

CGA Mentor & Leadership Academy

Aims to increase and retain students majoring in the STEM fields

By Tara King Clark, Editor



2012 USCGA Mentor & Leadership Academy Engineering Command Mentors (ECMs)

Captain Jonathan Russell '82, head of the Engineering Department at the Academy, had just crashed a closed door meeting. It was February of 2011 and Russell was attending the Black Engineer of the Year Award conference. This planning breakfast was on the list of events for the 14 engineering deans of the historically black colleges and universities with engineering programs. As it turns out, the event was invite-only and Russell hadn't received the memo.

After five minutes of chatting with the Dean of Engineering at Morgan State University, "Dr. Eugene M. DeLoatch turned to me and said 'Jon, I've got to ask you, what are you doing here?'" recounted Russell.

"I just told him the truth," said Russell, who had an idea for something he was calling a Mentor Academy — a program where rising college juniors majoring in the STEM fields could receive top-notch training in mentoring and leadership. After providing Dean DeLoatch with a brief overview, Russell was added to the agenda and, ten minutes later, had the floor.

Leaky Pipes

The fields of science, technology, engineering and math (STEM) face a concrete threat in the United States. According to a report by the President's Council of Advisors on Science and Technology (PCAST), the United States needs to produce 1 million more STEM professionals within the next decade to maintain our "historic preeminence" in these fields. However, of those college students who choose to major in these fields, fewer than 40 percent go on to graduate with a STEM degree.

One of the reasons cited is an academic culture that is not welcoming to those groups that are underrepresented in the STEM fields, including women and minorities. Therefore, diversifying pathways to STEM degrees is one of three recommendations to reverse this trend. The conventional "pipelines" into the STEM fields are just not enough anymore and according to PCAST "should be replaced by a more diverse set of pathways to attract and retain STEM students with backgrounds atypical of traditional STEM students."

The Academy has been on the front lines of this effort with what Russell calls the “three-legged stool concept,” which consists of the Academy Robotics on the Water (AROW) competition, the Engineering Challenge for the 21st Century Program, and the Mentor and Leadership Academy started in the summer of 2011. Each initiative was constructed with the recruitment of highly talented underrepresented minorities and first generation students in mind.

Like other engineering-focused colleges, the Academy has conducted outreach programs for years that not only expose high-schoolers to the Academy experience, but also to the STEM fields. The current week-long program, Academy Introductory Mission (AIM), exposes prospective applicants to all aspects of the Academy experience--military, athletic and academic.

The main academic component of AIM is the AROW competition. Developed in 2004 by the Academy’s engineering department and Admissions Division, this Coast Guard-specific competition requires participants build and test a radio controlled floating craft that then has to conduct CG missions within a 10’x10’ water arena.

The 15 hours needed to complete the project include lessons in naval architecture and marine, mechanical, civil and electrical engineering. Those attending AIM (AIMsters) work in teams throughout the week to build their craft. The competition is not easy and the key to success has been incorporating a knowledgeable cadet mentor into each team to provide technical assistance. It is that mentoring and leadership component that really engages the younger students.

“That’s where we saw the magic,” said Russell. The AIMsters just “fall in love with the cadre. It’s not the fact that they are cadets. They’re engineers. They’re college students. They are what those high school students want to be. It’s the near-peer mentoring concept.”

The success of AROW had Russell and the Office of Inclusion & Diversity wondering if they could export the Coast Guard-themed competition, taking it on the road to high schools throughout the country. The goal being to expand its

impact and get more diverse students interested in STEM and the Academy.

After condensing the competition down to a mere 6.5 hours, the length of an average high school day, the Academy piloted Mobile AROW early in 2008 with inner-city high schoolers from Hartford. It worked so well they tried it in New York, Miami, Baltimore, San Juan, Puerto Rico, and more.

“We always traveled with faculty and enough cadets to mentor a team of 4-6 high school kids,” said Russell. “We knew that in order for this accelerated program to work, we had to have a cadet that was knowledgeable on the game leading each team.” Again Russell noticed the magic that happened between the cadets and the younger students.

After seeing this happen again and again, those Academy personnel involved began to wonder if they could teach other college students how to be great mentors. “If we do it so well with our own students, wouldn’t it be cool if we could bring somebody in from the outside and teach them to do it,” Russell said.

The Pitch

Russell stood before the deans of the historically black colleges and universities. The Mentor & Leadership Academy concept was still in its infancy but he shared the basic skeletal structure with them.

The plan was straightforward. Rising college juniors from historically black colleges and universities, who were already majoring in the STEM fields,



2012 ECM William Everett works with an AIMster



2012 ECM Karlton Mitchell with AIM Cadre during their pre-AIM training

would come to the Academy for the summer to learn how to be effective mentors and leaders. They would receive intensive mentoring and leadership training, while living with cadets in Chase Hall. They would then put that training to use as the mentors for the AROW project throughout AIM. The final component would occur once they returned to their respective universities, where they would train their fellow STEM students in effective mentoring techniques and put those skills to use in local high schools and middle schools.

