

Natural History In the Lab

Professor, Cadets Pursue Project to Preserve Smithsonian Nematode Collection

By John Robertson IV

You'd be surprised at what a long-dead nematode can tell you. Not only does it relate the obvious information about its own physical characteristics, it also contains a record of the habitat in which it once lived.

"It's like a window into the history of an environment," said Maj. Ashleigh Smythe, assistant professor of biology. "For example, a polluted habitat will have a different species composition compared to a healthy habitat, with different nematodes found in differing abundances, so biological collections can give you that historical perspective."

Brody Stofflet '17 and Grant Morgan '19 joined Smythe this summer to organize, stabilize, and preserve some of the vast collection of marine nematodes



Maj. Ashleigh Smythe works with Brody Stofflet '17 and Grant Morgan '19 at the Smithsonian Museum Support Center this summer. – VMI Photo by John Robertson IV.

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Cadet Explores Arab Media Coverage of U.S. Elections

By Mary Price

A summer research project undertaken by a cadet double majoring in international studies and modern languages and cultures (Arabic) is revealing a side of U.S. presidential election coverage seldom seen in the United States – the Arab media's perspective.

Sam Moffatt '18 already had a year of Arabic study under his belt when he matriculated at VMI because he'd studied the language on his own in high school. Now, with two years of classroom Arabic completed, plus a summer 2015 immersion program in Amman, Jordan, Moffatt is

seeking to understand the Arabic-speaking world better through its media.

In fact, Moffatt was reading Arabic newspapers online when he happened upon the idea of analyzing the Arabic-speaking world's coverage of the U.S. presidential election.

"I noticed the rhetoric to be particularly striking," said Moffatt. At that point, he decided to apply to the Summer Undergraduate Research Institute, with Maj. Brent Hierman, assistant professor of international studies, as his faculty mentor. The two had met when Moffatt took

an introduction to international studies course from Hierman.

To narrow the scope of what would otherwise have been a dissertation-level project, Moffatt and Hierman decided to pick approximately three sources each from five areas: Saudi Arabia, Egypt, Palestine, Jordan, and the pan-Arab newspapers, most of which are published in London or the United Arab Emirates.

Moffatt explained that unlike in the United States, many of the newspapers in

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Campaign Surpasses \$300 Million

By Scott Belliveau '83, VMI Foundation

This past summer marked a milestone for VMI's comprehensive fundraising effort, An Uncommon Purpose: A Glorious Past, A Brilliant Future: The Campaign for VMI.

Through the generosity of the alumni and friends, the campaign reached \$300.2 million in gifts and commitments from 14,307 donors.

In an email message to alumni and friends, Donald MacLean Wilkinson '61, chairman of the campaign, thanked all those who had participated. "By taking a stand for VMI, you have helped ensure that the Institute will continue to graduate the well-educated, capable, and honorable citizen-soldiers that our country needs."

Wilkinson also wrote, "While I am pleased by this achievement, I am not entirely surprised by it. After all, generosity in the support of the Institute and its mission has long been a hallmark of the VMI family."

Even though it has passed a significant milestone, the campaign will continue, according to Brian Scott Crockett, CEO of the VMI Foundation. Citing the matriculation of the Institute's newest cadets, he said, "The Class of 2020 already is benefiting from the generosity of donors who made gifts to VMI during An Uncommon Purpose. But, like other fundraising efforts on behalf of VMI, this campaign is not just about today, but also countless tomorrows.

"Future generations of cadets – as well as future members of our faculty and staff – will have ample reason to thank those who have come to the support of the Institute during An Uncommon Purpose."

For more information on the campaign, visit www.vmi.edu/campaign.



Bronze Rejuvenated

Conservators refinish the Gen. Lemuel C. Shepherd '17 memorial plaque and the statue of Francis H. Smith. Every two or three years the bronze statues and plaques on post are cleaned and waxed with a corrosion-inhibiting compound that helps the bronze maintain its integrity. – VMI Photos by Kelly Nye.



Coding Botany

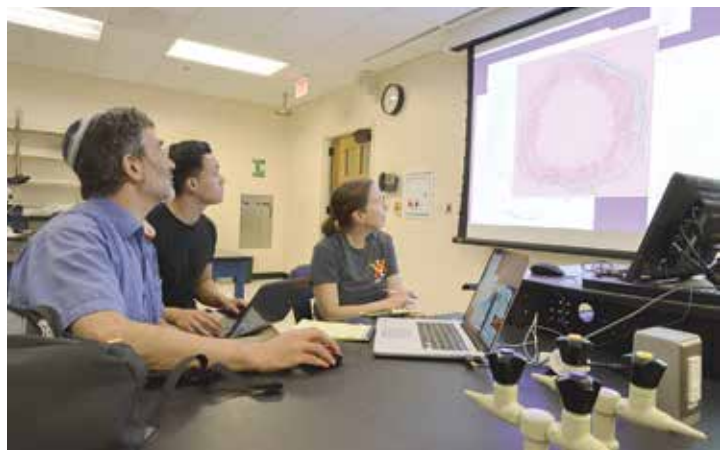
VMI Team Writes Scripts for Soybean Imaging with Help from Israeli Expert

By Chris Floyd

When Lt. Col. Anne Alerding and her biology students ran into difficulties creating viable images of soybean stems during their recent research, she decided to go off post for help. Way off post.

Enter Dr. Aryeh Weiss, who came all the way from Israel to help the VMI group solve the problem. An expert in an imaging program called ImageJ, Weiss spent a week this summer helping Alerding and her students develop a working knowledge of the program. And they made a few discoveries along the way.

"I feel grateful that he was willing to put the investment in this



Dr. Aryeh Weiss (left) helps Anh Duy "Anthony" Tran '17 and Lt. Col. Anne Alerding use ImageJ software to examine soybean stems. - VMI Photo by Kelly Nye.

project," said Alerding. "Because he came here, he is now influencing a lot of other people and spreading the knowledge. It's really going to help all of us make advances."

A long-term goal of Alerding's research is to improve crop seed yields by studying stem growth as a critical factor in seed production, and several cadets have worked on the research in recent years.

Weiss is a professor of engineering at Bar-Ilan University in Israel, which, with VMI's Department of Biology, paid for his visit. He's also a member of the Nano Medical Center at the Institute of Nanotechnology and Advanced Materials. He is considered an expert in using ImageJ to isolate microscopic particles, having employed the program in a wide range of research including the medical, nuclear, and astronomy fields.

Alerding and Weiss met at a conference for ImageJ users and developers in Wisconsin.

"She presented a problem I thought I could help with," explained Weiss, who returned to Israel at the end of the second summer session but will be keeping tabs on the project via Skype. "So over the course of a year, I was able to arrange to work on the problem here and do a research collaboration."

