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Brian J. Novoselich

United States Military Academy, brian.novoselich@westpoint.edu

Jakob C. Bruhl

United States Military Academy, jakob.bruhl@westpoint.edu

Matthew Scheidt

Purdue University

Christina Willis

University of Utah

Michael Scott Sheppard

Arizona States University

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ASEE Support to Student Veterans: Results of a 2018 ASEE Leadership Roundtable

Lt. Col. Brian J. Novoselich, U.S. Military Academy

Brian Novoselich is an active duty Army Lieutenant Colonel currently serving as an Assistant Professor in the Department of Civil and Mechanical Engineering at the United States Military Academy (West Point). He earned his Ph.D. in Engineering Education at Virginia Tech in 2016. He holds Master's and Bachelor's degrees in mechanical engineering from The University of Texas at Austin and West Point respectively. His research interests include capstone design teaching and assessment, undergraduate engineering student leadership development, and social network analysis. He is also a licensed professional engineer in the Commonwealth of Virginia.

Lt. Col. Jakob C. Bruhl, U.S. Military Academy

Lieutenant Colonel Jakob Bruhl is an Assistant Professor in the Department of Civil and Mechanical Engineering at the United States Military Academy, West Point, NY. He received his B.S. from Rose-Hulman Institute of Technology, M.S. Degrees from the University of Missouri at Rolla and the University of Illinois at Urbana/Champaign, and Ph.D. from Purdue University. He is a registered Professional Engineer in Missouri. His research interests include resilient infrastructure, protective structures, and engineering education.

Mr. Matthew Scheidt, Purdue University-Main Campus, West Lafayette (College of Engineering)

Matthew Scheidt is a Ph.D. student in Engineering Education at Purdue University. He graduated from Purdue University with a B.S. in Mechanical Engineering, The Ohio State University with a M.S. in Mechanical Engineering with a focus in Ultrasonic Additive Manufacturing. Matt is currently part of Dr. Allison Godwin's STRIDE (Shaping Transformative Research on Identity and Diversity in Engineering) research group at Purdue. His research interest focuses on supporting military veterans within post-secondary education.

Ms. Christina Nicole Willis, University of Utah

Christina Willis is a Ph.D. Candidate in the Chemical Engineering Department of the University of Utah. She received a B.S. in Chemistry from Utah State University and an M.S. in Chemical Engineering from the University of Utah. Her current research is focused on the development and improvement of electrochemical sensors for disease diagnosis by breath. Her interest in support for diversity and special interest groups inspired her collaboration on this project.

Mr. Michael Scott Sheppard Jr., Arizona State University

Michael Scott Sheppard is a graduate research associate pursuing a Master of Science degree in Engineering and a Ph.D. in Engineering Education Systems and Design at Arizona State University. He received a Bachelor of Science in Biomedical Science degree from Lynchburg College in 2002, after which he served in the military for six years as a Special Amphibious Reconnaissance Corpsman (SARC) at the 2nd Force Reconnaissance Company. Following military service, Michael obtained a Bachelor of Science in Engineering degree from Arizona State University, graduating in 2013. His research and service interests include veterans in engineering, veterans with service-connected disability, post-traumatic stress disorder (PTSD), and human sex trafficking.

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Abstract

As industry demands for qualified science, technology, engineering, and mathematics (STEM) workers continue to increase, supporting diverse groups of students towards success in STEM may help mitigate future shortfalls in the STEM workforce. Education benefits like the post 9/11 GI Bill may provide a viable pathway for increasing the STEM-qualified, engineering technician, engineering technologist, and engineer (ETETE) workforce through the nation's veteran population. Supporting student veterans along ETETE pathways may involve three key tasks: 1) building early awareness of ETETE pathways; 2) ensuring academic recognition for prior military work experience; and 3) providing seamless support from government agencies, academic institutions, and industry. Student veterans follow non-traditional education pathways and bring with them a wealth of diverse life experiences. Correspondingly, the growing number of veterans pursuing STEM degrees, and the diversity of this underserved group of students continues to gain the attention of faculty, administrators, and national organizations. To bolster ASEE's support for many diverse groups to include student veterans in ETETE pathways, the ASEE president commissioned a series of leadership roundtables during the 2018 ASEE National Conference and Exposition. There, roundtables were tasked with making recommendations regarding how ASEE can support engineering education, relevant diversity research, and engagement of these diverse communities in society activities.

