarajan (NAGU), Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; Ramanathan.Nagarajan.civ@mail.mil	ACS Award Lectures (Invited only)
Ramanathan Nagarajan (NAGU), Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; Ramanathan.Nagarajan.civ@mail.mil	Fundamental Research in Colloids, Surfaces and Nanomaterials (POSTER SESSION)

Biomembrane Synthesis, Structure, Mechanics, and Dynamics

Organizers

Subra Muralidharan, Office of Chancellor and Provost, University of California, Davis, CA 95616; subra.murali@ucdavis.edu;

Atul Parikh, Department of Biomedical Engineering, University of California, Davis, CA 95616; anparikh@ucdavis.edu;

Mu-Ping Nieh, Department of Chemical & Biomolecular Engineering, University of Connecticut, Storrs, CT 06269; mu-ping.nieh@uconn.edu;

John Katsaras, Neutron Sciences Directorate, ORNL, Oak Ridge, TN; katsarasj@ornl.gov

The dynamic structural and mechanical properties of cell membranes strongly regulate functions of proteins, lipids, and genes, signaling pathways, and disease onset and progression. The symposium will focus on the current state of the art in biomembrane synthesis and self-assembly, structure, mechanics, and dynamics of cells and model membrane systems. Experimental and theoretical approaches including single molecule force and optical microscopy and spectroscopy methods, neutron and x-ray structural studies, nanoscale probes, and molecular dynamics simulations exemplify topics that have been presented at this symposium over the last 12 years.

The journal BioInterphases will be sponsoring prizes for the top three U.S. and one international student oral presentations at this symposium. The first of these prizes were awarded at the 255th ACS National Meeting in New Orleans. BioInterphases will continue to support student presentations and award prizes.

Understanding the Inorganic-organic Interface in Colloidal Nanomaterials

Organizers:

Hedi Mattoussi, FSU Chemistry and Biochemistry, Tallahassee, FL 321306; mattoussi@chem.fsu.edu

Vincent Rotello, Department of Chemistry, University of Massachusetts Amherst, MA; rotello@chem.umass.edu

Colloidal nanomaterials are often made of inorganic cores with size-, composition- and shape-tunable optical and electronic properties. These include plasmonic metal nanostructures and luminescent semiconductor and perovskite nanocrystals. They have generated great scientific interest over the past three decades, for use in many energy- and bio-related areas, e.g., photovoltaic and other optoelectronic devices, biosensing and in vivo tissue imaging. These materials share one important characteristic. Their surfaces are capped with organic ligand/surfactant molecules that coordinate on the nanocrystal surfaces, while promoting interactions with the immediate environment. The surface coating is complex, crucially important to processing and manipulating of these materials, and affects several of their photophysical properties. The nature of the ligand coordination, density and lateral extension play an important role in controlling the nanocrystal properties, e.g., hydrodynamic size, effective charge, long-term colloidal stability, biocompatibility, fluorescence emission as well as conductivity in devices. A thorough understanding of the ligand arrangement on the nanocrystals is essential for optimizing the material's performance in biological as well as non-biological matrices. An array of highly effective characterization strategies have been applied to various colloidal nanomaterials and data have yielded new and remarkably

detailed information and understanding of these systems. These techniques include a battery of NMR techniques, x-ray scattering, XPS, EDX, FT-IR, and Mass Spectrometry.

This symposium intends to bring together a group of chemists, physicists, biologists and engineers actively using such tools to characterize and understand the organic coating of these nanomaterials, such as structure, stoichiometry, and affinity on the colloidal properties of these materials. Theoretical and computational considerations will also be included.

