Academic Council Updates

during the limited time in an academic program. In this regard, it might be possible to cover more of systems engineering in a four-year undergraduate program than in a two-year graduate program. But perhaps systems engineering education and systems thinking should start even earlier! Could it be that the way we learn and teach math and the current path to engineering is actually filtering out children with impressive systems thinking ability and preventing them from becoming (systems) engineers?

Overall, it was an interactive and informative panel session that reflected the current state of systems engineering education, with valuable takeaways for systems engineering educators and practitioners. The increasing movement to non-deterministic systems is driving us to realize the importance of a broader systems engineering practice that is driven less by reacting to the systems of today and more by proactively embracing systems thinking and approaches across the engineering disciplines. It was evident that systems engineering is moving into mainstream engineering within universities, and that their presence is gaining prominence with stand-alone programs, minors, and curricular additions to other engineering programs.

The council is considering ideas for a follow-on panel to carry forward these discussions and explore topics such as systems engineering across boundaries and domains, thinking like a systems engineer, and success stories of systems-based approaches.

For more details about the ASEE Systems Engineering Division and to offer your comments and suggestions, please contact the Division Chair (Dr. Federica Robinson-Bryant, robinsof@erau.edu) or the Program Chain (Dr. Alejandro Salado, asalado@vt.edu).

Special Note: The Call For Papers for the 2019 ASEE Conference is open, inviting the systems engineering community to submit a paper.

The INCOSE Academic Council discusses and explores issues related to systems engineering in academia. Please consider joining if academic programs in systems engineering is an area of your work or interest. If you have questions or comments, please contact the Director for Academic Matters (Dr. Ariela Sofer, asofer@gmu.edu).

EWLSE Update

Tracee Gilbert, Alice Squires, and Dinesh Verma
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Empowering Women Leadership Forum: Embracing Systems Engineering Leadership Diversity

On July 7, 2018, over 40 engineers gathered at the International Council on Systems Engineering (INCOSE) International Symposium (IS) for a transformative leadership forum. Empowering Women as Leaders in Systems Engineering (EWLSE) and the Systems Engineering Research Center (SERC) co-sponsored the event to inspire and empower women as leaders in the engineering field. Featured were two keynote speakers, a panel, an interactive workshop, followed by a networking reception. Attendees gained insights into overcoming leadership obstacles, strategies for pursuing leadership, and how to create inclusive work environments.

Ms. Kristen Baldwin, Acting Deputy Assistant Secretary of Defense for Systems Engineering, kicked off the event with the "Department of Defense (DoD): Research & Engineering Leadership" keynote address. As the principal systems engineering advisor to the Secretary of Defense, Ms. Baldwin leads more than 50,000 acquisition professionals in the DoD Engineering and Production, Quality, and Manufacturing workforce. She gave an overview of the DoD Research and Engineering enterprise, which provides the technological foundation to ensure our military remains the most capable in the world. Ms. Baldwin also chronicled her journey, highlighted the demographics of women in defense, and provided key tenets that she followed to navigate her career.

Ms. Victoria Fox provided a second keynote address: "Flying High and Fast Towards the Next Generation of Leaders." As the Federal Aviation Administration's former Assistant Administrator, Ms. Cox led the transformation of the national airspace system with responsibility for the multi-billion-dollar NextGen portfolio. She opened with candid experiences, discussed in the context of what leadership is not. After an engaging discussion with attendees, she shared successes that stemmed from effective leadership practices.

After a networking break, Dr. Alice Squires, the Chair of EWLSE, moderated the Leadership Journey panel that included Ms. Baldwin, Ms. Cox, Mr. David Long, and Mr. Bill Parkins.

EWLSE Update

Mr. Long is currently the founder and president of ViTech, a leading systems engineering software environment. Mr. Parkins recently retired as the principal engineering manager of Rockwell Collins Australia, and is the current president of the Systems Engineering Society of Australia. The panel was transparent in sharing their leadership journey - the successes, failures, sacrifices, challenges with work-life balance and gender specific experiences. There was also a discussion on how to increase the percentage of women in leadership roles.