The purpose of this paper is to report the results of the 2018 ASEE Student Veteran Leadership roundtable. This roundtable brought together a diverse group of veterans, engineering educators, and engineering student veteran researchers. Through a series of ideation exercises and discussions, the group examined the challenges student veterans traditionally face, on-going support initiatives at their home institutions, and recommended actions for ASEE to pursue in the years ahead. The topics discussed during the panel are related to previous research about the challenges faced by veteran students beyond ETETE career paths. A series of novel initiatives are presented that may assist ASEE and university administrators more broadly in adopting a fresh approach to veteran student support.

Introduction

The number of veterans attending colleges and universities is rising, largely due to the Post 9/11 GI Bill [1]. These veterans bring unique experiences from the military with them into the classroom and industry. Many of those experiences prepare veterans to excel in communication and teamwork, skills valued in engineering [2]. Additionally, veterans, as non-traditional students, bring different experiences to the classroom than those of their traditional student counterparts [3]. Those experiences can provide them with additional knowledge of contemporary issues and help them "to understand the impact of engineering solutions in a global, economic, environmental, and societal context" [2]. Communication skills, teamwork, and a practical knowledge of how engineering can be applied make veterans assets to the engineering profession [2]. Therefore, learning how to support the recruitment, retention, and

graduation of student veterans in engineering is a pressing interest in the engineering education community.

Literature Review

Over the past decade, there has been a notable increase in veterans attending college and utilizing the Post 9-11 GI Bill [4]. Following the inception of the Post 9-11 GI Bill in 2009, hundreds of thousands of veterans and dependents of veterans were using this source of academic funding, and attendance is continuing to rise [5]. Not only has there been an increase in student veterans in general, there has also been an increase in combat action veterans [6] and student veterans with service-connected disabilities. These disabilities include invisible disabilities, such as Post Traumatic Stress Disorder (PTSD) and Traumatic Brain Injury (TBI) [7], [8]. Of student veterans attending post-secondary institutions, almost a third of them (31.3%) are pursuing degrees in science and engineering [9]. This massive influx of student veterans signals to institutions that they must be ready to provide support for their student veterans [10]. This diverse group of student veterans may face unique challenges, but they also bring with them distinctive skills [11]. Institutions seeking to recruit and retain these students must understand the challenges they face and provide them with the requisite support to allow them to thrive.

For student veterans, the transition from military service to undergraduate student can be fraught with challenges that students without military service do not face [8]. Prior literature has shown that the transition from a military culture to a student culture is difficult [3], [12]. In understanding this transition, we must also attempt to understand the experiences and motivations of these student veterans. A better understanding of student veteran motivations and the transitional experience may lead to greater persistence [13]. The challenges in transition that are prevalent for student veterans may stem from combat experience [6], physical or invisible service-connected disabilities [7], [14]–[16], or a loss of support or belonging [17]. There are inherent challenges in this transition, but some students, whether active duty, active reservists, inactive reservists, or national guard may face additional challenges if they are required to deploy and later re-enroll into their programs of choice [18].

Due to this increase in student veterans in undergraduate engineering and the challenges they may face in transition, there is work that must be done to investigate the support they may require throughout their journey to becoming engineers [19]. The American Society of Engineering Education (ASEE) has resources to assist these engineering students in their transition from their military service to academia; however, institutional support is also necessary. Engineering education scholars have proposed solutions designed to assist in this transition through technology, like the Experiential Learning for Veterans in Assistive Technology and Engineering (ELeVATE) program [20], while others have sought to better understand these students in order to inform institutions of holistic approaches to supporting student veterans in transition [21]. Aside from individual institution transitional support programs, veteran centers offer support like readjustment counseling, outreach, and referral sources [22]. Student veterans have many experientially learned skills from the military [11], and it is important that they are offered an appropriate level of support from institutions so they may continue to bring the value of their military experiences to undergraduate engineering.

