

# Laura K. Alford

## education

Ph.D. Naval Architecture and Marine Engineering, University of Michigan, 2008

M.S.E. Naval Architecture and Marine Engineering, University of Michigan, 2003

B.S.E. Naval Architecture and Marine Engineering, University of Michigan, 2002, Magna Cum Laude

## academic appointments

University of Michigan

Research Investigator, January 2013 – present

Lecturer, January 2008 – present

Research Associate II, January 2012 – December 2012

Research Fellow, May 2008 – August 2011

## teaching

Engr 100, Intro to Engineering: Underwater Vehicle Design.

Intensive first-year course involving two design-build-test projects (bathysphere and remote operated vehicle). Requires management and guidance of 60 first-year undergraduate students, 3 undergraduate instructional assistants, 12 peer mentors, and 1 grader. Co-taught with technical communication faculty. Coordinate 3-4 industry guest lecturers per semester and 2 major competitions.

Engr 101, Intro to Computer Programming.

Another intensive first-year course covering engineering problem solving through computing. Problem solving and program design using both Matlab and C++. 6 major projects throughout the semester. Collaborate with 2 other instructional faculty to teach in sync across 3 separate lectures. Requires management and guidance of 700 first-year undergraduate students (total across the 3 lectures), 9 graduate student instructors, 6 undergraduate instructional assistants, and 5 graders.

Video lectures on ship geometry, hydrostatics, intact stability, and damage stability

Xplore Engineering workshops, 2013-2015

## research areas

Effects of project-based learning and teams on first-year undergraduate engineering students

Recognizing and removing implicit bias in the classroom

Hydrodynamics of marine structures, including ecological effects

Design loads for ships and marine structures using probabilistic methods

Microplastic pollution in the Great Lakes

## grants and contracts

University of Michigan -- Faculty Communities for Inclusive Teaching, "Addressing the Impact of Implicit Bias on Teams in Introductory Engineering Courses," \$1000, January 8, 2016, PI: Dr. Laura K. Alford.

Office of Naval Research, "A Real-Time Wave Sensing and Ship Motion Prediction System," Phase 2, \$4,748,144, July 10, 2014, PI: Prof. Robert F. Beck, co-PIs: Dr. Laura K. Alford, Prof. Ryan Eustice, Prof. Joel Johnson (Ohio State University), Dr. David Lyzenga, Dr. Okey Nwogu, Dr. Eugene Terray (WHOI), Dr. Alan Zundel (Aquaveo, LLC).

USGS, "Design and Planning Fish Habitat Remediation Projects in the Detroit River Area of Concern and Construction of One Reef Site", \$880,000, May 1, 2013, PI: Dr. Jennifer Read, co-PIs: Dr. Laura K. Alford, Prof. Aline Cotel.

### **selected publications**

Alford, L. K., Lyzenga, D., Nwogu, O., Beck, R. F., Johnson, J. T., Zundel, A., Andrews, M., Collier, J., Katz, E., McKelvey, C., O'Brien, A., Smith, G., Wijesundara, S., 2016. "Performance Evaluation of a Multi-Ship System for Environmental and Ship Motion Forecasting," 31st Symposium on Naval Hydrodynamics, Monterey, California.

Alford, L. K., and Maki, K. J., 2015. "Generating Large Deterministic Water Waves for Numerical Simulation," In MODSIM World 2015.

Alford, L. K., Beck, R. F., Johnson, J. T., Lyzenga, D., Nwogu, O., and Zundel, A., 2015. "A Real-Time System For Forecasting Extreme Waves And Vessel Motions," In ASME 34th International Conference on Offshore Mechanics and Arctic Engineering (OMAE 2015).

Alford, L. K., and Maki, K. J., 2015. "Effects Of Third-Order Nonlinearities On The Fourier Representation Of Deterministic Wave Trains," In ASME 34th International Conference on Offshore Mechanics and Arctic Engineering (OMAE 2015).

Alford, L. K., Fowler, R., Sheffield, S., 2014. "Evolution of Student Attitudes Toward Teamwork in a Project-based, Team- based First Year Introductory Engineering Course," Proceedings of the 2014 Annual Conference of the American Society for Engineering Education, Indianapolis.

Alford, L. K., Kim, D., and Troesch, A. W., 2010. "Estimation of extreme slamming pressures using the non-uniform Fourier phase distributions of a design loads generator," *Ocean Engineering*, Vol. 38, Issues 5–6, April 2011, pp. 748–762.

Alford, L. K., and Troesch, A. W., 2009. "Generating extreme ship responses using non-uniform phase distributions," *Ocean Engineering*, Vol. 36, Issues 9-10, July 2009, pp. 641–649.

### **other media**

[Hydrostatics Short Course](#) [youtube.com]

Microplastics Pollution in the Great Lakes Ecosystem: Summary of Presentations at IAGLR 2014, Alford, L. K., Corcoran, P. L., Driedger, A., Duhaime, M., Dürr, H., Helm, P., Mason, S. A., Norris, T., *Lake Scientist*, July 16, 2014.

### **honors and awards**

NA&ME Departmental Award: 2016

National Defense Science and Engineering Graduate (NDSEG) Fellowship: 2003

### **memberships**

American Society for Engineering Education (ASEE)

Society of Naval Architects and Marine Engineers (SNAME)

International Association for Great Lakes Research (IAGLR)

Ann Arbor Area Modeling Discussion Group

Ann Arbor Women In Tech