

Andrea Serani

Curriculum Vitae

National Research Council
Institute of Marine Engineering

✉ andrea.serani@cnr.it

📄 [My Webpage](#)

🐙 [Github](#) [in](#) [Linkedin](#)



Personal Info

Identifiers **ORCID** 0000-0002-8814-1793, **ResearcherID** D-3872-2016

Languages Italian (native), English (full professional proficiency)

Interests Simulation-based design • Design-space learning • Optimization • Dimensionality reduction • Surrogate and multi-fidelity modelling • Machine Learning • Computational Marine Design

Current Position

since 2019 **Research Scientist**, *National Research Council-Institute of Marine Engineering*, Rome, Italy.
Multi-disciplinary analysis and design optimization.

since 2026 **Adjunct Professor**, *Alma Mater Studiorum University of Bologna*, Forlì, Italy.
Computer-Aided Yacht Design.

Research Experience and Previous Positions

2025, 2026 **Visiting Scholar**, *Aaron Friedman Marine Hydrodynamics Laboratory, University of Michigan*, Ann Arbor, USA.

Simulations for Autonomous Underwater Gliders and Wind-Assisted Propulsion Systems. Manufacturability and producibility for small USV design and optimization, under multiple environmental and operational conditions.

2018 – 2019 **Postdoctoral Research Fellow**, *National Research Council-Institute of Marine Engineering*, Rome, Italy.

Design optimization in environmental and operational stochastic conditions, based on numerical computer simulations.

2018 **Visiting PostDoc**, *IIHR Hydrosience & Engineering, University of Iowa*, Iowa City, USA.

Evaluation of Prediction Methods for Ship Performance in Heavy Weather.

2016 – 2018 **Postdoctoral Research Fellow**, *National Research Council-Marine Technology Research Institute*, Rome, Italy.

Study and development of reliability-based and robust design optimization techniques in ship hydrodynamics for real ocean environment.

2013 – 2015 **PhD Fellow**, *National Research Council-Marine Technology Research Institute*, Rome, Italy.

Study and development of theoretical and numerical methodologies in multidisciplinary robust design optimization.

Education

2016 **PhD, Mechanical and Industrial engineering**, *Roma Tre University*, Rome, Italy.

Dissertation title: "Hybrid global/local optimization methods in simulation-based shape design"

2015 **Visiting PhD student**, *IIHR Hydrosience & Engineering, University of Iowa*, Iowa City, USA.

Topic: "Design space assessment for ship design optimization by CFD simulations"

2012 **Master of Science, Aeronautical engineering**, *Roma Tre University*, Rome, Italy.

Dissertation title: "RANS aerodynamics analysis of non conventional airfoil via OpenFOAM"

- 2009 **Bachelor of Science, Mechanical engineering**, *Roma Tre University*, Rome, Italy.
Dissertation title: “Numerical characterization of a cylindrical cavity”

Certifications & Licenses

- 2024 **National Scientific Qualification** - *Full Professor*, Sector: 09/A1 Aeronautical, Aerospace, and Naval Engineering
- 2023 **National Scientific Qualification** - *Associate Professor*, Sector: 09/A1 Aeronautical, Aerospace, and Naval Engineering
- 2015 **Professional License** - *Industrial Engineer*, Ordine degli Ingegneri di Roma, Registration Number: A36133

Fellowships & Awards

- 2026 **AVT Young Contributor Award** by NATO Science & Technology Organization, Applied Vehicles Technology
- 2026 **Short Term Mobility Award** by National Research Council, Italy for the research project “Manufacturing-Informed Bayesian Optimization for Producible Naval Hull Design”. Host Institution: University of Michigan; host: Prof. Kevin J. Maki
- 2025 **Short Term Mobility Award** by National Research Council, Italy for the research project “High-Fidelity Simulations for Autonomous Underwater Gliders and Wind-Assisted Propulsion Systems”. Host Institution: University of Michigan; host: Prof. Kevin J. Maki
- 2024 **Panel Excellence Award** by NATO Science & Technology Organization, Applied Vehicles Technology for the Research Task Group AVT-331 “Goal-Driven, multi-fidelity and multidisciplinary analysis for military vehicle system level design”
- 2018 **Short Term Mobility Award** by National Research Council, Italy for the research project “High-fidelity Simulations of Ship Performance in Heavy Weather”. Host Institution: The University of Iowa; host: Prof. Frederick Stern,
- 2013 **PhD Fellowship** by the Engineering, ICT and Technologies for Energy and Transportation Department, National Research Council-Marine Technology Research Institute, Italy

Research Projects

International

- 2026 – 2029 **BEAM–Bayesian Exploration and optimization for hull-form Architecture and producibility Modeling**, US Department of the Navy, Office of Naval Research (ONR), Funding: 201k\$. Position: Principal Investigator
- 2025 – 2030 **ML-4D–Hydro-Structural Data-Driven MF-MDA of High-Speed Small Crafts via Multi-Loop Digital Design**, US Department of the Navy, Office of Naval Research (ONR), University of Iowa sub-award. Funding: 220k€. Position: Technical Team Member
- 2024 – 2027 **DAPHNE–Data-Driven, Physics-Based, and Equation-Free Multi-Fidelity Reduced Order Models for Fast and Accurate Predictions of Naval Ship Transient Maneuvers in Calm Water and Waves**, US Department of the Navy Office of Naval Research (ONR) Global, Naval International Cooperative Opportunities in Science and Technology Program (NICOP), grant N62909-24-1-2102. Funding: 249k\$. Position: Technical Team Member
- 2023 – 2026 **RETROFIT55–Retrofit solutions to achieve 55% GHG reduction by 2030**, European Union HORIZON Europe program. WP2 Hydrodynamic design optimization, CNR Funding: 732k€. Position: WP leader for CNR
- 2022 – 2025 **ONR DIGITAL–Multi-Fidelity Multi-Disciplinary Simulation-Driven Digital Design**, US Department of the Navy, Office of Naval Research (ONR), University of Iowa sub-award. Funding: 150k\$. Position: Task Leader

