Scientists of the quality of Casey “set the standards not just for their students and their competitors in research, but for all the areas in which they offer their services,” says Daryle H. Busch, a past-president of ACS and a chemistry professor at the University of Kansas. “Casey deserves recognition for raising the standards in organometallic chemistry research, in the education of graduate students in organometallic chemistry, in the service of the many organizations that serve inorganic and especially organometallic chemistry, and in the conduct of the leadership of the American Chemical Society itself.”

Casey will deliver the award address before the Division of Inorganic Chemistry.—STEVE RITTER

ACS AWARD IN INORGANIC CHEMISTRY

Sponsored by Aldrich Chemical

Robert J. Cava, a professor of chemistry at Princeton University, likes to point out that buried deep within most of our modern electronic technologies are special materials. Cell phones, televisions, and computers all employ materials with unique electronic and magnetic properties that solid-state chemists such as Cava have discovered and optimized.

“These properties arise from chemistry somehow, and you have to figure out how,” Cava says. “Thankfully, the world is complicated enough that that makes a lifetime job.”

Cava has spent his career creating and studying solids with special magnetic and electronic characteristics, including new, innovative high-temperature superconductors, exotic magnets, and transparent electronic conductors. He is being honored for these seminal contributions to solid-state chemistry.

“I think it’s a great recognition by the inorganic chemistry community of the solid-state chemistry field, and I really appreciate it,” Cava says about receiving the award. “We are different because we don’t work with molecules, but we make very complicated materials where structure and properties are related in really complex and interesting ways.”

High-temperature superconductors have been a major focus of Cava’s research. His early work on the cuprate superconductor YBa$_2$Cu$_3$O$_7$ has been cited more than 14,000 times in scientific literature. More recently, he and his colleagues discovered how to influence the balance between magnetism and superconductivity in lanthanide nickel borocarbides to produce novel superconductors.

Creating new transparent electronic conductors is also a chemical balancing act, Cava says. His group has worked on producing materials for possible use in flat-panel displays, such as zinc-doped indium oxides, that have big enough bandgaps to allow light to pass through the solid but can also conduct current effectively.

Other interesting materials that Cava has synthesized include quirky solids called frustrated magnetic systems. The crystal lattice structure of these materials prevents their atoms’ spins from settling on a single alignment when frozen to near absolute zero. Because of this spin switching, these solids retain finite entropy at absolute zero, similar to a property that Linus Pauling described about ice.

“Cava has transformed the discipline of solid-state chemistry in a fundamental manner,” says Peter P. Edwards, a chemistry professor at Oxford University. “No one has made more significant and wide-ranging contributions to our understanding of how atoms combine to give rise to new inorganic materials with quite spectacular and breathtaking electronic and magnetic properties.”

At Princeton, Cava has won several awards for teaching undergraduates. “One must also give great credit to Cava the teacher,” Edwards says, “imparting his knowledge, insights, and joy in educating the young—and sometimes the not so young!”

Cava earned a B.S. and an M.S. in materials science and engineering in 1974 and a Ph.D. in ceramics in 1978, all from the Massachusetts Institute of Technology. After graduate school, he spent a year as a National Research Council postdoctoral scholar at the National Institute of Standards & Technology. Then he worked at Bell Laboratories for 16 years before leaving to join the faculty of Princeton in 1996. Cava served as the Princeton chemistry department chair from 2004 to 2010.

Over his career, Cava has published some 500 journal articles and mentored about 15 graduate students. In 1998, he received the ACS Award in the Chemistry of Materials.

Cava will present the award address before the Division of Inorganic Chemistry.—MICHAEL TORRICE

FRANK H. FIELD & JOE L. FRANKLIN AWARD FOR OUTSTANDING ACHIEVEMENT IN MASS SPECTROMETRY

Sponsored by Waters Corp.

Time-of-flight mass spectrometry is today a widespread technique, but that wasn’t always the case. Many of the advantages of TOF that make it useful for biological MS can trace their roots back to Robert J. Cotter, professor of pharmacology and molecular sciences and professor of biophysics and biophysical chemistry at Johns Hopkins University School of Medicine. Cotter, 67, is being honored for his many contributions to the development of TOF MS.

