

10 QUESTIONS

FROM BOOTS
TO SUITS

FEATURE

BRAVE
FACES

FEATURE

SMARTER & SAFER
MILITARY

TECH HISTORY

FRAT BROTHERS
IN ARMS

GEORGIA TECH

ALUMNI MAG

VOLUME
90
NO. 2
2014

The
Military
Issue

STANDING TALL

Elite ROTC programs, cutting-edge defense research and battalions of alumni veterans keep Tech's ties to the military strong.



"It gives me great pleasure to help Tech students through scholarship support."

— Jane G. and John Q. Bullard Sr., IM 1943, MS IM 1947

John Bullard is a native Atlantan, successful entrepreneur, World War II veteran, and philanthropist. "I wanted to help Tech students to be able to stay in school and graduate," said Bullard. "As a student, it was not easy for me to come up with tuition, so I understand the challenges. I remember what that felt like."

Bullard attended Atlanta public schools, from Peeples Street Elementary through Boys' High. His father encouraged him to apply to Georgia Tech, and he made his son an offer: John could continue living at home at no expense if he could pay his own tuition.

In the fall of 1940, John Bullard entered Tech, joined the ROTC, and worked his way through to graduation in 1943. Soon after, he was drafted as a private and eventually served as an officer in the Army's 11th A/B Div., stationed in the Pacific Theater. He was discharged as a captain. After the war, Bullard returned to Atlanta and to Tech, earning a master's degree in 1947.

His professional career began at a company founded by a fellow Georgia Tech graduate, Eugene M. "Gene" Clary, GS 1932. Clary and Associates was a successful

Atlanta-based manufacturer's representative for top-of-the-line pumps and heating equipment, and it is where Bullard learned the business. After 15 years, he left Clary to start his own company, John Q. Bullard Associates.

He built something special. Over the last 40 years, the company has been a leader in providing the engineering, design-build, wholesale distribution, and service industries with a variety of products — from boilers and tankless water heaters to pumps, steam accessories, hydronic equipment, and cooling towers.

Bullard married Geraldine Rogers in 1951, and the couple had four children and six grandchildren. He was widowed in 2006 and later reconnected with, and ultimately married, his childhood sweetheart, Jane Graham O'Halloran. She shares Bullard's connection with and gratitude to Georgia Tech. His many gifts and commitments, including a recent gift of a life insurance policy and a charitable gift annuity, will provide endowed scholarship support for qualified, talented students facing financial need — for generations to come.



Founders' Council is the honorary society recognizing donors who have made estate or life-income gifts of \$25,000 or more for the support of Georgia Tech. For more information, please contact: 404.894.4678 • founderscouncil@dev.gatech.edu • www.development.gatech.edu

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CONTENTS

Co

features

VOLUME 90 NO.2 2014

BRAVE FACES

P 40

Tech alumni and students share how they served the call of duty in very different ways.

SMARTER & SAFER MILITARY

P 48

Many of the latest, cutting-edge technologies designed to help and protect our troops get their start in Tech labs.

G.T.R.O.T.C. N.O.W

P 56

Follow a day in the lives of two of the Institute's top ROTC Marine options.

departments



p 22



p 30



p 38



p 100

AROUND CAMPUS 010

- 012 **Talk of Tech** Students investigate the landscapes of war under their feet.
- 016 **Student News**
- 022 **10 Questions**
- 024 **Office Space** Dana Gordon, EE 89, runs a very tight ship as XO of the USS *Iwo Jima*.

ON THE FIELD 026

- 026 **Mr. Consistency** For Matt Kuchar, Mgt 00, the key to winning is approaching every golf tournament the same way.
- 028 **Athlete Profiles**

IN THE WORLD 030

- 030 **Dollars & Sense** Jaime Weston, Mgt 94, scored big when she landed a job with the NFL.
- 032 **Tech Hack**
- 034 **On The Job** Amy Vertrees, Bio 95, follows a call to care for those in harm's way.
- 036 **Jacket Copy** Excerpt from *The Lieutenant Don't Know* by Jeff Clement, ME 08.
- 038 **Balancing Act** Jenny Lentz Moore, AE 05, not only flies a F/A-18 Superhornet for the Navy, she's also a new mom.

ALUMNI HOUSE 066

- 068 **New Trustees Appointed**
- 070 **Wrecks at Work** Resources for veterans transitioning from "boots to suits."
- 072 **Travel**
- 074 **Affinity Groups** Why the GT Military Affinity Group is for more than just swapping war stories.

RAMBLIN' ROLL 076

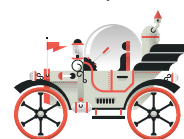
- 077 **Out & About**
- 080 **Weddings**
- 082 **Births**
- 084 **In Memoriam**

TECH HISTORY 100

- 100 **Memories** Two of the most powerful military officers in the world were fraternity brothers at Tech.
- 104 **Artifacts**
- 105 **Time Machine**

BACK PAGE 106

Preparing for the war we won't expect.



