Twenty years of Sphere Decoding

**ABSTRACT:**
The sphere decoding algorithm was first introduced in digital communications in 1993. This algorithm provides a practical solution to an otherwise NP-complete problem (ML decoding for multidimensional lattice constellations over fading channels). This work has been cited to date in over 1200 papers (source: scholar.google) and this number is steadily growing. The pioneering use of lattice decoding of codes for single antenna systems has been followed by a substantial body of research showing the use of the sphere decoder in many other applications, among which decoding of space-time codes for MIMO. More recently, the sphere decoding algorithm has been implemented in VLSI, for high rate wireless LAN terminals.

**SPEAKER:**
Emanuele Viterbo received his degree (Laurea) in Electrical Engineering in 1989 and his Ph.D. in 1995 in Electrical Engineering, both from the Politecnico di Torino, Torino, Italy. From 1990 to 1992 he was with the European Patent Office, The Hague, The Netherlands, as a patent examiner in the field of dynamic recording and error-control coding. Between 1995 and 1997 he held a post-doctoral position in the Dipartimento di Elettronica of the Politecnico di Torino. In 1997-98 he was a post-doctoral research fellow in the Information Sciences Research Center of AT&T Research, Florham Park, NJ, USA. He became first Assistant Professor (1998) then Associate Professor (2005) in Dipartimento di Elettronica at Politecnico di Torino. In 2006 he became Full Professor in DEIS at University of Calabria, Italy. From September 2010 he is Full Professor in the ECSE Department at Monash University, Melbourne, Australia.

In 1993 he was visiting researcher in the Communications Department of DLR, Oberpfaffenhofen, Germany. In 1994 and 1995 he was visiting the cole Nationale Suprieure des Telecommunications (E.N.S.T.), Paris. In 2003 he was visiting researcher at the Maths Department of EPFL, Lausanne, Switzerland. In 2004 he was visiting researcher at the Telecommunications Department of UNICAMP, Campinas, Brazil. In 2005, 2006 and 2009 he was visiting researcher at the ITR of UniSA, Adelaide, Australia. In 2007 he was visiting fellow at the Nokia Research Center, Helsinki, Finland. Prof. Emanuele Viterbo is a 2011 Fellow of the IEEE, a ISI Highly Cited Researcher and Member of the Board of Governors of the IEEE Information Theory Society (2011-2013). Dr. Emanuele Viterbo was awarded a NATO Advanced Fellowship in 1997 from the Italian National Research Council and the 2012-13 Australia-India Fellowship from the Australian Academy of Science. His main research interests are in lattice codes for the Gaussian and fading channels, algebraic coding theory, algebraic space-time coding, digital terrestrial television broadcasting, and digital magnetic recording.

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**EVENING LECTURE**

**Venue:** Meeting Rooms A & B, Engineers Australia Building, 21 Bedford Street, North Melbourne

**Time:** 6:00pm refreshments for 6:30pm start

**Date:** Tuesday, 4 December 2012

Register at [www.ieeevic.org](http://www.ieeevic.org)

There is no admittance fee for IEEE or Engineers Australia members or students.

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Note: Engineers Australia members are eligible to claim CPD for attending this event.