DESIGN RESEARCH ENGINEERING
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Matthew L. Schirmann, Ph.D.

Professional Specialization

Naval architecture and marine engineering design and failure analysis. Accident reconstruction related to marine casualties and system and equipment failures. Analysis of vessel stability, seakeeping, resistance and propulsion, and maneuvering characteristics. Wave and wake measurement and characterization. Propeller strike modeling and analysis. Laboratory testing, field testing, and data analysis of ships and recreational vessels' planing characteristics, response to maneuvering inputs, and behavior under dynamic loads. Design analysis, failure analysis, and testing of mechanical systems and equipment. Field inspections including measurement and documentation of accident sites and incident involved vessels, equipment, or consumer products. Digitization and CAD rendering of accident scenes, vessels, mechanical systems, or equipment.

Professional Background

University of Michigan, Ann Arbor
B.S.E. Naval Architecture and Marine Engineering, 2017
M.S.E. Naval Architecture and Marine Engineering, 2017
M.S. Electrical and Computer Engineering, Signal and Image Processing and Machine Learning, 2020
Ph.D. Naval Architecture and Marine Engineering, 2021

Certified Marine Electrical Advisor, American Boat & Yacht Council
Member, Society of Naval Architects and Marine Engineers

Project Engineer
Design Research Engineering, Novi, Michigan, 2021–Present

Research Assistant
University of Michigan, Ann Arbor, 2017–2021

Tutor, Marine Dynamics I
University of Michigan, Ann Arbor, 2018

Production Engineering Intern
Back Cove Yachts, Rockland, Maine, 2017

Graduate Student Instructor, Marine Engineering Laboratory I
University of Michigan, Ann Arbor, 2017

Undergraduate Research Assistant
University of Michigan, Ann Arbor, 2016

Ship Engineering Department Intern
American Bureau of Shipping, Houston, Texas, 2016

Honors

3rd Prize, Application Track, EECS 545: Machine Learning, University of Michigan, Ann Arbor, 2019.
2nd Place, Student Poster Competition, American Society of Naval Engineers Technology, Systems & Ships, 2018
1st Place, Dr. James A. Lisnyk Student Design Competition, Society of Naval Architects and Marine Engineers, 2017
magna cum laude, University of Michigan, Ann Arbor, 2017

Continuing Education

- NASBLA Level 1 – Comprehensive Boating Incident Investigation Course (April 18-22, 2022, Ewing Twp., NJ)
- ABYC Marine Electrical Certification (June 7-23, 2022, Virtual)

Technical Publications

"Water Intrusion Injuries: Occupant Kinematics and Pressure Exposure during Rearward Falls from a Personal Watercraft," *SAE Int. J. Trans. Safety*, Vol 11(1), 2023 (with E. Winkel, K. Zakutansky, K. Breen, R. Taylor).

Technical Publications *(continued)*

"Data-driven models for vessel motion prediction and the benefits of physics-based information," *Applied Ocean Research*, Vol 210, 102916, March 2022 (with M.D. Collette, J.W. Gose).

"Significance of wave data source selection for vessel response prediction and fatigue damage estimation," *Ocean Engineering*, Vol 216, 107610, November 2020 (with M.D. Collette, J.W. Gose).

"Improved vessel motion predictions using full-scale measurements and data-driven models," 33rd Symposium on Naval Hydrodynamics (33rd SNH), Osaka, Japan (Virtual), October 2020 (with M.D. Collette, J.W. Gose).

"Linking seakeeping performance predictions with onboard measurements for surface platform digital twins," Practical Design of Ships and Other Floating Structures (PRADS 2019), Yokohama, Japan, September 2019 (with T. Chen, M.D. Collette, J.W. Gose).

"Impact of weather source selection on time-and-place specific vessel response predictions," 7th International Conference on Marine Structures (MARSTRUCT 2019), Dubrovnik, Croatia, May 2019 (with M.D. Collette, J.W. Gose).

"Ship motion and fatigue damage estimation via a digital twin," 6th International Symposium on Life-Cycle Civil Engineering (IALCCE 2018), Ghent, Belgium, October 2018 (with M.D. Collette, J.W. Gose).

Doctoral Dissertation

"Physics-informed data-driven models for ship response prediction using global wave data," University of Michigan, Ann Arbor, August 2021.