

## **Workshop: Democratizing and Demystifying Engineering for All - A workshop to help you bring e4usa to your campus**

### **Mr. Kevin Calabro, University of Maryland, College Park**

Kevin Calabro is Keystone Instructor and Director in the Clark School of Engineering at the University of Maryland and the Credit and Placement Lead for Engineering for US All (e4usa).

### **Dr. Stacy S Klein-Gardner, Vanderbilt University**

Dr. Stacy Klein-Gardner serves as an Adjunct Professor of Biomedical Engineering at Vanderbilt University. She is the co-PI and co-Director of the NSF-funded Engineering For Us All (e4usa) project. She is also the co-PI and co-Director of the Youth Engineering Solutions (YES) Middle School project focusing on engineering and computational thinking. Dr. Klein-Gardner is a Fellow of ASEE.

### **Dr. Susan E. Walden, University of Oklahoma**

Dr. Susan E. Walden is the Executive Director of Engineering Pathways at the Univ. of Oklahoma. She leads outreach, recruiting, first-year engineering, and several retention programs in the Gallogly College of Engineering.

### **Dr. Kenneth Reid, University of Indianapolis**

Kenneth Reid is the Associate Dean and Director of the R.B. Annis School of Engineering at the University of Indianapolis and an affiliate Associate Professor in Engineering Education at Virginia Tech. He is active in engineering within K-12, serving on the TSA Board of Directors for over 10 years. He has recently co-authored Introduction to Engineering among other texts.

### **Dr. Medha Dalal, Arizona State University**

Dr. Medha Dalal is an assistant research professor and associate director of scholarly initiatives in the Fulton Schools of Engineering at Arizona State University. She holds a PhD from Arizona State University in Learning, Literacies and Technologies with a focus on engineering education. Her research interests span three related areas: democratization of engineering education, ways of thinking, and faculty development.

### **Dr. Petronella A James, Morgan State University**

Dr. Petronella James is a teaching faculty in Engineering at Morgan State University and has experience in accreditation, and program assessment. Her research interests include broadening participation of underserved communities in STEM, equity and diversity, engineering ethics and program assessment solutions

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In this workshop, participants will be introduced to the research-based Engineering for US All (e4usa) curriculum, will learn how the e4usa curriculum has been modified and offered as undergraduate coursework at universities around the country, and will understand the benefits of offering an e4usa course at their institution. Workshop participants will have time to explore ways to bring an engineering literacy course derived from the e4usa curriculum to their home institution.

This workshop is designed for higher education administrators and faculty who offer or plan to begin offering first-year engineering coursework. High school engineering educators and administrators may also find this workshop of interest as it relates to developing a network of institutions offering coursework that is closely aligned with the high school e4usa curriculum. Lastly, influencers and changemakers frustrated with the status quo and who desire more diverse, equitable, and inclusive engineering degree programs and workforces will find this session of interest.

### **Background on e4usa**

Engineering for US All is leading the charge in opening up the world of engineering to a new generation of students and educators. As an NSF-funded high school engineering program, our core mission is to increase student and teacher access to engineering nationwide, with a focus on reaching populations that have been traditionally underrepresented in the field. With over 6,000 students to date, e4usa is making a significant impact on the future of engineering.

Our students explore the impact of engineering on society, build professional skills that will serve them well in their future careers, and engage in hands-on design experiences that focus on addressing real-world problems in their communities. These experiences are designed to help our students see themselves as engineers and to give them the confidence and skills they need to succeed in this exciting and rewarding field.

At e4usa, we believe that engineering has the power to shape a better future for us all. By breaking down barriers and empowering a new generation of engineers, we are creating a more diverse and inclusive industry that will lead to breakthrough innovations and solve some of the world's most pressing problems. We hope that you will join us on this journey and discover the power and impact of making engineering available for all.

### **Workshop Description**

This workshop is being offered for the first time at the 2023 First-Year Engineering Experience conference. The workshop is designed to be interactive and engaging for participants. We anticipate about half of the workshop duration will consist of the workshop facilitators presenting information and the other half will consist of workshop attendees asking questions, engaging in activities, reviewing sample curricular resources, discussing pressing issues in small groups, and thinking concretely about actions they can take at their own institution. The

workshop schedule shown below provides a rough outline for the topics to be discussed and the amount of time spent on each topic.

**Table 1. Workshop Schedule**

<b>Topic</b>	<b>Duration</b>
Workshop and workshop facilitator introductions	5 minutes
The need for engineering for us all (e4usa)	5 minutes
Exploring the e4usa curriculum <ul style="list-style-type: none"> <li>- Curriculum development</li> <li>- Learning outcomes and learning threads</li> <li>- MyDesign</li> <li>- Sample open-source lesson plans</li> </ul>	20 minutes
Sample e4usa university course offerings <ul style="list-style-type: none"> <li>- STS102/ASU194: Engineering for All at Arizona State University</li> <li>- ENGR110: Engineering For US All at Morgan State University</li> <li>- ENES192: Engineering for US All at the University of Maryland</li> <li>- ENGR1411: Pathways to Engineering Thinking at The University of Oklahoma</li> </ul>	20 minutes
Benefits of offering e4usa <ul style="list-style-type: none"> <li>- Engineering literacy</li> <li>- Student recruitment</li> <li>- High school student/teacher affirmation</li> <li>- High school credit and placement opportunities</li> </ul>	5 minutes
Making plans to bring e4usa to your campus <ul style="list-style-type: none"> <li>- Resources available</li> <li>- Barriers to implementation and tips for overcoming these</li> <li>- Next steps</li> </ul>	30 minutes
Concluding thoughts	5 minutes

It is our hope that workshop participants will feel empowered to make changes to the first-year engineering program offered on their campus at the conclusion of this workshop and that they will have the tools, resources, and network to support their efforts.