



14TH ANNUAL SHANNON MEMORIAL LECTURE



Robert Calderbank

Director of the Information Initiative, Duke University

REMEMBERING SHANNON OCTOBER 10, 2016

2pm: Lecture
3pm: Reception

Qualcomm Institute/
Calit2 Auditorium
Atkinson Hall

BIOGRAPHY

Robert Calderbank is Director of the Information Initiative at Duke University, where he is Professor of Mathematics and Electrical Engineering. Prior to joining Duke as Dean of Natural Sciences in 2010, he directed the Program in Applied and Computational Mathematics at Princeton University. Prior to joining Princeton in 2004 he was Vice President for Research at AT&T, in charge of what may have been the first industrial research lab where the primary focus was Big Data.

Professor Calderbank is well known for contributions to voiceband modem technology, to quantum information theory, and for co-invention of space-time codes for wireless communication. His research papers have been extensively cited and his inventions are found in billions of consumer devices. Professor Calderbank was elected to the National Academy of Engineering in 2005 and has received a number of awards, including the 2013 IEEE Hamming Medal for his contributions to information transmission, and the 2015 Claude E. Shannon Award.

ABSTRACT

The foundation of our Information Age is the transformation of speech, audio, images and video into digital content, and the man who started the digital revolution was Claude Shannon. He arrived at the revolutionary idea of digital representation by sampling the information source at an appropriate rate, and converting the samples to a bit stream. He then characterized the source by a single number, the entropy, which quantifies the information content of the source, and he created coding theory, by introducing redundancy into the digital representation to protect against corruption.

Shannon started from the grand challenges of his day, he developed models that captured what made them so difficult, translated these challenges into mathematical terms and then developed fundamental limits. This talk will review some of what Shannon did, and it will speculate about what he might have done if he were among us today.



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