- 2021 – 2024 **FORWARD–Improving Knowledge, Prediction, and Forecasting of Ships in Waves via Hybrid Machine Learning Methods**, US Department of the Navy Office of Naval Research (ONR) Global, Naval International Cooperative Opportunities in Science and Technology Program (NICOP), grant N62909-21-1-2042. Funding: 180k\$. Position: Co-Principal Investigator
- 2020 – 2023 **MDO–High-Fidelity Multi-Phase Sharp-Interface Code Development and V&V for High Fr Small Craft FSI and MDO**, US Department of the Navy, Office of Naval Research (ONR), University of Iowa sub-award. Funding: 63k\$. Position: Task Leader
- 2017 – 2020 **HOLISHIP–Holistic optimization of ship design and operation for life cycle**, European Commission, HORIZON 2020 program. CNR-INSEAN WP Funding: 208k\$. Position: Technical Team Member
- 2016 – 2020 **PRICO–Analytical and Numerical Methods for Identifying Principal Components of Heterogeneous Physical Data**, US Department of the Navy Office of Naval Research (ONR) Global, Naval International Cooperative Opportunities in Science and Technology Program (NICOP), grant N62909-18-1-2033. Funding: 225k\$. Position: Task Leader
- 2018 – 2019 **EXTREME–High-Fidelity CFD/CSD of Delft Catamaran Wet Deck Slamming and CFD of 5415M Large Amplitude Motions in Extreme Waves**, Korea Institute of Science and Technology, The University of Iowa sub-award. Funding: 25k\$. Position: Co-Principal Investigator
- 2017 – 2019 **FSI–Fluid-structure interaction studies for semi-planing hulls**, US Department of the Navy, Office of Naval Research (ONR), University of Iowa sub-award. Funding: 50k\$. Position: Task Leader
- 2015 – 2017 **RDO II–Stochastic SBD for Reduction of Added-Powering/Motions/Slamming for Surface Ships in Real Seas**, US Department of the Navy Office of Naval Research (ONR) Global, Naval International Cooperative Opportunities in Science and Technology Program (NICOP), grant N62909-15-1-2016. Funding: 140k\$. Position: Task Leader
- National**
- 2023 – 2026 **BIODRONES–Biomimetic and Innovative Optimized hydrodynamic concepts of high-efficiency underwater gliding DRONES for ocean research**, Italian Ministry of University and Research, PRIN 2022. Funding: 250k€. Position: WP Leader.
- 2023 – 2026 **BRIDGESTONE–Fluid Dynamics**. Bridgestone Europe NV/SA – Italian Branch, Commessa 08CT22, Support to computational fluid dynamics analysis, Funding: 230k€. Position: Technical Team Member
- 2022 – 2025 **CNMS–National Sustainable Mobility Center**, Italian Ministry of University and Research, National Recovery and Resilience Plan (PNRR). Spoke 3-Waterways, WP1-Energy Efficiency, Task 1.1-Design Optimization Methods. Funding: 3.9M€. Position: Task and Roadmap Leader
- 2022 – 2025 **RAISE–Robotics and AI for socio-economic empowerment**, Italian Ministry of University and Research, National Program Resistance and Resilience (PNRR). Spoke 3 - Sustainable environmental caring and protection technologies, WP1 - Ecorobotics & AI Innovative Systems, WP3 - Smart Energy Storage and Distribution. Position: Technical Team Member
- 2021 – 2024 **UISH–Urban Intelligence Science Hub for City Network**, National Operative Program Metropolitan City - PON METRO, Agency for Territorial Cohesion. Funding: 3.9M€. Position: Technical Team Member
- 2021 – 2023 **NAUSICA–NAvi efficienti tramite l'Utilizzo di Soluzioni tecnologiche Innovative e low Carbon**, National Operative Program PON, Italian Ministry of University and Research. Funding: 2M€. Position: Technical Team Member
- 2020 – 2024 **CTEMT–Casa delle Tecnologie Emergenti di Matera**, Italian Ministry of Economic Development. Funding: 6.5M€. Position: Technical Team Member

- 2019 – 2022 **DDX–Numerical and experimental studies for the definition of the new naval destroyer units**, Italian Navy. Commessa 01CT19, Subtask 1 “Design optimization,” Funding: 20k€. Position: Principal Investigator
- 2019 – 2021 **RdS–Ricerca di Sistema**, Italian Ministry of Economic Development. Funding: 112k€. Position: Technical Team Member
- 2019 – 2021 **ARES–Autonomous robotics for the extended ship**, Italian Ministry of University and Research, National Operative Program (PON). Funding: 1.4M€. Position: Technical Team Member
- 2016 – 2019 **IBRHYDRO–Hybrid wing hydrofoil**, Italian Ministry of Transport and Infrastructures. OR.4 “Hydrodynamics optimization,” Funding: 398k€. Position: Co-Principal Investigator
- 2016 – 2018 **VINMAC–Sistema Innovativo Integrato di Ventilazione Industriale in Materiali Compositi**, Regione Lombardia, Programma Operativo Regionale 2014-2020. Obiettivo “Investimenti in Favore della Crescita e dell’Occupazione”, Funding: 202k€. Position: Technical Team Member
- 2013 – 2016 **RITMARE–Flagship Project**, Italian Ministry of Education, University and Research, National Research Program 2011-2013. Subproject 1 “Maritime Technologies,” WP2 “Environmental sustainability,” Funding: 1.8M€. Position: Technical Team Member

HPC Resources

- 2025 – 2026 **SBOBUG–Scalable Bayesian Optimization of Bioinspired Underwater Gliders: Configuration Benchmarking and High-Fidelity Validation**, CINECA-Italian SuperComputing Resource Allocation (ISCRA-B) grant HP10BZYAD3. Funding: 3.5MCPUh. Position: Principal Investigator
- 2025 – 2026 **LESBIO–Large-Eddy Simulation Benchmarking for the Investigation of Optimized Bioinspired Underwater Gliders**, CINECA-Italian SuperComputing Resource Allocation (ISCRA-C) grant HP10CJM3DH. Funding: 95kCPUh. Position: Principal Investigator
- 2023 – 2024 **PI-PME–Physics-informed Parametric Model Embedding**, CINECA-Italian SuperComputing Resource Allocation (ISCRA-C) grant HP10C3YKGR. Funding: 300kCPUh. Position: Principal Investigator
- 2020 – 2021 **ESODADR–Enabling high-fidelity Shape Optimization by Design-space Augmented Dimensionality Reduction**, CINECA-Italian SuperComputing Resource Allocation (ISCRA-C) grant HP10CRM564. Funding: 250kCPUh. Position: Principal Investigator

International Research Groups

Co-chair

- 2024 – 2027 **NATO-AVT-404 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Enhanced Design Processes of Military Vehicles through Machine Learning Methods”
- 2023 **NATO-AVT-MSG-ET-232 Exploratory Team**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Machine Learning and Artificial Intelligence for Military Vehicles Design”

Technical team member

- 2026 – 2030 **NATO-AVT-436 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Stability & Control and Loads Predictions of NATO Military Vehicles”
- 2020 – 2024 **NATO-AVT-351 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Enhanced Computational Performance and Stability & Control Prediction for NATO Military Vehicles”
- 2021 – 2023 **NATO-AVT-348 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Assessment of Experiments and Prediction Methods for Naval Ships Manoeuvring in Waves”

- 2020 – 2022 **NATO-AVT-331 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Goal-Driven, multi-fidelity and multidisciplinary analysis for military vehicle system level design”
- [Contributing author](#)
- 2017 – 2019 **NATO-AVT-280 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Evaluation of Prediction Methods for Ship Performance in Heavy Weather”
- 2016 – 2018 **NATO-AVT-252 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel (former ET-142), “Stochastic Design Optimization for Naval and Aero Military Vehicles”
- 2013 – 2015 **NATO-AVT-204 Research Task Group**, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Assess the Ability to Optimize Hull Forms of Sea Vehicles for Best Performance in a Sea Environment”

Professional Services

Organization of scientific meetings

- 2027 **Scientific Committee Member and Invited-session Organizer**, MARINE 2027, XII International Congress on Computational Methods in Marine Engineering; Invited Session on “*Simulation-based and AI-enhanced design optimization in marine engineering*” ([Web page](#)), Ravenna, Italy, June 14-17
- 2027 **Invited-session Organizer**, AIAA SciTech 2027; Invited Session on “*AI and Machine Learning for Vehicle Design and Optimization*”, Orlando, FL, USA, Jan. 11-15
- 2026 **Invited-session Organizer**, G-NAOE 2026, Global Conference on Naval Architecture and Marine Engineering on “*Artificial Intelligence and Machine Learning Application to Ship and Vehicle Design*”, Houston, TX, USA, October 20-24
- 2026 **Program Committee Member**, “18th International Conference on Evolutionary Computation Theory and Applications” - ECTA 2026 ([Web page](#)), Angers, France, October 28-30
- 2026 **Invited-session Organizer**, WCCM-ECCOMAS 2026, 17th World Congress on Computational Mechanics 10th European Congress on Computational Methods in Applied Science and Engineering on “*Machine Learning for the Design of Sustainable and High-Performance Vehicles*” ([Web page](#)), Munich, Germany, July 19-24
- 2025 **Program Committee Member**, “17th International Conference on Evolutionary Computation Theory and Applications” - ECTA 2025 ([Web page](#)), Marbella, Spain, October 22-24
- 2025 **Invited-session Organizer**, MARINE 2025, XI International Congress on Computational Methods in Marine Engineering; Invited Session on “*Simulation-based design optimization in marine engineering*” ([Web page](#)), Edinburgh, Scotland, June 23-27
- 2025 **Program Committee Member**, NATO-AVT-411 Research Specialist' Meeting, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Machine Learning and Artificial Intelligence for Military Vehicle Design” ([Web page](#)), Washington DC, USA, May 19-21
- 2023 **Chairman and Program Committee Member**, BUILD-IT 2023, BUILDing a Digital Twin: requirements, methods, and applications ([Web page](#)), Rome, Italy, October 19-20
- 2023 **Invited-session Organizer**, MARINE 2023, X International Congress on Computational Methods in Marine Engineering; Invited Session on “*Simulation-driven design optimization in marine engineering*” ([Web page](#)), Madrid, Spain, June 27-29
- 2023 **Session Co-chair**, AIAA SciTech Forum; Non-deterministic approaches Session 7 on “*Multifidelity Surrogate Modelling*”, National Harbor, MD, USA, January 24,

