



# Hamilton Institute

Design Considerations for  
Extremely High Frequency Wireless Networks

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**Abstract:** State-of-the-art wireless communication already operates close to Shannon capacity and one of the most promising options to further increase data rates is to increase the communication bandwidth. Very high bandwidth channels are only available in the extremely high frequency part of the radio spectrum, the millimeter wave band (mm-wave). Upcoming communication technologies, such as IEEE 802.11ad, are already starting to exploit this part of the radio spectrum to achieve data rate of several GBit/s. However, communication at such high frequencies also suffers from high attenuation and signal absorption, often restricting communication to line-of-sight (LOS) scenarios and requiring the use of highly directional antennas. This in turn requires a radical rethinking of wireless network design. On the one hand side, such channels experience little interference, allowing for a high degree of spatial reuse and potentially simpler MAC and interference management mechanisms. On the other hand, such an environment is extremely dynamic and channels may appear and disappear over very short time intervals, in particular for mobile devices. This talk will highlight some of the challenges of and possible approaches for networking in the mm-wave band.

Joerg Widmer is Research Professor at Institute IMDEA Networks in Madrid, Spain. He received his M.S. and PhD degrees in computer science from the University of Mannheim, Germany in 2000 and 2003, respectively. His research focuses primarily on wireless networks, ranging from MAC layer design and interference management to future mobile network architectures. From 2005 to 2010, he was manager of the Ubiquitous Networking Research Group at DOCOMO Euro-Labs in Munich, Germany, leading several projects in the area of mobile and cellular networks. Before, he worked as post-doctoral researcher at EPFL, Switzerland on ultra-wide band communication and network coding. He was a visiting researcher at the International Computer Science Institute in Berkeley, CA, USA and University College London, UK. Joerg Widmer authored more than 100 conference and journal papers and three IETF RFCs, holds 13 patents, serves on the editorial board of IEEE Transactions on Communications, and regularly participates in program committees of several major conferences. Recently he was awarded an ERC consolidator grant as well as a Spanish Ramon y Cajal grant. He is senior member of IEEE and ACM.

**Venue:** Seminar Room, Hamilton Institute, North Campus, Maynooth University

**Time:** 3.00pm - 4.00pm

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