

PhD position at TUDelft on Wideband Wide-Scan Arrays

Announced:	28 May 2020
Closing date:	31 July 2020
Duration:	4 years

There has been a growing interest, in the last decade, in the development of phased arrays that can operate over wide bandwidths and wide scan ranges. Such characteristics are desired to support multifunction operation for both communication and radar applications and to reduce the number of antennas on complex platforms, where there is limited space available to accommodate an ever increasing number of sensors. Also in satellite communication (Satcom) applications, the need of wideband terminal antennas able to scan to larger and larger angles is emerging, to guarantee agile connections to different satellites.

An antenna concept to achieve very wide bandwidth with large scan angles was developed in the THz group and consists of a connected array of slots with artificial dielectric structures [1]. These latter can be fabricated to achieve gradually decreasing refractive indices to implement wideband matching between the antenna feed and free space. The artificial dielectric solutions were demonstrated to achieve very wide bandwidth, with stable active impedance within a scan range exceeding ± 60 degrees. However, artificial dielectrics generate high cross-polarization (X-pol) in the radiated signals, when used over ultra-wide bandwidths.

The goal of this project is to design arrays with new classes of artificial dielectrics, with non-uniform or non-planar characteristics, with the goal of reducing the X-pol. The results will further advance the connected array concept and will improve the current state-of-the-art in the field of wideband arrays.

What are you going to do?

You will work on the analysis, design and experimental validation of a phased array antenna based on the connected array antenna solution, with improved performance compared to the state of the art.

[1] D. Cavallo, W. H. Syed and A. Neto, "Connected-Slot Array With Artificial Dielectrics: A 6 to 15 GHz Dual-Pol Wide-Scan Prototype," *IEEE Transactions on Antennas and Propagation*, vol. 66, no. 6, pp. 3201-3206, June 2018.

Contact

Dr. Daniele Cavallo, Associate Professor
 Department: Microelectronics, Group: Terahertz Sensing
 Tel.: +31 15 27 89538 , E-mail: D.Cavallo@tudelft.nl

To apply for this position, please send a detailed CV, a motivation letter (1 page max), B.Sc. and M.Sc. transcripts, names and contact information of at least two referees.

Additional information

In The Netherlands, almost all PhD positions are linked to funded research projects. This has several implications:

- PhD students are employed: they receive a salary rather than a grant. Most projects have a duration of 4 years.
- Positions become available once a project is funded. This can happen at any time during the year.
- It typically takes 6 to 9 months for a project proposal to receive funding. In this period, a position may be anticipated but the outcome remains insecure. Once a project is funded, the open position needs to be filled as soon as possible.

If you are interested in our research, it merits to inquire whether openings will be available. We collect resumes of prospective PhD students throughout the year, for each of our research tracks.

General requirements

We make our selection based on the following general requirements:

- **Formal requirements regarding prior education:** you should have earned an MSc degree at a recognized institute for higher education.
- **Background:** you should have a strong background in Electromagnetics and Antennas
- **Excellence:** your Grade-Point-Average should be above 8 (10). Also your MSc thesis should have received a grade above 8 (10).
- **English:** you should be able to communicate well in English (written and oral). Provide TOEFL/IELTS scores if available.
- **Originality:** your MSc thesis or later work (publications) should reflect some original ideas. Critical and independent thinking is very important.
- **Team player:** you should be able to work well in a team of other project members.

Your resume should contain contact information of prior advisors/supervisors who can provide feedback.