- 2023 **Program Committee Member**, 9th International Conference on Machine Learning, Optimization and Data Science ([Web page](#)), Grasmere, UK, September 22-26
- 2022 **Program Committee Member**, NATO-AVT-354 Research Workshop, NATO Science and Technology Organization (STO), Applied Vehicle Technology (AVT) panel, “Multi-fidelity methods for military vehicle design”, Varna, Bulgaria, September 26-28
- 2022 **Program Committee Member**, 8th International Conference on Machine Learning, Optimization and Data Science ([Web page](#)), Certosa di Pontignano, Siena, Italy, September 18-22
- 2021 **Program Committee Member**, 7th International Conference on Machine Learning, Optimization and Data Science ([Web page](#)), Grasmere, UK, October 5-8
- 2020 **Program Committee Member**, 6th International Conference on Machine Learning, Optimization and Data Science ([Web page](#)), Certosa di Potignano, Italy, July 19-23
- 2019 **Program Committee Member**, 5th International Conference on Machine Learning, Optimization and Data Science ([Web page](#)), Certosa di Potignano, Italy, September 10-13
- 2018 **Program Committee Member**, 4th International Conference on Machine Learning, Optimization and Data Science ([Web page](#)), Volterra, Italy, September 13-16

Editorial & Reviewing activities

- since 2026 **Editorial Board Member**, *Journal of Marine Engineering & Technology* (Taylor & Francis)
- since 2026 **Editorial Board Member**, *Computation* (MDPI)
- since 2026 **Editorial Board Member**, *Algorithms* (MDPI)
- since 2025 **Editorial Board Member**, *Applied Sciences* (MDPI)
- since 2022 **Editorial Board Member**, *Scientific Reports* (Nature)
- since 2020 **Topical Advisory Panel Member**, *Mathematics* (MDPI)
- 2022 – 2026 **Topical Advisory Panel Member**, *Algorithms* (MDPI)
- 2021 – 2022 **Guest Editor**, *Algorithms* (MDPI), Special issue on “Simulation-Based Optimization: Methods and Applications in Engineering Design” ([Web page](#))
- since 2022 **Technical Expert for National Central Administration**, *Ministry of Enterprises and Made in Italy* “Fondo per la crescita sostenibile”,
 - Project proposal 241, D.M. del 31/12/2021 – “Accordi per l’Innovazione”, since 2023
 - Project proposal 3, D.M. del 01/12/2021 – “Progetti di ricerca, sviluppo e innovazione per la transizione ecologica e circolare negli ambiti del Green New Deal italiano”, since 2024

- 2020 **External Reviewer**, *Roma Tre University*, Doctoral School of Mechanical and Industrial Engineering, XXXIII cycle, PhD candidate Monica Rossetti, Dissertation title: Simulation-based aeroacoustic metamodels for unconventional aircraft configurations

- since 2014 **Reviewer** for international journals in marine engineering, computational mechanics, optimization, machine learning and applied mathematics, including *Ocean Engineering*, *Applied Ocean Research*, *Engineering Optimization*, *Optimization and Engineering*, *Applied Soft Computing*, *Journal of Ship Research* and *Journal of Marine Science and Technology*.

Teaching activities

- 2026 – 2027 **Adjunct Professor**–*Computer-Aided Yacht Design*, MSc in Nautical Engineering, Alma Mater Studiorum University of Bologna (Forlì Campus)
- 2024 – 2025 **Lecturer**–*Design-space dimensionality reduction for shape optimization; Benchmark problems for multi-fidelity methods in ship hydrodynamic optimization and uncertainty quantification*, Research Lecture Series on “Multi-Fidelity Methods for Multidisciplinary Design Optimization”, AVT-385 (Applied Vehicle Technology), NATO Science & Technology Organization

2021 **Adjunct Professor**–*Simulation-based design for efficient hull forms*, Advanced Training Course for “Nautical and naval R&D experts”, Project TRIM (Tecnologia e Ricerca Industriale per la Mobilità Marina within Italian Transport Cluster 2020)

since 2015 **Lecturer and Examination Committee Member**–*Simulation-based design methodologies for Aircraft Design and Structures*, MSc in Aeronautical Engineering, Rome Tre University, Italy

[Institutional responsibilities](#)

2021 – 2024 **Technical Committee Member**–“*Manoeuvring*” Committee, 30th ITTC (International Towing Tanks Conference association)

Academic Advising

[PhD students](#)

2023 *Ficini S.* – Mechanical and Industrial Engineering, “Multi-fidelity active learning models for simulation-driven design in presence of computational-output noise,” co-advisor with Prof. Umberto lemma, Roma Tre University and Dr. Matteo Diez, CNR-INM

2021 *D’Agostino D.* – Operations Research, “Nonlinear Machine Learning Methods for Design-Space Dimensionality Reduction in Shape Optimization,” co-advisor with Prof. Stefano Lucidi, Sapienza University of Rome and Dr. Matteo Diez, CNR-INM

[MSc students](#)

2024 *Badolato M.* – Aeronautical Engineering, “Development and optimization of innovative bio-inspired autonomous underwater gliders” co-advisor with Prof. Umberto lemma, Roma Tre University

2023 *Squillace D.* – Aeronautical Engineering, “Design-space dimensionality reduction in shape optimization through physics-informed parametric model embedding” co-advisor with Prof. Umberto lemma, Roma Tre University

2021 *Vulpio I.* – Aeronautical Engineering, “Reinforcement Learning Applied to Derivative-free Optimization: Development of an Evolutionary Variant of the Q-Learning Algorithm” co-advisor with Prof. Umberto lemma, Roma Tre University

2021 *Dragone P.* – Aeronautical Engineering, “Study of a Forecasting Methodology for the Evolution Prediction of Dynamical Systems via Dynamic Mode Decomposition” co-advisor with Prof. Umberto lemma, Roma Tre University

2021 *Schneider A.* – Aeronautical Engineering, “Nonlinear design-space dimensionality reduction methods for simulation-based optimization,” co-advisor with Prof. Umberto lemma, Roma Tre University and Dr. Matteo Diez, CNR-INM

2021 *Milano C.* – Aeronautical Engineering, “Development of surrogate models based on artificial neural networks for aeroacoustic applications,” co-advisor with Prof. Umberto lemma, Roma Tre University and Dr. Matteo Diez, CNR-INM

2021 *D’Orazio E.* – Aeronautical Engineering, “Development of non-hierarchical multi-fidelity meta-models based on Gaussian process,” co-advisor with Prof. Umberto lemma, Roma Tre University