Student veterans may require more support than traditional students as they enter into college [8], [14], [15], [23], but they also have skills and experiences in problem-solving that make them well-suited as engineering students and professionals. As *Adult Learners* [24], student veterans differentiate themselves from traditional students in that the majority are “self-driven, have valuable experience, are actively engaged in learning and knowledge, and are task motivated” [25]. Student veterans have substantial training and experiences that 99% of United States citizens have never encountered, allowing them the opportunity to develop unique skill-sets, methods of process thinking, and problem-solving techniques [26]. Moreover, their military experiences and lessons learned may make them better-matched to succeed in engineering programs than traditional students [27]. Prior literature has found that there are many skills and proficiencies learned in the military that apply to later success in civilian life including communication, leadership, the ability to work in teams, and a persistent motivation to succeed [11], [28]. These students also exhibit a great tenacity for success and unique perspective about the world around them [29]. Because of the assets that student veterans bring to engineering and the challenges they face, a collaborative Military Veterans roundtable event was organized to better understand how ASEE can assist student veterans as they transition into and through engineering programs.

At the request of the ASEE president, Dr. Bevlee Watford, the ASEE staff were tasked with developing a series of ASEE leadership diversity roundtables as a part of the 2018 ASEE national convention. These diversity roundtables took place during the 2018 ASEE Annual Convention and Exposition held in Salt Lake City, Utah in June 2018. The purpose of these diversity roundtables was to facilitate open dialogue and conversation, allowing participants to discuss how ASEE can support engineering education, relevant diversity research, and engagement of various groups in society activities. A total of six diversity roundtables were assembled to address these issues among the LGBTQIA+, 1st Generation/SES, Persons with Disabilities, Military Veterans, Non-Tenure Track Faculty, and Graduate Students special interest groups. This paper specifically addresses the results of the Military Veterans roundtable.

Methods

A group of individuals with interest in veteran affairs gathered at the 2018 ASEE Veteran Leadership roundtable. Recruitment to the roundtable was done largely by word of mouth but was initiated by ASEE, who published the event in the conference schedule. During the conference, the session was discussed among the executive committee of the Military Engineering and Veterans Division and the annual “Meet the Divisions” mixer event where all ASEE divisions provide representatives to explain their role within the larger ASEE organization. In print, the event was publicized through the newsletter of the Military Engineering and Veterans Division as well as in several posters. From these, word continued to spread verbally, including through talks at technical sessions and recruitment of note takers. In one case, a non-military associated graduate student was specifically recruited for note taking by the hosting university (the University of Utah, Salt Lake City UT).

The eleven roundtable attendees self-organized into two different tables. The meeting began with introductions, including each person’s background and connection to the military. An aggregated summary of the attendees is presented in Table 1.

Table 1: Summary of Leadership Session Attendees

Demographic		# of Attendees
Professional Background	Professors	7
	Industry/Practicing Engineer	1
	Students	3
Active / retired military service	Army	5
	Navy	3
University Size	Small (<5,000)	2
	Medium (5,000 – 15,000)	0
	Large (>15,000)	8
Gender	Men	7
	Women	4

After introductions, a short review of previous research pertaining to challenges veterans face in higher education was presented. The top five challenges identified were differences in age, financial resources, balancing work and education, familial responsibilities, and the availability of veteran resources on campuses. In their small groups, the attendees were asked to participate in several problem framing exercises, including affinity mapping of current issues and a collection of proposed solutions. The affinity mapping [30] of current issues served as a primer to begin thinking about veteran issues and areas where ASEE can add support. After the affinity mapping exercise, a brain-writing [30] exercise was conducted, followed by a group discussion. In attendance during the sessions were a total of four session “scribes” that took detailed notes to capture the conversation that occurred during the session. Three of those four people are co-authors of this paper.

Centering the participants on veteran engineering education

The workshop attendees, including the authors, participated in a modified affinity mapping exercise as a centering tool for veteran engineering education. As part of this effort, we co-constructed different ideas, policies, and concerns surrounding student veteran engineer (SVE) experiences. The attendees self-organized into two tables. They were asked to “identify and discuss common challenges veteran and military students face” to address the following questions:

- How can ASEE build early awareness of engineering technology, engineering technologist, and engineering pathways?
- How can ASEE ensure academic recognition for prior military work experience?

- How can ASEE provide seamless support from government agencies, academic institutions, and industry?

