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**Message from the Chair of the Division**

*Vukica Jovanovic, Ph.D., Old Dominion University*  
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It was so nice to see you in Tampa last year! We had a productive business meeting, make changes and updates to our Bylaws and had elections for our slate of officers. This year had many changes to the conference format due to Covid-19, but we pulled through and made it happen. Welcome to our events we are glad to have you there!



**Message from the Program Chair**

*Lynn A. Albers, Ph.D., Hofstra University*  
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It was a pleasure meeting you in Tampa and I had looked forward to seeing y'all again in Montreal. However, the world had different plans for us. I hope that you continue to stay healthy and I am grateful that I will be able to see you at ASEE's Virtual Conference 2020. We have a great program for you! Thanks to the Energy Conversion and Conservation Division Program Chair, Dr. Siamak Farhad, we will be co-hosting **W416 Distinguished Lecture: Smart Energy: Opportunities and Challenges by Dr. Yunus Çengel**. We will also be co-hosting **R716 Virtual Tour - Energy Facilities** where engineers from **Covanta** will share the waste-to-energy process including energy storage and grid interconnection.

While we won't have our own social this year, I encourage you to attend the Multidisciplinary Social on Tuesday and the Energy Conversion and Conservation Division Social on Thursday. I will be happy to introduce you to my friends and colleagues at both events.

Last but not least, please support our authors at **T344 Ocean and Marine Engineering Division: Best Paper Technical Session**. Both papers are excellent and perfect examples of the high quality that the division expects and is proud to share with the Engineering Education community.

We will be planning ASEE 2021 during our business meeting so please come and share your ideas. Until then, stay well and be safe. Cheers! #ASEEVC

# ASEE Ocean and Marine Engineering Division

## *ASEE 2020 Virtual Conference*

### **M417·The Engineer of 2020: Realizing the Vision?**

***Mon. June 22, 2020 1:00 PM to 1:30 PM, Online, A Virtual Conference***

*Panel Engineering and Public Policy Division, Engineering Design Graphics Division, Environmental Engineering Division, Engineering Research Council, ASEE Committee on Diversity, Equity & Inclusion , Ocean and Marine Division, Engineering Technology Division, Manufacturing Division, Entrepreneurship & Engineering Innovation Division, and Technological and Engineering Literacy/Philosophy of Engineering Division*

Session Description: Please join us for a moderated discussion on the current state of engineering education and the profession as compared to the vision of two National Academy of Engineering (NAE) landmark reports.

The NAE's 2004 report, "The Engineer of 2020: Visions of Engineering in the New Century," presented forward-looking goals for the engineering profession in 2020, including the challenges, opportunities, and global context within which engineers would work. Importantly, the report stated that engineering "must (1) agree on an exciting vision for its future; (2) transform engineering education to help achieve the vision; (3) build a clear image of the new roles for engineers, including as broad-based technology leaders, in the mind of the public and prospective students who can replenish and improve the talent base of an aging engineering workforce; (4) accommodate innovative developments from nonengineering fields; and (5) find ways to focus the energies of the different disciplines of engineering toward common goals." The report also defined a set of skills and capabilities that would be needed by those future engineers, including both professional and technical skills.

A follow up report in 2005, "Educating the Engineer

of 2020: Adapting Engineering Education to the New Century," recommended several changes to engineering education, including accrediting master's degree programs for the professional engineering degree, exploring new education models, infusing design activities throughout the undergraduate curriculum, encouraging interdisciplinary learning at the undergraduate level, promoting engineering to the public, and rewarding faculty for conducting engineering education research.

Note: This session initially was planned as a precursor to the Interdivisional Town Hall on looking forward to engineering education in 2030, which was cancelled. We plan to have a full panel in conjunction with next year's town hall forum.

