

WINNER

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Apostolos Papanikolaou
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Category: Waterborne

Country: Greece

Prof. Apostolos Papanikolaou has been deeply involved in shaping the maritime industry's response to the evolving patterns of seaborne trade and goods transportation. Over the past decade, spanning from 2013 to the present, he has assumed leadership roles in a series of groundbreaking FP7 and Horizon 2020 European Research projects. These projects have been instrumental in addressing the urgent need for substantial reduction of GHG (Green House Gas) emissions from marine operations, aligning with the ambitious targets set by the International Maritime Organisation (IMO) and the European Commission.

One of Prof. Papanikolaou's key contributions lies in his involvement in the development of innovative zero emissions and green vessels. Projects such as TrAM (Transport: Advanced and Modular) and ORCELLE (Wind as main propulsion by ORCELLE) have been pivotal in pioneering new technologies and design concepts aimed at reducing environmental impact and improving sustainability in maritime transportation.

Furthermore, Prof. Papanikolaou has played a central role in projects focusing on maritime and environmental safety, such as SHOPERA (Energy Efficient Safe Ship Operation). These initiatives have contributed to enhancing safety protocols and operational efficiency in marine operations, ensuring compliance with stringent safety standards and regulations.

Additionally, his involvement in projects like HOLISHIP (Holistic Optimisation of Ship Design and Operation for Life Cycle) underscores his commitment to advancing methods and software tools for future ship designs. By leveraging cutting-edge technologies and holistic optimization strategies, these projects aim to revolutionise ship design and operation, paving the way for more efficient, eco-friendly, and sustainable maritime transportation solutions.

Through his contributions, Prof. Papanikolaou continues to drive innovation and progress in the maritime industry, addressing critical challenges and shaping the future of sustainable shipping on both regional and global scales.

Key research themes

Naval Architecture, Ocean/Offshore Engineering, Theoretical and Applied/Numerical Ship Hydrodynamics

Project / Impact	Science	Economy	Safety	Policy	Environment	Innovation
TrAM	Achieved through systematic numerical optimisation; uniquely high total propulsive efficiency of abt. 80% (>10%)	Modular design allows reduced building cost Reduced operational (fuel) and life cycle cost		Contribution to the non-zero emissions regulations for high-speed craft at national (Norway) and international (EU global IMO) level	Zero GHG emissions, zero noise & vibrations	Demonstrator: 1st worldwide battery driven, zero emissions, high-speed passenger vessel
Orcelle	Simulation of combined hydro- and aerodynamics of wind assisted ships	Simulation of combined hydro- and aerodynamics of wind assisted ships Significantly reduced operational (fuel) and life cycle cost	Contribution to the development of standards for wind assisted ships (Class, IMO)	Contribution to the GHG emissions regulations for deep sea cargo wind assisted ships (IMO)	Reduced GHG emissions up to 50% in year-round service	-Planned full scale demonstrator (2027); 1st worldwide large Ro-Ro/PCC carrier (200m length, 7,000 cars capacity) to use wing propulsion as main propulsion unit -2nd demonstrator: refitted PCC carrier (2024) -Patented solid wing wind propulsion system (Oceanbird)
SHOPERA	Simulation of the maneuverability of ships in waves and verification of developed methods/tools		Definition of criteria for the minimum power and maneuverability of ships in waves	Contributions to the formulation and update of the IMO EEDI- Regulations (MEPC70/INF30)	Resolving the issue of combined safety of ship and emissions of marine environment	
HOLISHIP	Implementation of holistic, multi-objective and multi-disciplinary approach to ship design	Reduced design development cost: optimisation for building, operational and life-cycle cost		Developed design platform enables the development of green ships	Developed design platform enables the development of green ships	Holistic, multi-objective and multi-disciplinary optimisation approach to ship design and implementation of s/w platform (s)



Prof. Apostolos Papanikolaou earned his master's (1972) and doctoral (1977) degrees in Naval Architecture & Marine Engineering from the Technical University Berlin, Germany. He is currently Emeritus Professor at the National Technical University of Athens, he has extensive academic experience spanning more than 40 years. Prof. Papanikolaou has authored over 100 scientific publications, without counting numerous conference papers, technical reports and more.