Jerome B. Cohen, 1932–1999

Jerome Cohen joined the Northwestern faculty in 1959 as an assistant professor of materials science in what is now the Department of Materials Science and Engineering. He was promoted to associate professor in 1961 and full professor in 1965 and was named Frank C. Engelhart Professor of Materials Science and Engineering in 1974 and the first Technological Institute Professor in 1984. He served as department chair from 1973 to 1978 and as dean of the Robert R. McCormick School of Engineering and Applied Science from 1986 to 1999.

Dean Cohen's research centered on measurements of residual stress, thermodynamics, ordering, clustering of defects, and phase transitions. The consummate materials scientist, he included metals, ceramics, and polymers in his studies. While dean, he continued to carry out research on the role of x-ray diffraction in allowing scientists and engineers to understand material structure and its relationship to properties and performance. He was a major contributor to the effort to build the Advanced Photon Source at Argonne National Laboratory and initiated the discussions with E. I. duPont de Nemours and later Dow Chemical Company to establish the DND-CAT, one of the leading experimental research facilities at the APS.

Dean Cohen received SB and ScD degrees in metallurgy from Massachusetts Institute of Technology and an honorary doctorate from Linköping University in Sweden. His awards included the 1981 Howe Medal of the American Society for Metals and the 1992 Acta Metallurgica Gold Medal. In addition to being elected to the National Academy of Engineering in 1993, Dean Cohen was a fellow of ASM International and the Minerals, Metals, and Materials Society and an honorary member of the Japan Institute of Metals.

Jerome B. Cohen Distinguished Lecturers

2012 Knut W. Urban, RWTH Aachen University
2011 Emily Carter, Princeton University
2010 Joanna Aizenberg, Harvard University
2009 Helmut Dosch, University of Stuttgart
2007 Sharon C. Glotzer, University of Michigan
2006 Yves Bréchet, Institut National Polytechnique de Grenoble, France
2005 Alex Zunger, National Renewable Energy Laboratory
2004 Frans A. Spaepen, Harvard University
2003 George W. Scherer, Princeton University
2002 Mildred S. Dresselhaus, Massachusetts Institute of Technology
2001 Edward J. Kramer, University of California, Santa Barbara
2000 William D. Nix, Stanford University

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McCormick
Northwestern Engineering

Jerome B. Cohen Distinguished Lecture Series in Materials Science and Engineering

April 23 and 25, 2013

Presented by
Peter Fratzl
Director, Max Planck Institute of Colloids and Interfaces
Potsdam, Germany

Robert R. McCormick School of Engineering and Applied Science
Northwestern University

Department of Materials Science and Engineering

Peter Fratzl

Peter Fratzl is the director of the Max Planck Institute of Colloids and Interfaces in Potsdam, Germany, and head of its Department of Biomaterials. He is also an honorary professor at Humboldt University Berlin and Potsdam University.

His laboratory studies the relationship between hierarchical structure and mechanical behavior of biological and bioinspired composite materials and conducts research on osteoporosis and bone regeneration.

Before moving to Potsdam in 2003, Fratzl was a professor in materials physics at the University of Vienna and the University of Leoben, Austria. He has published more than 400 papers in journals and books. Recent awards include the 2008 Max Planck Research Award from the Humboldt Foundation and the 2010 Leibniz Prize from the German Science Foundation.

He received an honorary doctorate from the University of Montpellier, France, in 2010 and was elected a corresponding member of the Austrian Academy of Sciences in 2007 and fellow of the Materials Research Society in 2012.

Fratzl received an engineering degree from the École Polytechnique Paris and a doctorate in physics from the University of Vienna.

Tuesday, April 23, 4 p.m.
Lecture Room 211, Technological Institute
Reception to follow in the William A. and Gayle K. Cook Hall atrium

Studying Bone Growth, Remodeling and Regeneration through Multiscale Imaging

The mechanical properties of bone depend essentially on its complex hierarchical structure, which adapts to the need of every part of our skeleton. In the laboratory collagen fibrils reinforced with mineral nanoparticles are assembled into lamellae at the micron scale. Rotated plywood arrangements of lamellae build osteons in compact bone or trabeculae in cancellous bone. Some or all of these levels may be affected by bone diseases, such as osteoporosis or osteogenesis imperfecta, and by treatment of the diseases. The talk will review how multiscale imaging based on optical and electron imaging combined with scanning synchrotron x-ray scattering has been applied to the study of bone structure. Medical applications relating to osteoporosis treatment, bone healing, and tissue engineering will be highlighted.

Thursday, April 25, 4 p.m.
Lecture Room 211, Technological Institute

Nanostructure and Mechanical Function of Natural Hybrid Materials

A great variety of natural materials with outstanding mechanical properties have appeared in the course of evolution. These include wood, grasses, bone, sea shells, and glass sponges, which are hybrid materials composed of proteins or polysaccharides and, sometimes, mineral. They resist fracture, adapt to loads, and show self-healing behavior. Some of these materials are even able to generate force or movement without an intrinsic energy supply. The lecture will review some of the structural principles observed in such biological load-carrying and actuating hybrid materials and discuss perspectives for bioinspired materials research.