

PhD in Civil and Environmental Engineering

Research Title: Cryosphere and Ocean Dynamics (POLITO - Lyon joint doctorate)

Funded by	Ateneo Internazionalizzazione su fondi della Fondazione Compagnia di San Paolo
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Context of the research activity	<p>The ocean dynamics in the polar region and their interaction with the cryosphere still exhibit several challenging and open questions in the field of oceanography and climatology.</p> <p>In this research project, we aim at tackling two of these aspects:</p> <ul style="list-style-type: none">• Interactions between the floating glacial tongues and the underlying ocean water masses with the consequent formation of marine density currents triggered along the frozen continental coasts. This phenomenon is believed to play a fundamental role on (positive and negative) back-regulation of the warming of the atmosphere;• Sea-ice formation and its interactions with the wave motion.
Objectives	Both the above mentioned aspects can be conveniently investigated by mean of laboratory experiments adopting a model at a reduced scale. The sea-ice downscaled model will be made in a dedicated cold room, wherein it is possible to control the temperature down to -25° . Indeed, these low temperatures are strictly necessary to reproduce the physical

	<p>mechanisms governing the ice formation and the sea-ice interactions. The results of the experimental measurements will then be compared with the predictions of theoretical models, which will be developed as part of this same project.</p> <p>Recently installed in the Water Engineering Laboratory of the Politecnico di Torino (Polito), the cold room is actually one of the few cold chambers totally dedicated to scientific studies in Europe.</p> <p>It is worth noting that the research activity will also involve Prof. Peter Wadhams (former director of the Scott Polar Research Institute), one of the world's leading experts on polar issues. The reserach team and the experimental equipment provide a unique possibility for a PhD candidate to tackle complex phenomena occurring in polar environments and playing a key role in the response to climate change.</p>
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Skills and competencies for the development of the activity	<p>This doctoral research project will benefit from candidates with the following skills and competencies:</p> <p>Physics: climate processes, climate change scenarios, mathematical modeling</p> <p>Laboratory: previous experience or training in laboratory facility</p> <p>Soft skills: teamwork, problem-solving, self-time management, critical thinking, curious personality, manual skills in laboratory.</p>
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