Colloidal Nanoparticle Synthesis and Assembly

Organizers:

Hongyou Fan, Sandia National Laboratories, Albuquerque, NM 87106; hfan@sandia.gov

Tao Li, Department of Chemistry and Biochemistry, Northern Illinois University, Dekalb IL 60115; tli4@niu.edu

Ou Chen, Department of Chemistry, Brown University, Providence, RI, 02912; ouchen@brown.edu

Feng Bai, Henan University, China; 86-371-2388-5808; baifengsun@126.com

Colloidal nanoparticles represent an important class of structural and functional building block for many technologically significant materials and devices. However, technologies that leverage the structural advantages of individual nanoparticles have not been fully realized and have been limited by synthesis method. Fundamental issues related to chemical precursors, size, shape, and core/shell structure, surface chemistry, etc. critically determine the property and applications of nanoparticles and their assemblies. To address these issues, this symposium will cover the general topics of colloidal nanoparticle synthesis and assembly. Specifically, this symposium will focus on (1) nucleation and growth for crystal growth and to manipulate nanoparticle size, shape, and core/shell structure; (2) structural and property characterizations of nanoparticles; (3) Integration of nanoparticles in nanoelectronics and nanophotonics; and (4) Advanced spectroscopy and transport studies on optical, electronic, and magnetic structure, carrier dynamics, of nanoparticles/nanowires.

Tentative listing of topics to be covered

- Design of chemical precursors for synthesis of nanoparticles with control size and surface chemistry.
- Nanoparticle surface chemistry/functionalization to manipulate particle interactions, packing symmetry, external framework, and property
- Crystal growth and characterizations
- New synthetic processes and integration methods of nanoparticles
- Large area of nanoparticle assembly and patterning with long range order
- In-situ observation and characterizations of nanoparticle nucleation and growth
- In-situ characterizations of nanoparticle self-/directed-assembly (GISAXS, TEM, SEM, etc)
- Integration of nanoparticles in nanoelectronics and nanophotonics.
- Advanced spectroscopy and transport studies on electronic and magnetic structure, carrier dynamics, and charge/energy transfers of nanoparticles/nanowires

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Surface Chemistry of Colloidal Nanocrystals

Organizers:

Dong Qin, School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA 30332; dong.qin@mse.gatech.edu

Svetlana Neretina, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN 46556; sneretina@nd.edu

Jingyi Chen, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR 72701; chenj@uark.edu

Xiaohu Xia, Department of Chemistry, University of Central Florida, Orlando, FL 32816; xiaohu.xia@ucf.edu

This symposium will consist of oral presentations (both invited and contributed) and posters on recent progress in understanding and utilizing the surface chemistry of colloidal nanocrystals made of both metals and semiconductors. Specifically, it will focus on the role of surface capping in shape-controlled synthesis of colloidal nanocrystals where the ligands form coordination bonds with the surface atoms or ions. It will also include a discussion on the premise of surface coordination in tuning the electronic, optical and chemical properties of the nanocrystal surface for enhancing their catalytic or photocatalytic properties. Topics of interest include but are not limited to:

- The role of surface capping in shape-controlled synthesis of colloidal nanocrystals.
- Synthesis of nanocrystals with low-coordination surface atoms or ions.
- Strong interactions between metal nanocrystals and the support for enhancing their catalytic activity and selectivity.
- Strong interaction between organic modifiers and the surface of metal nanocrystals for electronic perturbations to enhance the catalytic performance of a heterogeneous catalyst.
- Ex situ characterization and quantitative analysis of surface capping for colloidal nanocrystals and its correlation with coordination chemistry.
- In situ characterization of surface capping during the nucleation and growth of colloidal nanocrystals.

Quantitative particle cell interaction

Organizers:

Wolfgang Parak, Department of Physics, University of Hamburg, Hamburg, Germany, and CIC biomaGUNE, Donostia – San Sebastián, Spain. Email: wolfgang.parak@uni-hamburg.de

Luis M. Liz-Marzán, CIC biomaGUNE, Donostia – San Sebastián, Spain. Email: llizmarzan@cicbiomagune.es

Neus Feliu, Department of Physics, University of Hamburg, Hamburg, Germany. Email: nfeliu@physnet.uni-hamburg.de

Nanoparticles are widely used as vehicles for delivery and sensing in cells. The fundamentals of such applications involve interaction of the nanoparticles with cells on a general level. While much is know, still many competitive methods exist to quantify particle uptake by cells. Also correlation of uptake to the physicochemical properties of the particles is not fully conclusive yet. Also concerning potential toxicity, many pathways are known, but a more unified picture, which again would relate everything to basic physicochemical properties would be extremely helpful. This symposium will address this topic by

discussing different methodologies for quantifying interaction of particles with cells, involving different types of particles, different surface chemistries, in in vitro and in vivo scenarios. Appropriate topics include, but are not limited to:

- Particle synthesis and characterization
- Colloidal stability in biofluids
- Protein corona
- Particle degeneration
- Fluorescence-, SERS-, dark-field, MRI, and element-analysis-based detection
- particle induced toxicity
- particle uptake by cells
- endocytosis/exocytosis

Novel Functionalization Methods for Textiles & Fibers

Organizers:

Molly Richards, Chemical/Biological Innovative Materials & Ensemble Development Team, Natick Soldier Research, Development, & Engineering Center, General Greene Avenue, Natick, MA 01760; 508-233-4310; Molly.N.Richards2.civ@mail.mil

Natalie Pomerantz, Chemical/Biological Innovative Materials & Ensemble Development Team, Natick Soldier Research, Development, & Engineering Center, General Greene Avenue, Natick, MA 01760; 508-233-4047; Natalie.l.pomerantz.civ@mail.mil

Modifying textiles and fibers to provide functionality through incorporation of particles, nanoparticles, colloids, and other molecules has been of interest for many years. Applications of multifunctional materials can range from chemical reactivity, anti-microbial properties, vector protection, selective sorption or low-cost fire resistance into protective fabrics and garments. This symposium will specifically focus on the novel functionalization methods to provide enhanced properties of textiles and fibers (coatings, covalent bonding, vapor deposition, embedding particles into the fibers, etc.) and address how these methods of incorporation impact functionality as well as fiber and/or textile substrate inherent physical properties. Abstracts are invited in all areas focusing on the incorporation/attachment methods to functionalize textiles & fibers.

New Frontiers in Hybrid Nanosized Metallic and Semiconductor Materials

Organizer:

Bhanu P. S. Chauhan, Engineered Nanomaterials Laboratory, Department of Chemistry, William Paterson University, 300, Pompton Road, Wayne, New Jersey 07470; 973-720-2470; chauhanbps@wpunj.edu

The control of matter at nanoscale provides one the opportunities to create materials of unique property profiles. In recent years, hybridization of multi-components in one monolith has been very successful in creating metal and semiconductor nanomaterials endowed with novel and exciting new property profiles. Currently, we are witnessing an explosion of interest in the synthesis, characterization and property profiling of such hybrid nanosized and microsized metallic and semiconductor materials because of their size related

properties and potential applications in various fields. The focus of this symposium is to bring together the scientists working on all aspects of nanoscale materials chemistry. Special emphasis will be placed on the new directions and developments in design and applications of new hybrids of metallic and semiconductor nanoparticles, which are tailored with organic/inorganic, polymer, biopolymers, and other nanoarchitectures. Specific Topics include:

- Hybrids of carbon nanotubes
- Fullerene metal/semiconductor hybrids
- Hybrids of metal nanoparticles
- Hybrids materials of main group elements
- Semiconductor polymer/biopolymer hybrids
- Metal Biopolymer hybrids
- Nanoarchitectures of DNA hybrids
- Hybrid phase catalysts
- Nano silicone/silica colloidal hybrids
- Bioorganic/inorganic Hybrids
- Hybrid Nanomaterial for surface energy transfer
- Enzyme based metallic/semiconductor materials

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

Ramanathan Nagarajan, Natick Soldier Research, Development & Engineering Center, General Greene Avenue, Natick MA 01760; 508-233-6445; 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.

Surface Chemistry

Organizer:

Steven Tait, Dept. of Chemistry, Indiana University, Bloomington, IN 47405; (812) 855-1302; 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.

Biomaterials and Biointerfaces

Organizers:

Vernita Gordon, Center for Nonlinear Dynamics, Institute for Cellular and Molecular Biology, University of Texas at Austin, Austin, TX; 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.

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

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 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.

ACS Awards Lectures (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

This is a plenary session where award lectures will be presented. Recipients of ACS Award in Colloid Chemistry and ACS Award in Surface Chemistry will present their award lectures. There may be additional ACS National Awardees who may select to present at this symposium.

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

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.
