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**Message from the  
Chair of the Division**

*Vukica Jovanovic, Ph.D.,  
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It was so nice to meet you all virtually last year! We had a productive business meeting and made updates to our Bylaws. Last 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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Once again we are virtual! I hope that you continue to stay healthy and I am grateful that I will be able to “see” you at ASEE’s 2021 Virtual Conference. We have a great program for you! Thanks to the Cooperative and Experiential Education Division Program Chair, Dr. Huihui Qi, we will be co-hosting the **Distinguished Lecture: Innovation is Driving Business and Education Transformation by Dr. Stefan Jockusch, Vice President,**

**Philips.**

We have a **great panel session on Thursday, July 29**, starting at 11:30 a.m. PDT. I am very grateful to former Division Chair, Dr. Leigh McCue for her assistance assembling an esteemed panel. If you are interested in learning about ocean and marine engineering student competitions and how to incorporate them into your curriculum, please join us! We are co-hosting a **social** with the Energy Conversion and Conservation Division **on Wednesday, July 28 starting at 6:00 p.m. PDT**. Bring dinner, a drink, and have fun meeting new people!

Last but not least, please support our authors at **TWO technical sessions: Tuesday, July 27 starting at 11:30 a.m. PDT, and Thursday, July 29 starting at 8:00 a.m. PDT**. We are very grateful to all our authors for submitting a total of eight, high quality papers that the division expects and can be proud to share with the Engineering Education community. We are especially pleased to congratulate Dr. Maija Benitz whose paper has been awarded best PIC V paper. We will be planning ASEE 2022 during our **business meeting on Thursday, July 29** starting at 3:30 p.m. PDT so please come and share your ideas. Cheers! #ASEEAC

# Ocean and Marine Engineering Division

## Newsletter, July 2021

### Treasurer/Secretary's Report



ASEE membership revenue for OMED was \$168 for this past year, a slight decrease from \$185 the previous year.

Membership was fairly steady since the previous annual conference. Overall finances

have increased, however. The PIC chairs awarded OMED a \$500 grant to cover the panelists for the 2021 annual conference, so the balance of \$232.57 will be carried over to next year. A \$1 fee will soon be assessed for membership within the division.

### 2021 Interdivisional Town Hall Meeting

*Tues. July 27, 2021 3:30 PM to 5:00 PM PDT*

#### Session Description:

In 2004, the National Academy of Engineering published “The Engineer of 2020: Visions of Engineering in the New Century,” which urged the engineering profession to recognize what engineers can build for the future through not just technical jobs but also a wide range of leadership roles in industry, government, and academia. It’s now 2021. Where do we go from here? Join us as we explore positioning engineering education in preparing the next generation of engineers – the “Engineers of the 2030s.” The Town Hall Planning Committee has been engaged in a visioning process for systematically developing the “Engineers of the 2030s” framework, and has come up with the following eight discussion topics: Being stewards of the profession; Engineering a more just world; Engineering as meaningful and purposeful; Engineers as ethical authorities in a technological society; Engineers as mentors/instructors/coaches; Rethinking sustainability; The engineers of the 2030s versus the engineers of 2020; and The

ever evolving and multifaceted engineer. Additional details regarding these topics can be found in our abstract:

<https://tinyurl.com/2021ASEETownHall>.

This session will open with brief statements pertaining to the chosen topics and proceed directly to a set of hands-on, parallel breakout sessions for sharing suggestions and generating ideas designed to focus the discussions toward generating proposed lists of actionable items. Individuals identified during the Town Hall will be asked to apply their skills, knowledge, and expertise to these action items in crafting deliverables for guiding future efforts in support of the Engineers of the 2030s initiative. These deliverables will be shared with the ASEE membership and also provided to the National Academy of Engineering.

The Interdivisional Town Hall has been an exciting way for us to un-silo our communities and work together across the entire ASEE membership in advancing engineering education. Please join us this year to share your thoughts and ideas!

