



PhD Position Robust Signal Processing for Next Generation Automotive Radars

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Challenge: Design new waveforms and algorithms for next-generation automotive radars in strong interference environments.

Change: Use advanced techniques from multi-dimensional sequence design, optimization, distributed signal processing, and machine learning.

Impact: Enable interference robustness in dense radar environments.

Job description

The [Delft Center for Systems and Control \(DCSC\)](#) is offering one PhD vacancy under the newly funded 'Signal Processing for Environment-Aware Radar' (SPEAR) project. The project will be carried out in the research group of Dr. N. J. Myers, in collaboration with researchers at the faculty of 3mE and the faculty of EEMCS. The PhD candidate will work on industry-relevant scientific challenges in collaboration with industry experts from NXP.

Dr. Myers's group at TU Delft develops and analyzes novel signal processing techniques for communications and sensing with wireless systems. We focus on both applied and theoretical aspects of challenging problems in connected automotive and radars.

In next generation automotive networks, radars will be deployed in almost every vehicle to ensure safe driving. In such dense radar deployments, signals from multiple radars interfere with each other and deteriorate the perception capability of the radars. This PhD project will develop new signal processing techniques, to construct multi-dimensional digital radar waveforms and algorithms, that ensure interference-robust radar operation even in dense automotive networks. Our techniques are also expected to adapt to the sensing environment, by leveraging information from various sensors in an automotive.

Relevant research from our lab members:

[1] H. Masoumi, N. J. Myers, G. Leus, S. Wahls, and M. Verhaegen, "Structured Sensing Matrix Design for In-sector Compressed mmWave Channel Estimation," *IEEE SPAWC 2022*. [Best Student Paper Award]

[2] K. Patel, N. J. Myers, and R. W. Heath Jr., "Circulant Shift-based Beamforming for Secure Communication with Low-resolution Phased Arrays," *IEEE Transactions on Wireless Communications* (early access), 2022

[3] P. Kumari, N. J. Myers, and R. W. Heath Jr., "An adaptive and fast beamforming design for automotive millimeter-wave joint communication-radar," *IEEE Journal on Selected Topics in Signal Processing*, vol. 15, no. 5, June 2021

[4] V. Slobodyanyuk, R. Rimini, U. Fernando, N. J. Myers and V. Varadarajan, "High resolution and computationally efficient radar techniques", *US Patent Appl. no. 16/885,239*, May 2020

[5] R. Rimini, P. Huang, and N. J. Myers, "Wireless communication with enhanced maximum permissible exposure (MPE) compliance based on vital signs detection", *US Patent Appl. no. 17/000,228*, Aug 2020

Requirements

- A Master's degree in Electrical Engineering, Systems & Control, Engineering Physics, Applied Mathematics, or any field related to the lab's research topics;
- A background in applied mathematics, particularly, linear algebra and probability;
- A solid understanding of statistical signal processing and optimization;
- A background in radar and wireless communication is desirable, but not mandatory;
- An experience in programming e.g., Python, MATLAB, R;
- A good command of English (verbal and written);
- Excellent communication and interpersonal skills;
- Ability to work in a collaborative environment.

Doing a PhD at TU Delft requires English proficiency at a certain level to ensure that the candidate is able to communicate and interact well, participate in English-taught Doctoral Education courses, and write scientific articles and a final thesis. For more details please check the [Graduate Schools Admission Requirements](#).

Conditions of employment

Doctoral candidates will be offered a 4-year period of employment in principle, but in the form of 2 employment contracts. An initial 1,5 year contract with an official go/no go progress assessment within 15 months. Followed by an additional contract for the remaining 2,5 years assuming everything goes well and performance requirements are met.

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2541 per month in the first year to € 3247 in the fourth year. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment with an excellent team of supervisors, academic staff and a mentor. The Doctoral Education Programme is aimed at developing your transferable, discipline-related and research skills.

The TU Delft offers a customisable compensation package, discounts on health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. For international applicants we offer the [Coming to Delft Service and Partner Career Advice](#) to assist you with your relocation.

TU Delft (Delft University of Technology)

Delft University of Technology is built on strong foundations. As creators of the world-famous Dutch waterworks and pioneers in biotech, TU Delft is a top international university combining science, engineering and design. It delivers world class results in education, research and innovation to address challenges in the areas of energy, climate, mobility, health and digital society. For generations, our engineers have proven to be entrepreneurial problem-solvers, both in business and in a social context.

At TU Delft we embrace diversity as one of our core [values](#) and we actively [engage](#) to be a university where you feel at home and can flourish. We value different perspectives and qualities. We believe this makes our work more innovative, the TU Delft community more vibrant and the world more just. Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale. That is why we invite you to apply. Your application will receive fair consideration.

Challenge. Change. Impact!

Faculty Mechanical, Maritime and Materials Engineering

The Faculty of 3mE carries out pioneering research, leading to new fundamental insights and challenging applications in the field of mechanical engineering. From large-scale energy storage, medical instruments, control technology and robotics to smart materials, nanoscale structures and autonomous ships. The foundations and results of this research are reflected in outstanding, contemporary education, inspiring students and PhD candidates to become socially engaged and responsible engineers and scientists. The faculty of 3mE is a dynamic and innovative faculty with an international scope and high-tech lab facilities. Research and education focus on the design, manufacture, application and modification of products, materials, processes and mechanical devices, contributing to the development and growth of a sustainable society, as well as prosperity and welfare.

Click [here](#) to go to the website of the Faculty of Mechanical, Maritime and Materials Engineering. Do you want to experience working at our faculty? These [videos](#) will introduce you to some of our researchers and their work.

Additional information

For more information about this vacancy, please contact Nitin Jonathan Myers (N.J.Myers@tudelft.nl) or Geethu Joseph (G.Joseph@tudelft.nl).

For information about the application procedure, please contact Irina Bruckner, HR Advisor (application-3me@tudelft.nl).

Candidates are also encouraged to look at another PhD vacancy, within the project SPEAR, in the group of Dr. Geethu Joseph, EEMCS: [PhD Position in Radar Signal Processing For Next Generation Vehicular Networks](#)

Application procedure

Are you interested in this vacancy? Please apply before **31 January 2023**, via the application button, and upload:

- A cover letter stating your motivation (max 1 page).
- A detailed curriculum vitae.
- Name and contact information of two professional referees.
- A list of courses taken with grades obtained in bachelor's and master's degree.
- A list of publications (if any).

The available position will be filled as soon as possible (i.e., once a suitable candidate is found). This means that the selection of candidates will already start before the application deadline.

Please note:

- A pre-employment screening can be part of the selection procedure.
- You can apply online. We will not process applications sent by email and/or post.
- Acquisition in response to this vacancy is not appreciated.

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