In the VMI Summer Undergraduate Research Institute projects, which included two cadets, Anh Duy "Anthony" Tran '17 and Mitchell Fornwald '17, the team has written new code for ImageJ to allow the researchers to create better images of soybean stems while identifying and isolating the aspects of those stems relevant to their

research. While that sounds like a great deal of work – and it was – in the long run, it saved much more labor.

"What we're trying to avoid is spending hours tracing," said Alerding. "The hand and human eye are not as accurate as a computer can be. Then we can help others to do the same thing so they can apply this to other complex problems."

"It has been difficult, just learning all of the software and all of the coding and scripting," said Tran. "I'm learning on the fly, and it has been a good experience. In biology, we don't really get exposed to this."

The software has revealed information about plants other than soybean.

"This goes beyond what we know about plants at the microscopic level," said Alerding, who noted that as far as she knows this is the first such research done with ImageJ. She expects to produce an article on the new method the group developed to segment plant stems in addition to using that method in her soybean research. "I'm seeing characteristics of the tissue that are making me rethink how a plant grows and works. I'm seeing things that I never would have seen before."

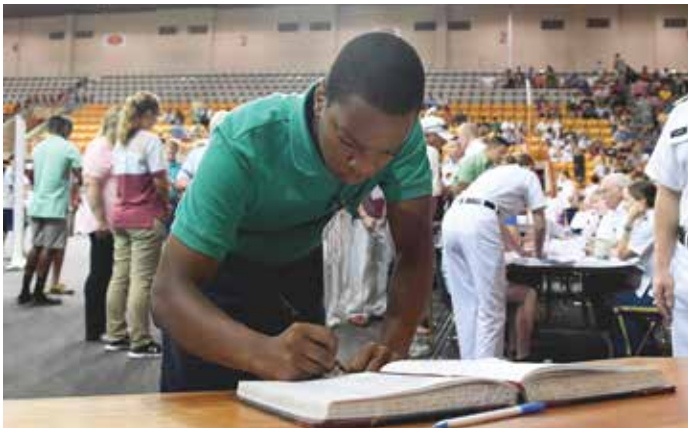
While Alerding and her crew might have been able to figure out ImageJ for themselves, especially with the help of its extensive online community, Weiss's help was especially appreciated in writing the necessary code. And he, like Alerding, is very pleased with the outcome.

"There's no substitute for coming to beat on the problem and think about things," he said. "I didn't do things exactly like I thought I would. I didn't know when I got off the plane that this is the way we would be doing it. It's been a very worthwhile visit."



Awaiting New Carriages

VMI physical plant staff remove one of the cannons in the cadet battery. The cannons, dubbed Matthew, Mark, Luke, and John, were moved to storage while new carriages are constructed for them. For more information, see bit.ly/cadetbattery. - VMI Photo by John Robertson IV.



Matriculation Week

VMI's third largest matriculating class signed the Matriculation Book Aug. 20. The Class of 2020 came in at 506, with 60 women and 95 recruited NCAA athletes. Fifty-eight percent are from Virginia and 42 percent from out of state, including four foreign countries. Sixty percent are majoring in math, science, or engineering, and 40 percent in the liberal arts. VMI provided a live webcast of the Welcome Ceremony, which is viewable at www.vmi.edu/livestream. As always, training started immediately after the ceremony and continued for nine days, culminating in Rat Crucible Aug. 28. To see more photos, visit vminews.tumblr.com. – VMI Photos by H. Lockwood McLaughlin and Kelly Nye.



at the Smithsonian National Museum of Natural History's Museum Support Center in Maryland – just a few miles outside Washington, D.C.

In their work, funded by the center's Department of Invertebrate Biology, they faced the challenge of transferring thousands of specimens – along with the information associated with each specimen – from temporary storage desiccators to more appropriate permanent containers.

That process involved many hours of precise work at the microscope, removing each of the tiny nematodes from the desiccators and repackaging them in an alcohol and glycerin solution.

"It's been interesting," said Stofflet. "At times it can be a little tedious, but it's nice to learn techniques that professionals in the field are using to take care of and preserve specimens like they do here at the Smithsonian."

With the collection permanently preserved, scientists of the future will be able to compare their findings with specimens housed in the museum.

"I feel like a real citizen of society," said Morgan. "I get to contribute to something where possibly one day someone will go

back, look at these nematodes and make a great discovery."

The free-living marine nematodes that the group is preserving represent the most diverse and abundant type of nematodes, and a strong collection, such as that housed at the Smithsonian, holds clues about how their habitats have changed over time.



Vials of nematodes preserved in an alcohol solution are grouped together in a large storage vessel. This permanent storage method will preserve the collection for future research. – VMI
Photo by John Robertson IV.



A nematode in the subfamily Stilbonematinae is shown at 400x magnification. What appear as hairs on the nematode are actually symbiotic bacteria that the nematode grows on its body and on which the nematode feeds. – Photo courtesy of Maj. Ashleigh Smythe.

"If you had good collections from particular habitats over time you could also look at the change in geographic distribution of a species," said Smythe. "Maybe back in the 1800s it only was found this far north, but starting around 1900 we start to collect it at some localities further north."

The collections of species housed in the museum also serve as a taxonomic authority, with slide-mounted specimens exemplifying the key characteristics of each species housed in the museum.

"It's a really important repository for species descriptions, so anytime anyone describes a species, they need to deposit specimens in a museum that will be cared for long after they are gone," said Smythe.

Future researchers can then compare what they think might be a new species with those housed at the museum to ensure the uniqueness of their species.

Smythe noted that without participation from cadets, much of the work accomplished this summer would have remained incomplete.

"I was originally going to do this work before I got my job at VMI and it was going to be a year solid with just me," said Smythe. "There's just not enough time during the summer, so I literally could not have done it without cadet helpers."

Working with scientists and as a scientist over the summer has given Stofflet, who is considering graduate school, insight into possible career opportunities he might pursue.

"This is definitely a big help," said Stofflet. "Knowing that I'll possibly be able to have the best of both worlds – working in the field and in the lab – is reassuring going into my final year at VMI."

The experience impressed on Morgan the depth of knowledge that scientists have in their areas of expertise. Morgan and Stofflet met scientists working at the downtown Washington, D.C., Smithsonian facility, many of whom are leaders in their fields.

"There are so many people down there who know everything about any organism you could ever imagine," said Morgan. "It's interesting to see that if you pursue your studies beyond college and grad school, how much knowledge you can attain on what seems such a fine subject."

Watch the video: VMINews.tumblr.com.

Goal: Teach Them the Math They Need

Cadets, Professors Begin Research to Develop Math Course for the Humanities

By Mary Price

It's not every day that college students are asked to come around to the other side of the desk and think like professors. Nor is it every day that college students are asked to undertake a massively inter-departmental project. But that's exactly what happened this summer in VMI's Department of Applied Mathematics, as two cadets worked under the auspices of the Summer Undergraduate Research Institute to develop content for the Institute's quality enhancement plan.

