



**PhD topic #12: Deep learning for robust vision-based localisation, mapping and navigation for mobile robotics**

The capabilities of mapping, localisation and navigation are fundamental for mobile robots to operate autonomously in dynamic environments. Methods based on laser scanners or LiDAR incur high costs. Low-cost cameras provide rich information of the environment that can be exploited by robots to operate autonomously. However, mapping, localisation and navigation based on visual data is challenging for many reasons including the change of visual appearance under different illuminations. The doctoral candidate will address this issue by incorporating 3D scene reconstruction and semantic information to enable mobile robots to see, interpret and understand the surroundings before planning its motion for autonomous navigation. The scene understanding will be based on deep learning to perform object-level visual perception. An inertial measurement unit and an altimeter will also be used to solve the scale ambiguity problem when using a monocular camera.

- The doctoral candidate will be supervised by Dr Mounir Ghogho and Dr Bassma Guermah.
- Applicants must have a Master (or equivalent) in data science, computer science, applied mathematics or equivalent field.
- Good skills in programming (C++, Python), computer vision and machine learning, and a good command of English are required. Prior work on probabilistic robotics and prior research experience are viewed positively but are not necessary.
- Applications should be emailed to [ticlab-admin@uir.ac.ma](mailto:ticlab-admin@uir.ac.ma) and [doctorat@uir.ac.ma](mailto:doctorat@uir.ac.ma)