On the Cover: Andrew Townsend and Shelby Downing represent the elite students who make up Tech's ROTC programs today.

Tech's Military Tradition Leaves a Lasting Legacy

Georgia Tech's rich and longstanding military heritage is a legacy of both service and progress. In Bob Wallace's great history of Tech, *Dress Her in White and Gold*, he talks about the beginnings of Tech's engagement in the defense of our country. When the United States entered World War I, Georgia Tech offered its facilities "for any war work that might be needed." But the government replied that the education Tech provided was more critical to the nation than anything else the Institute could supply, and thus it should continue following its core mission.

Still, Tech soon began a number of special programs to support war efforts, including military aeronautics, radio communications, wireless telegraphy and even auto track construction. (I tried looking this term up but couldn't find it; I assume this refers to the development and operation of tank treads. Correct me if I'm wrong, alumni!)

In June of 1916, ROTC was established on campus. Georgia Tech's first ROTC commander arrived in December of 1917, and almost 100 years later, our ROTC programs still rank among the strongest in the nation. Georgia Tech's research program is also part and parcel of ensuring that our country remains a technological leader in defense matters. In 2013, Tech was granted more than \$300 million in research awards from the U.S. Air Force, Army, Navy and the Department of Defense, and that doesn't count other related work that we do for the NSA and other agencies. There are so many amazing stories to tell—including those involving alumni who've served our country in remarkable ways—that it's been quite a challenge to select which ones to fit into the 108 pages of this magazine. We hope

you enjoy the stories we've chosen to share, and what we couldn't will no doubt wind up in a future issue.

I also want to tend to a little business here as well. Our second annual Gold & White Honors Gala was finally held on March 25 after "Snowmageddon 2" delayed our planned February event. The gala came off beautifully, and we honored some of our incredible alumni and friends for their great service to Tech. We also raised more than \$400,000 for the Association's student programs, including the Student Alumni Association, the GT Student Foundation and the GT Ambassadors. These programs are building the future alumni leaders of Georgia Tech, and the caliber of our student members is striking. These young adults will inspire you and give you great hope for the future of America. Thanks to our great sponsors, including the Coca-Cola Company and Coca-Cola Enterprises, who presented the event. Please take a look at the enclosed booklet.

Finally, you'll note a couple changes on the masthead of the magazine. Roger Slavens has joined us as editor, and he brings more than 20 years of magazine and journalism experience to the role. His predecessor, Van Jensen, is off to follow a lifelong dream to write



comic books. He's now the co-writer for DC Comics' *The Flash* and *Green Lantern Corps*. Good luck to Van and welcome to Roger!

As always, thank you for your terrific support of Georgia Tech. Alumni are one of Tech's greatest assets, and you prove that fact day after day, year after year.

JOSEPH P. IRWIN, IM 80
PRESIDENT & CEO
GEORGIA TECH ALUMNI ASSOCIATION

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Just wanted to say thank you for putting together such an awesome publication. The magazine's design is phenomenal, the photography stunning and the content engaging. It's as good as Fast Company or Wired!"

Blake Perdue, MBA 09
Raleigh, N.C.

Gumball Before Cannonball

I guess Ed Bolian ("Gearing Up for a Cannonball Run," Vol. 90, No. 1) is too young to be aware of the original coast-to-coast race movie on which the *Cannonball Run* movies were undoubtedly based. This movie was *The Gumball Rally*, and it was released in 1976 starring a group of unknowns. It was a very funny movie and I would recommend it to anyone.

Pat McKeown, AE 65, MSIM 67
Fort Myers Beach, Fla.

Unsafe at High Speeds

The article on Ed Bolian's Cannonball Run effort was in poor taste and does not reflect positively on the Tech community. It should not be glorified. This act was dangerous and illegal. Driving at 150 mph in a car with a trunk full of gasoline isn't "handiwork"—it is idiotic. He should not be getting positive press from the Alumni Association.

Carson Olsheski, EAS 05
Atlanta

Fifth Street, Third House

The opening photo, "Fifth Street Bridge, Then and Now," (Vol. 90, No. 1) bears significant meaning for many Phi Sigma Kappa brothers. The house shown in the 1950 insert picture became our House No. 2 during the late 1950s when we enjoyed a major growth spurt. At that time we rented two houses from Georgia Tech. We later bought the property on Fifth Street, and the construction lot in the lower right corner of the "Now" picture was where our House No. 3 once sat. Lots of good memories for us, and we loved being on that "Entrance to Tech" corner.

Marvin Turner, ChE 58
Hixson, Tenn.