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### **T344·Ocean and Marine Engineering Division: Best Paper Technical Session**

Technical Ocean and Marine Division

***Tue. June 23, 2020 11:40 AM to 12:00 PM, Online, A Virtual Conference***

*Moderated by*

- Dr. *Vukica* M. Jovanovic and Dr. Lynn A. Albers

*Papers Presented*

- An Open-source Autonomous Vessel for Maritime Research - Dr. Robert Kidd (State University of New York)
- Using Student-faculty Collaborative Lectures to Teach High-level Hydrodynamics Concepts - Dr. Laura K. Alford (University of Michigan), Mr. James A. Collier (University of Michigan), and Dr. Robin Fowler (University of Michigan)

## ASEE Ocean and Marine Engineering Division *ASEE 2020 Virtual Conference*

### **W416·DISTINGUISHED LECTURE: Smart Energy: Opportunities and Challenges**

*Wed. June 24, 2020 2:00 PM to 2:30 PM, Online, A Virtual Conference*

*Dist. Lecture Energy Conversion and Conservation Division, Mechanical Engineering Division, Instrumentation Division, and Ocean and Marine Division*

Session Description: The world is entering into the "smart everything" age, and energy is no exception. Artificial intelligence (AI) is forming the new platform for tomorrow's products, services, work environments, and the workforce. Data literacy is becoming an essential cross-cutting skill. Power grids are to be replaced by smart grids where electric generation plants, consumer devices, and storage systems are connected, and supply-and-demand analyses are made. To survive in this high-tech environment, the society at large will have to embrace change and acquire new skills associated with society 5.0. The future engineers will have to develop a creative mindset and focus on producing original ideas and inventing new goods and services.

Moderated by: Dr. Lynn A. Albers and Dr. Maryam Younessi Sinaki

Speaker:

***Dr. Yunus A. Çengel P.E., University of Nevada, Reno***

Dr. Yunus Çengel is Professor Emeritus at the University of Nevada, Reno, and the founding dean of the Faculty of Engineering at Adnan Menderes University in Aydin, Turkey.



He received his Ph.D. in Mechanical Engineering from North Carolina State University. Before joining ADU in 2012, he held the position of the Dean of the Faculty of Mechanical Engineering at Yildiz Technical University and as advisor to the President at Scientific and Technological Research Council TUBITAK on international cooperations. Professor Çengel served as the assistant director and director of the Industrial Assessment Center at UNR for eight years. He also served as the advisor to several government organizations and private companies on energy efficiency, energy policies, and education reform. Professor Çengel is the author or coauthor of the widely adopted textbooks Thermodynamics: An Engineering Approach, Fundamentals of Thermal-Fluid Sciences, Heat and Mass Transfer: Fundamentals and Applications, Fluid Mechanics: Fundamentals and Applications and Differential Equations for Scientists and Engineers all published by McGraw-Hill. Some of his textbooks have been translated into Chinese, Japanese, Korean, Thai, Spanish, Portuguese, Turkish, Italian, Greek, and French. The recipient of several outstanding teacher awards, he has received the ASEE Meriam/Wiley Distinguished Author Award twice. He is a registered professional engineer in the Nevada.

### **W544·Ocean and Marine Engineering Division Business Meeting**

*Wed. June 24, 2020 3:30 PM to 4:30 PM, Online, A Virtual Conference*

### **W716·Virtual Tour - Energy Facilities**

*Wed. June 24, 2020 7:00 PM to 9:00 PM, Online, A Virtual Conference*

*Social Energy Conversion and Conservation Division, Ocean and Marine Division, and Instrumentation Division*

Session Description: Several educational virtual tours of energy facilities have been planned. Each one is 30 minutes with Q & A.

# ASEE Ocean and Marine Engineering Division

## ASEE 2020 Virtual Conference

### OMED Best Paper Award

*Dr. Laura K. Alford (University of Michigan), Mr. James A. Coller (University of Michigan), and Dr. Robin Fowler (University of Michigan)*

### Using Student-faculty Collaborative Lectures to Teach High-level Hydrodynamics Concepts

Introduction to engineering courses are increasingly team-based and project-based, with student teams designing and building real-world things. A popular project for intro courses are remotely operated vehicles (ROVs). Our intro to engineering class at a large midwestern research university uses ROVs because they are fundamentally interdisciplinary: a successful design includes elements of mechanical engineering, electrical engineering, computer science, naval architecture, marine engineering, and others. However, over the years we have observed that students continued to struggle with an early understanding of the forces and moments that impact how ROVs move through the water -- in other words, hydrodynamics. This lack of hydrodynamic understanding led them to design vehicles that were frustrating to drive because they were not hydrodynamically stable.



