

Tuesday, 25<sup>th</sup> June, 2019  
Lecture time : 2:30 – 3:30 pm  
Location: G10 50 Waterloo Road  
Macquarie University  
\* New South Wales, Australia

## ***Terminal Antenna Design for Future Wireless***

Massive MIMO, full-dimension (FD) MIMO, millimeter-wave and small cells are some popular candidates for the 5th generation (5G) wireless communication systems. However, as much as these technologies present exciting new challenges for antenna design, the conventional design framework is expected to remain, partly due to the current emphasis on non-antenna issues. Conventionally, terminal antennas are designed based on simple, and often unrealistic criteria, including an emphasis on antenna performance in free space. Moreover, the need for compact multi-antenna implementation makes it even more challenging to deliver efficient antenna designs. Though poor antenna performance in reality is largely overlooked for different reasons, future wireless systems with high performance requirements will greatly benefit from a more comprehensive antenna design paradigm.

In this lecture, I will start by giving an overview of conventional terminal antenna design and comment on its limitations. Then, I will outline current trends in terminal antenna design for 4G systems. I will then introduce a new antenna design paradigm that has the potential to dramatically improve 5G performance. In particular, the paradigm takes into account the interactions of the antenna system with its nearfield and far field surroundings and provides a powerful framework to optimize these interactions. Finally, I will provide some practical techniques to take advantage of this design paradigm, where each technique offers promising performance gains over the state-of-the-art



**Prof. Buon Kiong Lau**

*Department of Electrical and Information Technology  
Lund University, SE-221 00 Lund, Sweden  
[buon\\_kiong.lau@eit.lth.se](mailto:buon_kiong.lau@eit.lth.se)  
[http://www.eit.lth.se/staff/buon\\_kiong.lau](http://www.eit.lth.se/staff/buon_kiong.lau)*

Buon Kiong Lau received the B.E. degree (with honors) from the University of Western Australia, Perth, Australia, and the Ph.D. degree from the Curtin University of Technology, Perth, Australia, in 1998 and 2003, respectively, both in electrical engineering. During 2000 to 2001, he was a Research Engineer with Ericsson Research, Kista, Sweden. From 2003 to 2004, he was a Guest Research Fellow at the Department of Signal Processing, Blekinge Institute of Technology, Sweden. Since 2004, he has been with the Department of Electrical and Information Technology, Lund University, where he is now a Professor in the Communications Group. He also holds a Senior Researcher appointment with the Swedish Research Council since 2010. He has been a Visiting Researcher with the Department of Applied Mathematics, Hong Kong Polytechnic University, China; the Laboratory for Information and Decision Systems, Massachusetts Institute of Technology, Cambridge, MA, USA; and the Takada Laboratory, Tokyo Institute of Technology, Japan.

*Further information:*

Khushboo Singh  
[khushboo.singh@students.mq.edu.au](mailto:khushboo.singh@students.mq.edu.au)