



Job offer Royal Military Academy - Patrimony



Researcher (M/F/X) on AI & Optimization Departement of Mechanics Research engineer AI & optimization Publication date: 20/10/2022

Job description and associated tasks

We are looking for a research engineer to support the implementation of European Commission (EC), European Defence Agency (EDA) and Defence contracts in robotics (software) projects involving international, multi-partner collaboration in applications including ground, air and maritime robotics, including counter-drone systems. The position is in the department of Mechanics in the Robotics & Autonomous Systems (RAS) unit (<https://mecatron.rma.ac.be/>). The candidate will support the RAS unit in the development of multi-objective constraint optimizers and AI tools across multiple projects. For this reason, we are looking for a full-time researcher with a master degree in Mathematics / Informatics / Computer Science / Applied Sciences / Engineering / Physics and experience in the field of Robotics. We offer an enticing work environment, where you will work in a multi-national team on a mix of European and Belgian collaborative research projects with real robotic systems and practical applications on the terrain. The Royal Military Academy (RMA) is strongly committed to promoting diversity and gender equality. Therefore, women candidates are strongly encouraged to apply.

Context:

The Royal Military Academy of Belgium (RMA) is a military institution responsible for the basic academic, military and physical training of future officers, and for the continuing advanced training of officers during their active career in the Belgian Defense department (www.rma.ac.be). It is fully recognized as a university, fulfilling the same criteria as civilian universities. The Royal Military Academy is also conducting scientific research at university level for projects funded by the Belgian Defense department or external sources.

You work within the multi-national research cell 'Robotics & Autonomous Systems' (<https://mecatron.rma.ac.be/>) of the department of Mechanical Engineering of the Royal Military Academy and together with several large consortia of research institutes and companies in the context of collaborative European research projects. You conduct scientific research at university level.

Study:

Robotic & autonomous systems, be it on land, in the air or at sea, more and more leave the protected lab environment and become able to perform operations in complex outdoor environments. This also means that these robotic systems in a first phase need to 'understand' the environment, based on their heterogeneous sensor data (in the case of RAS: visual, infrared, omnidirectional event & depth cameras, 2D & 3D LIDAR, RF sensors, multi beam echo sounder, ...). This typically entails the development of AI algorithms for sensor data processing, for object detection, classification & identification. In a second phase, optimal actions need to be calculated for the robot(s) to perform. As we are often dealing with multi-agent systems operating as a multi-agent swarm towards a higher common goal in a complex natural environment, this also leads to a very complex multi-objective optimization problem to be solved.

Main Tasks

The main task of the candidate will be to support the RAS team across multiple projects that all deal with multi-agent systems in order to solve questions related to AI & optimization, more specifically:

- Leading AI architectures definition, AI component design and managing integrations across projects
- Leading optimization framework definition (problem definition, choice of solvers, ...), optimization component design and implementation across projects
- Leading / supporting the management of the local high performance computing infrastructure (CPU & GPU cluster)
- Curating & setting up datasets, performing network training and running inference with real sensor data on edge computers
- Supporting the team with code optimization and management
- Supporting the implementation of project-specific AI & optimization software
- Interacting closely with the technical leads (and occasionally acting as technical lead, depending on projects and work scope)
- Ensuring the timely release and delivery of projects, with required quality level
- Producing required documentation.

Required skills

Technical skills

The applicant shall have a master degree. This is a multi-disciplinary study, requiring a mix of theoretical skills (conception of novel AI & optimization algorithmic approaches) and more practical skills (implementation and field validation of these AI & optimization algorithms on unmanned systems).

- Experience in the design & implementation of AI algorithms (deep learning neural networks) is required;
- Training or experience in the design & implementation of solvers for optimization problems is required;
- Experience in programming is required (Python is required, C/C++ is recommended);
- Training or experience in robotics & AI is recommended;
- Knowledge of software engineering life cycles, Agile methodologies and Scrum experience is recommended
- Hands-on experience with Continuous Integration processes and agile software development is recommended
- Experience with complex software architectures assemblies, deployment and testing (e.g. Docker, Conda), Virtual Machines is recommended
- Knowledge of ROS (<https://www.ros.org/>) is recommended;
- Proficiency in technical documents production is recommended
- Training or experience in (sensor) signal processing is recommended;
- Training or experience in Control Engineering is recommended;
- Training or experience in Sensor integration is an added value;
- Training or experience in applied research and or design is an added value;
- Training or experience in Sensor integration is an added value.
- Previous experience with EC / EDA project management is an added value for the position
- Previous experience in computer vision or natural language processing is an added value

