

Robert J. McEliece, Error-Coding Technology Expert, to Receive 2009 IEEE Alexander Graham Bell Medal

Contributions Have Benefited Mass-Market Data Storage Devices and Deep-Space Telecommunications Systems

PISCATAWAY, N.J. – 22 June 2009 – Robert J. McEliece, who has been instrumental in achieving maximal performance in data storage and wireless transmission devices through enhanced error-correcting codes, is being honored by IEEE with the 2009 IEEE Alexander Graham Bell Medal. IEEE is the world's largest technical professional association.

The medal, sponsored by Alcatel-Lucent Bell Labs, recognizes McEliece for fundamental contributions to the theory and practice of error-correcting codes and the design of deep-space telecommunication systems. The medal will be presented on 25 June 2009 at the IEEE Honors Ceremony in Los Angeles, Calif. For the first time, the IEEE Honors Ceremony will be broadcast live on the Web through IEEE.tv (<http://www.ieee.tv/>).

Considered an international authority on error-correcting coding, McEliece has made groundbreaking contributions to error-correcting codes that are key to both consumer products such as compact discs and flash memory devices, and channel coding for reliable deep-space communication with interplanetary spacecraft. Error-correcting codes help maintain data integrity between transmitter and receiver when the information is sent in noisy environments. The transmitted data is encoded with redundant information so that any errors can be repaired without requiring retransmission of the data.

McEliece is best known for his theoretical and practical contributions to algebraic error-correcting codes, and perhaps most notably for leading the team of researchers who developed the celebrated "McEliece, Rodemich, Rumsey, Welch Bound." The MRRW Bound is the best known upper bound on the tradeoff between rate and minimum distance of the best binary codes. More recently, his co-development of "repeat-accumulate" codes with D. Divsalar represents advancement in practical channel codes, that approach capacity limits with simple implementation.

A leading contributor to many coding systems for NASA deep-space communications systems over the past 28 years, McEliece was one of the first researchers to study convolutional codes, which became a staple of channel coding for these systems as well as other wireless communication systems. Of notable importance was his work on the "Galileo" mission to Jupiter. When the spacecraft's high-gain antenna failed to deploy, threatening the ability to transmit photos and data from Jupiter, McEliece was an important member of the team which reprogrammed the on-board convolutional encoder in a way that saved most of the data. The innovations required to rescue the Galileo mission proved to be of sufficient importance and

were adopted in several later NASA missions.

An IEEE Life Fellow and member of the National Academy of Engineering, the American Mathematical Society and the American Society for Engineering Education, McEliece holds four patents and is the author of three textbooks. His 250 research papers written jointly with 75 co-authors span a wide range of problems in information theory and coding that have been valuable to graduate students and other researchers alike.

McEliece has won several awards from NASA as well as others including the 2004 Claude E. Shannon Award from the IEEE Information Theory Society. He received his bachelor's and doctorate degrees from the California Institute of Technology, Pasadena. McEliece has been on the faculty at the California Institute of Technology since 1982 and is currently the Allen E. Puckett Professor and Professor of Electrical Engineering Emeritus. He is also a consultant to the NASA Jet Propulsion Laboratory, Pasadena, Calif.

About IEEE

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