#### *Interdivisional Town Hall Meeting Planning Committee:*

Mahesh Aggarwal; Atsushi Akera  
Lynn Albers; Sharana Basaweshwara Asundi;  
Maureen Barcic; Jenna P. Carpenter; Alan Cheville; Jennifer Cole; Phil Cornwell; John K. Estell; Eliza Gallagher; Jamie R. Gurganus; Timothy Hinds; Susannah Howe; Amardeep Kaur; Alison Kerr; Rebecca Komarek; Micah Lande; Bala Maheswaran; Mehrube Mehrubeoglu; Beshoy Morkos; Shannon L. Isovitsch Parks; Sarah Ilkhanipour Rooney; Blake Stringer; Joe Tranquillo; and Denise A. Wetzel.

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### Our Sessions at ASEE 2021:

#### Microsoft Teams, Deep Learning, and Classroom Flipping Technical Session

*Tues. July 27, 2021 11:30 AM to 1:00 PM PDT*

*Moderated by*

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

#### *Papers Presented*

- Microsoft Teams Utilization for Group Function in Maritime-Focused Mechanical Design Capstone - Dr. Robert Kidd (State University of New York Maritime College)
- Deep Learning at a Distance: Remotely Working to Surveil Sharks - Grace Nolan (California Polytechnic State University, San Luis Obispo), Prof. Franz J. Kurfess (California Polytechnic State University, San Luis Obispo), Mr. Kathirvel A. Gounder, Damon Tan, Mr. Casey Daly (California Polytechnic State University, San Luis Obispo), and Caroline Skae (California Polytechnic State University, San Luis Obispo)
- How Classroom Flipping Affects Coast Guard License Students in Engineering - Dr. Paul M. Kump (SUNY Maritime College)
- An Undergraduate Course on Renewable Energy Systems with Enhanced Marine Energy Content - Dr. Radian Belu (Southern University and Agricultural & Mechanical College) and Dr. Alexandru Belu

#### Best Paper, Best Diversity Paper Technical Session

*Thurs. July 29, 2021 8:00 AM to 9:30 AM PDT*

*Moderated by*

Dr. Robert Kidd and Dr. Lynn A. Albers

#### *Papers Presented*

- Using a Serious Game to Teach Maritime Economics and Technology to Students from Mixed Backgrounds - Dr. Jeroen Pruyn (Delft University of Technology) and Dr. Edwin van Hassel (University of Antwerp)
- Teaching in the Era of COVID-19: A Reinvented Course Project for an Ocean Engineering Course - Dr. Maija A Benitz (Roger Williams University)
- Mentoring Prospective Engineering Students Through the After School Program “Girls in Engineering” Focused on Building an Underwater Remotely Operated Vehicle - Dr. Vukica Jovanovic (Old Dominion University), Ms. Deborah Marshall (Norfolk Public Schools Career & Technical Education Dept.), Mr. Jeff Warren Larson Jr., Mr. Abdul Rahman Badawi (Old Dominion University), Mr. Neil R. StClair (Old Dominion University), Dr. Otilia Popescu (Old Dominion University), Dr. Murat Kuzlu (Old Dominion University), Dr. Petros J. Katsioloudis (Old Dominion University), Dr. Linda Vahala (Old Dominion University), and Mr. Michael Anthony Crespo (Granby High School, Norfolk Public Schools).
- A Curriculum on Naval Science & Technology for a Midwestern University - Dr. James Buchholz (University of Iowa), Dr. Jae-Eun Russell (University of Iowa), Venanzio Cichella (University of Iowa), Prof. Casey Harwood (University of Iowa), Dr. Shaoping Xiao (University of Iowa), and Dr. Pablo M. Carrica (University of Iowa).

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### **DISTINGUISHED LECTURE: Innovation is Driving Business and Education Transformation**

**Thurs. July 29, 2021 1:45 PM to 3:15 PM PDT**

*Cooperative and Experiential Education Division, Engineering Design and Graphics Division, Manufacturing Division, Multidisciplinary Engineering Division, Energy Conversion and Conservation Division, Instrumentation Division, and Ocean and Marine Engineering Division*

**Speaker: Dr. Stefan Jockusch., Vice President, Services and Solutions, Philips**



Dr. Stefan Jockusch is the Vice President of Services and Solutions Innovation at Philips. He has been driving innovative business models for over two decades. His passion is to apply new technology to help customers transform their businesses. After a number of R&D and business leadership roles in manufacturing businesses based in Germany and the US, he entered the technical software industry and has been privileged to work with some of the world's most innovative companies, supporting them in their business transformation.