2019 *Antognoli L.* – Aeronautical Engineering, “Development of an Adaptive Multi-fidelity Metamodel for Hydrofoil Shape Optimization,” co-advisor with Prof. Umberto lemma, Roma Tre University and Dr. Matteo Diez, CNR-INM

2019 *Montagliani L.* – Aeronautical Engineering, “Comparative study of Radial Basis Function Kernels and Use of Cross-validation in Stochastic Simulation-Based Design and Uncertainty Quantification,” co-advisor with Prof. Umberto lemma, Roma Tre University and Dr. Matteo Diez, CNR-INM

2017 *D’Agostino D.* – Management Engineering, “Nonlinear Methods for Design-Space Dimensionality Reduction in Shape Optimization,” co-advisor with Prof. Stefano Lucidi, Sapienza University of Rome and Dr. Matteo Diez, CNR-INSEAN

BSc students

- 2017 *D'Ascenzo N.* – Mechanical Engineering, “Fluid dynamics analysis of a competition kayak based on potential flow theory,” co-advisor with Prof. Umberto Iemma, Roma Tre University and Dr. Matteo Diez, CNR-INSEAN
- 2014 *Lombardi L.* – Mechanical Engineering, “Hull-form modification methodologies in simulation-based ship design optimization,” co-advisor with Prof. Umberto Iemma, Roma Tre University and Dr. Matteo Diez, CNR-INSEAN

Publications and Presentations

Journal Articles

- [1] Palma, G., Serani, A., Diez, M. “Data-driven uncertainty-aware seakeeping prediction of the Delft 372 catamaran using ensemble Hankel dynamic mode decomposition,” *Journal of Hydrodynamics*, 1-17, 2026
- [2] Gaggero S., Serani A. “Physics-informed dimensionality reduction for propeller shape optimization,” *Applied Ocean Research*, 2026, 166, 104932
- [3] Palma G., Santic I., Serani, A. Minno L., Diez M. “System Identification of a Moored ASV with Recessed Moon Pool via Deterministic and Bayesian Hankel-DMDc,” *Journal of Marine Science and Engineering*, 2025, 13(12), 2267
- [4] Palma G., Serani A., Aram S., Wundrow D. W., Drazen D., Diez M. “Bayesian Hankel dynamic mode decomposition for ship motion digital twinning,” *Applied Ocean Research*, 165, 104863, 2025
- [5] Serani A., Palma G., Wackers J., Quagliarella D., Gaggero S., Diez M. “Extending parametric model embedding with physical information for design-space dimensionality reduction in shape optimization,” *Engineering with Computers*, 2025
- [6] Mainini L., Serani, A., Pehlivan-Solak H., Di Fiore F., Rumpfkeil M. P., Minisci E., Quagliarella D., Yildiz S., Ficini S., Pellegrini R., Thelen A., Bryson D., Nikbay M., Diez M., Beran P. S. “Analytical benchmark problems and methodological framework for the assessment and comparison of multifidelity optimization methods,” *Arch Computat Methods Eng*, 2025
- [7] Palma G., Serani A., Aram A., Wundrow D. W., Drazen D., Diez M. “Model-free system identification of surface ships in waves via Hankel dynamic mode decomposition with control,” *Ocean Engineering*, 341(3), 122539, 2025
- [8] Serani A., Diez M. “A Survey on Design-Space Dimensionality Reduction Methods for Shape Optimization,” *Arch Computat Methods Eng*, 2025
- [9] Palma G., Bardazzi A., Lucarelli A., Pilloton C., Serani, A. Lugni C., Diez M. “Analysis, Forecasting, and System Identification of a Floating Offshore Wind Turbine Using Dynamic Mode Decomposition,” *Journal of Marine Science and Engineering*, 2025, 13(4)
- [10] Diez M., Gaggero M., Serani A., “Data-driven forecasting of ship motions in waves using machine learning and dynamic mode decomposition,” *Int J Adapt Control Signal Process*, 39(10), 2119-2142, 2025
- [11] Pehlivan Solak H., Wackers J., Pellegrini R., Serani A., Diez M., Perali P., Sacher M., Leroux J.-P., Augier B., Hauville F., Bot P. “Optimising hydrofoils using automated multi-fidelity surrogate models,” *Ships and Offshore Structures*, 2024, 1–12
- [12] Serani A., Diez M. “Hydrodynamic Shape Optimization of a Naval Destroyer by Machine Learning Methods,” *J. Mar. Sci. Eng.*, 2024, 12, 1979
- [13] Seelinger L., Reinarz A., Lykkegaard M. B., Akers R., Alghamdi A. M., Aristoff D., Bangerth W., Benezech J., Diez M., Frey K., Jakeman J. D., Jørgensen J. S., Kim K., Kent B. M., Martinelli M., Parno M., Pellegrini R., Petra N., Riis N. A. B., Rosenfeld K., Serani A., Tamellini L., Villa U., Dodwell T. J., Scheichl R., “Democratizing Uncertainty Quantification,” *Journal of Computational Physics*, 113542, 2024

- [14] Serani A., Diez M., Quagliarella D., "Aerodynamic shape optimization in transonic conditions through parametric model embedding," *Aerospace Science and Technology*, 109611, 2024
- [15] Serani A., Scholcz T. P., Vanzi V., "A scoping review on simulation-based design optimization in marine engineering: trends, best practices, and gaps," *Archives of Computational Methods in Engineering*, 2024
- [16] Diez M., Serani A., "Design-space dimensionality reduction in global optimization of functional surfaces: recent developments and way forward," *Ship Technology Research*, 71(2), 141-152, 2024
- [17] Lee E. J., Diez M., Harrison E. L., Jiang M. J., Snyder L. A., Powers A. M. R., Bay R. J., Serani A., Nadal M. L., Kubina E. R., Stern F., "Experimental and computational fluid-structure interaction analysis and optimization of Deep-V planing-hull grillage panels subject to slamming loads–Part II: Irregular waves," *Ocean Engineering* 292, 116346, 2024
- [18] Spinosa E., Pellegrini R., Posa A., Broglia R., De Biase M., Serani A., "Simulation-Driven Design Optimization of a Destroyer-Type Vessel via Multi-Fidelity Supervised Active Learning," *Journal of Marine Science and Engineering* 11(12):2232, 2023
- [19] D'Agostino D., Diez M., Felli M., Serani A., "PIV Snapshot Clustering Reveals the Dual Deterministic and Chaotic Nature of Propeller Wakes at Macro-and Micro-Scales," *Journal of Marine Science and Engineering*, 11(6)
- [20] Pellegrini, R., Ficini, S., Odetti, A., Serani, A., Caccia, M., Diez, M., "Multi-fidelity hydrodynamic analysis of an autonomous surface vehicle at surveying speed in deep water subject to variable payload," *Ocean Engineering*, 271, 113529, 2023
- [21] Serani, A., Diez, M., "Parametric model embedding," *Computer Methods in Applied Mechanics and Engineering*, 404, 115776, 2023
- [22] Serani, A., Dragone, P., Stern, F., Diez, M., "On the use of dynamic mode decomposition for time-series forecasting of ships operating in waves," *Ocean Engineering*, 267, 113235, 2023
- [23] Wackers, J., Pellegrini, R., Serani, A., Visonneau, M., Diez, M. "Efficient initialization for multi-fidelity surrogate-based optimization," *Journal of Ocean Engineering and Marine Energy*, 9, 291-307, 2023
- [24] Piazzola C., Tamellini L., Pellegrini R., Broglia R., Serani A., Diez, M., "Comparing multi-index stochastic collocation and multi-fidelity stochastic radial basis functions for forward uncertainty quantification of ship resistance," *Engineering with Computers*, 39, 2209–2237, 2023
- [25] Pellegrini, R., Wackers, J., Broglia, R., Serani, A., Visonneau, M., Diez M., "A Multi-Fidelity Active Learning Method for Global Design Optimization Problems with Noisy Evaluations," *Engineering with Computers*, 2022
- [26] D'Agostino, D., Serani, A., Stern, F., Diez, M., "Time-series forecasting for ships maneuvering in waves via recurrent-type neural networks," *J. Ocean Eng. Mar. Energy*, 8(4), 479–487, 2022
- [27] Diez, M., Serani, A., Campana, E. F., Stern, F., "Time-series forecasting of ships maneuvering in waves via dynamic mode decomposition," *J. Ocean Eng. Mar. Energy*, 8(4), 471–478, 2022
- [28] Khan, S., Kaklis, P., Serani, A., Diez, M., "Geometric moment-dependent global sensitivity analysis without simulation data: application to ship hull form optimisation," *Computer-Aided Design*, 151, 103339, 2022
- [29] Khan, S., Kaklis, P., Serani, A., Diez, M., Kostas, K., "Shape-supervised dimension reduction: Extracting geometry and physics associated features with geometric moments," *Computer-Aided Design*, 150, 103327
- [30] Pellegrini R., Serani A., Liuzzi G., Rinaldi F., Lucidi S., Diez, M., "A Derivative-Free Line-Search Algorithm for Simulation-Driven Design Optimization Using Multi-Fidelity Computations," *Mathematics*, 10(3), 481, 2022
- [31] Serani A., Stern F., Campana E. F., Diez M., "Hull-form stochastic optimization via computational-cost reduction methods," *Engineering with Computers*, 38, 2245-2269, 2022