Ross Schmeisser '18, a mechanical engineering major, spent the first summer session talking to faculty in the departments of biology and economics and business about what math skills they'd like their majors to have, while Chen Chun-Hao '18, an applied math major, likewise met with faculty in these departments and international studies and political science during the second summer session.

Input from both cadets will be used as Maj. Jessica Libertini and Maj. Karen Bliss, both assistant professors of applied mathematics, write the quality enhancement plan, a requirement for VMI's bid for reaccreditation from the Southern Association of Colleges and Schools Commission on Colleges.

The quality enhancement plan strives to change how cadets whose major fields do not require calculus learn math – and both Libertini and Bliss expressed frustration at a higher education system that frequently requires students to take a math class, but does not make that math applicable to the careers those students will be undertaking. The required math class “is just a check in the box, and not something anyone thinks they could gain anything from,” said Bliss. “It almost seems like an act of futility to teach such a class.”

Following the Institute's selection of a math and problem-solving-targeted QEP, it was natural to turn to the in-house expertise of Libertini and Bliss, as both faculty members have earned national recognition in the fields of mathematical modeling and applied mathematics education. Math modeling teaches a problem-solving framework in which students translate the real world into a mathematical problem, solve the problem, and then communicate the solution to an interested audience.

Because of this emphasis on mathematical modeling, carefully designed modules that open with intriguing interdisciplinary questions and help students develop a broad set of skills will be the central focus of a new two-course sequence for 4th Class cadets whose majors do not require calculus. The new sequence, which is tentatively scheduled for implementation in the 2018-19 academic year, will replace two current course sequences in the applied math department: Math 105/106, Introduction to Probability and Statistics, and Math 125/126, Quantitative Methods.

Cadets take these classes to fulfill the math requirements in a variety of disciplines, including biology, history, and economics and business.

“We want this course to serve the other departments, so I want them to feel represented in this course,” Libertini said. Consequently, Schmeisser and Chun-Hao spent much time with faculty in those other departments, seeking to learn as much as they can about what quantitative skills their majors need. Their research will help Libertini and Bliss as they design the new course sequence to



Ross Schmeisser '18 (right) talks math with Lt. Col. Paul Moosman and Maj. Jessica Libertini. – VMI Photo by Stephen Hanes.

include modules covering the quantitative skills needed by all of those departments.

In an email interview, Schmeisser explained that he'd begun his work in the biology department by sitting down with Lt. Col. Paul Moosman '98, associate professor of biology, to learn more about the statistical analysis of Moosman's research on the Eastern small-footed bat. Specifically, Moosman needed to come up with a way to estimate the entire population of the species without attempting to count every single bat.

“Maj. Libertini, [Maj.] Bliss, and myself decided we would write a module around [the idea that] the world isn't perfect and using the concept ... to teach the concept of sample taking,” Schmeisser wrote. “The biology department needs students who have very strong grasp [of] probability and statistics skills and a firm foundation [in] calculus.”

In the Department of Economics and Business, Schmeisser met with Lt. Col. Sam Allen and Lt. Col. Valentina Dimitrova-Grajzl, both associate professors, to learn about the quantitative skills economists use. He found out that economics is a math-heavy discipline, and economists need math skills to predict a country's economic development.

“We plan to use the data given to us by the ECBU department to start a conversation about correlation vs. causation (a constant problem in any data analysis),” Schmeisser wrote. “What actually causes the change?”

He concluded, "The ECBU students need to enter into their major classes confident in their math skills and need to be able to apply those numbers to mean something in the real world."

That's just what Schmeisser – and his faculty mentors – hope and expect to see in the years ahead, once the new course sequence is implemented.

"This new math class has been created in order to make math seem less like a chore and make it interesting and applicable," Schmeisser wrote. "I personally believe that this class will boost students' confidence in math, and they will find that math will actually follow them into whatever career they choose."

For Libertini and Bliss, applicability is likewise at the heart of the quality enhancement plan. Libertini noted that when she's designing a course, she always asks herself what she expects students to remember in five years – or 20 years.

"No matter how many times I ask them to repeat the quadratic formula, I don't expect them to remember it in five years if they aren't using it," she said. "Wouldn't it be much more valuable if I could equip them with the confidence to learn more quantitative skills as needed?"

Cadre Week

Cadre members head through town back to VMI after the early morning Jacob's Ladder run. Cadre arrived on post Aug. 13 to prepare for Matriculation Day, Aug. 20 – VMI Photo by Kelly Nye.



Statue Honoring Fourth Superintendent Restored

By Kelly Nye

As the VMI community looked forward to the reopening of Cocke Hall this month after a 15-month renovation, few may have noticed a smaller piece of the VMI story getting a restoration as well.

The *Spirit of Youth*, the marble statue on the west end of the Memorial Garden and well beyond the construction fencing, received its share of the attention in June. The 12 ½-foot statue, made of Carrara marble from the Carrara Quarry in Tuscany, Italy, was professionally cleaned this summer for the first time since it was unveiled in 1939.

"For about 50 years the statue was under the branches of very large mature oak trees, and as far as the statue was concerned that was probably the worst place to live because of the high tannic acid that is produced," said Col. Keith Gibson, executive director of the VMI Museum System.

The oak trees were planted to make Memorial Garden a shaded outdoor space, almost an anteroom to Cocke Hall with four walls open to the sky. The damage the trees would cause to the statue was not taken into consideration.

"That resulted in the surface of the statue becoming what is called 'sugary,' meaning that it had become pocked with little craters. ... The way to address that is to smooth out the surface to reduce those crevasses. And that is done through a process called honing, which is a hand process that's really done by feel," explained Gibson.

Scott McKee, a professional conservator, cleaned and honed the statue over a two-week period.

"My theory is, if you don't take care of it, it will get to the point where nobody wants to take care of it," said McKee, noting the way forgotten statues in cemeteries become rounded, eventually rendering fine work, such as appendages, unrecognizable.

