

TFK programme, funded projects 2022

<p>Project title: Future Sea Ice – Creating capabilities to understand and adapt</p>	
<p>Coordinator</p> <p>Aalto-korkeakoulusäätiö sr</p> <p>Jukka Tuhkuri jukka.tuhkuri@aalto.fi</p>	<p>Global warming is changing the polar marine environment, including the sea ice around the Antarctica. The sea ice is getting warmer, thinner, and weaker. There are two major unknowns in our understanding of this new ice. First, as the ice is getting warmer, its material properties are changing but we do not know how the new, warm ice deforms and fractures. Second, there are more severe storms, bigger waves, and larger areas of broken ice than before, but our understanding of the wave-ice interaction is limited. These changes in the marine environment have important impact on the global climate, but also on the marine traffic and how we should design the future ice-going ships to ensure safety and sustainability.</p> <p>Aalto University from Finland, together with Stellenbosch University and University of Cape Town from South Africa are joining forces to educate engineers and oceanographers with capabilities to understand the polar marine environment and operations in ice covered seas, but also to solve the challenges global warming is forcing us to face. We will support mobility of master level students to participate in courses and projects in the partner universities, we will support mobility of doctoral students to collaborate with the partner universities, and we will arrange workshops where thesis writers can share their ideas and get supervision and feedback.</p>
<p>Partners</p> <p>Aalto University, Stellenbosch University, University of Cape Town</p>	<p>At the center of this collaboration are three unique research infrastructures: The Aalto Ice and Wave Tank in Finland, an engineering laboratory for vibration measurements in South Africa, and the research vessel SA Agulhas II in South Africa. The Aalto Ice and Wave Tank is a 40m x 40m water basin equipped to produce sea ice and waves in model scale. The facility is used to study the behavior of ships and structures, including offshore wind turbines, under loads due to ice and waves. The tank is also used to study ice mechanics, ice dynamics, and wave-ice interaction. The laboratory for vibration measurements in Stellenbosch is well suited to study ice induced mechanical vibrations in ships and will be made applicable to measurements on ship shaft lines, including condition monitoring. SA Agulhas II is an icebreaking Antarctic research vessel making annual voyages to the Antarctica and offers a platform for engineering and sea ice studies and has been – and will be – used for collaborative research between Aalto University, Stellenbosch University, and University of Cape Town. We will offer our students the possibility to take a course in Model Scale Testing in Ice at Aalto, do</p>

	<p>hands-on vibration measurements at Stellenbosch, and to take part in Antarctic expeditions onboard SA Agulhas II as part of their thesis projects.</p>
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OPETUSHALLITUS
UTBILDNINGSSTYRELSEN

Finnish National Agency for Education EDUFI
Hakaniemenranta 6, P.B. 380, FI-00531 Helsinki
Puh. /Tel. +358 (0) 29 533 1000, Faksi /Fax +358 (0) 29 533 1035
www.oph.fi