- [32] Serani A., Diez M., van Walree F., Stern F., "URANS analysis of a free-running destroyer sailing in irregular stern-quartering waves at sea state 7," *Ocean Engineering*, 237, 109600, 2021
- [33] Leotardi C., Serani A., Diez M., Campana E. F., Fasano G., Gusso R., "Dense conjugate initialization for deterministic PSO in applications: ORTHOinit+," *Applied Soft Computing*, 104, 107121, 2021
- [34] Pellegrini R., Serani A., Liuzzi G., Rinaldi F., Lucidi S., Diez M. "Hybridization of Multi-Objective Deterministic Particle Swarm with Derivative-Free Local Searches," *Mathematics*, 8(4), 546, 2020
- [35] D'Agostino D., Serani A., Diez M., "Design-space assessment and dimensionality reduction: An off-line method for shape reparameterization in simulation-based optimization," *Ocean Engineering* 197, 106852, 2020
- [36] Serani A., D'Agostino D., Campana E. F., Diez M., "Assessing the Interplay of Shape and Physical Parameters by Unsupervised Nonlinear Dimensionality Reduction Methods," *Journal of Ship Research*, 64(4)
- [37] Serani A., Pellegrini R., Wackers J., Jeanson C. E., Queutey P., Visonneau M., Diez M., "Adaptive multi-fidelity sampling for CFD-based optimisation via radial basis function metamodels," *International Journal of Computational Fluid Dynamics*, 33(6-7), 237-255, 2019
- [38] Campana E.F., Diez M., Liuzzi G., Lucidi S., Pellegrini R., Piccialli V., Rinaldi F., Serani A., "A Multiobjective DIRECT algorithm for ship hull optimization," *Computational Optimization and Applications*, 71(1), 53-72, 2018
- [39] Pellegrini R., Serani A., Leotardi C., lemma U., Campana E.F., Diez M., "Formulation and parameter selection in multi-objective deterministic particle swarm for simulation-based optimization," *Applied Soft Computing*, 58, 714-731, 2017
- [40] Serani A., Leotardi C., lemma U., Campana E. F., Fasano G., Diez M., "Parameter selection in synchronous and asynchronous deterministic particle swarm optimization for ship hydrodynamics problems," *Applied Soft Computing*, 49, 313-334, 2016
- [41] Serani A., Fasano G., Liuzzi G., Lucidi S., lemma U., Campana E.F., Diez M., "Ship hydrodynamic optimization by local hybridization of deterministic derivative-free global algorithms," *Applied Ocean Research*, 59, 115-128, 2016
- [42] Leotardi C., Serani A., lemma U., Campana E.F., Diez M., "A variable-accuracy metamodel-based architecture for global MDO under uncertainty," *Structural and Multidisciplinary Optimization*, 54(3), 573-593, 2016
- [43] Campana E.F., Diez M., lemma U., Liuzzi G., Lucidi S., Rinaldi F., Serani A., "Derivative-free global ship design optimization using global/local hybridization of the DIRECT algorithm," *Optimization and Engineering*, 17(1), 127-156, 2015

Books and Book Chapters

- [1] Serani A., Leotardi C., "BUILding a Digital Twin: requirements, methods, and applications - BUILD-IT 2023 WORKSHOP," National Research Council-Institute of Marine Engineering, 2022
- [2] Diez M., Serani A., "From Uncertainty Quantification to Shape Optimization: Cross-Fertilization of Methods for Dimensionality Reduction," In: Vasile, M., Quagliarella, D. (eds) *Advances in Uncertainty Quantification and Optimization Under Uncertainty with Aerospace Applications. UQOP 2020. Space Technology Proceedings*, 8, pp. 3-19 Springer, Cham, 2021
- [3] Diez M., Volpi S., Serani A., Stern F., Campana E.F., "Simulation-Based Design Optimization by Sequential Multi-criterion Adaptive Sampling and Dynamic Radial Basis Functions," *Computational Methods in Applied Sciences* 48, 213-228, 2019
- [4] D'Agostino D., Serani A., Campana E.F., Diez M., "Augmented Design-space Exploration by Nonlinear Dimensionality Reduction Methods," *Lecture Notes in Computer Science* (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) LNCS, 2019

- [5] Serani A., Diez M., "Dolphin Pod Optimization: A Nature-Inspired Deterministic Algorithm for Simulation-Based Design," *Lecture Notes in Computer Science* (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 10710 LNCS, 2018, pp. 50-62
- [6] Pellegrini R., Serani A., Liuzzi G., Rinaldi F., Lucidi S., Campana E.F., Iemma U., Diez M., "Hybrid Global/Local Derivative-Free Multi-Objective Optimization via Deterministic Particle Swarm with Local Linesearch," *Lecture Notes in Computer Science* (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 10710 LNCS, 2018, pp.198-209
- [7] D'Agostino D., Serani A., Campana E.F., Diez M., "Nonlinear methods for design-space dimensionality reduction in shape optimization," *Lecture Notes in Computer Science* (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 10710 LNCS, 2018, pp. 121-132
- [8] Serani A., Diez M., "Dolphin Pod Optimization," In: Tan Y., Takagi H., Shi Y. (eds) *Advance in Swarm Intelligence*, 8th International Conference, ICSI 2017, Fukuoka, Japan, July 27 - August 1, 2017, Proceedings, Part I. Lecture Notes in Computer Science, vol 10385 Springer, Cham
- [9] Diez M., Serani A., Leotardi C., Campana E.F., Fasano G., Giusso R., "Dense Orthogonal Initialization for Deterministic PSO: ORTHOinit+," *Advances in Swarm Intelligence*, Lecture Notes in Computer Science, 9712 LNCS, 2016, pp. 322-330
- [10] Serani A., Diez M., Campana E.F., Fasano G., Peri D., Iemma U., "Globally Convergent Hybridization of Particle Swarm Optimization Using Line Search-Based Derivative-Free Techniques" *Recent Advances in Swarm Intelligence and Evolutionary Computation, Studies in Computational Intelligence*, vol. 585, Yang, Xin-She (Ed.), Springer, 2015
- [11] Diez M., Serani A., Leotardi C., Campana E.F., Peri D., Iemma U., Fasano G., Giove S., "A proposal of PSO particles' initialization for costly unconstrained optimization problems: ORTHOinit," *Advances in Swarm Intelligence*, Lecture Notes in Computer Science Volume 8794, 2014, pp 126-133