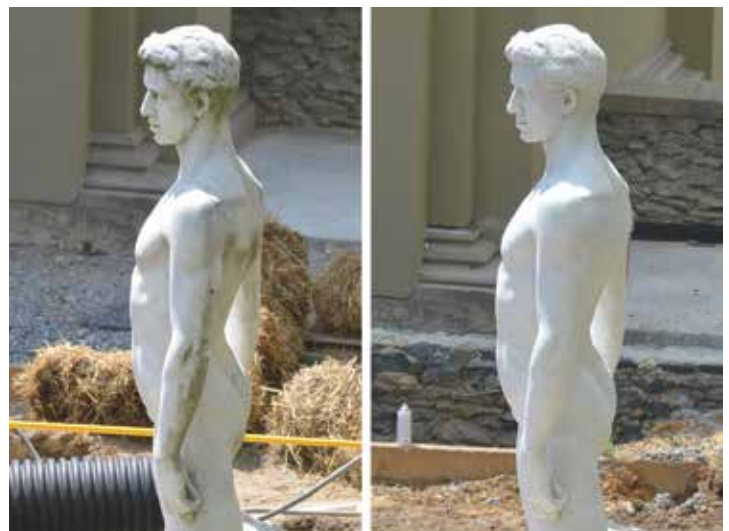
Originally a gift from Ann Cocke as a memorial to her husband, Gen. William H. Cocke, VMI's fourth superintendent, the statue is part of the rich history of VMI.

Carved by Attilio Piccirilli to commemorate the young men who fought in the Battle of the Piave River in 1918, a decisive Italian victory during World War I, it was originally intended for the Italian dictator Benito Mussolini. But Piccirilli disagreed with Mussolini's politics and refused to ship the statue.

When the Cockes approached Piccirilli with the potential commission, he offered the *Spirit of Youth*, thinking it a perfect fit for the school whose cadets had fought decisively in the Battle of New Market.

Ann Cocke dedicated the statue as a memorial to her husband a year after he died. It was unveiled in Memorial Garden in June 1939.

To see more photos, visit VMINews.tumblr.com, post date Aug. 5. The renovated Cocke Hall will be dedicated later this semester.



The pocked surface of the *Spirit of Youth* (left) is smooth and clean after restoration work (right). – VMI Photos by Kelly Nye.

'Marshall's Greatness for All to Understand'

Marshall Foundation Publishes Seventh and Final Volume of George C. Marshall Papers

By Mary Price

On June 23, the George C. Marshall Foundation celebrated an accomplishment nearly four decades in the making: the publication of the seventh and final volume of *The Papers of George Catlett Marshall*.

The massive project took more time than the Voyager I spacecraft to reach interstellar space: its launch was in 1977, the same year the Marshall project started, but it arrived back in 2012. Those who worked on the Marshall papers project say that for an undertaking such as this, which involved collecting and annotating thousands of documents, concluding in just 39 years is speedy work indeed.

"These projects always last for years and years," said Dr. Mark Stoler, emeritus professor of history at the University of Vermont, who served as editor for the last two volumes of the papers. Stoler put the Marshall papers project in perspective by noting that work on the papers of George Washington began in 1968 and is yet to be completed. Likewise, work on an 80-volume history of the U.S. Army in World War II began just after the war ended in 1945 and finished this year.



Marshall visits VMI on New Market Day in 1951 to take part in a review of the Corps, receive the Virginia Distinguished Service Medal, and speak at the dedication of Marshall Arch. – Photo courtesy of the George C. Marshall Foundation.

The Marshall papers project began 13 years after the Marshall Foundation moved into its home on the VMI post with the hiring of Larry Bland. Bland initiated the effort to collect and publish the papers of Marshall, a member of the VMI Class of 1901. The statesman, who died in 1959 at the age of 78, had not only served as U.S. Army chief of staff during World War II, but later, while serving as secretary of state, became the architect of the Marshall Plan, which brought recovery to war-ravaged Europe. Marshall remains the only career officer in the U.S. Army to win the Nobel Peace Prize, an honor he received in 1953.

Undeterred by the magnitude of the task ahead of him, Bland made multiple trips to the National Archives to put documents on microfiche and bring the microfiche back to Lexington. By the time of his death in 2007, Bland and his assistant editor, Sharon Stevens, had published five volumes. In 2013, Stevens herself died following a long illness.

In 2008, Stoler was hired to pick up where Bland had left off. The two men had been friends, a relationship forged while Stoler was making trips to Lexington to do the research for his 1989 biography of Marshall, *George C. Marshall: Soldier-Statesman of the American Century*.

To conclude the Marshall papers project, Stoler hired Dan Holt, now retired from the Dwight D. Eisenhower Presidential Library in Abilene, Kansas, as managing editor. Because neither Stoler nor Holt could be in Lexington full time to work on the project, four then-local residents were hired to assist them: Mame Warren and Anne Wells, both senior assistant editors; Gregory Franke, assistant editor; and Joanne Hartog, research assistant. In eight years, that team published the last two volumes of the series.

The publication of the final volume is a "fantastic achievement," noted Dr. Rob Havers, who has served as president of the Marshall Foundation since 2014. "Marshall is a key figure during many of the world events of the first half of the 20th century," said Havers. "These papers, now concluded, ... present Marshall's greatness for all to understand and appreciate."

Underneath the greatness, of course, was a man, the youngest of three children in a family from Uniontown, Pennsylvania. George C. Marshall followed his older brother, Stuart, to VMI, where the younger Marshall was a member of the football team and served as first captain his 1st Class year.

Stoler noted that Marshall felt "very, very warmly" toward his alma mater.

At a time in his life when he was extraordinarily busy with commitments on the national stage, serving first as secretary of state from 1947 to 1949 and then secretary of defense from 1950 to 1951, Marshall made time for VMI. He was a member of the Board of Visitors from 1946 to 1954 and addressed the graduating classes on four occasions between 1940 and 1956. In addition, Stoler noted that Marshall maintained an "extensive correspondence" with the Institute's superintendents in those years.

Stoler emphasized that Marshall's time at VMI had a deep and long-lasting impact on his character and career. "There was nothing



Dr. Rob Havers, Foundation president, displays the new volume at a June 23 gathering at the Marshall Library. – Photo courtesy of the George C. Marshall Foundation.

about Marshall that would say that this man is destined for glory before he arrives at VMI,” the historian and biographer said. “Something happens at VMI.”

And while the Institute’s influence on Marshall was far-reaching, so was Marshall’s influence on VMI. Lt. Col. Bradley L. Coleman ’95, associate professor of history and director of the John A. Adams ’71 Center for Military History, teaches from the Marshall papers on a regular basis.

“For me, in the classroom, the published Marshall papers are the single most effective teaching tool,” said Coleman. “I routinely ask cadets to read documents from the collection. It is an exceptionally

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‘Out of History and into the Modern World’

Foundation Strategizes to Preserve Marshall Memory as Inspiration to Future Leaders

The recent conclusion of the George C. Marshall papers project after nearly 40 years of work has left the Marshall Foundation at a transitional point, looking to move with confidence into the future while ensuring the past stays relevant.

It’s a past that Dr. Rob Havers, president of the Marshall Foundation, wants to make sure isn’t forgotten as time marches on. Marshall’s time “is increasingly receding into history,” noted Havers. “Even those who were alive when he was alive are now elderly. ... How do we bring a man like Marshall out of history and into the modern world?”

