

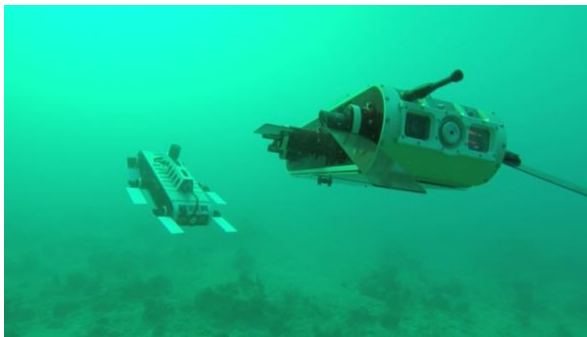
Title: Field Deployments of Autonomous Marine Robots

Abstract

The last few years, robots have moved from the pages of science fiction books into our everyday reality. Currently, robots are utilized in entertainment, scientific exploration, manufacturing, and household maintenance. While the above advances were made possible by recent improvements in sensors, actuators, and computing elements, the research of today is focused on the computational aspects of robotics.



In particular, methodologies for utilizing the vast volumes of data that can be generated by a robotic mission, together with techniques that would allow a robot to respond adequately in unforeseeable circumstances are the challenges of tomorrow.



This talk presents an overview of algorithmic problems related to marine robotics, with the particular focus on increasing the autonomy of robotic systems in challenging environments. I will talk about **vision-based state estimation and mapping** of shipwrecks, underwater caves, and coral reefs. **Exploration and Coverage algorithms** for underwater and surface vehicles will be discussed together with **novel trajectory planning** strategies. **Acoustic based communication and localization** present novel challenges which need to be addressed when deploying multiple underwater robots. I will also talk about several vehicles used at the University of South Carolina such as underwater and surface vehicles and a short overview of current projects will be presented. The work that I will discuss has a strong algorithmic flavour, while it is validated in real field deployments.



Short Bio

Ioannis Rekleitis is an Associate Professor at the Computer Science and Engineering Department, University of South Carolina. He was an Adjunct Professor at the [School of Computer Science](#), McGill University 2007-2020. Between 2004 and 2007 he was a visiting fellow at the Canadian Space Agency. During 2004 he was at McGill University as a Research Associate in the [Centre for Intelligent Machines](#) with Professor [Gregory Dudek](#) in the [Mobile Robotics Lab \(MRL\)](#). Between 2002 and 2003, he was a [Postdoctoral Fellow](#) at the [Carnegie Mellon University](#) in the



[Sensor Based Planning Lab](#) with Professor [Howie Choset](#). He was granted his Ph.D. from the [School of Computer Science, McGill University](#), Montreal, Canada in 2002 under the supervision of Professors [Gregory Dudek](#) and [Evangelos Miliotis](#). Thesis title: "Cooperative Localization and Multi-Robot Exploration". His Research has focused on mobile robotics and in particular in the area of cooperating intelligent agents with application to multi-robot cooperative localization, mapping, exploration and coverage. Field deployments of the robotics systems provide valuable feedback for the developed algorithms. His interests extend to computer vision, machine learning, and sensor networks. He has worked with underwater, surface, terrestrial, aerial, and space robots. Ioannis Rekleitis has published more than one hundred journal and conference papers. His work can be found online at:

<http://www.cse.sc.edu/~yiannisr/>