**Session Description:** Never before has the process of creating and making products undergone such a rapid transformation in such a short time span as we are witnessing now. One great revolution is the ability to create a complete “digital twin” of the products, manufacturing processes and factories, and the products in operation, which allows to model and test the entire lifecycle of products virtually. However, there is a widening skills gap that threatens to slow down digitalization. Employers struggle to find candidates with the right understanding across the many disciplines that need to be brought together, and are increasingly taking training into their own hands. Students find out their university degrees not only come at a paralyzing cost, but

also are not sufficient to prepare them for the needs of prospective employers. Education, or more generally, the acquisition and development of critical know-how and skills - is likely ready for a deep disruption. A new generation of software technologies might be the enabler of this disruption.

Moderated by: Dr. Katherine McConnell, Ms. Robin R Hammond, and Dr. Huihui Qi

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

**Thurs. July 29, 2021 3:30 PM to 5:00 PM PDT**

**OMED Best Paper Award, Best Paper PIC V**

#### **Dr. Maija Benitz**



Maija Benitz joined Roger Williams University in the fall of 2017, after teaching physics and mathematics in Washington State. She received her M.S. and PhD degrees in Mechanical Engineering from the University of Massachusetts, Amherst. She has a B.A. in Physics from Colorado College. Dr. Benitz's research focuses on simulating ocean hydrodynamics using computational fluid dynamics. Her doctoral research applied these methods to the platforms for offshore floating wind turbines. At Roger Williams, she teaches ENGR 110 – Engineering Graphics and Design, ENGR 115 – Computer Applications for Engineers, ENGR 340 – Sustainable Energy Systems. She serves as an advisor for the student group of the American Society of Mechanical Engineers.

#### **“Teaching in the Era of COVID-19: A Reinvented Course Project for an Ocean Engineering Course”**

Experiential, team-based course projects, with an emphasis on designing and building physical products, are increasingly being adopted across many engineering disciplines, including wide use in ocean engineering courses. COVID-19 presents new

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challenges to pedagogies that rely heavily on physical production and face-to-face teamwork. While collaborative, hands-on projects, such as designing and building ROVs, have many documented educational gains—deepening content understanding and improving motivation, to name a few—these once beneficial activities are currently infeasible. The complications brought on by the pandemic necessitate the creation of new course projects that heed social distancing guidelines, minimize touch, and accommodate remote learners, all while continuing to enhance student learning.

In the Fall of 2020, our small liberal arts university reopened its classrooms for in-person teaching and learning. While most students elected to return to the physical classroom, some chose to learn remotely, resulting in a large number of hybrid course offerings. The potential for a spike in COVID-19 cases in the campus community meant that courses could pivot to fully remote teaching and learning at any moment. In response to this new pedagogical framework, the semester-long course project for an upper-level ocean engineering course was reinvented. The project was inspired by Wired Magazine’s video series “5-Levels” in which experts explain a topic to a child, teenager, undergraduate, graduate student, and an expert in their field. This Fall, students worked individually to create a video series in which they explained a self-selected advanced topic in ocean engineering to three distinct audiences of their choosing.

The success of the new course project is assessed through analysis of students’ videos, reflection papers, peer evaluations, and course surveys. More specifically, the aim of this work is to explore the efficacy of the project in meeting a variety of learning outcomes, including enhancing 21st century skills in audiovisual communication, and deepening the students’ knowledge of ocean engineering concepts. Finally, this paper shares lessons learned and provides recommendations for future implementations of this course project.

