

Project Id: 20190397

E2, Doktorand inom beyond-5G mm-Wave
Array Antenna Systems

External id: REF 2019-0398



Prestigious PhD Student Position in Beyond-5G mm-Wave Array Antenna Systems

At the department of Electrical Engineering research and education are performed in the areas of Communication and Antenna systems, Systems and Control, Computer vision, Signal processing and Biomedical engineering, and Electric Power Engineering. Our knowledge is of use everywhere where there is advanced technology with integrated electronics. We work with challenges for a sustainable future in society of today, for example in the growing demands concerning efficient systems for communications and electrification. We offer a dynamic and international work environment with about 200 employees from more than 20 countries, and with extensive national and international research collaborations with academia, industry and society. The department provides about 100 courses, of which most are included in the Master's Programs "Biomedical Engineering", "Electric Power Engineering", "Systems, Control and Mechatronics" and "Communication Engineering". Read more at www.chalmers.se/en/departments/e2

Information about the research

The European Innovative Training Network 'MyWave' on Efficient Millimetre - Wave Communications for beyond - 5G wireless communications offers 15 prestigious, fully funded PhD student positions in the area of millimetre-wave antennas, integrated circuits and signal processing, starting in the autumn of 2019. The MyWave consortium consists of 8 leading European R&D laboratories from universities, industries, and technology institutes in the domain of wireless infrastructure which are located in The Netherlands, Sweden, Belgium and Germany. Each PhD student will be enrolled in a doctoral programme and is jointly supervised by supervisors from the academic and industry sector. Each PhD student will do a secondment (i.e. training) of 18 months abroad at one of the industrial partners.

Our society is on the brink of a new age with the development of new visionary concepts such as internet of things, smart cities, autonomous driving and smart industries. This stimulates the use of the mm-wave frequencies up to 100 GHz to support much higher data rates and to increase the capacity of mobile wireless communication systems to enable future beyond-5G infrastructure. This requires new system concepts such as Distributed Massive Multiple-Input-Multiple-Output (DM-MIMO) in which instead of a single base-station, the cell is covered by multiple remote antenna stations, all connected to a central unit. To overcome existing limitations, such as poor power efficiency and poor signal quality, MyWave will focus on an innovative antenna system concept utilizing both silicon and III-V semiconductor technologies, and advanced signal processing concepts.

The goal of this PhD project is to propose and develop concepts for active antenna array architectures for DM-MIMO systems that can enable reconfiguration functionalities (e.g. in terms of generated power, and beamforming) to support mobility. The envisioned active antenna arrays need to be low-cost and highly efficient. This represents a great challenge due to the lack of suitable integration solutions at these frequencies as well as the beam scanning range and bandwidth limitations of conventional array architectures. To address these challenges, in this research we will target unconventional optimally sparse array architectures and exploit novel quasi-optical power amplifier (PA)-integrated antenna feeding techniques. Ultimately, an active PA-integrated antenna array will be designed through multi-physics modelling and optimisation.

Major responsibilities

Your major responsibilities are to pursue your own doctoral studies. You are expected to develop your own scientific concepts and communicate the results of your research verbally and in writing, in English. The position generally also includes teaching on Chalmers' undergraduate level or performing other duties corresponding to 10-20 per cent of working hours.

Position summary

Full-time temporary employment. The position is limited to a maximum of four years + X, where X depends on the amount of teaching and department duties, and can vary from 0 to maximum 1 year.

Qualifications

Applicants should have, or expect to receive, a Master of Science degree or equivalent in a relevant electrical engineering or applied physics discipline, and typically should not have more than four years of research experience. In addition to the formal qualifications, selection is also based on the performance of the candidates in other works (e.g. thesis and advanced level courses), as well as through interviews and assignments. Besides good subject knowledge, emphasis will be on creative thinking, motivation, ability to cooperate, initiative to work independently and personal suitability for research training. Previous experience in the area of antennas, electromagnetics, electronics, as well as proficiency in using scientific and engineering software packages such as CST, HFSS, ADS, Matlab etc. are meritorious.

According to EU regulations, a candidate student who has stayed in Sweden for more than 12 months in the last 3 years cannot apply to the PhD positions at Chalmers.

Chalmers continuously strives to be an attractive employer. Equality and diversity are substantial foundations in all activities at Chalmers.

Our offer to you

Chalmers offers a cultivating and inspiring working environment in the dynamic city of [Gothenburg](#). Read more about [working at Chalmers](#) and our [benefits](#) for employees.

Application procedure

The application should be marked with Ref 20190397 and written in English. The application should be sent electronically and be attached as pdf-files, as below:

CV: *(Please name the document: CV, Family name, Ref. number)*

- CV
- Other, for example previous employments or leadership qualifications and positions of trust.
- Two references that we can contact.

Personal letter: *(Please name the document as: Personal letter, Family name, Ref. number)*

1-3 pages where you:

- Introduce yourself
- Describe your previous research fields and main research results
- Describe your future goals and future research focus

Other documents:

- Copies of bachelor and/or master's thesis.
- Attested copies and transcripts of completed education, grades and other certificates, eg. TOEFL test results.

Please use the button at the foot of the page to reach the application form. The files may be compressed (zipped).

Application deadline: 15th of September 2019

For questions, please contact:

Full Professor Marianna Ivashina, The Head of Antenna Group, Chalmers,
marianna.ivashina@chalmers.se

**** Chalmers declines to consider all offers of further announcement publishing or other types of support for the recruiting process in connection with this position. ****

Chalmers University of Technology conducts research and education in engineering sciences, architecture, technology-related mathematical sciences, natural and nautical sciences, working in close collaboration with industry and society. The strategy for scientific excellence focuses on our eight Areas of Advance; Building Futures, Energy, Information & Communication Technology, Life Science, Materials Science, Nanoscience & Nanotechnology, Production and Transport. The aim is to make an active contribution to a sustainable future using the basic sciences as a foundation and innovation and entrepreneurship as the central driving forces. Chalmers has around 11,000 students and 3,000 employees. New knowledge and improved technology have characterised Chalmers since its foundation in 1829, completely in accordance with the will of William Chalmers and his motto: Avancez!
