



## Karena W. Chapman named 2015 MRS Outstanding Young Investigator for contributions to energy-relevant systems

**K**arena W. Chapman, a scientist in the X-ray Science Division of Argonne National Laboratory, has been named a 2015 Materials Research Society (MRS) Outstanding Young Investigator. Chapman was cited “for her contributions to understanding the coupled structure and reactivity of energy-relevant systems and for developing the incisive experimental and analytical tools needed to interrogate these complex materials systems.” She will be presented with the award at the 2015 MRS Spring Meeting in San Francisco.

With established leadership in an emerging characterization field and a history of seminal developments and

contributions on topical materials systems, Chapman has led the development of x-ray pair distribution function (PDF) methods, a rapidly growing and versatile tool capable of probing the atomic and nanoscale structure of materials beyond the limits of conventional crystallography, spanning crystalline, nanoscale, and amorphous materials, alike. Her current materials interests are focused on energy and span battery electrodes and electrolytes, catalysis, and porous framework materials for energetic gas storage and nuclear-waste capture.

Chapman received her BSc and PhD degrees in chemistry from The University of Sydney, Australia. Her doctoral

research focused on structure–property relationships in cyanide-bridged open framework materials, including their anomalous thermo-mechanical properties (negative thermal expansion) and hydrogen gas storage. During this time, she employed a wide range of tools, including single-crystal methods, powder diffraction, and PDF methods.

Most recently, Chapman has made significant contributions to the area of chemical energy storage. She has developed *in situ* methodologies to examine the structure of batteries across a wide length scale—from atoms to electrodes—working to combine PDF with small-angle scattering, EXAFS, and imaging modalities to examine important phenomena related to ion/electron transport and structural transitions. Notable achievements include the first *in situ* PDF measurements, which required a new *operando* battery cell to be designed. These developments have had a major impact on a number of important materials systems, including lithium ion (LiFePO<sub>4</sub>), conversion chemistries, and multivalent systems (e.g., Mg), and have shed new light on storage mechanisms and major issues facing batteries, including cycle life and safety.



## Ali Javey named 2015 MRS Outstanding Young Investigator for contributions in integrating nanomaterials

**A**li Javey, associate professor at the University of California–Berkeley, has been named a 2015 Materials Research Society (MRS) Outstanding Young Investigator. Javey was cited “for innovative contributions in integrating nanomaterials into device applications.” He will be presented with the award at the 2015 MRS Spring Meeting in San Francisco.

Javey developed a novel contact printing strategy for depositing highly uniform, well-aligned, clean monolayer films of semiconductor nanowires with controlled density. His approach represents an implementation of the “bottom-up” paradigm that is general to the material, substrate, and dimensionality of structures. He used this approach to

assemble three-dimensional nanoelectronic structures consisting of up to 10 vertically stacked layers of functional nanowire transistors, and novel multifunctional structures consisting of logic gates and nonvolatile memory in distinct, addressable layers. This work has opened up a unique area of nanoscience.

Using the contact printing process, his group demonstrated successful heterogeneous assembly of nanowires for an all-integrated image sensor circuitry in which hundreds of thousands of optically active CdSe and high-mobility Ge/Si nanowires are controllably assembled into arrays of functional circuit elements, demonstrating the versatility of the contact printing process and the unique functionality of nanowire materials. This sensor circuit integration presents the largest functional circuit array demonstrated to date based on any synthetic



nanomaterials, and presents a unique route toward utilization of nanowire arrays for printable sensor circuitry.

The integration of high mobility materials on Si can be challenging due to large-lattice mismatch, and Javey has confronted this challenge by developing an approach he has termed the X-on-insulator (XOI),

which has allowed for some of the highest mobilities on Si substrates.

Javey is a faculty member in the Department of Electrical Engineering and Computer Sciences at the University of California–Berkeley. He earned his PhD degree in physical chemistry from Stanford University. He received the *Nano*

*Letters* Young Investigator Lectureship, UC Berkeley Electrical Engineering Outstanding Teaching Award, APEC Science Prize for Innovation, Research, and Education, Netexplorateur of the Year Award, IEEE Nanotechnology Early Career Award, and he was a Blavatnik National Award for Young Scientists Finalist.



## Hongyou Fan to present Kavli Lecture at 2015 MRS Spring Meeting

**H**ongyou Fan, research professor in the Department of Chemical and Nuclear Engineering at The University of New Mexico, and a principal member of the Technical Staff at Sandia National Laboratories, has been selected for the Fred Kavli Distinguished Lectureship in Nanoscience. He will give his presentation at the 2015 MRS Spring Meeting in San Francisco.

Precise control of structural parameters through nanoscale engineering

to improve optical and electronic properties of functional nanomaterials remains an outstanding challenge. Previous work has been conducted largely at ambient pressure and relies on specific chemical or physical interactions such as van der Waals interactions, dipole-dipole interactions, chemical reactions, and ligand-receptor interactions. In his presentation, Fan will introduce a stress-induced fabrication method that uses mechanical compressive force applied to nanoparticles to

induce structural phase transition and to consolidate new nanomaterials with precisely controlled structures and tunable properties.

He received a BS degree from the Department of Chemistry at Jilin University, a MS degree from the Chinese Academy of Sciences in the field of polymer chemistry and physics, and a PhD degree from The University of New Mexico in the field of nanoporous materials and composites.

Fan and his research programs have been recognized by multiple awards, including the Sandia National Labs Laboratory Directed Research and Development (LDRD) Award for Excellence in 2007, the *R&D Magazine* R&D 100 Award for technically significant products in 2007 and 2010, the Federal Laboratory Consortium (FLC) Outstanding Technology Development Award in 2008 and 2013, a University of New Mexico Outstanding Faculty Mentor Award in 2005, and the Asian American Engineer of the Year Award in 2012.

### ICSI-9 to be held May 17–22 in Canada

<http://www.icsi-epi.com>

**T**he 9th International Conference on Silicon Epitaxy and Heterostructures (ICSI-9) will be held May 17–22, 2015, in Montreal, Canada. The conference provides a platform for scientists and engineers from both academia and industry to discuss the latest developments in physics; device technologies; and instrumentation of Si-based epitaxy, heterostructures, nanostructures, and quantum systems. It will also cover recent progress in the heterointegration of III–V

semiconductors and two-dimensional materials on group IV platforms.

The organizing committee is comprised of Oussama Moutanabbir (École Polytechnique de Montréal, Canada); Matthias Bauer (Applied Materials, USA); Minjoo Larry Lee (Yale University, USA); Armando Rastelli (Johannes Kepler University, Austria); and Patrick Desjardins (École Polytechnique de Montréal, Canada).

There are three plenary lecturers: Hiroshi Amano (Nagoya University,

Japan), who is the 2014 Nobel Prize in Physics Laureate; Eugene A. Fitzgerald (Massachusetts Institute of Technology, USA); and Richard Martel (Université de Montréal, Canada).

The manuscript submission deadline is March 18, and the conference proceedings will be published in a special issue of *Thin Solid Films*. More information can be accessed from the meeting website at <http://www.icsi-epi.com> or email [icsi-9@polymtl.ca](mailto:icsi-9@polymtl.ca). □