The forum concluded with an interactive workshop: "Embracing Systems Engineering Leadership Diversity: Ally Skills Outcomes." Facilitated by Dr. Sherry Smarts, CEO of S*Marts Consulting LLC., the first half of the workshop began by providing the attendees an understanding of diversity and inclusion and its importance to organizations. The group defined diversity beyond the traditional view (e.g., gender, race, and age), and characterized it as a broad set of experiences, backgrounds, and ideas, which ultimately provide different ways of seeing the world. Inclusion was defined as having one's voice heard, being treated fairly and equitably with equal access to opportunity and resources, and welcoming differences. The primary need for increasing diversity and inclusion in the organization was to have greater diversity of thought, and to make better decisions for the organization as a whole.

In the second half of the workshop, small group discussions were used to openly discuss personal issues, identify ally skills that are needed to support colleagues in the workplace, and apply the lessons learned from the workshop. The focus of the scenarios was on recognizing a situation when someone was being mistreated (both consciously and unconsciously), and how allies can respond to behavior, ask clarifying questions, and become active bystanders.

Participants shared their top takeaways from the workshop, including the examples below:

- Celia Tseng: "Raising the number of women in engineering may require sacrifice and courage, like speaking up and advocating for each other." "Real innovation requires diversity."

- Ellie Gianni: "The messages conveyed are useful for ALL professionals - empowering professionals as leaders in systems engineering."

- Dorothy McKinney: "Those who have risen in their professions have done so by facing and overcoming their own and others' limiting beliefs and prejudicial actions - to develop and strengthen skills which were useful in many other ways in their careers." "There is huge power in example — successful women often have used the success of other women before them to support their own convictions that they can rise high in their career."

- Renee Steinwand: "My key takeaway was a definite excitement and enthusiasm from the panel discussion regarding the systems engineering profession and how government and industry are embracing the need for systems engineering throughout acquisition and product lifecycle."

- Jennifer Nelson: "One of the most valuable things I heard for professional and personal life is 'unspoken expectations are premeditated resentment,' and to consider the impact of microaggression."

What Can You Learn About Systems Engineering by Building a Lego™ Car?
Heidi Ann Hahn, hahn@lanl.gov

Los Alamos National Laboratory's (LANL's) Future Female Leaders in Engineering (FFLIE) Program brings female engineering undergraduate students to the Laboratory for summer internships, which include a technical work assignment and a specialized eight-week long professional development program. During their first year in the program, FFLIE students receive training on LANL's Mission Assurance (MA) Program, which involves the integrated application of systems engineering (SE), project management (PM), and engineering quality and rigor (QA) to ensure mission success. The instruction is organized around the system development project life cycle and emphasizes activities and artifacts associated with the various life cycle phases. A home improvement project (adapted from Braakhuis, Janssen, Koudenburg, de Liefde, Malotaux, Rens, and Stevenson, 2010) is used in a series of table-top exercises throughout to illustrate various points. The training culminates with a project – building a car for a Lego™ Derby race – on which the students exercise the skills they have just learned in the classroom instruction.

In her presentation on this topic at IS2018, Heidi briefly reviewed the instructional content, with an emphasis on the activities and artifacts exercised in the Derby project; provided lessons learned; and concluded that there's a lot one can learn about systems engineering by building a Lego™ Derby car if the experience is properly structured! As there was a great deal of interest among audience members, the instructional materials have now been reviewed by LANL management and approved for public release. Send Heidi an email (hahn@lanl.gov) if you would like to receive a copy.

Following the successful events at the INCOSE IS 2018, EWLSE continues their mission by inviting abstracts for a dedicated *Diversity in Systems Engineering* themed *INSIGHT* volume in 2019. Also, EWLSE invites systems engineers to consider submitting a letter written to their younger self for an upcoming INCOSE EWLSE book entitled: "Letters To My Younger Self: How Systems Engineering Changed My Life." For more information about EWLSE and up and coming news and events, please visit: https://www.incose.org/incose-member-resources/ewlse/about-ewlse