Personal skills

- You conduct scientific research in an independent and upright way within a multidisciplinary environment
- You think in an innovative and creative way. You take initiative, you are involved and result oriented.
- You communicate your results in a clear, concise and precise manner.
- You are honest, loyal toward the institution and respect confidentiality.
- You plan and manage proactively your self-development, while being critical to your own functioning and striving to your self-improvement.
- You improve the team-spirit and solve interpersonal conflicts. You are flexible for change and adapt yourself.
- You solve problems autonomously and find alternatives or solutions.
- You behave in a respectful way toward the others, their ideas and opinions as well as toward procedures.
- You are capable of writing qualitative technical reports on your work
- You are capable to manage, direct and assist with the composition of deliverables towards the funding authority
- You are capable to write and present scientific papers about your work

Other skills

- The applicant shall have excellent oral & written knowledge of English.
- Minimum knowledge of Dutch or French is an added value for collaboration with peers.

Application

You will be working in a military environment. That is why everyone is expected to undergo a security verification. Please add to your application the filled out document. The form can be downloaded from: <http://www.rma.ac.be/nl/aanvraag-veiligheidsverificatie>

Send by email to Mr Geert De Cubber (geert.decubber@mil.be) AND to Mrs Helena BRUYNINCKX (erm-deao-rsw@mil.be):

- a motivational letter;
- a CV
- a scan of your ID card (both sides);
- the filled out security document

Please mention clearly the reference of the vacancy: "AI & Optimization Engineer".

Note that the RAS unit is opening up simultaneously four different positions (Maritime Robotics, Ground Robotics, Network Engineer, Optimization & AI Engineer). Please choose the position that matches best your skills and apply only for that one, in order to avoid administrative overhead. If you think that your profile could also suit the other profiles, then you can mention this in the motivation letter and we will fully consider this when performing the candidate selection.

Application deadline: 30/11/2022.

The interviews will take place at the Royal Military Academy, Hobbemastraat 8, 1000 Brussels. In case of access restriction due to COVID-19 or non-Belgian application, on-line interviews will take place. The date and time of the interview will be communicated to the preselected candidates.

Miscellaneous

Contract

- Probable date of recruitment: 01/01/2023, in consultation with the applicant.
- Status: Full-time employment based on an open-ended contract with the Patrimony of the Royal Military Academy (you will not be a civil servant). Please do note that – while the contract is open-ended – the financing is secured only until 31/12/2024 (so, a 2-year period). An extension is possible subject to the availability of funding.
- Wage scale: class A1 (holders of a Master's degree in Science) / class A2 (Ir ; holders of a Master's degree in Engineering). RMA applies a merit-based research career track, allowing researchers to advance in wage scale based upon annual evaluations.
- Holiday pay.

Extra-legal benefits

- Possibility to benefit from a bilingualism allowance (Dutch/French) following a SELOR test;
- End-of-year bonus;
- Free DKV hospitalization insurance. Possibility of additional affiliation for one or more persons living under the same roof: spouse, child(ren) (50% of the price per additional member);
- Bike allowance / Free public transport (home-work commute);
- Free access to campus sports facilities outside working hours;
- On-campus restaurant and cafeteria with democratic prices (discount on the daily menu);
- Flexible working hours within the 38-hour week;
- Teleworking possible after 1 year of service at the latest;
- Additional holiday for all staff between Christmas and New Year;
- 26 days holiday / year (then from 45 years: +1 day holiday every 5 years) from the 1st year of contract + 3 days / year dispensation from service offered by the department;
- Advantages and interesting offers thanks to the Benefits@work card (discounts, vouchers...);
- Entitlement to services offered by the 'Office Central d'Action Sociale et Culturelle de la Défense' (OCASC): among others holiday centres, discount on travel organised by the tour operator...;
- Possibility of benefiting from the nursery funded by Belgian Defence (subject to availability).

Workplace

- Royal Military Academy, Avenue de la Renaissance 30, 1000 Brussels;
- Occasional travel abroad for scientific conferences, etc.

Points of contact

- Concerning the research project: to Mr Geert De Cubber (geert.decubber@mil.be)
- Concerning the recruitment modalities: Mrs Helena Bruyninckx (erm-deao-rsw@mil.be)
- For more information about:
 - the Royal Military Academy, see <http://www.rma.ac.be>
 - the research cell 'Robotics & Autonomous Systems', see <https://meatron.rma.ac.be/>