The Foundation’s current attempt to answer that question is the Marshall Legacy series, a four-year program designed to bring attention to aspects of the world that Marshall and his contemporaries helped to build. Among the topics covered by the Legacy series so far have been codebreaking and weapons of World War II and Marshall’s efforts to include women and minorities in the armed services.

This summer’s Marshall Legacy series sequence, “Speed & Fury,” centered on the technological advances in weapons and vehicles produced during World War II. Presentations included “Marshall, Arnold and the Creation of American Air Power” by Dr. Dik Daso, a “Made for Speed” LEGO competition, “The Fast and Furious Race for the Atomic Bomb” by

former VMI chemistry professor Dr. Frank A. Settle, and a talk by NASA astronaut Patrick Forrester about the development of rockets, which were first used as long-range missiles during World War II but were transformed into vehicles for the exploration of outer space.

The Legacy series began in 2015 and will continue through 2018. Upcoming sequences include “Let’s Get A Move On” about the vast civilian and industrial mobilization during World War II, “The World Wars” about the development of warfare and world leaders (Marshall, Patton, MacArthur, Truman, Churchill, and others) through both wars, and “Europe’s Unlikely Recovery” about the economic recovery program known as the Marshall Plan.

A key anniversary is also coming up. The year 2017 will mark the 70th anniversary of Marshall’s speech at Harvard University in which he announced the Marshall Plan, an initiative which brought desperately needed aid to war-torn Europe.

With the anniversary looming, Havers and other members of the Marshall Foundation staff are looking to renovate and reimagine the Marshall Museum, which holds a number of artifacts from Marshall’s life. As they see it, the museum would “underscore the lessons of Marshall’s life and times and convey what that life and those times were like,” explained Havers.

In addition, Havers envisions the basement of the Marshall Foundation building as a decision center, an idea borrowed from the White House Decision Center at the Harry S. Truman Presidential Library and Museum in Independence, Missouri. There, students of all ages and corporate groups can step into the former president’s shoes and try to solve the very problems that confronted him in the years after World War II.

For Havers, educational outreach such as that provided by the museum and decision center is essential to ensure that Marshall is not forgotten as the years roll on and members of what’s been referred to as the “greatest generation” die off.

“Marshall is emblematic of a time in the aftermath of World War II when the U.S. is looked to as a beacon of hope and inspiration and opportunity, and the Marshall Plan is the practical manifestation of that,” said Havers. “All of these things provide ... inspiration to contemporary and future leaders.”

– Mary Price



The Legacy series will introduce current generations to Marshall’s influence on today’s world.

the Arabic-speaking world are government owned. Of the others, ownership is difficult if not impossible to determine. In addition, each paper includes both staff-written articles and translated pieces from wire services such as the Associated Press and Reuters.

"It's really challenging to unpack ... the political stances of these different newspapers," he noted. "Arabic media is extremely complex and it's very difficult to identify where the information is truly coming from."

As the first summer session drew to a close, Moffatt was still hard at work translating newspaper articles, with the help of an obviously well-used Arabic dictionary.

"I have a strong foundation, but I'm not at a level where I can read everything perfectly in these articles," Moffatt noted.

Moffatt has found a strong sentiment of fear and distrust in the Arabic media's coverage of Donald Trump, the presumptive Republican nominee. Moffatt explained that when Trump first announced his candidacy, he received little attention. The billionaire candidate began attracting the attention of the Arabic media, though, after his Dec. 7, 2015, speech in which he proposed a ban on Muslims entering the United States.

"What I've been seeing so far is just repetitive and consistent comparisons with the Nazi party," said Moffatt. "Every editorial that I've read is quick to point out his racism and his racist policies."

The presumptive Democratic nominee, Hillary Clinton, has been under scrutiny for her policies, particularly her support of the 2003 invasion of Iraq, but not her character, Moffatt noted. Moreover, no Arabic-language newspaper that Moffatt has seen has made a point of discussing gender in the race.

"They all do want to be seen as progressive," the Richmond, Va., native noted.

"Arabic media has come a long, long way since it came out in the early 2000s."

In the second summer session, Moffatt moved on to the second stage of his work, content analysis of the articles to determine their bias for or against both Trump and Clinton.



Maj. Brent Hierman and Sam Moffatt '18 discuss examples of Arabic media coverage of the U.S. election. – VMI Photo by H. Lockwood McLaughlin.

To do the content analysis, Moffatt created a code book, which is a tool used by social scientists to empirically measure rhetoric and word choice. Hierman described the code book as an aid in the search for "whatever frame is emerging, based on the weight of the words and the phraseology that's been found."

"That will be the part of the research that really brings out the different results and patterns," he said.

Moffatt isn't sure what he's going to do with his research once it's completed, but since he's earning a double major, plus a national security minor, and participating in the Institute Honors program, he's sure his work will fit in somewhere, whether it be an honors thesis or a capstone project.

"It's definitely something that's provoked an interest in Arabic media for me and something I definitely just don't want to drop when I'm finished," he said. Down the road, Moffatt hopes to go to graduate school and work in military intelligence.

In the meantime, he's been appreciating the experience of research – and breaking new ground. When Moffatt set out to determine if an Arabic media analysis had been done before, during an earlier U.S. presidential election, he couldn't find any published evidence of such work.

"As far as I could find, nothing really exists," he noted. "That's part of the challenge as well, trying to figure stuff out on my own, with Maj. Hierman's help."

An expert on Central Asia and fluent in several languages but not Arabic, Hierman has learned alongside his student.

"Sam is a really motivated cadet, which makes my job much easier," said Hierman. "It's a very valuable project. The American election is vital to most of the regions in the world. The media coverage is incredibly important, because it at least gives you access toward what certain segments of the population may be viewing about the U.S. In this global world, that's vital."

For Moffatt, the project has been worthwhile, not only in preparation for his future career, but also for the unique view of the global stage that it's provided.

"It's been pretty fun," he remarked. "Not only am I getting to practice my Arabic on a daily basis, but the Arabic coverage is far different from anything we're seeing on CNN. It's not something you think about. ... There's people across the world watching and listening and commentating on everything that is said. It's fascinating to see what a different region thinks about this issue."

Marshall Papers continued from page 9

effective way to teach American foreign relations and military history [at VMI]."

Coleman's appreciation for Marshall began during his own cadetship, when he served as a cadet assistant at the Marshall Library and got to know Bland and his staff. In the intervening years, that appreciation has deepened. "The collection documents the career of a hugely influential VMI graduate," Coleman commented. "It preserves his contribution to global affairs for posterity and assures that Marshall and his work [are] accessible to a broad audience in perpetuity."

Publication of the Marshall papers has been supported by grants from a variety of sources, chief among them the National Endowment for the Humanities and the National Historic Publications and Records Commission.

