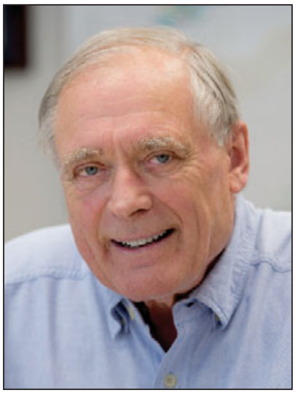
Samuel I. Stupp of Northwestern University to give plenary address at 2015 MRS Spring Meeting

Samuel I. Stupp of Northwestern University has been selected to give the plenary address at the 2015 Materials Research Society (MRS) Spring Meeting to be held April 6–10 in San Francisco. The plenary session will be held on Wednesday, April 8, at 6:30 p.m., in the San Francisco Marriott Marquis.

Soft materials in their many forms—polymers, organic crystals, liquid crystals, gels, supramolecular materials—mimic the structures and physical properties of biological systems and are therefore a rich platform for bioinspired materials design. All these forms of condensed matter are extraordinarily useful because of their unique functions or because replacement of hard materials with soft ones is increasingly a sustainability issue. Soft materials design is in its early stages and needs to be directed to functions that have not yet been achieved. Examples include materials that are reversibly responsive, dynamic, adaptable, or capable of integrating synergistic functions. These features emulate biological structures such as cells.

Stupp's presentation will provide examples of soft matter design using supramolecular structures that integrate functions for energy applications or exhibit dynamic features of interest in bioactive materials. The lecture will also demonstrate how functions in soft matter are linked to energy landscapes and thus to synthetic pathways.

Stupp is currently the Director of Northwestern University's Simpson Querrey Institute for BioNanotechnology, and is also the Director of the US Department of Energy's EFRC Center for Bio-Inspired Energy Science. Stupp's research is focused on materials for medicine and energy covering the fields of supramolecular chemistry, self-assembly of materials, solar photovoltaics, solar fuels, regenerative medicine, and nanomedicine for cardiovascular and cancer therapies. He earned his PhD degree in materials science and engineering at Northwestern University. He is a member of the National Academy of Engineering, the American Academy of Arts and Sciences, and the Spanish Royal Academy. He is also a Fellow of the American Physical Society, MRS, the American Association for the Advancement of Science, The World Technology Network, and the World Biomaterials Congress. His awards include the MRS Medal, the US Department of Energy Prize for Outstanding Achievement in Materials Chemistry, the Humboldt Senior Award from Germany, the American Chemical Society Award in Polymer Chemistry, the Sir Edward Youde Memorial Award in Hong Kong, the American Chemical Society Ronald Breslow Award for Achievement in Biomimetic Chemistry, the International Award from The Society of Polymer Science, Japan, and Honorary Doctorates from Eindhoven University of Technology, the University of Gothenburg, and the National University of Costa Rica. He holds distinguished visiting positions in Eindhoven, Singapore, and Hong Kong.



John M. Carpenter to receive MRS Innovation in Materials Characterization Award

John M. Carpenter of Argonne National Laboratory (ANL) is being honored with the Materials Research Society (MRS) Innovation in Materials Characterization Award "for innovations in neutron sources that have fundamentally changed their performance and enabled opportunities for further advancement of materials that improve the quality of life." He will be presented with the award at the 2015 MRS Spring Meeting in San Francisco. The award is endowed by Toh-Ming Lu and Gwo-Ching Wang.

Neutron scattering is one of the most important characterization tools available to materials scientists. The strengths of neutron scattering—sensitivity to hydrogen, deep penetration into materials, inelastic excitations, sensitivity to magnetism—have been critical in our understanding of high-temperature superconductivity (inelastic excitations), spin structure in exotic materials (magnetism), the function of proteins in pharmaceuticals (hydrogen), and sources of fatigue in reinforcement cables for bridges (deep penetration).

One of Carpenter's major contributions to materials science is the invention of the high intensity pulsed thermal neutron source. He recognized the value of using the intrinsic time structure of a pulsed spallation neutron source to perform neutron scattering. He also recognized that with clever design of the spallation target and its moderator and reflector assemblies, the efficiency in converting proton beam power to neutron production while maintaining very sharp neutron pulses (for high-resolution neutron scattering) could be vastly increased.

Carpenter's pioneering work in inventing the pulsed thermal neutron source (ZING-P at ANL) and a myriad of instrumentation designed for such a source resulted in the construction of a new generation of neutron sources. These sources in Japan (KENS), Argonne (the Intense Pulsed Neutron Source, of which Carpenter was the director), the Los Alamos Neutron Science Center, and ISIS in the United Kingdom established a new trend in source performance. Today, the Spallation Neutron Source at Oak Ridge, J-PARC (Japan), the European Spallation Source (to start in 2019)—all pulsed spallation neutron sources—have exceeded the performance of the most powerful reactors.

Carpenter earned his PhD degree in nuclear engineering from the University of Michigan. He is a Fellow of the American Physical Society, American Nuclear Society, Neutron Scattering Society of America (which also awarded Carpenter its highest honor—the Cliff Shull Prize), and the American Association for the Advancement of Science. He continues to lecture and is actively involved in commissioning the ultra-small-angle-scattering instrument at the Spallation Neutron Source.

Seth R. Marder to receive Mid-Career Researcher Award for chemical structure–property characterization of organic molecules

The Materials Research Society (MRS) has named Seth R. Marder, professor and Georgia Power Chair in the School of Chemistry and Biochemistry and the School of Materials Science and Engineering at the Georgia Institute of Technology, to receive the Mid-Career Researcher Award "for establishing fundamental relationships between the chemical structure of organic molecules and their optical and electronic properties, thereby profoundly impacting how the scientific community designs optimized molecular structures for use in nonlinear optical applications." Marder will be recognized during the Award Ceremony at the 2015 MRS Spring Meeting in San Francisco. The Mid-Career Researcher Award, endowed by Aldrich Materials Science, recognizes exceptional achievements in materials research made by mid-career researchers.

Marder's work on the nonlinear polarizabilities and nonlinear absorptive properties of organic materials has had a profound effect on how the chemistry and physics communities think about the molecular basis for nonlinear optical responses, and also on how chemists go about designing optimized structures for nonlinear optical applications.

Prior to Marder's work, the search for nonlinear optical chromophores was largely empirical and guided by simplistic concepts, for example, π-systems need to be substituted with strong donors and acceptors for second-order responses, and long conjugated π-systems are needed for third-order responses. Marder pioneered the use of organometallic compounds for nonlinear optical applications. Later, he applied physical organic methodologies to gain an understanding of how to optimize molecular structures for achieving large second-order nonlinear optical responses. He realized that within a simple valence bond approach, it could be useful to map the dependencies of nonlinear polarizabilities as a function of ground-state polarization. Marder refined and expanded these concepts and championed the use of bond length alternation in polymethine dyes as a useful metric to correlate the degree of charge separation in its ground state with its linear and nonlinear polarizabilities.

Marder received his PhD degree in chemistry from the University of Wisconsin–Madison. He has 23 issued patents, of which 11 are licensed and 9 were jointly developed with companies. He has published over 375 peer-reviewed papers. Other honors include the Materials Awards from the Georgia Tech Research Corporation for Excellence in Research, American Chemical Society Arthur C. Cope Scholar, and the Outstanding Award in Research Program Development from Georgia Tech. Marder is a Fellow of the American Association for the Advancement of Science, the Optical Society of America, Society of Photo-Optical Instrumentation Engineers, the Royal Society of Chemistry, and the American Physical Society.