Each participant silently reflected and wrote their ideas as they related to the prompts on sticky notes. At the end of the session, the session leaders reorganized the notes into initiative categories, as applicable. As is true with many of these activities, the ideas and their subsequent conversation diverged outside of the prompts. After discussing challenges that SVEs may face, the participants were asked to “identify and discuss programs or activities on your campuses that have been helpful or failed veteran students.” The results section below discusses emergent themes identified by one of the authors who analyzed both the affinity maps and the corresponding notes from the session. All authors, as participants in the panel, conducted member checking [31][32] of the results to add validity to the work. General discussion topics during the exercise were grouped as follows.

Academic Recognition. Military education and experience being not properly recognized in academia was a concern that was brought up by multiple participants. More specifically, the participants noted that there are inconsistencies in what credits transfer from military experience into an engineering curriculum. A couple of the assets that were brought up during the session included, “vet populations are diverse and understand diversity,” and that student veterans are “very task-oriented compared to peers.”

Funding. Another concern for SVEs surrounds funding. Some of the participants brought up the “lack of transparent alternate funding,” and “only 36 months of funding (initially)”. One participant brought up “GI Bill Logistics” as a barrier to academic success for SVEs. This comment sits in juxtaposition with the comments noting VA representatives residing on-site at institutions provide “educational assistance and support,” and help student veterans navigate educational benefits, such as the Montgomery GI Bill, and Post-9/11 GI Bill.

Academic Preparedness. How prepared are our SVEs for engineering programs? There were several questions and comments related to this theme. More specifically, are SVEs ready for the math that is required for engineering? One person within the session quoted a student veteran as saying, “proficiency in math is a perishable commodity.” More broadly, one session participant claimed that some SVEs “have forgotten how to study; do homework.” Another participant noted that SVEs might have different expectations for their college experiences than what they actually experience, including reduction or loss in structure and support as they transition from a military career into an academic setting.

Veteran Resource Centers. Veteran resource centers (VRCs) can provide tremendous support for our SVEs. One participant described their school’s center as a “strong veteran resource center, led by a retired officer and staffed by veteran students.” Another participant introduced Arizona State University’s Tillman Center as a model for VRCs, noting that the level of support that the Tillman Center provides is not available on other campuses. VRCs were noted as serving their veterans through such services as assistance with vocational rehab, mock interviews, company visits, resume training, reviews, and job placement. They were described as veteran spaces that can be open to the public as well as spaces that have access restricted to only student veterans. They can be used as places of contact with the larger institution, engaging veterans in

military days at NCAA sporting events, inclusive Veteran's Day activities, and even as places for group meetings such as a "Veteran book club."

Although these spaces and services are available on many campuses, one participant stated that not all services are utilized, and that in some cases, student veteran groups on small campuses can have low participation. One participant noted that "some veterans want to 'appear' to be traditional students and fit in with them rather than be seen as veterans". Another participant noted that SVEs could be reconciling military identity with their engineering identity. One participant stated that asking veterans to self-identify to ensure their connection with resources may be problematic.

Belonging. A sense of belonging, feeling different than other students, and social inclusion were listed as challenges student veterans may face. Many different explanations were offered, including: 1) "mismatch in experiences, vets coming off active duty have experienced a different world from those coming from high school"; 2) student veterans being "more worldly than most of their peers"; 3) many veterans come to college with families and significant responsibilities; 4) student veterans have challenges with managing their time and ensuring that they can meet their class schedule; 5) veterans struggle in developing trust and good communications with traditional students, one possible reason being that the military encourages forceful and direct communication that may not be valued in some circumstances; 6) student veterans are generally older than other students, but age was also listed "as an advantage, not a challenge". One participant noted that these challenges are common for all non-traditional students, not just military veterans. Many participants noted something that can separate veterans from their non-traditional student peers is the possibility of challenges due to a service-connected disability. Another participant noted that some student veterans are also reservists, requiring them to "drill" one weekend per month and two weeks a year.

Initiatives to support SVEs. Several initiatives to support SVEs were provided by many of the workshop participants, some of them institutionally specific. Those include accelerated admissions for veterans and active duty military; early registration; a Summer workshop for re-enlisting marines and families; and tuition discounts for married students.