As with the first six volumes, the seventh volume, *The Man of the Age*, is available for purchase in the Marshall Museum shop or online at www.marshallfoundation.org.

Watch the video tracing Marshall's relationship with VMI: bit.ly/MarshallPapers.

Forecast Positive as VMI NCAA Teams Enter the New Academic Year

By Chris Floyd

VMI's women's soccer team, which won just six games last year, kicked off the 2016-17 season with a 1-0 victory over South Carolina State Aug. 19 in Orangeburg, South Carolina, and the win solidified a sentiment across the Keydets athletic program.

Everyone is excited, and that renewed enthusiasm has folks talking about big things for the new athletic season.

While a number of coaching changes dominated headlines for the Keydets last year, only one new head coach takes the field for VMI this season. Recently arrived from St. Mary's University in San Antonio, Texas, Michael Bonelli takes over on the men's soccer pitch and has his work cut out for him; men's soccer went winless a year ago. However, Dr. Dave Diles, VMI's athletic director, has confidence in the new coach.

"I've known him for years, since his days coaching at Slippery Rock [University]," said Diles. "[At St. Mary's], he turned that program around and got them to a completely different competitive level. His recruiting efforts are noteworthy."

And Bonelli's recruiting efforts received a big boost this year. Men's soccer is one of two programs at VMI that has seen an increase in recruiting dollars.

"Men's soccer received a significant infusion of scholarship dollars, which will be tremendously helpful in recruiting talented young men to augment the roster and support the competitive advancement of the program," said Diles. "[Lacrosse] is another scholarship budget that has received a significant infusion of ... support, and so I think the competitive trajectory of that program will change in the next year or two."

The VMI lacrosse team, which finished last season with a 2-14 mark, was part of the inaugural season of lacrosse in the Southern Conference. This year, men's and women's rifle, with VMI at the head of the class, will join the league, bringing the total number of sports sponsored by the conference to 21.

The idea to add rifle to the Southern Conference list was hatched at VMI. The Keydets will be joined by fellow SoCon members Citadel and Wofford, along with associate members Alabama-Birmingham, Georgia Southern, and North Georgia, to form a six-team league and become just the second Division I conference to sponsor the sport. Diles noted that the addition of lacrosse to the list of sports was a rousing success, and he predicts rifle will be just as positive.

"We have good leadership in the conference office, [and] we have a bunch of bright administrators who are looking thoughtfully and investing the time to assess the competitive landscape and opportunities available for these programs," said the VMI athletic director. "They want to take care of the opportunities and experiences for the athletes ... at their member schools."

VMI continues to be at the forefront of the Southern Conference when it comes to online streaming. With the rest of the league, VMI launched its campaign for ESPN3

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a year ago and plans on staying out front with broadcasts of soccer, football, basketball, and baseball this year.

"We jumped in with both feet to a comprehensive broadcast schedule, ... and we're excited to continue that," said Diles. "We're going to work hard to remain at the top of the Southern Conference in terms of volume and quality of broadcasts."

Another area in which VMI plans to stay at the top is in academics. Though the Institute's reputation took a bit of a hit when it was revealed that the men's track team will be ineligible for postseason meets after falling a mere four points short of the NCAA's Academic Progress Rate benchmark, it must be noted that three sports – men's and women's cross country and women's swimming – received perfect scores.

Diles said that grades for the athletes were "outstanding," and those earned during the summer sessions were among the best he has ever seen.

"Academics has consistently been improving, and that's the most important thing we do here," Diles said. "We have to stay in sync with the mission, and we have to make certain that our cadet-athletes are excelling in the classroom. If we can continue to do those things, we are moving down the right path."

VMI's fall season is off to a good start with the women's soccer victory, so it's easy to see why Diles counts himself among those who are anticipating the coming year.

"I don't think I've ever been more excited about an upcoming year than I am for 2016-17," he said. "I love our coaches, and I love the spirit in the department – people who are mutually supportive, who, I think, are here for the right reasons, [and] who understand and are excited about the mission of VMI and the opportunity to work in this environment with young people."



Coach Michael Bonelli briefs the men's soccer team during practice Aug. 24. – VMI Photo by John Robertson IV.

Alleviating Poverty in the United States

Cadet Shepherd Interns Assist At-Risk Youth, Victims of Domestic Violence

By Mary Price

Not many college students would willingly, much less eagerly, sign up for an inner-city, poverty-focused internship that pays only \$14 per day – but that’s just what five VMI cadets did this summer through the Shepherd Higher Education Consortium on Poverty.

Since 2012 VMI has participated in the Shepherd program, which began at neighboring Washington and Lee University. The program offers eight-week internships to students from 19 participating colleges and universities across the country, with the goal of encouraging students to make a difference by serving both disadvantaged individuals and their communities.

In years past, VMI has generally had two Shepherd interns each summer, but this year, all of the consortium member schools were asked to supply five interns. “This was a big uptick for us,” noted Maj. Dorothy Hayden, assistant director of career services and facilitator of the Shepherd internships at VMI.

As might be expected, the Shepherd interns’ diverse experiences reflect the many facets of poverty in the United States. Laura Siles-Suaznabar ’17, who’s double-majoring in modern languages and cultures (Spanish) and international studies, interned at CitySquash, a nonprofit organization in the Bronx area of New York City. CitySquash seeks to lift at-risk youths out of poverty through a program that includes tutoring, mentoring, community service, travel – and learning to play the game of squash.

In an email interview, Siles-Suaznabar wrote that she chose CitySquash so she could use her Spanish, as the area served by CitySquash is a mixture of Spanish-speaking and Italian-speaking communities.

“Life is very loud,” Siles-Suaznabar wrote, “which is typical of New York. ... The Bronx is always loud and hectic, very different from the serene life at Lexington, but it has its unique beauty that cannot be found anywhere else.”

After a two-hour commute via the subway and a city bus, Siles-Suaznabar would arrive at work by 9 a.m. each weekday. In the mornings, she assisted with paperwork and phone calls, and then she helped to serve lunch to elementary and middle-school students.

“This is slightly tricky, because the lunches are healthy lunches, and I have to make sure the students eat their food, even though they may not be used to eating in such a way,” she observed.

After lunch, Siles-Suaznabar taught fourth- through sixth-graders, using lesson plans and themes she developed herself, and then tutored individual children, including some ninth-graders headed to boarding

school this fall. As the summer advanced, Siles-Suaznabar found herself getting to know not only the children but also their families, and she discovered that some common stereotypes about the economically disadvantaged are simply not true.

“Many of the parents I’ve met and gotten to know are extremely hard-working and are really proud of their kids for being part of such a great after-school program,” she wrote. “The parents and children are some of the most hardworking people I have ever encountered.”

Like the other Shepherd interns, Siles-Suaznabar signed an honor pledge to live on a poverty wage of \$14 per day, a figure that does not include housing costs. From living on such a limited budget, she’s learned that fun doesn’t have to cost a lot of money.

