



The Institute of Marine Engineering, Science & Technology



Eastern USA Branch

Chairman & Honorary Secretary
Bradley D.M. Golden
15-55 Bell Blvd., 2nd Floor, Bayside, NY 11360
goldenmarineandoffshore@gmail.com

Honorary Treasurer
Chris Law

February 6, 2020

MEETING NOTICE

The next technical meeting of the IMarEST Eastern USA Branch will be a joint session with the Society of Naval Architects and Marine Engineers (SNAME), the Society of Marine Port Engineers (SMPE), and the American Society of Naval Engineers (ASNE). This meeting is being hosted by SMPE.

Date: Wednesday, February 19, 2020

Location: India House
1 Hanover Square
New York, NY 10004

Topic: Fluid-Structure Interactions for High-Speed Planing Craft

Presenter: Christine M. Gilbert, PhD, Assistant Professor
Kevin T. Crofton Department of Aerospace and Ocean Engineering
Virginia Polytechnic Institute and State University

<u>Time:</u>	Social Hour	– 5:00 PM	<u>Cost:</u>	Members	– \$40.00
	Dinner	– 6:00 PM		Non-Members	– \$55.00
	Technical Session	– 7:00 PM		Student Members	– \$15.00
				Student Non-Members	– \$25.00

Additional details about this presentation and future meetings can be found on the following pages. Please also see the Eastern USA Branch's website for details on viewing a live webcast of this meeting and recordings of past meetings.

Please E-mail your plans to attend to Bradley Golden, Chairman & Honorary Secretary (goldenmarineandoffshore@gmail.com) by Monday, February 17, 2020. We encourage inviting prospective new members interested in joining the Institute to attend a technical meeting as a guest of the Eastern USA Branch of the IMarEST.

Best regards,

Bradley D.M. Golden, Chairman & Honorary Secretary

Vice Chair – Technical
Paul Hormann
pmhormann@gmail.com

Honorary Secretary Emeritus
Robert J. Bazzini



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TECHNICAL PRESENTATION INFORMATION

Date: Wednesday, February 19, 2020

Location: India House
1 Hanover Square
New York, NY 10004

Topic: Fluid-Structure Interactions for High-Speed Planing Craft

Presenter: **Christine M. Gilbert, PhD, Assistant Professor**
Kevin T. Crofton Department of Aerospace and Ocean Engineering
Virginia Polytechnic Institute and State University

Dr. Christine Gilbert (née Ikeda) received her PhD from the University of Maryland in Mechanical Engineering in 2012. She has held appointments at the U.S. Naval Academy and the University of New Orleans before joining the faculty at Virginia Tech in Fall 2016. Dr. Gilbert is a 2015 Office of Naval Research Young Investigator Program (YIP) and a 2020 National Science Foundation Early Career Development Program (CAREER) Awardee. Dr. Gilbert has recently received funding for an ONR DURIP called, "Advanced Towing Tank Carriage and Instrumentation for the Study of Small Vessels in Waves." This project is currently ongoing and will equip Virginia Tech with a high-speed towing carriage (top speed of 20 ft/s) and a vertical planar motion mechanism (VPMM) that will allow for controlled, nontraditional slamming experiments. This project is in collaboration with DLBA, Stevens Institute of Technology, MAPC, and WL3 Solutions.

Abstract: Small, high-speed planing craft are often subject to repeated slamming events, which can cause interesting fluid-structure interactions. The loads and structural response of the vessel depends on a number of factors such as wave topography, impact angle, forward speed, encounter angle, and height of the vessel relative to the water surface before impact. Wave-load predictions, rigid body motions, and structural response are difficult to predict due to the complex interactions of this nonlinear phenomenon. Much of the criteria for designing high-speed planing craft are based on semi-empirical data and often lead to overly conservative designs, which limits the operational envelope of the vessel.

One approach to exploring this fluid-structure interaction is to study the vertical impact of a V-shaped wedge in calm water, which serves as a model for a single slam event after a vessel has become partially airborne. This problem is well-known in the field of Naval Engineering and hydrodynamic loads on rigid wedges can be accurately predicted using existing analytical methods. This presentation will focus on wedges with flexible bottom plates fabricated from aluminum and composites that are outside of the scope of existing analytical methods. Pressure on the wedge bottom, rigid-body kinematics, full-field out-of-plane deflection, and spray root evolution were measured. The out-of-plane deflection was measured using Stereoscopic-Digital Image Correlation (S-DIC). Comparisons of the experimental results are made to an in-house two-way coupled, semi-theoretical model.



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A second approach to understanding slamming on small craft is to perform tow tank experiments in waves. Future experiments are planned in the VT Advanced Towing Tank Facility using a Vertical Planar Motion Mechanism. These new facilities are still currently under development through collaborations with DLBA, Stevens Institute of Technology, MAPC, and WL3 Solutions. Preliminary features of the new facility will be discussed as well as the plans for the non-traditional slamming experiments that will be performed using data collected from traditional towing tank experiments. This project is funded by the Office of Naval Research.

This presentation is expected to be accredited for 1 PDH. Please contact SNAME's Professional Engineer Continuing Education Program Evaluator, David Chapman (davechapman50@gmail.com), for more details.



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NEW YORK AREA JOINT SOCIETIES' MEETING SCHEDULE, 2019-2020

Date	Day	Event	Host	Location	Presentation
18 Sep 2019	Wed	SNAME Meeting Past Chairman's Night	SNAME	India House 1 Hanover Sq.	International Regulations / Rod Acquie
16 Oct 2019	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting	SNAME	India House 1 Hanover Sq.	The Effects of Hull and Propeller Roughness on Ship Speed, Power, Required Freight Rate and Maneuverability / John Daidola
30 Oct-2 Nov 2019	Wed- Sat	SNAME Maritime Convention	SNAME	Tacoma, WA	Papers at Meeting
13 Nov 2019	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting	IMarEST	India House 1 Hanover Sq.	Eliminating the Sterntube in New Deep Sea Ship Construction / Ken Ogle
11 Dec 2019	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting	SMPE	Iberia Peninsula Newark, NJ	Ropes and Wires for the Marine Industry / Mark Pieter Frolich
15 Jan 2020	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting	SMPE	Iberia Peninsula Newark, NJ	Reliability Based Maintenance Programs / Brian Graney
19 Feb 2020	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting (SMPE Elections)	SNAME	India House 1 Hanover Sq.	Fluid-Structure Interactions for High-Speed Planing Craft / Christine Gilbert, PhD
TBD Mar 2020	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting	IMarEST	India House 1 Hanover Sq.	TBA
15 Apr 2020	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting (SNAME Elections)	SNAME	Riccardo's by the Bridge Astoria, NY	Student Papers
20 May 2020	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting (Student Paper Night)	ASNE	India House 1 Hanover Sq.	Student Papers
13 Jun 2020	Wed	SNAME/IMarEST/SMPE/ ASNE Joint Meeting	SNAME	India House 1 Hanover Sq.	TBA
16-18 Jun 2020	Tue- Thur	TSS/ASNE Day 2020	ASNE	Washington DC	Papers at Meeting