

The Erlang Prize

is awarded at most once every two years by the *Applied Probability Society* of INFORMS to an applied probabilist under the age of thirty-five who has shown great promise by already making outstanding contributions to applied probability. The 2000 Erlang Prize is awarded to

David Tse

from the Department of Electrical Engineering and Computer Sciences of the University of California at Berkeley.

David Tse and his research collaborators have successfully applied probability theory to design and analyze communication networks, giving special emphasis to the challenging problems of wireless networks. David's papers demonstrate a deep understanding of both probability theory and the communication network context. The papers contain new fundamental theory and important practical engineering consequences.

David has contributed to a better understanding of the theoretical limits for wireless channels and to engineering methods enabling real systems to approach those limits. David's work has emphasized multi-user and fading properties of wireless channels, and the interplay between physical and networking layers. A main result, exploiting an underlying polymatroid structure, is the characterization of the capacity region as well as the optimal joint rate and power allocation strategies to achieve boundary points of the capacity region. David has also contributed to the design and analysis of multi-user receivers for direct-sequence CDMA systems. Based on a synchronous model with random signature sequences, David showed that in a large system the performance of several important linear receivers can be characterized by the two key notions "effective bandwidth" and "effective interference." David has also successfully extended these notions to more complex channel models, including user asynchronism, multi-path fading and multi-antenna diversity. In the latter case, random matrix theory is exploited to demonstrate resource pooling of the antennas.