She wrote, “For example, in the city there are so many free events from Bastille Day to the hundreds of parades ... that it is nearly impossible to be bored. ... Shepherd has let me experience an amazing program in New York City, which seemed unimaginable, but now I am seriously considering moving here at some point during my life.”

Several states away, in Georgia, Samantha Alexander ’18 also found herself learning, stretching, and growing in new directions this summer as she works with Tapestri Inc., an Atlanta-based nonprofit that



Samantha Alexander '18, Laura Siles-Suaznabar '17, Amanda Smith '17, and Brianna Anderson '18 attend the annual Shepherd symposium in Atlanta, Georgia. – Photo courtesy of the VMI Shepherd Poverty Program.

serves foreign-born women who are victims of human trafficking or domestic violence.

Alexander, who is pondering a career as a lawyer, worked this summer as a legal advocate in Tapestri's domestic violence department. "Working with the victims of domestic violence is an experience I will remember forever," she wrote. "The majority of the women have experienced abuse most of us could not imagine, and yet they continue to move forward."

Alexander assisted a woman who was kicked out of her home by an abusive husband, who left her without her personal belongings and access to her children. Alexander and others at Tapestri helped the woman to receive a temporary protective order, through which she also received custody of her children.

Next, Tapestri staff will help the woman, who is not a U.S. citizen, apply for a temporary visa through the Violence Against Women Act. The visa, if approved, will pave the way toward a green card and work permit.

Alexander said that she's learned that escaping abuse, particularly for women who do not speak English, is a long and difficult process.

"Tapestri has taught me how complicated the world really is, and how difficult it can be for individuals to overcome ... boundaries," she wrote.

"There are so many barriers for immigrant women who are victims of domestic violence, and the language barrier is only one of them," Alexander continued.

"Learning about these barriers has certainly opened my eyes to the world, and to see these women overcome the boundaries amazes me and gives me hope."

Also participating in the Shepherd program internships this summer were Amanda Smith '17, a biology major who worked at the Cleveland Clinic in Cleveland, Ohio; Angelique Barlow '17, a biology major whose internship was with the Christian Appalachian Project in Mt. Vernon, Kentucky; and Bria Anderson '18, an international studies and political science major who was with Code Interactive in the Bronx.

All of the interns have either taken a required class, Poverty and Human Capability, or will do so upon conclusion of their internship.

To see the slide show, visit VMINews.tumblr.com, post date Aug. 16.

Piegari Launches VMI Campaign's Faculty Initiative

By Scott Belliveau '83, VMI Foundation

George Piegari, a member of the VMI Foundation Board of Trustees, spoke briefly at the General Faculty and Staff meeting Aug. 22 in Marshall Hall. The purpose of his appearance was to announce the beginning of the Faculty-Staff Initiative, a special effort within the context of An Uncommon Purpose: A Glorious Past, A Brilliant Future: The Campaign for VMI to engage those who work at VMI to support it.

In his remarks, Piegari, who retired from the VMI faculty after many years of service, thanked his former colleagues for "inspiring me to be the best professor and mentor I could be" and described the importance of the faculty and staff to the Institute, especially to its cadets.

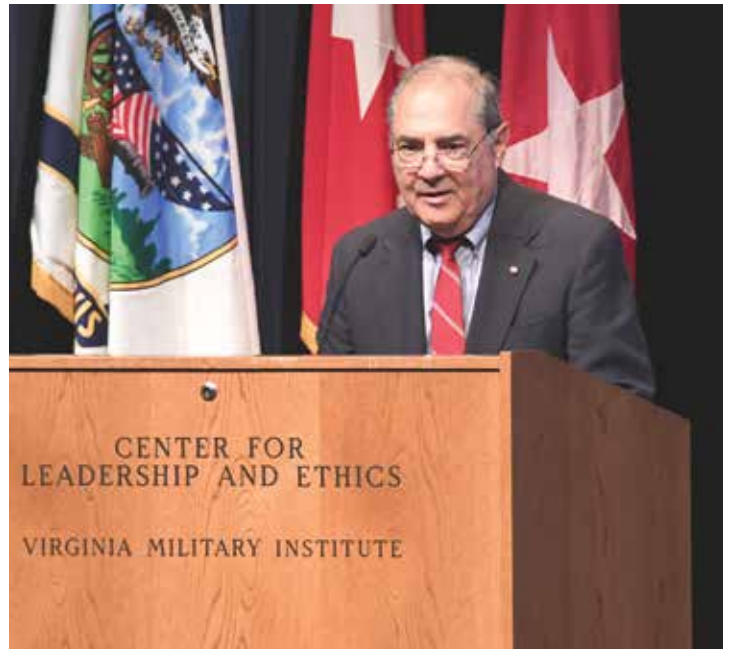
"The VMI mission truly is uncommon, the cadets are a remarkable group of young leaders, and it is you, the faculty and staff, who make all the difference in a cadet's development," said Piegari.

From his new perspective on the Foundation Board, he noted, he has learned about what motivates donors to give, specifically those who have provided the more than \$300 million in gifts and commitments already made to the campaign.

"People believe in VMI and in what you do every day in the classroom, on the field and on the court, in laboratories and offices, and out on the road. They believe – and so they give," he said.

Piegari outlined three reasons why the faculty and staff should participate. "First, because you, too, believe in VMI. Second, because you are closest to this place, your support of it is the strongest testimony you can offer about the important work you and your colleagues do. Third, I believe – and it really is true – that all gifts make a difference, no matter the amount."

Piegari concluded his remarks by saying that a high rate of participation by the faculty and staff also would send a strong message to other members of the VMI community. "The faculty and staff are closest to cadets. Think of what a powerful statement it would make if you supported it 100 percent."



George Piegari addresses the VMI faculty and staff in Gillis Theater. – VMI Photo by Kelly Nye.

"All of us at the campaign are grateful to George Piegari for his willingness to make the case for faculty and staff participation in this effort," said Brian Scott Crockett, CEO of the VMI Foundation. "His decades-long record of giving as an active professor and an emeritus professor makes him a true example of consistent and generous support of the Institute.

"We also are thankful for all that the men and women who make up VMI's faculty and staff do for the Institute and its cadets and for their consideration of how they can participate in this campaign," Crockett concluded.

Cadet Attends National Honors Council Parks Program

By Chris Floyd

Basim Khan '18 probably wasn't the only VMI cadet who went hiking this summer, but he was the only one who did it as part of an honors program.

Khan was selected to participate in the National Collegiate Honors Council's Partners in the Parks program and spent a portion of his summer along the Appalachian Trail near Harper's Ferry, West Virginia.