Conference Proceedings

- [1] Palma, G., Serani, A., Diez, M., Milano, C., Wang, Z., Park, S., Sarigul D. O., Stern, F., "Bayesian Hankel Extended Dynamic Mode Decomposition for System Identification of High-Speed Planing Hulls," *SNAME International Conference on Fast Sea Transportation*, p. D011S016R001, 2025, SNAME.
- [2] Gaggero S., Diez M., Lavini G., Gustin G., Serani A., "Enhancing Ship Propeller Design via Physics-Informed Parametric Model Embedding," *XI Conference on Computational Methods in Marine Engineering - MARINE 2025*, 23-25 June 2025, Edinburgh, UK.
- [3] Scholcz T. P., Serani A., "Where Are We and Where Are We Going? Analyzing Simulation-Driven Design Optimization Trends in Marine Engineering by Scoping Review," *XI Conference on Computational Methods in Marine Engineering - MARINE 2025*, 23-25 June 2025, Edinburgh, UK.
- [4] Serani A., Palma G., Wackers J., Diez M., "Preliminary Design Optimization for Internal Arrangement and Hull Geometry of a Bio-Inspired Autonomous Underwater Glider through Machine Learning," *XI Conference on Computational Methods in Marine Engineering - MARINE 2025*, 23-25 June 2025, Edinburgh, UK.
- [5] Pehlivan Solak H., Wackers J., Pellegrini R., Serani A., Diez M., "Improving Multi-fidelity Surrogate Modelling by Updating the Uncertainty Estimation," *XI Conference on Computational Methods in Marine Engineering - MARINE 2025*, 23-25 June 2025, Edinburgh, UK.
- [6] Squillace D., Iemma U., Quagliarella D., Diez M., Serani A., "Aerodynamic Shape Optimization of RAE-2822 Airfoil by Physics-Informed Parametric Model Embedding," *AeroBest2025 - III ECCOMAS Thematic Conference on Multidisciplinary Design Optimization of Aerospace Systems*, 22-24 April 2025, Lisbon, Portugal.

- [7] Del Buono A., Broglia R., Serani A., Diez M., Maione A., Cervicato C., "Full-scale RANS validation of multi-fidelity bow optimization for a RoRo Cargo Ship," *NAV 2025 - 21st INTERNATIONAL CONFERENCE ON SHIP & MARITIME RESEARCH*, 18-20 June 2025, Messina, Italy.
- [8] Serani A., Del Buono A., Diez M., Broglia R., Maione A., Cervicato C., "Multi-fidelity Shape Optimization for Bow Retrofitting of a RoRo Cargo Ship," *IMAM 2025 – 20th International Congress of the International Maritime Association of the Mediterranean*, 28 Sep. - 3 Oct. 2025, Crete, Greece.
- [9] Wackers J., Solak H., Pellegrini R., Serani A., Diez M., "Adaptivity and Uncertainty of Multi-fidelity surrogate model for shape optimization," *16th World Congress in Computational Mechanics (WCCM)*, 21–26 July 2024, Vancouver, Canada.
- [10] Serani A., Diez M., Aram S., Wundrow D., Drazen D., McTaggart K., "Model Order Reduction of 5415M in Irregular Waves via Dynamic Mode Decomposition: Computational Models' Diagnostics, Forecasting, and System Identification Capabilities," *Proceedings of the 35th Symposium on Naval Hydrodynamics*, Nantes, France, 2024.
- [11] Diez M., Pellegrini R., Serani A., Stern F., "Design-Space Dimensionality Reduction in Fluid-Structure Interaction Optimization via Parametric Model Embedding," *Proceedings of the 35th Symposium on Naval Hydrodynamics*, Nantes, France, 2024.
- [12] Rumpfkeil M. P., Serani A., Beran P. S. "Multi-Fidelity Constrained Optimization Methods Applied to Benchmark Problems," *AIAA SciTech Forum* (p. 0385), 2024, eISBN: 978-1-62410-711-5.
- [13] Serani A., Ficini S., Broglia R., Diez M., Goren O., Danisman D. B., Pehlivan Solak H., Yıldız S., Nikbay M., Scholcz T., Klينkenberg J., Grigoropoulos G., Bakirtzoglou C., Papadakis G., "Shape Optimization of a Naval Destroyer by Multi-Fidelity Methods," *10th International Conference on Computational Methods in Marine Engineering (MARINE)* 2023.
- [14] Diez, M., Pellegrini, R., Serani, A., Stern, F., "Design-Space Dimensionality Reduction in Structural Optimization via Parametric Model Embedding.," *10th International Conference on Computational Methods in Marine Engineering (MARINE)* 2023.
- [15] Solak H. P., Wackers J., Pellegrini R., Serani A., Diez M., Perali P., ... & Bot P., "Hydrofoil Optimization via Automated Multi-Fidelity Surrogate Models," *10th International Conference on Computational Methods in Marine Engineering (MARINE)* 2023.
- [16] Vulpio I., Burghignoli L., Palma G., Iemma U., Serani A., Diez M., "An evolutionary variant of Q-learning applied to derivative-free optimization," *AIAA AVIATION Forum* (p. 4262), 2023, eISBN: 978-1-62410-704-7.
- [17] Wackers J., Solak H. P., Pellegrini R., Serani A., Diez M., "Error estimation for surrogate models with noisy small-sized training sets," *Adaptive Modelling and Simulation (ADMOS)*, 2023.
- [18] Serani A., Diez M., Quagliarella D., "Efficient Shape Optimization via Parametric Model Embedding," *AIAA SciTech Forum* (AIAA 2023-1273), 2023, eISBN: 978-1-62410-699-6.
- [19] Khan S., Kaklis P., Kostas K., Serani A., Diez, M., "Bayesian shape optimisation in high dimensional design spaces using isogeometric boundary element analysis," *AIAA SciTech Forum* (AIAA 2023-2546), 2023, eISBN: 978-1-62410-699-6.
- [20] Vulpio, I., Serani, A., Diez, M., Burghignoli, L., Palma, G., Iemma, U., "Use of Reinforcement Learning for Multifidelity Optimization in Multiply-connected Trust Regions," *28th International Conference on Sound and Vibrations (ICSV 28)*, Singapore, 2022, ISBN: 978-981185070-7.
- [21] Diez, M., Serani, A., Stern, F., "A Data Clustering Approach to Identifying Slamming Types in Irregular Waves," *9th International Conference on Hydroelasticity in Marine Technology*, Rome, Italy, 2022.
- [22] Diez, M., Serani, A., Gaggero, M., Campana, E. F., "Improving knowledge and forecasting of ship performance in waves via hybrid machine learning methods," *Proceedings of the 34th Symposium on Naval Hydrodynamics*, Washington DC, USA, 2022.

