# Lowcountry Graduate Center

# Advanced Manufacturing Advisory Board

# Meeting Minutes

Date of Meeting: March 9, 2020

1. **Call to order**  
   Dr. Nancy Muller opened the meeting shortly after 4:30 PM in conference room 148 at the Lowcountry Graduate Center.
2. **Self-Introductions   
   Those in attendance were:**  
   Nancy Muller – Lowcountry Graduate Center  
   Cindy Bezanson – Boeing

Brian Kuney - SCMEP  
Paul Gibson – Blackbaud  
Jim Thompson – Concentric (Zoomed In)

David Greenburg – Program Director, Project Management, The Citadel

Ron Welch – Dean, School of Engineering, The Citadel

Muller welcomed Cindy Bezanson, IT site manager for BoeingSC, replacing Garth Cook who is working on a new global education plan for employees. She thanked Dean Welch for agreeing to give an update of recent program expansions, enrollment, and outlook for the School of Engineering, both undergraduate and graduate.

1. **Presentations & Discussions**

Welch opened by noting that for each of the last six years, The Citadel has been recognized among “Best Colleges” by *U.S. News & World Report* for its undergraduate engineering. Nationally, it is ranked 21st among public institutions. The Citadel was first in the state to become ABET accredited and gave assistance to Clemson to help it achieve the same. Beginning with a BS in both civil and electrical engineering, the School today offers 5 different undergraduate degrees, 4 master of science programs in engineering, and 13 graduate certificates. The College is rapidly moving to offer all graduate programs both F2F and online. All undergraduate classes are already being recorded, with lecture-capture, for content review by students. He noted that students who try to take all classes online often suffer by not staying current. Half of all students, he believes, need the F2F for engagement and optimal learning outcomes.

Every graduate program, including certificates, must have a minimum cohort size of 10 in any single course for The Citadel’s fixed and variable costs to be covered. The structure is the same for all master’s degrees and undergraduate engineering programs, with 6 core courses required plus 4 elective courses which may be selected from any graduate school at The Citadel or transferred from another accredited school of engineering. This provides both elasticity and the ability to accommodate interdisciplinary interests. It facilitates timely completion of the program, as not all graduate courses are taught every semester. It also helps achieve the business model’s financial requirements for sustainability. Students learn broadly about engineering principles, allowing them the knowledge base to move across sectors and even into new fields. Any Citadel student can take courses year 4 and 5 at the College of Charleston, such as environmental science or physics or homeland security, to complete a double undergraduate degree. (The dual registration is already being done in foreign languages. )

Welch is proud of the fact that all faculty are allowed to consult up to 8 hours per week. However, a faculty member teaching mechanical engineering to undergraduates, for example, is expected to teach both day and evening classes. ABET requires coverage of all accredited courses and programs to have a faculty roster that is “two deep” so that students are never caught without instruction if a professor becomes sick or otherwise incapacitated.

All undergraduate engineering students undertake “capstone” research as part of the curriculum requirements. This year, the capstone research is being presented March 26-27. The Citadel encourages achievement of high standards and celebrates its “Student Excellence Day” on March 22nd. The public can register online to attend.

Muller commented that she considers The Citadel’s graduate program in Project Management, whose evening classes are at the Lowcountry Graduate Center, to be a model for how to structure and successfully market a relevant offering to build out a knowledgeable workforce, not only applicable to advanced manufacturing but a wide variety of sectors including healthcare, IT services, software engineering, and the like. Content is broadly applicable and increasingly relevant to the workplace.

Welch mentioned the impending decision of the College of Charleston as to whether it should renew the lease for its North Campus that the LGC shares. Muller assured the group that the investigation and ultimate negotiation of a location for the future is being done collaboratively so that the LGC can continue to be a portal for working professionals to attend classes on weekday evenings and weekends while working full-time. That is the LGC’s charter by the state. Optional locations are being considered that can serve the location of employers and homes of students at the LGC, taking travel distances and transit time into account.

