IDLab UGent – PhD AI-Driven Resilient RAN Optimization

PhD Position in AI-Driven Resilient RAN Optimization for 6G and O-RAN Architectures

ABOUT THE EMPLOYER

Ghent University is a top-ranked University (ranked 90 worldwide according to the Shangai Ranking) located in Belgium. Employing more than 15.000 people, it is actively involved in education and research, management and administration, as well as technical and social service provision on a daily basis. It is one of the largest, most exciting employers in the area and offers great career opportunities. With its 11 faculties and more than 85 departments offering state-of-the-art study programmes grounded in research in a wide range of academic fields, Ghent University is a logical choice for its staff and students.

Within the faculty of Engineering and Architecture, the IDLab research group (https://idlab.ugent.be/home) performs research on 1) connectivity and 2) data science & artificial intelligence. In these research areas we focus on 1) foundations, 2) system design, and 3) applications. IDLab collaborates with many universities and research centres worldwide and jointly develops advanced technologies with industry (R&D centers from international companies, Flanders' top innovating large companies and SMEs, as well as numerous high-tech start-ups). In order to support the research, IDLab created a unique research infrastructure used in numerous national and international collaborations. IDLab is also a core research group of imec, the world-leading research and innovation hub in nanoelectronics and digital technologies. IDLab staff counts about 50 professors, 60 Post Doc researchers, 200 PhD researchers and 40 other staff members. These are spread over about 20 research teams.

The research for this PhD position will be conducted in the IDLab research cluster on Intelligent Wireless Networking (https://idlab.ugent.be/research-teams/iwine).

JOB DESCRIPTION

This PhD research aims to investigate beyond state-of-the-art technology enablers for the next-generation cellular paradigm, called 6G. The main focus will be on Radio Access Network (RAN) optimization mechanisms within the Open-RAN (O-RAN) framework to meet strict and diverse requirements of emerging use cases in the 6G era.

Specifically, this position addresses intelligent radio resource management (RRM) as a key mechanism for maintaining resilient connectivity under adversarial and disrupted conditions. The research will investigate agentic AI and reinforcement learning-based control for adaptive spectrum usage, power control, scheduling, and multi-RAT coordination (integrating 5G/6G Terrestrial/Non-Terrestrial networks and Wi-Fi).

The focus is on developing decentralized, proactive, and self-healing RRM strategies that enable wireless systems to autonomously sustain performance and service continuity in the presence of active jamming, complex interference, partial infrastructure failures, and severe spectrum scarcity, without relying on static configurations or centralized control. The candidate will validate and evaluate the developed mechanisms utilizing simulation tools and in-house cutting-edge cellular/Wi-Fi testbeds.

Your main tasks will include:

· Studying state-of-the-art techniques and benchmarks in the domain of next-generation O-RAN based wireless networks (including 6G both Terrestrial Network (TN) and Non-Terrestrial Network (NTN)(Satellite), and Wi-Fi),

with a specific focus on resilient and survivable network architectures.

· Designing and implementing novel, intelligent techniques for next-generation cellular communications, focusing on robust RAN optimization, intelligent radio resource allocation, and cross-technology coordination.

· Developing proactive spectrum management and mitigation strategies for interference and jamming avoidance, ensuring service continuity despite adversarial disruptions, spectrum scarcity, or partial infrastructure damage.

· Empowering cutting-edge AI/ML technologies—such as Agentic AI, Reinforcement Learning, and Wireless Physical Layer Foundation Models —to build autonomous, decentralized control loops that adapt dynamically to changing environmental threats.

· Collaborating towards a proof-of-concept implementation to test, validate, and benchmark your resilient RRM solutions using simulation tools and real, in-house wireless testbeds.

· Writing high-quality publications, targeting top journals and international conferences.

· Assisting in limited educational tasks of the research group.

· Taking on a mentoring role by supervising master theses related to the subject of this PhD.

YOUR PROFILE

We are looking for a highly creative and motivated PhD student with the following qualifications and skills:

- You must have (or will receive in a few months) a Master's degree in Computer Science Engineering, Master of Science in Information Engineering Technology, Master of Science in Electrical Engineering, or a related field.
- You are interested to do research in an academic environment for a 4 years period in view of a PhD degree.
- You have a strong background in wireless and mobile networks, as well as machine learning, ideally with exposure to Reinforcement Learning (RL) or decision-making agents.
- You have an interest or background in network resilience, robust optimization, or wireless security (e.g., mitigating jamming, interference, or network failures).
- You have excellent coding skills and hands-on experience with programming languages like Python and C++, as well as familiarity with wireless network simulation tools (e.g., ns-3) or prototyping frameworks.
- You have strong analytical and mathematical skills to model wireless systems and interpret complex research results.
- You are a team player and have strong communication skills to collaborate effectively within a multi-disciplinary research group.
- You can commit to timing and milestones set forward by different research projects.
- Your English is fluent (C1 CEFR level) both speaking and writing.

OUR OFFER

· We offer a full-time position as a doctoral fellow, consisting of an initial period of 12 months, which - after a positive evaluation, will be extended to a total maximum of 48 months.

· The fellowship amount is 100% of the net salary of an AAP member in equal family circumstances. The individual fellowship amount is determined by the Department of Personnel and Organization based on family status and seniority. A grant that meets the conditions and criteria of the regulations for doctoral fellowships is considered free of personal income tax. Click here for more information about our salary scales

· All Ghent University staff members enjoy a number of benefits, such as a wide range of training and education opportunities, 36 days of holiday leave (on an annual basis for a full-time job) supplemented by annual fixed bridge days, bicycle allowance and eco vouchers. Click here for a complete overview of all the staff benefits (in Dutch).

Interested?

For further information, please contact Prof. Adnan Shahid (adnan.shahid@ugent.be), Prof. Ingrid Moerman (Ingrid.moerman@ugent.be), Dries Naudts (dries.naudts@ugent.be), and/or Dr. Vasilis Maglogiannis (vasilis.maglogiannis@ugent.be)

Applications should include:

- A motivation letter (highlighting why you believe you are a suitable candidate for the position & why you want this position)

· Curriculum Vitae

- At least two reference contacts
- Copy of your diploma (if already in your possession)
- Transcripts of study results

https://idlab.ugent.be