### OMED Best Diversity Paper Award

*Dr. Vukica Jovanovic, et al. - “Mentoring Prospective Engineering Students Through the After School Program “Girls in Engineering” Focused on Building an Underwater Remotely Operated Vehicle”*



A number of studies by engineering education researchers have pointed out that all-female teams, rather than mixed teams, result in better forms of participation

and interaction in engineering related after-school programs and clubs. In particular, for after-school programs or clubs that form in response to a STEM competition, all-female teams have better chances of developing. One such competition, which will be discussed in this paper, is a regional Marine Advanced Technology Education (MATE) competition in which students from Blind\_Review High School have been participating for many years. For each year’s competition, an all-female team of students enrolled in the Career and Technical Education program at Granby High School, City, State build an underwater autonomous robotic vehicle, for which the robot specifications and competition rules are formulated each year by the MATE regional competition. Any team participating in the competition must have a mentor, and the students must be enrolled in courses within the engineering studies program. This paper will discuss the collaboration developed between the high school and college students, how the mentorship program was delivered, and how the program successfully helped future engineering students to establish their engineering and future STEM identities.

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### R344-Esteemed Panel on Ocean and Marine Engineering Student Competitions

*Thu. July 29, 2021 11:30 AM to 1:00 PM - Pacific Daylight Time*

The OMED is honored to present a panel of speakers representing both sponsors and teams participating in various maritime-related STEM competitions. Join us for an informal discussion on creation and participation in these types of outreach and capstone experiences, as panelists discuss their respective program(s) and the impact on student learning, retention, and recruitment.

Moderated by

Dr. Lynn A. Albers and Dr. Robert Kidd

Panelists:

**Dr. Leigh S McCue**, George Mason University. Leigh McCue is an Associate Professor and Interim Chair of George Mason University's Department of Mechanical Engineering. From June 2015-December 2018 she was the executive director of the American Society of Naval Engineers. Prior to that, from December of 2004 through May of 2015, she was an Assistant, then Associate Professor in Virginia Tech's Department of Aerospace and Ocean Engineering. Her research interests are in nonlinear and chaotic vessel dynamics and computational fluid dynamics. This work has been supported by ONR, NSF, NASA, the USCG, CSC, QinetiQ, and the Northeast Center for Occupational Safety and Health (NEC). Dr. McCue received her BSE degree in Mechanical and Aerospace Engineering in 2000 from Princeton University. She earned her graduate degrees from the University of Michigan in Aerospace Engineering (MSE 2001) and Naval Architecture and Marine Engineering (MSE 2002, PhD 2004). McCue is a past recipient of an NSF Faculty Early Career Development (CAREER) grant, an ONR Young Investigator Program (YIP) grant, and a Presidential Early Career Award for Scientists and Engineers (PECASE).

**Kelly Cooper, United States Navy**, Ms. Kelly B. Cooper began her career with the Department of Defense in 1996 when she joined the Naval Surface Warfare Center Carderock Division (NSWCCD). While at NSWCCD, she helped establish the Center for Innovation in Ship Design (CISD). CISD is a partnership between the Office of Naval Research (ONR) and Naval Sea Systems Command; it functions as the Navy hub for supporting the National Naval Responsibility for Naval Engineering, a dedicated effort to ensure the sustained national capability to develop innovative designs for Navy ships and submarines. She was the first Executive Director for CISD. Working with NSWCCD's Technical Advisory Board in 2000, Ms. Cooper developed and executed a Science and Engineering College Recruiting Program to meet workforce objectives at Carderock. Ms. Cooper is now a Program Officer at the Office of Naval Research, Sea Warfare & Weapons Department, where she specializes in modern ship design research, especially design generation, modeling, and simulation using computational techniques. Ms. Cooper also executes the National Naval Responsibility for Naval Engineering program at ONR, supporting basic research in ship design and engineering at major universities to benefit ship research objectives and increase the national research capacity. Parts of her responsibilities in this area include promotion of Science Technology Engineering and Mathematics (STEM) educational curricula and sponsorship of the SeaPerch Program, RoboBoat, the Maritime RobotX Challenge, and the Virtual RobotX Challenge. She has established operating Centers for Innovation in Naval Technologies (similar to CISD above) at four other Navy Research Facilities in support of multiple sponsors' requirements. She graduated from Florida Atlantic University (FAU) with a BS degree in Ocean Engineering. She has served as a member of the Undergraduate Academic Advisory Board for the Ocean Engineering Department of FAU, an External Advisory Board Member for the Aerospace Systems Design Laboratory at Georgia Tech, as well as several other advisory panels in maritime engineering, STEM education, and women in engineering.