- [23] Wackers, J., Pellegrini, R., Diez, M., Serani, A., Visonneau, M., "Improving active learning in multi-fidelity hydrodynamic optimization," *Proceedings of the 34th Symposium on Naval Hydrodynamics*, Washington DC, USA, 2022.
- [24] Serani A., Diez M., "Super-Parametrizing CAD Models for Efficient Shape Optimization via Parametric Model Embedding," *21st International Conference on Computer Applications and Information Technology in the Maritime Industries, COMPIT 2022*.
- [25] Wackers, J., Pellegrini, R., Serani, A., Diez, M., Visonneau, M., "Multi-fidelity Active Learning for Shape Optimization Problems Affected by Noise," *ECCOMAS 2022*, doi.org/10.23967/eccomas.2022.187.
- [26] Khan S., Kaklis P., Serani A., Diez, M., "Supporting Expensive Physical Models With Geometric Moment Invariants to Accelerate Sensitivity Analysis for Shape Optimisation," *AIAA SciTech Forum* (p. 2093), 2022
- [27] Pellegrini R., Odetti A., Serani A., Caccia M., Diez M., Ficini S., Iemma, U., "A Multi-fidelity Adaptive Gaussian Process for the Uncertainty Quantification of an Autonomous Surface Vehicle," *PROCEEDINGS OF SIMAI 2020+ 21*, 2021
- [28] Khan S., Kostas K., Kaklis P., Serani A., Diez, M., "Bayesian shape optimization in high dimensional design spaces using IGA-enabled solvers," *Virtual International Conference on Isogeometric Analysis*, 2021.
- [29] Ficini S., Iemma U., Pellegrini R., Serani A., Diez M., "Assessing the Performance of an Adaptive Multi-Fidelity Gaussian Process with Noisy Training Data: A Statistical Analysis," *AIAA AVIATION FORUM*, (p. 3098), 2021
- [30] Ficini S., Pellegrini R., Odetti A., Serani A., Iemma U., Caccia M., Diez M., "Uncertainty Quantification of an Autonomous Surface Vehicle by Multi-fidelity Surrogate Models," *9th edition of the International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2021)*.
- [31] D'Agostino D., Serani A., Stern F., Diez M., "Recurrent-type neural networks for real-time short-term prediction of ship motions in high sea state," *9th Conference on Computational Methods in Marine Engineering (Marine 2021)*, Virtual event, 2021.
- [32] Diez M., Serani A., Campana E. F., Stern, F., "Data-driven Modelling of Ship Maneuvers in Waves via Dynamic Mode Decomposition," *9th Conference on Computational Methods in Marine Engineering (Marine 2021)*, Virtual event, 2021.
- [33] Pellegrini R., Wackers J., Serani A., Visonneau M., Diez, M., "Towards automatic parameter selection for multi-fidelity surrogate-based optimization," *9th Conference on Computational Methods in Marine Engineering (Marine 2021)*, Virtual event, 2021.
- [34] Liuzzi G., Lucidi S., Rinaldi F., Pellegrini R., Serani A., Diez M., "Derivative-Free Line-Search Algorithm for Multi-Fidelity Optimization," *AIAA SciTech Forum* (p. 1237), 2021
- [35] Khan S., Serani A., Diez M., Kaklis P., "Physics-informed feature-to-feature learning for design-space dimensionality reduction in shape optimisation," *AIAA SciTech Forum* (p. 1235), 2021
- [36] D'Agostino D., Andre M., Bardet P., Serani A., Felli M., Diez M., "Observing PIV Measurements Through the Lens of Data Clustering," *33rd Symposium on Naval Hydrodynamics*, Osaka, Japan, 2020.
- [37] Wackers J., Visonneau M., Serani A., Pellegrini R., Broglia R., Diez M., "Multi-Fidelity Machine Learning from Adaptive-and Multi-Grid RANS Simulations," *33rd Symposium on Naval Hydrodynamics*, Osaka, Japan, 2020.
- [38] van Walree F., Serani A., Diez M., Stern F., "Prediction of heavy weather seakeeping of a destroyer hull form by means of time domain panel and CFD codes. *33rd Symposium on Naval Hydrodynamics*, Osaka, Japan, 2020.
- [39] Pellegrini R., Serani A., Ficini S., Broglia R., Diez M., Wackers J., Visonneau M., "Adapt, Adapt, Adapt: Recent Trends in Multi-fidelity Digital Modelling for Marine Engineering," *19h*

- [40] Beran P. S., Bryson D., Thelen A. S., Diez M., Serani A., "Comparison of Multi-Fidelity Approaches for Military Vehicle Design," *AIAA AVIATION FORUM* (p. 3158), 2020
- [41] Piazzola C., Tamellini L., Pellegrini R., Broglia R., Serani A., Diez M., "Uncertainty Quantification of Ship Resistance via Multi-Index Stochastic Collocation and Radial Basis Function Surrogates: A Comparison," *AIAA AVIATION FORUM* (p. 3160), 2020
- [42] Wackers J., Visonneau M., Ficini S., Pellegrini R., Serani A., Diez M., "Adaptive N-Fidelity Metamodels for Noisy CFD Data," *AIAA AVIATION FORUM* (p. 3161), 2020
- [43] Quagliarella D., Serani A., Diez M., Pisaroni M., Leyland P., Montagliani L., Iemma U., Gaul N. J., Shin J., Wunsch D., Hirsch C., Choi K. K., Stern F., "Benchmarking Uncertainty Quantification Methods Using the NACA 2412 Airfoil with Geometrical and Operational Uncertainties," *AIAA Aviation Forum* (p. 3555), 2019
- [44] Wackers J., Serani A., Pellegrini R., Diez M., Visonneau M., "Adaptive multifidelity shape optimization based on noisy CFD data," *International Conference on Adaptive Modeling and Simulation ADMOS* 2019.
- [45] Antognoli L., Bibuli M., Diez M., Durante D., Ficini S., Marrone S., Odetti A., Santic I., Serani A., "A Synergetic Design Study of a Passenger-Hydrofoil Flapped Surface: Experimental and Computational Fluid Dynamics, Optimization, and Control," *8th International Conference on Computational Methods in Marine Engineering* (Marine 2019) (pp. 334-345)
- [46] Serani A., Pellegrini R., Broglia R., Wackers J., Visonneau M., Diez M., "An Adaptive N-Fidelity Metamodel for Design and Operational-Uncertainty Space Exploration of Complex Industrial Problems," *8th International Conference on Computational Methods in Marine Engineering* (Marine 2019) (pp. 177-188)
- [47] Antognoli L., Ficini S., Bibuli M., Diez M., Durante D., Marrone S., Odetti A., Santic I., Serani A., "Hydrodynamic Design Procedure via Multi-Objective Sampling, Metamodeling, and Optimisation," *18th International Conference on Computer Applications and Information Technology in the Maritime Industries, COMPIT 2019*, Tullamore, Ireland, 25-27 March
- [48] Serani A., Durante D., Diez M., D'Agostino D., Clement S., Badra J., Andre M., Habukawa M., Bardet, P., "PIV data clustering of a buoyant jet in a stratified environment," *AIAA SciTech Forum* (p. 1830), 2019
- [49] Serani A., Diez M., Wackers J., Visonneau M., Stern F., "Stochastic shape optimization via design-space augmented dimensionality reduction and RANS computations," *AIAA SciTech Forum* (p. 2218), 2019
- [50] Serani A., D'Agostino D., Campana E. F., Diez M., "Assessing the interplay of shape and physical parameters by nonlinear dimensionality reduction methods," *32nd Symposium on Naval Hydrodynamics*, Hamburg, Germany, 2018
- [51] Serani A., Diez M., "Shape Optimization under Stochastic Conditions by Design-space Augmented Dimensionality Reduction", *19th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, USA, 25-29 June 2018
- [52] D'Agostino D., Serani A., Diez M., "On the Combined Effect of Design-space Dimensionality Reduction and Optimization Methods on Shape Optimization Efficiency", *19th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, USA, 25-29 June 2018
- [53] Pellegrini R., Serani A., Diez M., Wackers J., Queutey P., Visonneau M., "Adaptive Sampling Criteria for Multi-fidelity Metamodels in CFD-based Shape Optimization", *7th European Conference on Computational Fluid Dynamics (ECFD 7)*, Glasgow, UK, 11-15 June 2018
- [54] Wackers J., Queutey P., Visonneau M., Pellegrini R., Serani A., Diez M., "CFD-Based Shape Optimization Under Limited Computational Resources – A Study on Adaptive Multi-Fidelity Meta-modeling", *17th International Conference on Computer Applications and Information Technology in the Maritime Industries, COMPIT 2018*, Pavone, Italy, 14-16 May