When identifying and launching new engineering programs, The Citadel looks at those courses students are already taking. This was true in the case of creating a new BS in Computer Engineering. This eases the upfront pressures on enrollment, as new launches are built first around existing demand patterns and interests of students. As for the future, Welch envisions offerings in materials engineering and design, such as plastics and concrete, water purification systems, construction science, statics and dynamics, and elevators, as work is already underway to add 4 additional new undergraduate engineering degrees and 3 new master’s degrees. The Citadel stays in close touch with area employers, including site visits, and analyzes labor statistics data to identify new trends and knowledge gaps that could be served by a new program.

As an aside, The Citadel struggles, he commented, with student expectations, math readiness, and the tenacity to complete a program once enrolled. Welch believes the problem goes back to elementary school math instruction, as 3rd grade teachers are ill-equipped to teach math and excite children about learning and applying math principles, such as physics and fluid flow. Half of The Citadel’s engineering students start in pre-calculus.

There was a brief discussion about demand in general. Kuney said that a number of SCMEP’s scheduled certificate training had been cancelled due to low registrations, which he attributed entirely to the extremely low unemployment levels in the region and pressure on employees for productivity and performance. Welch said what is most needed is for employers to exercise the leadership to “mentor” their workers to encourage more education to be groomed for the future. Muller agreed that demand in higher education especially at the graduate level is counter-cyclical. 2+2 Transfer students from Trident Technical College are down from their peak in 2017. (Trident also lost students because their new 7-week compressed course schedule couldn’t be handled by students so they are now walking back from it.) The Citadel consequently still has 50% available capacity in all afternoon and evening engineering classes. Because of our relatively small population base and its resource constraints, The Citadel doesn’t have a great enough variety of engineering degrees, like Clemson and UofSC.

The Citadel has the highest graduation rate in the state and boasts 80% in engineering. Many don’t realize that 1,700 of the The Citadel’s total 4,000 students are not in the corps of cadets, represented by the evening students who are working during the day. Faculty switch out of uniforms to khaki’s and civilian clothes to teach in the afternoon/ evening classes. Muller asked if student performance differs between day versus evening students enrolled in the same program and with the same faculty. Welch responded that the transfers are already juniors and thus “in the groove.” Half are 21-22 years, but the other half are much older. Even a grandmother! They may take longer to finish because they are working, but The Citadel doesn’t see any difference in their performance.

Graduate enrollments also peaked in 2017 but already seeing a slight uptick. The Citadel is up in enrollments in every engineering program. There’s a good ROI for the state because 42% of students are out of state. Freshmen pay $22,000 in-state versus $53,000 out of state. Diversity (minority, gender) has increased from 18% to 23%. The number of females has increased from 8 to 44. Service academies are tough competition for females, as they give a free ride. The Citadel is trying to find scholarship monies to attract out of state students. Diversity in faculty has improved in recent years, and this helps to attract both minorities and females.

Comparisons to Georgia Tech and Clemson for like degrees illustrate how well The Citadel competes with diversity statistics, including graduation rates. The Citadel’s civil engineering program is the only one in the state from which students can sit for a PE certification exam and full licensing. The Citadel does well except attracting Asians and international students. Asians are not attracted to the military. Not until 1970 did the first African-American graduate from The Citadel with an engineering degree. Its culture has been transformed in the last 50 years. The Citadel also accommodates students with disabilities including low vision, impaired mobility, etc.

The Citadel aspires to an 80% retention rate. Over the last 9 years, this has already been improved from 51% to 71%. Muller asked how internships are accomplished by students since so many engineering students are working. Welch responded that this experiential learning takes the shape of field-based projects. Every year, there are filings for at least 3-4 patents.

The School has 4+1 programs to allow completion of a master’s degree in 5 years. In addition, there is a MS in Bioengineering in which The Citadel partners with Clemson at MUSC. Veterans can attend any day class if active duty.

There is approval to spend $60 million on a new building for engineering. Welch closed by saying that The Citadel is always looking for volunteers for its advisory boards and mentors to students. The Citadel is also wide open to providing customized, turn-key continuing education to area companies.

The meeting adjourned at approximately 5:50 p.m. Dean Welch’s power point slides are attached. The next meeting date will be announced late summer.