What Russell offered was the opportunity to “not only teach the college student to be an expert mentor, but give them the skills to recruit, educate, and train peers to be expert mentors,” said Russell. “They [the deans] loved it.”

Russell now realized the pressure was on to bring this concept to reality, which would require an Academy-wide effort. That skeletal structure quickly became something more concrete.

The Office of Inclusion and Diversity would oversee the funding and management of the program, recruiting and selecting the participants, providing administrative and logistical support, and supervising the participants throughout the six-week period and beyond. The Admissions Department would ensure that the participants were effectively incorporated into all AIM-related activities and training. The Cadet Division would provide the logistical support for berthing and messing, while the Department of Engineering would provide the academic training and support throughout the AROW competitions. CAPT Andrea Marcille from the Leadership Development Center along with Dr. Laurel Goulet from the Department of Management would provide and fund the near-peer and Leadership and Strategic Thinking training. The Institute for Leadership would provide a theoretical framework, labeled the “Pipelines Initiative,” as well a much needed infusion of funding.

By that spring the pieces fell into place and after securing a grant from the Coast Guard Foundation to fund the program’s stipend¹, plans moved quickly to market and promote the Mentor Academy to STEM students at the HBCUs. With the support of the deans at these schools, it didn’t take long to pull together a contingent of interested applicants with the potential to benefit from a mentoring and leadership experience.

Eight juniors majoring in a STEM field from four HBCUs (Morgan State University, Tennessee State University, University of the District of Columbia and Spelman College) were selected and in June of 2011 arrived at the Academy for six weeks to attend the first USCGA Mentor and Leadership Academy (MLA). An additional 9 juniors attended in 2012.

Mentor & Leadership Academy

Part of the MLA’s mission is to “provide a realistic Academy experience founded on superior cadet leadership, camaraderie, and robust logistical support.” For many of the participants, who upon arrival are called Engineering Command Mentors (ECMs), this is their first experience with the Coast Guard and in many cases, the military in general. A bit of indoctrination is required to bring them up to speed on protocols and the general culture of the Academy. To speed this process along, the ECMs room with a member of the AIM Cadre in Chase Hall and eat most of their meals with them in the wardroom. Like cadets, they are required to do morning calisthenics, wear uniforms, undergo room inspections, and follow a regimented schedule.

“We are like mini-cadre, in a sense,” said 2012 ECM Leslie Davis, a physics major at Spelman College. “We follow a lot of the same rules.”

Throughout the first week ECMs receive training on everything from the history of the Coast Guard and the Academy to the basics of military life. They are introduced to AROW and are prepped on what to expect

1. Because the program would compete with paid internships for the most talented juniors, they would have to offer a stipend to participants.

during the AIM program. They receive 16 hours of near-peer mentoring training, incorporating lessons on DiSC behavioral styles. They are also trained to facilitate college preparation sessions for high school students deciding which college is the right “fit” for them.

“A lot of us are natural born leaders and mentors, but we never really got the textbook version of what you’re supposed to do and how you’re supposed to handle certain situations,” said 2012 ECM Kasha Price, a biology student at Spelman College. “It was really valuable to see it on paper...to get the facts behind mentoring.”

The second week they join the AIM Cadre in preparing for the upcoming three weeks of AIM. Here they learn in detail the logistics of the AROW competition and go through the project themselves so that they fully understand what is expected of the participants.

The following three weeks are the AIM sessions, where the ECMs act as the mentor experts for the high school juniors throughout the engineering training and AROW competition. They offer guidance and encouragement, while also assisting the Engineering Department with the planning, organization, and technical aspects of both the training and the competition. They also lead the college preparation sessions with the AIMsters.

Throughout the entire program, the ECMs are constantly reflecting on their mentoring performance during daily debriefings. They receive feedback from their practicum supervisors, who are junior officers stationed at the Academy, as well as the Lead ECM, a position filled by 2011 MLA alumnus Thomas Clifford. “Linking that training with the experience really grounded me, it stayed with me,” said Clifford, an electrical and computer engineering major at Morgan State University. Clifford’s role was to supervise and support the ECMs, acting as a human “information booth.”

By the end of the six weeks, not only have the ECMs received unparalleled mentor training, they also have a solid understanding of what life is like at the Academy. “I can now go back and educate people on the Coast Guard,” said Davis.

Those who’ve gone through the program value an experience that has better equipped them to deal with change and adapt to any situation with a smile. “I learned to give 100% no matter what the situation,” said Price.

