

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Naval Architecture and Marine Engineering

Matthew D. Collette, associate professor of naval architecture and marine engineering, with tenure, Department of Naval Architecture and Marine Engineering, College of Engineering, is recommended for promotion to professor of naval architecture and marine engineering, with tenure, Department of Naval Architecture and Marine Engineering, College of Engineering.

Academic Degrees:

Ph.D. 2005 University of Newcastle upon Tyne, Marine Technology, Tyne, UK
B.S.E. 1999 Webb Institute, Naval Architecture and Marine Engineering, Glen Cove, NY

Professional Record:

2017 – present Associate Professor (with tenure), Department of Naval Architecture and Marine Engineering, University of Michigan
2009 – 2017 Assistant Professor, Department of Naval Architecture and Marine Engineering, University of Michigan
2005 – 2009 Research Engineer and Senior Naval Architect, SAIC, Bowie, MD

Summary of Evaluation:

Teaching: Professor Collette is an innovative, impressive, and successful classroom instructor, and a conscientious mentor and advisor. The courses he teaches are NA 270, NA 475, and NA 570. The two undergraduate classes (NA 270 and NA 475) occupy the critical positions of first and final in the NAME required undergraduate curriculum. NA 570 is NAME's first-year graduate-level design course. Professor Collette has brought modern pedagogical approaches to these courses, converted them from in-person to virtual instruction and back again, and implemented equity focused principles of instruction. Since joining the NAME faculty in 2009, he has been voted Outstanding Professor four times by the NAME student society and received the College of Engineering's 2017 Jon R. and Beverly S. Holt Award for Excellence in Teaching. NAME students' capstone design projects from Professor Collette's NA 475 course commonly win the prestigious International Lisnyk Student Ship Design Competition. He has graduated 12 Ph.D. students as chair or co-chair and has another four in progress. He is also active in advising undergraduate and masters students. His students have won several awards.

Research: Professor Collette's research addresses the design and prognosis of complex marine platforms (ships) at a level of detail that surpasses generic characterizations. His primary contribution is the development of techniques for refining and fusing information provided by myriad simulation and measurement data streams into manageable input for the design of ships and marine systems. In other words, his work allows data-derived performance predictions for design purposes and allows the construction of computational twins of existing ships and other marine platforms. The national and international recognition of his work has resulted in on-going research grants of a combined funding total exceeding \$2.7 million (his share) for which he serves as the PI. Professor Collette has built a strong research program with a total research

funding \$6.12M to date within which he is the sole PI for more than half of the grants. He is one of 16 recipients of the Office of Naval Research Young Investigator Program (YIP) research awards in 2013. He has published a total of 32 articles in referred journals, out of which 16 are top-tier journals in the field of marine engineering/structures and in a broader field of reliability, structural mechanics, fatigue, structural health monitoring. He has published a total of 50 major national and international marine conference/symposium papers, most of which are considered as the top-tier conferences. In addition, he has provided nine invited lectures.

Recent and Significant Publications:

- Schirmann, M.L., Collette, M.D., Gose, J.W., 2022, "Data-driven models for vessel motion prediction and the benefits of physics-based information," *Applied Ocean Research* 120, 102916.
- Zhang, K., Collette, M., 2021, "Experimental investigation of structural system capacity with multiple fatigue cracks," *Marine Structures* 78, 102943.
- Edwards, S.J., Troesch, A.W., Collette, M., 2021, "Estimating extreme characteristics of stochastic non-linear systems," *Ocean Engineering* 233, 109042.
- Groden, M., Zhang, K., Collette, M., 2018, "The strain amplification sensor: A 3D-printable stand-alone strain gauge for low-cost monitoring: The Strain Amplification Sensor," *Struct Control Health Monit* 25, e2145.
- Temple, D., Collette, M., 2017, "Understanding lifecycle cost trade-offs for naval vessels: minimizing production, maintenance, and resistance," *Ships and Offshore Structures* 12, 756–766.

Service: Professor Collette is a well-known and well-regarded member of the marine design community. He has served as a co-editor in chief of *Ocean Engineering* (his field's premiere journal), and as the elected chair of the Design Methods Committee for the International Ship and Offshore Structures Congress. His bid to bring the 2025 Practical Design of Ships and Other Floating Structures (PRADS) Conference to UM was recently accepted. His many service activities beyond UM (member of NATO and society committees; organization of workshops, and conference sessions, etc.) show he is an active, visible, and trusted member in the marine design community. Internally, he has been a 'model citizen' and colleague. He served on the UM's COVID-19 faculty council, and his commitment to diversity, equity, and inclusion (DEI) involves being trained for and then facilitating six anti-Black-racism bystander workshops and implementing equity-focused teaching and mentoring methods. Within the department, he has served as the NAME-building and -facilities faculty lead, as a member of the AY21-22 NAME Faculty search committee, and as the chair of the AY22-23 NAME Faculty search committee.

External Reviewers:

Reviewer A: "...he has proven himself to be a versatile and adaptable researcher, whose research program encompassed: design specification work; experimental fatigue investigation; forensic analysis of historical vessels; application of stochastic methods to support, design, operation, and maintenance of vessels; optimization, and additive manufacturing. Truly an impressive span of the space that is naval architecture!"

Reviewer B: "...Matthew Collette really understood how to take his discipline forward through the implementation of various first-principle based methods and approaches he developed, while

still linking them to practical design questions faced by engineers working at shipyards or design offices. Many of the peers working in the same field fail to do so consistently and all too often fall back on traditional manual and iterative design approaches, which are purely derivative in the end. The work performed by Matthew Collette and his team however has the potential to be, and partially is already, disruptive, which is highly appreciated.”

Reviewer C: “While many of his papers lean to the theoretical, they establish the groundwork for further development of directly applicable solutions. I have always been impressed with papers that extend the theoretical to current practical applications. Two stand out for their usefulness in the near term and address a critical issue we currently see, too many new vessels suffering early fatigue failures.”

Reviewer D: “He seems to combine in an efficient manner core knowledge of the marine environment and ship structures with a broader knowledge in data science, machine, learning, and design theory. These enabling technologies are important in addressing the emerging challenges relating to digital twins, autonomy, sustainability, and reliability in general and for naval architecture and ocean engineering (NAOE) in particular.”

Reviewer E: “...[Professor Collette] has shown: (i) a sustained record of contribution to scholarly literature; (ii) shown substantial cumulative evidence of publication impact; (iii) sustained record of success in mentoring; (iv) maintained a pipeline of students; (v) shown sustained record of funding from diverse sources, commensurate with leading and maintaining a robust and coherent research programme; and (vi) is seen as a leader with an established reputation in the field.”

Summary of Recommendation: Professor Collette has expanded and enriched the field of marine system design and prognosis. He is an excellent classroom instructor and research mentor. He is a known and respected member of the marine design community. He has a demonstrated and continuing commitment to DEI. It is with the support of the College of Engineering Executive Committee that I recommend Matthew D. Collette for promotion to professor of naval architecture and marine engineering, with tenure, Department of Naval Architecture and Marine Engineering, College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlastic Dean of Engineering
College of Engineering

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