“When Cotter began his research in this field in the late 1970s, biomedical applications of this instrument were few and commercial production had virtually ceased,” says Richard B. van Breemen, professor of medicinal chemistry at the University of Illinois, Chicago. At that time, people thought that laser desorption would only evaporate neutral molecules and that a second step was needed to ionize them. Cotter showed that desorption and ionization could be accomplished simultaneously with a single laser pulse. He proceeded to show that TOF MS makes an ideal companion for pulsed lasers because the technique analyzes ions.
Ralph F. Hirschmann Award in Peptide Chemistry

Sponsored by Merck Research Laboratories

It's easy to imagine how pursuing studies in nuclear magnetic resonance spectroscopy could do for David J. Craik, in his quest to discover and study the cyclic peptides known as cyclotides, you're just as likely to find Craik, scouting the Australian countryside or African plains for plants as you are to find him locked up with instrumentation.

We've had a lot of adventures," Craik tells C&EN of his search for cyclotides. Consider, for example, the time his lab drove through the Australian desert from Brisbane to Alice Springs, carrying all the food, water, and fuel needed for the five-day journey. "It takes skills other than chemistry," observes Craik, who is currently a Professorial Fellow at Australia's University of Queensland.

But it's Craik's sense of scientific adventure that's being recognized with the 2011 Ralph F. Hirschmann Award in Peptide Chemistry. "Professor Craik has made outstanding contributions to our understanding of the structure-function relationships of peptide toxins and circular peptides and proteins," notes Paul F. Alegood, Craik's colleague at the University of Queensland. "His multidisciplinary approach not only requires great intellect and drive but courage to learn new disciplines and employ them in smart ways."

A native of Australia, Craik earned bachelor's and doctoral degrees from La Trobe University, in his home country. After postdoctoral stints in the U.S. and back home, he joined the faculty at Australia's Victorian College of Pharmacy. In 1995, he moved to the University of Queensland.

It was during a sabbatical at England's Oxford University, in 1991, that Craik discovered the first cyclotide—a cyclic peptide with six cysteine residues in a knotted arrangement. The protein, named kalata B1, had originally been identified in the 1970s by Lorents Gran, a Norwegian doctor who isolated and identified the compound as the active component in a tea that women in the Congo drank to shorten their time in labor.

"It was a complete accident that I came across this peptide," Craik recalls. "I did the structure using NMR and we discovered the knotted disulfide arrangement and with colleagues discovered it was a head-to-tail cyclic peptide. No one had seen a cysteine knot before, and a head-to-tail cyclized backbone for a peptide of that size was unprecedented." There was some skepticism over the structure, he remembers. "It was stubbornness, I suppose, that kept me working in an area that wasn't fashionable."

Since then, Craik has discovered many other examples of the cyclotides, and that research has dovetailed nicely with his work on the peptides known as conotoxins. By linking the N- and C-termini of a conotoxin from cone snail venom, essentially transforming it into a cyclotide, Craik's group has made a stable peptide with promising properties for treating chronic pain.

As for the Hirschmann prize, Craik says, "I'm just really honored and delighted to receive the award."

Craik will present the award address before the ACS Division of Biological Chemistry—BETHANY HALFORD

ACS Award in Industrial Chemistry

Sponsored by the ACS Division of Business Development & Management and the Society of Chemical Manufacturers & Affiliates

John A. Lowe III, who launched the pharmaceutical consulting company JL3 Pharma in Stonington, Conn., in 2009 after a 30-year career with Pfizer Global Research & Development, is being honored for his role in the discovery of a treatment for schizophrenia and for advances deriving from his work with the receptor for substance P (SP), a peptide involved in the immune response and in transmission of pain signals.

Born in 1951, Lowe earned a B.A. in chemistry and history from Williams College, in Massachusetts, in 1973 and a Ph.D. in synthetic organic chemistry from the University of...