- [55] Wackers J., Queutey P., Visonneau M., Pellegrini R., Serani A., Diez M., "Hull shape optimisation using multi-fidelity metamodels and adaptive grid refinement", *21st Numerical Towing Tank Symposium - NuTTS 2018*, Cortona, Italy
- [56] D'Agostino D., Serani A., Diez M., Campana E.F., "Deep Autoencoder for Off-line Design-Space Dimensionality Reduction in Shape Optimization," *56th AIAA Aerospace Sciences Meeting, SciTech 2018*, Gaylord Palms, Kissimmee, Florida, USA, January 8-12, 2018
- [57] Pellegrini R., Serani A., Broglia R., Diez M., Harries S., "Resistance and Payload Optimization of a Sea Vehicle by Multi-Fidelity Surrogate Models," *56th AIAA Aerospace Sciences Meeting, SciTech 2018*, Gaylord Palms, Kissimmee, Florida, USA, January 8-12, 2018
- [58] Diez M., Serani A., Campana E.F., Stern F., "CFD-based Stochastic Optimization of a Destroyer Hull Form for Realistic Ocean Operations," *FAST 2017, 14th International Conference on Fast Sea Transportation*, Nantes, France, September 27-29, 2017.
- [59] Diez M., Serani A., Campana E.F., Stern F., "Towards Augmented Design-Space Exploration via Combined Geometry and Physics Based Karhunen-Loève Expansion." *AIAA/ISSMO Multidisciplinary Analysis and Optimization (MA&O), AVIATION 2017*, Denver, USA, 5-9 June 2017
- [60] Serani A., Diez M., "Are random coefficients needed in particle swarm optimization for simulation-based ship design?" *MARINE 2017 - 6th International Conference on Computational Methods in Marine Engineering*, Nantes, France, 15-17 May 2017
- [61] Pellegrini R., Serani A., Harries S., Diez M., "Multi-objective hull-form optimization of a SWATH configuration via design-space dimensionality reduction, multi-fidelity metamodels, and swarm intelligence." *MARINE 2017 - 6th International Conference on Computational Methods in Marine Engineering*, Nantes, France, 15-17 May 2017
- [62] Grigoropoulos G.J., Campana E.F., Diez M., Serani A., Gören O., Sariöz K., Danisman D.B., Visonneau M., Queutey P., Abdel-Maksoud M., Stern F., "Mission-based hull-form and propeller optimization of a transom stern destroyer for best performance in the sea environment." *MARINE 2017 - 6th International Conference on Computational Methods in Marine Engineering*, Nantes, France, 15-17 May 2017
- [63] Serani A., Leotardi C., Campana E. F., Diez M., Stern F., "Design-space Dimensionality Reduction in Hydrodynamic Shape Optimization by Generalized Karhunen-Loève Expansion." *SIMAI 2016 - bi-annual congress of the Italian Society of Industrial and Applied Mathematics*, Milan, Italy, 13-16 September 2016
- [64] Pellegrini R., Iemma U., Serani A., Liuzzi G., Lucidi S., Rinaldi F., Iemma U., Campana E. F., "Global/Local Hybridization of the Multi-Objective Particle Swarm Optimization with Derivative-Free Multi-Objective Local Search." *SIMAI 2016 - bi-annual congress of the Italian Society of Industrial and Applied Mathematics*, Milan, Italy, 13-16 September 2016
- [65] Diez M., Serani A., Stern F., Campana E.F., "Combined Geometry and Physics Based Method for Design-space Dimensionality Reduction in Hydrodynamic Shape Optimization", *31st Symposium on Naval Hydrodynamics*, Monterey, CA, USA, 11-16 September 2016
- [66] Iemma U., Marchese V., Serani A., Palma G., "Optimal design of phononic crystals using higher order boundary elements and a swarm optimization scheme," *23rd International Congress on Sound & Vibration, ICSV23*, Athens, Greece, 10-14 July 2016
- [67] Diez M., Serani A., Campana E.F., Stern F., "Design Space Dimensionality Reduction for Single- and Multi-Disciplinary Shape Optimization", *AIAA/ISSMO Multidisciplinary Analysis and Optimization (MA&O), AVIATION 2016*, Washington D.C., USA, 13-17 June 2016
- [68] Serani A., Campana E.F., Diez M., Stern F., "A multi-objective optimization of DTMB 5415: effects of potential flow formulation and correlation with RANS," *15th Conference on Computer Applications and Information Technology in the Maritime Industries, COMPIT 2016*, Lecce, Italy, 9-11 May 2016

- [69] Diez, M., Serani, A., Campana, E.F., Goren, O., Sarioz, K., Danisman, D., Grigoropoulos, G., Aloniati, E., Visonneau, M., Queutey, P., Stern, F., "Multi-objective hydrodynamic optimization of the DTMB 5415 for resistance and seakeeping," *13th international conference on fast sea transportation, FAST 2015*, Washington, DC, September 2015,
- [70] Serani A., Fasano G., Liuzzi G., Lucidi S., lemma U., Campana E.F., Diez M., "Derivative-free global design optimization in ship hydrodynamics by local hybridization," *14th International Conference on Computer Applications and Information Technology in the Maritime Industries, COMPIT 2015*, Ulrichshusen, Germany, May 2015
- [71] Diez M., Serani A., lemma U., Campana E.F., "A fish shoal algorithm for global derivative-free simulation-based ship design optimization," *17th Numerical Towing Tank Symposium - NuTTS 2014*, Marstrand, Sweden, September 2014
- [72] Pellegrini R., Serani A., Diez M., lemma U., Campana E.F., "Multi-objective extensions of the deterministic particle swarm algorithm for RBRDO in ship design: a parametric study," *17th Numerical Towing Tank Symposium - NuTTS 2014*, Marstrand, Sweden, September 2014
- [73] Pellegrini R., Campana E.F., Diez M., Serani A., Rinaldi F., Fasano G., lemma U., Lucidi S., Liuzzi G., Stern F., "Application of derivative-free multi-objective algorithms to reliability-based robust design optimization of a high-speed catamaran in real ocean environment," *4th International Conference on Engineering Optimization - EngOpt 2014*, Lisbon, Portugal, September 2014
- [74] Leotardi C., Diez M., Serani A., lemma U., Campana E.F., "Efficient simulation-based design optimization for fluid-structure interaction problems affected by uncertainty," (extended abstract only) *17th U.S. National Congress on Theoretical and Applied Mechanics*, Michigan State University, June 2014.
- [75] Leotardi C., Diez M., Serani A., lemma U., Campana E.F., "A framework for efficient simulation-based multidisciplinary robust design optimization with application to a keel fin of a racing sailboat," *OPT-i 2014, 1st International Conference on Engineering and Applied Sciences Optimization*, Kos Island, Greece, June 2014
- [76] Serani A., Diez M., Leotardi C., Peri D., Fasano G., lemma U., Campana E.F., "On the use of synchronous and asynchronous single-objective deterministic particle swarm optimization in ship design problems," *OPT-i 2014, 1st International Conference on Engineering and Applied Sciences Optimization*, Kos Island, Greece, June 2014