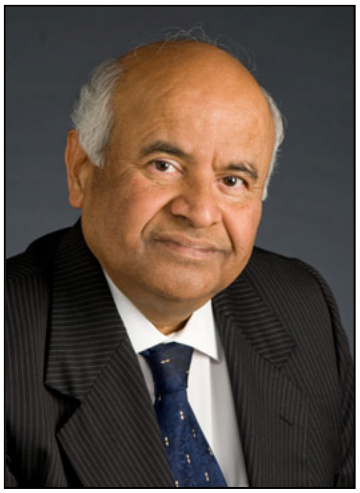


Green Cellular Networks: A Survey, Some Research Issues and Challenges

Vijay K. Bhargava
University of British Columbia
Vancouver, Canada
President, IEEE Communications Society

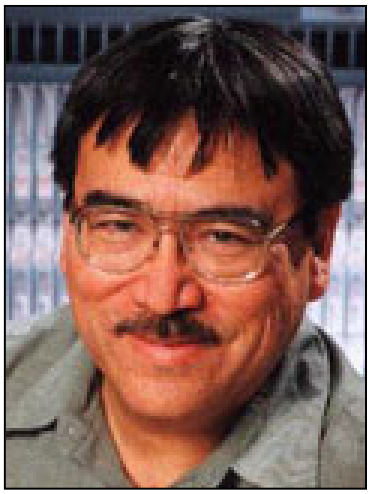
ABSTRACT

In this talk, we present techniques to enable green communications in future generation of wireless systems that will rely on cooperation and cognition to meet increasing demand of high data rate. So far, achieving high data rate has been the primary focus of research in cooperative and CR systems, without much consideration of energy efficiency. However, many of these techniques significantly increase system complexity and energy consumption. Escalating energy costs and environmental concerns have already created an urgent need for more energy-efficient "green" wireless communications. Therefore, we need to design energy-efficient solutions for cooperative and cognitive networks, which will potentially drive the future generation of wireless communication. We focus on several important topics that are crucial towards reducing the energy consumption of the cognitive and cooperative networks. These topics include efficient base station redesign, heterogeneous network deployment, green communications via cognitive radio, cooperative relays to deliver green communications, and energy efficient cognitive cooperative networks.

BIOGRAPHY

Vijay Bhargava, an IEEE Volunteer for three decades, is Professor in the Department of Electrical and Computer Engineering at the University of British Columbia in Vancouver, where he served as Department Head during 2003-2008. Previously he was with the University of Victoria (1984-2003) and Concordia University (1976-84). He received his Ph.D. from Queen's University in 1974. He is a fellow of the IEEE, the Royal Society of Canada, the Canadian Academy of Engineering and the Engineering Institute of Canada

Vijay has served on the Board of Governors of the IEEE Information Theory Society and the IEEE Communications Society. He has held important positions in these societies and has organized conferences such as ISIT'83, ISIT'95, ICC'99 and VTC 2002 Fall. He played a major role in the creation of the *IEEE Transactions on Wireless Communications*, and served as its editor-in-chief during 2007, 2008 and 2009. He is a past President of the IEEE Information Theory Society and is currently serving as the President of the IEEE Communications Society.



Smart Applications on Virtual Infrastructures

Alberto Leon-Garcia
University of Toronto

ABSTRACT

We envision future programmable application platforms where users and providers of content, services and infrastructure interact in an open applications marketplace that is in the center of social and economic activity. This marketplace will be characterized by extremely large scale and very high churn, with new applications and content being introduced and others retired at very fast rates. These attributes of the marketplace will place extreme demands on the supporting infrastructure for agility in resource allocation, as well as scalability, reliability, accountability and security. Cost-effectiveness will require flexibility in the infrastructure so it can be readily re-purposed, essentially reprogrammed, to provide new capabilities. In this talk we introduce the Canada NSERC Strategic Network for Smart Applications on Virtual Infrastructures, and we discuss how its research agenda is addressing these research challenges.

BIOGRAPHY

Professor Alberto Leon-Garcia is Professor in Electrical and Computer Engineering at the University of Toronto. He is a Fellow of the Institute of Electronics an Electrical Engineering "For contributions to multiplexing and switching of integrated services traffic". He is also a Fellow of the Engineering Institute of Canada. He has received the 2006 Thomas Eadie Medal from the Royal Society of Canada and the 2010 IEEE Canada A. G. L. McNaughton Gold Medal for his contributions to the area of communications. He holds a Canada Research Chair in Autonomic Service Architecture. Professor Leon-Garcia is author of the leading textbooks: Probability and Random Processes for Electrical Engineering, and Communication Networks: Fundamental Concepts and Key Architecture. He is currently Scientific Director of the SAVI NSERC Strategic Network.