



# Hamilton Institute

Beyond LTE Networks:  
Massive (MIMO) or Small (Cells)

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**Abstract:** Wireless networks are inherently limited by their own interference. Therefore, a lot of research focuses on interference reduction techniques, such as multiuser MIMO, interference alignment, interference coordination or multi-cell processing. Although these techniques might lead to considerable performance gains, it is unlikely that they will be able to meet the demand for wireless data traffic in the future. Therefore, a significant network densification, i.e., increasing the number of antennas per unit area, is inevitable. One way of densifying the network consists in cell-size shrinking, such as the deployment of femto or small cells, which comes at the cost of additional equipments and increased interference. Another much simpler, but also less efficient, option is the use of massively more antennas at each base station (BS). In this talk, we will discuss the challenges of small cell versus massive MIMO networks and show how Random Matrices provides the ideal framework to model, design and optimize beyond LTE (Long Term Evolution) networks.

**Biography:** Mérouane Debbah entered the Ecole Normale Supérieure de Cachan (France) in 1996 where he received his M.Sc and Ph.D. degrees respectively. He worked for Motorola Labs (Saclay, France) from 1999-2002 and the Vienna Research Center for Telecommunications (Vienna, Austria) until 2003. He then joined the Mobile Communications department of the Institut Eurecom (Sophia Antipolis, France) as an Assistant Professor until 2007. He is now a Full Professor at Supélec (Gif-sur-Yvette, France), holder of the Alcatel-Lucent Chair on Flexible Radio and a recipient of the ERC starting grant MORE (Advanced Mathematical Tools for Complex Network Engineering). His research interests are in information theory, signal processing and wireless communications. He is a senior area editor for IEEE Transactions on Signal Processing. Mérouane Debbah is the recipient of the "Mario Boella" award in 2005, the 2007 General Symposium IEEE GLOBECOM best paper award, the Wi-Opt 2009 best paper award, the 2010 Newcom++ best paper award as well as the Valuetools 2007, Valuetools 2008, Valuetools 2012 and CrownCom2009 best student paper awards. He is a WWRF fellow. In 2011, he received the IEEE Glavieux Prize Award.

**Venue:** Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

**Time:** 2.00pm - 3.00pm

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