

SEMINAR:

Antenna Array Synthesis via Convex Optimization

Speaker: Dr. Benjamin Fuchs

(University of Rennes 1, France)

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Location: Room A214 – Polo Scientifico F. Ferrari - Povo

Note: The seminar will be held in English

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The synthesis of antenna arrays is a very long standing field in electromagnetism because of its many applications (e.g. radar, radio astronomy, sonar, communications, direction-finding, seismology, medical diagnosis and treatment). A host of methods have been proposed since the 40's to solve increasingly difficult synthesis problems. These techniques range from analytical methods (fast but limited to very specific problems) to global optimization approaches (comprehensive but limited in performances due to their computational burden). Convex optimization has been shown to be a good trade-off in efficiency/generality between analytical and global optimization techniques.

The purpose of the talk is to show that a variety of antenna array synthesis problems can be cast as convex optimization problems and therefore efficiently solved. A procedure, known as semidefinite relaxation technique, will also be presented to efficiently solve non convex array synthesis problems. Several array synthesis problems will be addressed: focused beams, sparse arrays, polarization synthesis, shaped beam, phase-only and reconfigurable arrays.

- **About the Speaker**

Benjamin Fuchs received the M.Sc. and electrical engineering degrees in 2004 from the National Institute of Applied Science of Rennes, France, and the Ph.D. degree in 2007 from the University of Rennes 1, France. He was during his Ph.D. a visiting scholar at the University of Colorado at Boulder, USA.

In 2009, he joined the Institute of Electronics and Telecommunications of Rennes (IETR) as a researcher at the Centre National de la Recherche Scientifique (CNRS). He has spent three years (2008 as postdoctoral research fellow and 2011-2012 on leave from CNRS) at the Swiss Federal Institute of Technology of Lausanne (EPFL) in Switzerland.

His research interests include millimeter-wave antennas, focusing devices (lens antennas) and array synthesis methods.