DC2: Sub-terahertz and terahertz reconfigurable intelligent surfaces

Doctoral position at [Department of Electronics and Nanoengineering](#) at [Aalto University](#), in Espoo, Finland.

Main supervisor: [Prof. Viktar Asadchy](#) [AALTO]

Co-supervisors/mentors: Dr. Jorge Montero-Valor [[INDRA](#)] and Dr. Barthès [[3DEUS](#)]

Aalto University

Objectives:

- To establish an **analytical modeling approach** for multilayer tunable metasurfaces that captures the key electromagnetic coupling effects between layers and enables fast prediction of their tunable response without relying solely on full-wave simulations.
- To create efficient **adjoint-based optimization methods** for tunable metasurfaces that provide rapid sensitivity/gradient evaluation, support high-dimensional design spaces, and allow systematic optimization of performance targets such as efficiency, bandwidth, and multi-condition operation.
- To design and fabricate **reconfigurable metasurface prototypes** that implement a global tuning mechanism, and to experimentally characterize their electromagnetic performance. To validate the achieved tuning range and functional performance in laboratory measurements against modeling and simulation results.

This position is part of the [MetaTune](#) Doctoral Network "Reconfigurability using inversely designed metasurfaces", which has been funded under the Horizon Europe Marie Skłodowska-Curie Actions (MSCA) program.

Acquire knowledge: During the thesis, the candidate will acquire a solid understanding of the theoretical and practical requirements for designing tunable and reconfigurable metasurfaces, with emphasis on multilayer architectures and system-level performance metrics (efficiency, bandwidth, angular response, and robustness). In parallel, the candidate will gain in-depth knowledge of analytical modeling techniques and adjoint-based optimization methods for high-dimensional inverse design, as well as develop practical expertise in prototyping and laboratory characterization.

Design	Materials	Fabrication	Characterization
●●●●○	●●○○○	●●●○○	●●●●○

→ Go to the project webpage for more information

What METATUNE Offers:

- Work contract at Aalto is for 36 months funded through the MSCA network, with the additional benefits for employees (public and universal health system, free schools, etc.).

- Two 3-month research stays, one at Indra Sistemas SA in Madrid and one in 3DEUS Dynamics SAS at Lyon are foreseen in the research plan.

- Opportunity to pursue a PhD degree at a leading European university within a collaborative, international network.

- Training program including research-specific and transferable skills courses.

- Active participation in workshops, conferences, and network-wide events to build professional and scientific connections.

- Stimulating, multidisciplinary, and international research environment within a prestigious European training network.

Starting date: Now-December 2026; negotiable.

Deadline for online application: May 31, 2026 (but candidates are encouraged to apply as soon as possible).

Mandatory Requirements:

- You must have a finalised **master's degree** in fields related to the research topic: Electrical Engineering, Physics, Telecommunications Engineering, Applied Physics, Optics, Material Engineering, or similar.

- You should **not have a doctoral degree** at the time of recruitment.

- You must not have resided or carried out your main activity (work, studies, etc.) in Finland for more than **12 months in the 36 months** immediately before the recruitment (this is a requirement from the funding authority).

- You will apply for the study right in doctoral studies at Aalto University School of Electrical Engineering and must satisfy the eligibility conditions for this doctoral programme.

- Sufficient skills in the **English** language.

Additional Requirements:

- Strong background in electrodynamics and excellent mathematical skills.

- Basic knowledge of computational electromagnetics.

- High proficiency in Python, MATLAB, Wolfram Mathematica, or similar programming software.

- High motivation and creativity.

- Good written and verbal communication, including presentation skills.

- Good organizational skills, attention to details, and ability to meet deadlines.

- Willingness to learn and work collaboratively in a research environment.

Desired skills and knowledge:

- Proficiency in electromagnetic simulation software, such as COMSOL Multiphysics, ANSYS HFSS, or CST Studio Suite.

- Solid knowledge of computational electromagnetics.

- Previous experience with design and fabrication of metasurfaces.

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