Discussion of Affinity Mapping Results

Many of the themes that came from the affinity mapping exercise have been previously explored and are well documented in the literature. However, many programmatic changes have occurred in the intervening years that may have changed the landscape. One of the major changes is how veterans exit the military. Under President Obama, the Transition Assistance Program (TAP) was updated as part of the Veterans Opportunity to Work Act of 2011 [33]. The old program was primarily focused on retirees, while the new program allows for deep exploration into one of three post-military tracks: education, employment, and entrepreneurship. These tracks allow for veterans exiting the military to learn more about a specific transition option than the previous version of TAP. Additionally, the Post 9/11 G.I. Bill and its subsequent changes have made education more accessible and affordable for veterans. Benefits cover greater than eight semesters a full four years of education (36 months) with an option to apply for an additional 12 months of benefits [34]. The funding covers tuition (up to the highest cost of in-state tuition for

each state) and fees. It also provides a book stipend each semester, and a tax-free monthly stipend equivalent to a mid-grade enlisted person's housing allowance. To further attract and support users of the G.I. Bill, many schools have offered a "yellow ribbon program," which supplements the VA's payments. The funding covered through the Post 9/11 G.I. Bill was not understood by many of our participants. These changes to veteran preparedness and educational benefits have potentially shifted the landscape of student veteran experiences within engineering.

When a service member attends the education track within TAP, they learn about VA funding and the college application program. Although this program helps the service member prepare for life on campus, it does not specifically prepare a veteran for their intended major. Student veterans can arrive on campus unprepared for the math classes they typically take as first-year college students [21]. This concern was echoed within the affinity mapping exercise. Although those entering the military are academically similar to those entering college [35]–[37], the time away from school and the introductory subjects most students take may leave veterans at a disadvantage. This disadvantage could be mitigated through tutoring or other resources available through VRCs.

With changes to TAP for exiting service members, as well as the presence of VRCs, students may be more supported than ever to begin collegiate studies. The education track also teaches veterans about their joint service transcript (JST), which is a transcript listing all of the training, coursework, and professional skills a service member has accumulated through the military. This transcript can be used to justify transfer credit even in engineering [38], although not all colleges recognize these transcripts and give credit for the experiences of student veterans. Potentially, work can be done to better align the JST entries with jargon recognized at major engineering colleges, but educating the engineering education community about these transcripts and what is contained in them may help connect student veteran experiences with academic credit, addressing academic recognition concerns.

Tied within much of the above discussion is the theme of VRCs. These are campus-sponsored programs and spaces on campuses dedicated for helping student veterans navigate VA educational benefits as well as provide other services. The participants within the affinity mapping exercise mentioned VRCs many times. They discussed specific centers and the programs they offered as incredibly valuable in integrating service members into the university. Other participants discussed how the centers are not well used and that some student veterans avoid the centers and their programs in an attempt to fit in as a traditional student. This tension within identities was discussed by one of our participants and could be one of the reasons that some student veterans feel a lack of belonging on their campuses and in their programs. More work within the overall veteran community as well as the engineering education community may be needed to understand this concern fully.

Recommendations for ASEE support to veterans

The ultimate purpose of the roundtable was to identify ways that ASEE could support veteran engineering education, relevant veteran diversity research, and engagement within the veteran community. With discussion from the affinity mapping exercise fresh in mind, a brain writing exercise was used to develop actionable ideas.

Each attendee was given a brain writing 6-3-5 worksheet [30] with the following prompt: “How can ASEE support 1) engineering education, 2) relevant diversity research, and 3) engagement of this community in society activities?” They were asked to write a proposed solution for each of the three areas in the first row. The papers were then passed clockwise around each table, with each subsequent person adding to the idea given in the first row until all people at the table had contributed to each worksheet. Each rotation lasted five minutes. The resulting ideas were discussed aloud with the whole group. Results from this discussion were analyzed by one of the authors to identify themes and trends which are summarized below.