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**Michael Briscoe**, American Society of Naval Engineers: Mike Briscoe is the Educator-in-Residence for the American Society of Naval Engineers (ASNE). He manages the FLEET program, which centers on a free naval engineering video game, and the Promoting Electric Propulsion program, a collegiate electric-powered boat building contest. Mike has worked with standards-aligned education initiatives for almost 20 years and has degrees from Mary Washington College, University of Virginia, and hopes to defend his Educational Psychology dissertation shortly at George Mason University.

**Mr. Daryl Davidson**, RoboNation, Inc: Daryl Davidson is the Executive Director of RoboNation, a 501c3 educational nonprofit previously known as the AUVSI Foundation. RoboNation focuses on providing hands-on robotic programs for students of all ages. The organization's tagline, "Build a Bot, Change the World," reflects the belief that STEM-oriented skill sets equip students to impact a wide range of global issues. RoboNation spun off from the Association for Unmanned Vehicle Systems International (AUVSI) and serves as a pathway for students into the robotics and unmanned systems industry. Daryl began with AUVSI in 1988 and has served in staff and elected positions. He was the executive director of AUVSI from 1996 – 2008. During Daryl's time as the Executive Director of AUVSI, the Association grew from a membership of 1,700 to more than 6,000, including significant international growth. Corporate members more than quadrupled and the organization launched a number of initiatives aimed at serving the entire global unmanned systems community. Daryl holds a Bachelor of Science in Journalism (Public Relations specialization) degree from Texas A&M University.

**Dr. Steve Russell**, ONR Sea Warfare and Weapons Department: Born and raised in McLean Virginia. 1984: BS in Nuclear Engineering - University of Virginia, 1986 MS in Mechanical/Aerospace Engineering- University of Virginia, 1997 PhD in Mechanical Engineering - Catholic University of America. 1987-1997: Naval Surface Warfare Center,

Carderock Division, Ship Acoustics Department. R&D Program Manager for hydroacoustic design and verification of hull features on Seawolf and Virginia class submarines. 1997-2006: Electromagnetic Signatures Department, Chief Scientist, surface ship topside EM signatures S&T programs. 2006-present: ONR Sea Warfare and Weapons Department, Program Officer, topside signatures S&T, small craft acoustic and magnetic signatures, submarine mast materials and antennas.

**Dr. Vukica M. Jovanovic**, Batten Endowed Fellow, Associate Professor, Old Dominion University. She is teaching classes in the areas of mechatronics, digital thread, and digital manufacturing. Her research is focused on mechatronics, digital manufacturing, digital thread, cyber-physical systems, broadening participation, and engineering education. She is a Director of Mechatronics and Digital Manufacturing Lab at ODU and a lead of Area of Specialization Mechatronics Systems Design. She currently leads the team of researchers working on a project funded by the U.S. The Department of Education focused on the cybersecurity pathways. She is also a Youth Program Director of ODU BLAST, a summer residential program funded by the Virginia Space Grant Consortium. She worked as a Visiting Researcher at Commonwealth Center for Advanced Manufacturing in Disputanta, VA on projects focusing on a digital thread and cyber security of manufacturing systems. She has funded research in broadening participation efforts of underrepresented students in STEM funded by the Office of Naval Research focusing on mechatronic pathways. She is part of the ONR project related to the additive manufacturing training of active military. She is also part of the research team that leads the summer camp to nine graders that focus on broadening participation of underrepresented students into STEM (ODU BLAST). She received her doctorate from Purdue Polytechnic, Purdue University, West Lafayette, Indiana, Magistar (Ph.D. Candidate) and dipl.ing (M.Eng) degrees in Industrial Engineering from University of Novi Sad, Serbia. She is also a Master Electrician for high power voltage systems (Technical School, Uzice, Serbia).

# Ocean and Marine Engineering Division

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## *Division Officers*

**2019-2021**



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