A Celebration of Science: Symposium Honors the Work of David N. Seidman

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At first, David Seidman wasn't sure about the prospect of an honorary symposium for his 70th birthday. "I was somewhat reluctant, but on reflection I thought it would be an excellent way to reconnect with the many people I have interacted with over the years," said the Walter P. Murphy Professor of Materials Science and Engineering at Northwestern University. "And, this certainly was true. I felt really honored and enjoyed it both scientifically and socially."

The symposium, "Advanced Characterization and Modeling of Phase Transformations in Metals in Honor of David N. Seidman" was a highlight for many at the TMS 2009 Annual Meeting in February. More than 50 abstracts were submitted, including contributions from Seidman's colleagues and former students. Approximately half of the papers were invited, with 90 percent of those individuals agreeing to come, even when it meant making a long journey overseas. Said Robert Averbach, symposium organizer and Donald W. Hamer Professor of Materials Science and Engineering at the University of Illinois, "With David's achievements, he deserved something larger. When thinking how to appropriately honor the occasion of his birthday, my first thought was to try TMS."

Seidman is considered to be one of the world's leading authorities in atom-probe tomography, and is credited for designing the first atom-probe field ion microscope (FIM) with full computer control for high mass resolution, setting the standard for future instrument design. His talents and intellect were

evident early on, as his thesis advisor and post doctoral supervisor, Robert W. Balluffi, adjunct professor in the Department of Materials Science and Engineering at Cornell University, remembers. "He had—and has—many superior qualities," Balluffi said. "In particular, he has an ability and willingness to take on unusually difficult and ambitious experimental work that is cleverly designed in order to obtain new and critical information at the forefront of the field of materials science."

As the founding director of the Northwestern University Center for Atom-Probe Tomography, Seidman has more recently focused on combining simulations and experiments to understand the structure and chemistry of buried interfaces and grain boundaries. He has also employed this approach to study solid-state phase transformations in great detail, which he showcased at the Material Research Society's prestigious David Turnbull Lecture in December 2008 (see the article in Member News, page 10). Currently, Seidman is using atom-probe tomography to study phase separation of high-temperature structural alloys on an atomic scale, model nickel-based superalloys, and aluminum-scandium based alloys. Additionally, he is studying silicidation reactions with atom-probe tomography on an atomic scale, which is relevant to the problem of fabricating integrated circuits with finer and finer lines.

"With the development of three-dimensional atom-probe tomography I was further stimulated to study atomic scale phenomena and this has proven to be an extremely exciting time of my scientific career," said Seidman. "My dream is that atom-probe tomography will be widely accepted by materials scientists as an important instrument in their study of a broad range of scientific

and engineering problems. It gives me a great deal of personal satisfaction to see young Ph.D. and post-doctoral students becoming excited about this technique and to want to make further advances with it on their own."

Although his contributions to materials science are numerous and well-documented, Seidman has shaped the future even more profoundly through the minds and imaginations of his students. For example, Chantal K. Sudbrack, visiting research scientist at Northwestern University, is a recent Ph.D. and post-doctoral student of Seidman's. "I learned from Professor Seidman to look and question data deeply and critically," she said. "This has had a profound influence on how I approach research problems."

As one of Seidman's first students at Cornell, Arnold S. Berger, Senior Lecturer at the University of Washington, Bothell, shared in some of Seidman's earliest accomplishments. For his thesis, he looked for monovacancies and divacancies in high-purity platinum wires that were quenched from high temperature. With Seidman as his thesis advisor, he used electrical resistivity to determine the concentration and then used the field-ion microscope with Seidman to see them.

For his post-doctoral research, Berger built Seidman's first atom-probe FIM. "Working with David I learned that I had a knack for designing and building high-speed digital electronics and computer control systems," he said. "He gave me a lot of freedom to do my research and learn by doing. I think that most shaped my perspective on working with people in general, and with my own students."

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