Supporting veteran engineering education

- ***Engage with ABET about transfer credits.*** Several participants developed suggestions that ASEE facilitate discussions with ABET concerning transfer credits from military training. One specific idea about how this could be accomplished is the development of a “roadmap” from military service to an engineering degree that ASEE could publish and make available through their website, TAP, and VRCs.
- ***Develop academic resources for veterans to prepare prior to arrival on campus (math, chemistry, physics, intro to engineering, etc.).*** Much discussion centered around ASEE taking an active role in preparing veteran students for a successful transition to academia. Because many veterans have not taken traditional academic courses during their military service, reviewing foundational topics prior to beginning an undergraduate education may improve their chances for success. At a minimum, such review activities may improve their confidence as they begin taking college courses. These may include traditional, in-residence, review courses or could be delivered through online platforms.
- ***Advocate for veteran faculty hires.*** Several participants suggested that support to veterans on campus could improve if there were a larger number of veterans on the faculty. The creation of the Military Engineering and Veterans Affairs Division of ASEE in 2015 provides one mechanism for veteran faculty advocacy.

Support relevant veteran diversity research

- ***Support research focused on mentoring and role models (not just focused on negative issues associated with veterans).*** The group talked much about the positive attributes that veterans bring to the college campus. Because of their military experience, they are well suited to serve as mentors and role models for other students, not just other student veterans. ASEE could encourage new research into these positive attributes of veterans through the annual conference call for papers. Much of the existing literature focuses on overcoming negative issues with veterans, or a deficit model for student veterans. Contributing to the literature about these positive elements is important in changing the conversation regarding the student veteran population.
- ***Address gaps in understanding about veterans.*** There are several areas that participants noted which are not well understood and could benefit from additional focused research.

One such area was to quantify how well veterans perform in engineering programs: specifically, how many finish the program and what are the reasons for those who do not? Another area of interest to several participants was to address why some veterans choose to not disclose their veteran status. Answers to these questions will help inform the development of more useful programs to support SVEs.

- ***Create a high-level database of veteran-focused research.*** All participants agreed that it would be helpful if there was a central clearinghouse where veteran-focused research could reside. Partnering with other professional societies, ASEE could help spearhead this effort. A database would assist VRCs in developing research-based solutions for their veteran populations without having to unknowingly duplicate research efforts. There are already many papers in the ASEE conference proceedings grouped in the Military and Veteran Division on peer.asee.org.

Support engagement within the veteran community

- ***Support veteran participation in ASEE.*** Several ideas for encouraging broader participation in ASEE, specifically the annual conference, were discussed. Specifically, it was suggested that ASEE offer incentives to SVEs for attending, perhaps by reducing registration costs. Another idea was to award the best paper written by veterans; not necessarily the best paper about veteran issues.
- ***Host veteran social/service events that also involve non-veterans.*** One idea that gained much support during the discussion was creating events that bring veterans and non-veterans together. Rather than planning a mixer, it was emphasized that these events be focused on community service because this provides an opportunity for these two populations to work together to achieve something purposeful.
- ***Have an ASEE presence within service member transition programs (e.g., SEP/TAP).*** All service members attend a transition program prior to exiting the military. These programs are often supported by colleges and universities near military installations. Several participants suggested that ASEE could provide support to these programs specifically to help military members better understand what engineering opportunities exist and how to succeed as students in engineering programs. Because these transition programs are conducted regularly across all military installations, having physical participation by ASEE is likely not realistic; more reasonable could be for ASEE to develop literature that can be provided to separating service members participating in these programs.
- ***Explicitly highlight veteran-focused efforts/initiatives at ASEE national events.*** During the annual conference plenary sessions, ASEE leaders highlight success across ASEE with awards, recognition, and presentations. Seeking to highlight recent veteran-focused initiatives being advanced within ASEE could help make the broader membership more aware of this important population. Perhaps acknowledging the rapid growth and participation in the Military and Veterans Division at the next ASEE annual conference would be appropriate.

Conclusion

The Military Veterans Roundtable that occurred during the 2018 ASEE Annual Conference in Salt Lake City, Utah, brought together participants from a variety of backgrounds to discuss student veteran issues and ideas that may better serve those veterans desiring to pursue engineering. The discussion was focused and facilitated through individual and small group exercises (affinity mapping and brain writing exercise) and refined through large group discussion. The outcome of this roundtable included several specific ideas that ASEE leadership and members can consider for implementation at local and national levels. To facilitate change, it is important that the discussion from the roundtable not stay only in the minds of the participants; this paper serves to share the output with a broad population. Through the support efforts described, ASEE can work better with veterans, and veterans can work better with ASEE, fostering an environment where ASEE contributes to the support of student veterans in engineering, and veterans engage with ASEE to grow and better engineering education.

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