Our objective was to give students a high level understanding of basic hydrodynamics concepts (drag, stability, free body diagrams) such that their initial design choices are better informed. However, hydrodynamics is a complex and nuanced field of study, and teaching even high-level hydrodynamics concepts is challenging at best. A traditional lecture format teaching a formal introduction to hydrodynamics is not an option because our students do not yet have the background math and science knowledge necessary to understand the equations used in such an introduction. Using pure observation

to convey high level concepts through experiential learning is ideal, and we do this in our lab sections, but students need to have some conceptual preparation before they do their lab-based learning. We were moving to an active learning format in which students work in their teams the majority of the class meeting time, and we decided to take advantage of the small groups to create interactive lectures on hydrodynamics to prepare students for their labs on hydrodynamics.

The interactive lectures on hydrodynamics start with a scaffolded google slides presentation. Students make a copy of the presentation and share it with their teammates. The presentation uses pictures and diagrams to create a type of experiential learning in lieu of something like a recirculating water channel. The instructor presents the slides, but there are many “incomplete” sections. Each incomplete section is a time for the student teams to discuss a picture, a concept, or a linked video demonstration; come to a consensus on their interpretations of the concepts; or complete a quick example of each concept. A key component of the interactive lecture is that no “solution” slides are provided. The teams must work through the calculations or reflections to gain a complete set of slides. This forces all students to engage in the lecture. Answers are shared out in the larger group and the instructor guides the discussion of the answers so as to ensure a common understanding of the concepts.

Our initial assessment shows a marked improvement in student understanding of the relevant hydrodynamics concepts necessary to designing an underwater vehicle. Students are able to converse more knowledgeably on hydrodynamics, and the ROV designs are more thoughtful and reasoned with respect to hydrodynamics. We believe that this approach of interactive lectures with small groups will be beneficial to others needing to teach high level concepts to students who do not yet have the background knowledge required for a formal teaching.



## Ocean and Marine Engineering Division Officers 2019 - 2020



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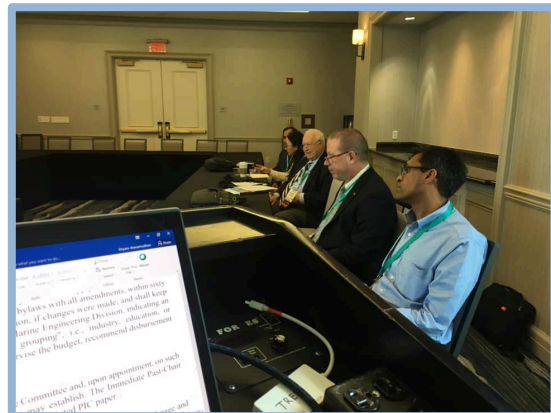
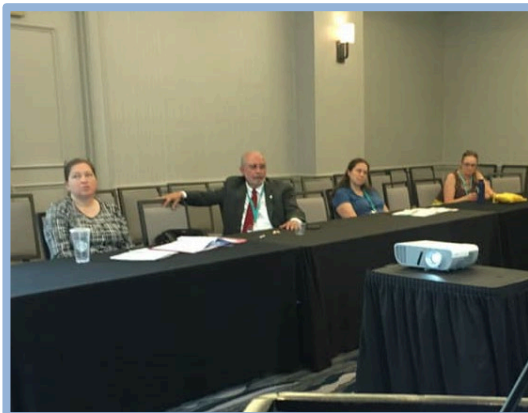


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## Ocean and Marine Engineering Division Officers 2019 - 2020



Ocean and Marine Engineering Division Officers in Tampa, Florida on ASEE 2019 National



Business meeting of Ocean and Marine Engineering Division held in June 2019 in Tampa, Florida on ASEE National