"The Partners in the Parks trip was a fulfilling experience," said Khan, who also spent part of his summer at Fort Benning, Georgia, attending Air Assault School. "I got to learn and work alongside honors students from different schools, as well as our two knowledgeable and supportive faculty mentors."



Basim Khan '18 hikes the Appalachian Trail with another Partners in the Parks participant. - Photo courtesy of Christina McIntyre.

One of those mentors was Christina McIntyre, associate director of university honors at Virginia Tech. She had nothing but praise for Khan and his contributions to the program.

"His attitude and physical ability were [helpful] to those who were new to backpacking and the physical rigors that come with

this experience," said McIntyre. "Bas was my 'go to' when I needed something done quickly. [He] represented Virginia Military Institute in a very positive light."

Partners in the Parks brought honors students from across the country to Harper's Ferry, where they learned about the conservation and management of the 2,185-mile trail that stretches from Georgia to Maine. Khan noted that the week-long experience included instruction from a team of park rangers, who taught participants about the history, biology, and conservation of the Appalachian Trail.

Khan and his fellow honors students were also part of a community-service project and were able to interact with other hikers on the trail. Nightly campfire discussions wrapped up each day, often focusing on the day's excursions.

It was during one such excursion that Khan, a biology major who plans on commissioning into the Army upon graduation from VMI, ran into a difficulty.

The group set out for a two-day hike along the Appalachian Trail, and when it was time to set up camp for the night, Khan and his partner from the University of Florida realized that the latter had forgotten to pack the tent. No problem.

"He was upset with himself, and he apologized profusely," said Khan. "But I really didn't mind because I was used to sleeping outdoors without a tent during our FTX exercises back at VMI. I told him we'd just figure something out for the night."

Using some paracord he had packed, Khan rigged up a shelter with a poncho and a plastic trash bag. The refuge was just wide enough to cover the duo, and that proved fortunate when the rains came that night.

"There was substantial rain, [but] our hooch held up and kept us dry," said Khan.

"That really demonstrates Bas' character," said McIntyre, who noted that Khan's group elected him spokesman for their reports. "He demonstrated leadership beyond just the physical."

Despite the mishap on the hiking trip, Khan was thrilled with his Partners in the Parks experience.

"I learned a lot about the National Park System and its purpose, particularly about the myriad ... career opportunities the organization provides," said Khan. "By the time the program came to a close, everyone was reluctant to say goodbye. ... It was a great time, and I intend to sign up for another PITP trip next summer."



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Energy from Carbon Dioxide?

Cadets and Chemistry Professor on Quest to Turn Greenhouse Gas into Fuel

Kelly Nye

Sometimes chemistry projects teach cadets life lessons as well as new science. This summer, Maj. Dan Harrison '05 and two cadets, Samantha Shepherd '18 and Daniel Chisner '19, have learned lessons in delayed gratification.

The long-term goal of their project is to make solar fuels out of carbon dioxide (CO₂), a process similar to photosynthesis, in which plants use light, CO₂, and water to create chemical energy. In the same way, Harrison and his cadets are developing a process to use CO₂ to create fuel. It essentially creates energy out of thin air – part of it, anyway – and there is too much of that part, CO₂. That excess CO₂ has contributed to the greenhouse effect, and using some of it up could be a step toward decreasing the effects of global warming.

“The goal is to create a carbon-neutral society,” said Chisner, who worked this summer under a Summer Undergraduate Research Institute grant. “So the amount of CO₂ that you’re emitting is being pumped back in and ... used after you burn off the fuel that you created.”

But the cadets are still in the building blocks stage.

Shepherd and Chisner will finish at VMI long before any solar fuels are created, and future chemistry majors will work with Harrison to build upon the information they discover. Harrison has no shortage of subprojects to occupy cadets along the way. And as they work on their subproject, Shepherd and Chisner are learning the skills necessary to analyze the theory and to become scientists.

“So we teach them the skills and that just becomes second nature, and then they actually begin to think deeply about the projects,” said Harrison. “And then eventually they begin to develop the projects. They become our colleagues rather than our students; they teach us about these things.”

Shepherd and Chisner, though in different stages of the process, started by making the materials that will produce electro-polymers. Electro-polymers are essentially chains of molecules created using electricity in a process called polymerization.

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Maj. Dan Harrison '05 supervises Daniel Chisner '19 and Samantha Shepherd '18 in the chemistry lab. – VMI Photo by Kelly Nye.

Shepherd used chromatography to separate impurities in the material. She also looked for a way to attach a catalyst within the electro-polymer, which is necessary to convert the carbon dioxide into fuel, by using transition metals. Chisner created compounds similar to Shepherd’s but with additional carbon atoms, which can completely change electro-polymers’ properties.

Then both of them studied the stability and catalytic activity of the new compounds.

“And because we have this broad range of things that they’ve made, we’ll get a really

good understanding of how they behave,” added Harrison.

Shepherd also used compounds that she created during her SURI project last year, some of them previously unknown. This year her work was supported by the chemistry department’s Summer Undergraduate Research Program under the SURI umbrella. She and Chisner will continue work with Harrison on the project in the fall.

When Chisner graduates, he will commission into the Marine Corps and hopes to continue to do work in chemistry later. Shepherd hopes to work for the Department of Defense one day, and she plans to earn her doctorate so she can work in synthesizing explosives.

Both are pleased to be working on a project that could have a real effect on the environment.

“You’re always really excited to get on with you’re next project because you know eventually it could probably help save the world,” said Chisner.

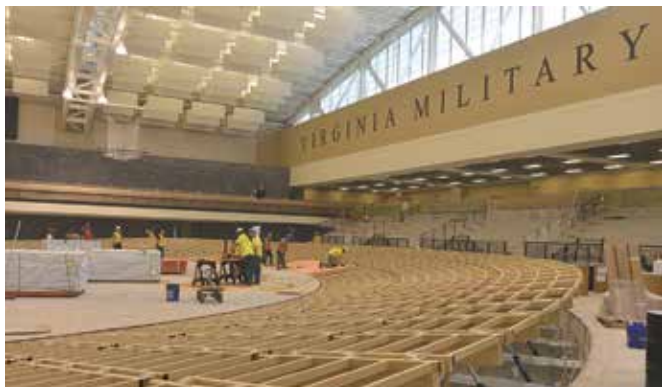
And they are not discouraged by how long the project will take.

“If someone comes along and gets it done based on our help, ... then that’s amazing to me,” said Shepherd.



Maj. Dan Harrison and Samantha Shepherd inspect ligand molecules. – VMI Photo by Kelly Nye.

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New Facilities

Construction crews make rapid progress on the Indoor Training Facility (above) and Cocke Hall (below). The Cocke Hall renovations are expected to wrap up in September and Indoor Training Facility construction is expected to be complete later this semester. - *VMI Photos by John Robertson IV and Kelly Nye.*

