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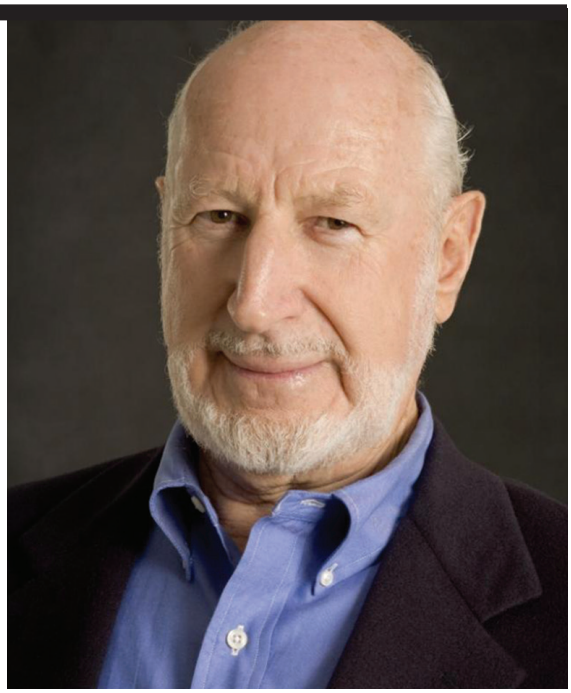
2017 SIGMOBILE OUTSTANDING CONTRIBUTIONS AWARD: Norman Abramson



Citation: Fundamental contributions to the theory and practice of random access wireless networking.

Dr. Norman Abramson is the 2017 SIGMOBILE Outstanding Contributions Award recipient, granted for significant and lasting contributions to the research on mobile computing and communications and wireless networking. There are few instances in the world of science and technology where one individual and one idea have produced such a monumental impact on an array of problems in practice as well as in fundamental theory. For that reason, many of us would be puzzled by the fact that Dr. Abramson has not received this award yet. Many of us had simply assumed that he must have received this honor already!

Dr. Abramson is best known for his work on a wireless packet network, ALOHAnet, developed at the University of Hawaii. ALOHAnet became operational in June 1971 and was the first public demonstration of a wireless packet data network. The ALOHAnet used UHF to provide a terrestrial wireless data network within the state of Hawaii in 1971. In 1973, the ALOHA System used VHF and ATS-1, an experimental NASA satellite, to establish PacNet, an international satellite data network connecting NASA in California and five universities in the USA, Japan, and Australia. Also in 1973, the ALOHA System pioneered the unconventional use of a conventional Comsat channel to link these two early networks to ARPANET in the Continental United States.

Both the ALOHANet within Hawaii and PacNet covering the Pacific were based upon the use of Dr. Abramson's novel random access communication architecture and protocol. Communication networks with this general structure are referred to now as ALOHA networks. Today, ALOHA-type protocols are used in all wireless mobile standards and almost all two-way satellite data networks. As well, ALOHA channels led directly to CSMA/CD and CSMA/CA protocols, which provided the basis for both Ethernet and Wi-Fi. Random access protocols are also used in cellular networks and, in short, are practically part of every wireless network design.

Equally important are Dr. Abramson's results that developed the theory of random access ALOHA channels, providing a foundation to study and design random access based networks systematically. His work made innovative use of broadcast channels and opened up this new area for research and development. In short, he delivered a one-two punch on both theory and design of random access channels. The reader should pause to appreciate that this was in 1971, before the arrival of cellular networks, mobile ad hoc networks, sensor networks, etc. ALOHANet was more than just a protocol; it was a fully functional system in deployment usage. The first time anyone showed this was possible has indeed become a historic moment in hindsight.

It is important to admire the fact that ALOHA's elegance lies in its simplicity. ALOHA had practically zero configuration complexity, avoided over-engineering, was easy to deploy with technologies of the day and was robust to the harsh wireless transmission environments. Thus, its simplicity and robustness became the engine of its enormous success.

Beyond technical contributions, Dr. Abramson mentored many PhD candidates, who, in turn, have delivered groundbreaking results and mentored numerous future high-impact researchers. According to the Math Genealogy Project website, just two of Dr. Abramson's students, Thomas Cover and Robert A. Scholtz, have 321 descendants. And, as one navigates Dr. Abramson's academic tree, it is easy to appreciate the tremendous impact he has had on the field beyond his technical contributions.

In closing, it is an honor for our whole community to celebrate Dr. Abramson's contributions with this award from ACM SIGMOBILE. ■