However, it’s not just the ECMs that benefit from the experience. The impact on the cadets was also positive. Being in such close proximity to those unfamiliar with the ways of the Academy, the cadets found that the ECMs offered a unique outside perspective. “By the middle of the second week of AIM, the cadets were asking the ECMs to join their nightly debriefs,” explained MLA Program Manager Erin Mitchell Richeson. They were also challenged by the ECMs to explain why things are done a certain way at the Academy. It offered cadets a unique opportunity to reflect on the Academy culture and its commitment to leadership development.



2012 ECMs Kasha Price and Karlton Mitchell (in white shirts) with the winning AROW team from AIM Week 2

In addition, the ECMs disrupted cadets’ perceptions of diversity explained Antonio Farias, chief diversity officer at the Academy. When the perception of diversity means lowered standards, having these ECMs outperform cadets in the STEM challenges was an eye-opener. Farias noticed that a transfer of knowledge was occurring, where the ECMs offered STEM assistance to the cadets and the cadets helped the ECMs with their leadership development. ECM Price admitted that by rooming with a cadet, they were able to learn a lot from each other during late night “bunk talk.”

The end of the six week residency does not signal the conclusion of the MLA. For ECMs to receive their full stipend amount, they must demonstrate their efforts at recruiting their peers to be mentors and must develop strong relationships with a high school in their area.

“We just want to get home and implement some of the stuff we learned here,” said 2012 ECM William Everett, a physics and math major at Morehouse. “The primary focus is to just get these youngsters enthusiastic about STEM majors and going to college in general, just planting the seed.”

Three Legged Stool

The model for success has been Morgan State University, who sent four students to MLA in 2011 and two more in 2012. In addition, Norma Boyd, the liaison between the Baltimore City schools and Morgan State’s STEM outreach efforts, had attended the Engineering Challenge



Academy Superintendent RADM Sandra Stosz with the 2012 ECMs

for the 21st Century program in the summer of 2011 (see sidebar). There was now a critical mass of students and influencers at Morgan State who had spent time at CGA, understood the principles of AROW, and grasped the importance of mentor training.

Upon their return in 2011, Clifford and the other Morgan State ECMs started a program called Engineers on Deck (EOD). Armed with the same materials they had used during their own MLA training, Clifford and his peers trained 14 of their engineering classmates in best mentoring practices. Working with Boyd they developed a relationship with the Friendship Academy of Engineering & Technology, a combination high school/middle school in Baltimore.

"We specifically chose this school because they are a new engineering/technology school and they are very close to [Morgan State], so it's a great place to start an engineering and mentor pipeline," said Clifford.

Two times a week, 5-6 of the "Engineers on Deck" would mentor in the high school, helping out in 3 different classrooms, impacting more than 30 students. This year, the EODs are training not only their peers to be mentors to the high schoolers; they will also be training some of the Friendship Academy high school students to be mentors to the middle schoolers.

Boyd, who's been involved in STEM outreach programs since 1986 in the Baltimore region, cannot praise the MLA alumni enough. "They have grown tremendously," she said. She notes their skill in being able to effectively train their peers to be great mentors who "are very credible; the children listen to them."

According to Boyd, female enrollment in engineering at the Friendship Academy increased considerably in 2012, believed to be a direct result of the mentoring presence in the classrooms the year previous. "Now we just gotta get them to stay," said Boyd. With the mentors in the classrooms that potential "is looking really good."

Engineering Challenge for the 21st Century

Through a robust partnership with Dr. Karen Birch, Executive Director of the Regional Center for Next Generation Manufacturing and John Birch of the Birch Group, the Academy has developed a one-week program that offers high school and middle school teachers an intensive hands-on STEM experience (AROW), while also providing them with unique skills and training to encourage students to remain in the STEM fields. Here teachers learn how to hone team-building skills that are designed to be directly applicable to the classroom. While this program is open to STEM teachers throughout the country, in 2011 the Academy began to target those teachers who worked in schools located near the historically black colleges and universities that had sent students to the Mentor & Leadership Academy. Because the two programs occur in tandem, the ECMs are able to interact directly with those teachers and administrators who work at secondary schools back home. That way there is a network of support in place for the ECMs when they return in the fall to set up their own mentoring initiatives.

The success at Morgan State proves that having a critical mass of students, teachers and program administrators trained at the Academy has a multiplying effect on STEM mentoring initiatives. As a result, the Academy hopes to greatly expand its AROW outreach and 21st Century teachers program, while continuing to offer the Mentor & Leadership Academy to civilian students each summer. In addition, the Science Department is developing an Oceans-in-a-Box module that will complement the existing AROW competition, and outreach efforts are underway to Tribal Colleges and Hispanic Serving Institutions via the Society of Hispanics Professional Engineers to replicate the success of MLA in those communities.

"This has the potential to now be spread nationally," Russell said, "if we can only find a sustainable non-appropriated funding source."