Gone to the Dogs



One Handsome Yearbook Photo

Great spring issue (Vol. 90, No. 1) of the *Alumni Magazine*! On Page 19, you feature the "Tech Pet Hall of Fame." However, I think you missed one. In the 1986 *Blueprint*, on Page 427, you will see my dog Shi Thead's senior photo. He was a campus favorite from 1980–1987. He lived at 773 Techwood Drive with me, and went to class, track practice and everywhere I went. We both "got out" of Tech with business degrees.

Bill Magee, IM 85
Rocky Face, Ga.

Dear Dearborn

Mojo, my 15-year-old lab/golden mix friend and I thoroughly enjoyed reading the latest issue. We particularly liked the article about the Dearborn Animal Clinic and Dr. Linda Ellington ("Home Sweet Dearborn," Vol. 90, No. 1). I grew up in Decatur, Ga., and I remember Dearborn well. Mojo received great treatment by Dr. Ellington.

The Rev. Dr. Jim (Joe) Watkins, IM 65
Pawleys Island, S.C.

More Animal Stories

Your animal-themed issue (Vol. 90, No. 1) was certainly interesting,

especially for a school that didn't place much emphasis on the life sciences when I attended. The collection of articles brought back several memories for me. For one, I remember Chai of Lambda Chi, who was quite a favorite of many students. Ask anyone who was in my sophomore physics class in 1970. Chai would come into the large lecture hall in the Physics Building after Dr. Goda began his lecture. The St. Bernard would lie down on the floor next to the lecture table, and promptly go to sleep for the rest of the class! Chai made us almost die of envy!

Also, the "Hedgehog Confidential" article didn't come close to the top story that I remember. Steve Engel, a member of the football team who lived in Towers Dorm our freshman year, had a pet snake—likely a pigmy python or boa constrictor. One day the dean of student housing, Jerry Purser, went into Scott's room to talk with him. As I remember the story, the snake was on top of his dresser (not in a cage), and Dean Purser, who was not very tall, stood at eye level with the snake. Fortunately, he never turned around and didn't see it!

Collins Nix, ISyE 73
Shreveport, La.

Want to get in touch? Send letters to: Editor, *Georgia Tech Alumni Magazine*, 190 North Ave. NW, Atlanta, GA 30313, or editor@alumni.gatech.edu. Comment at gtalumimag.com or at facebook.com/georgiatechalumni. View our letters to the editor policy at gtalumimag.com/letters-policy.



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Around CAMPUS



Under Our Feet





This wartime landscape may not look familiar, but it's ground that Georgia Tech students and faculty walk upon every day. Some 150 years ago, as Union troops marched on Atlanta, Confederate forces cleared the trees and erected fortifications across much of what is campus today.





Landscapes of War

 Roger Slavens

An architecture professor and her students investigate the Confederate fortifications that once resided where Tech stands today.



the Civil War. “We took a close look at why the Civil War is considered the first modern war,” Hollengreen says.

Luckily, her students didn’t keep their explorations of the subject to themselves. Encouraged by Hollengreen and joined by additional students intrigued by the fact Tech stands on historical ground, they developed a mixed-media installation called “Surface + Depth: Civil War History Under Our Feet” that was housed at the Clough Commons third-floor gallery last fall.

Here’s what the students discovered: Before the Union army under the command of Gen. William Tecumseh Sherman marched on Atlanta, Confederate forces expanded their defenses and dramatically altered the landscape where the main Georgia Tech campus now resides. Troops felled trees and set up large fortifications for protecting their defensive positions surrounding the city.

As part of the installation, Hollengreen wrote: *Today when we at Georgia Tech say*

that we must go or send something “up the hill” or that a decision will be made “on the hill,” we refer to the central academic administration of the Institute. Even after the war, hills remained

With the 150th anniversary of the surrender of Atlanta during the Civil War approaching on Sept. 2, 2014, a group of Georgia Tech architecture students has been exploring the history literally

underneath our feet. In associate professor Laura Hollengreen’s “Landscapes of War” seminar last year, students studied the importance of the physical, cultural and political landscapes of



the BASELINE

19,500

Number of gallons of rainwater a new cistern on Techwood Drive can collect.



10

Number of businesses on the Technology Association of Georgia’s “Top 40 Innovative Technology Company” list that are or have been part of Tech’s ATDC incubator program.



important as both literal and symbolic high points. During the war, the ridge of land that runs along the southern edge of campus, north of North Avenue, suggested itself to engineers as strategic, solidly defensible high ground. It featured at least four major forts east of Fort K at the corner of Peachtree Street and Ponce de Leon Avenue; Fort K occupied the highest hill in the area, commanding views over the landscape in every direction.

But there were also several forts located to the west on what is now Georgia Tech land. Holden Spaht, M CRP 08, M Arch 2014, plotted a line of forts over a current map of Tech's campus. To the west of "Fort K" stood: "Fort

Z," located near where Tech Tower is now, Fort Y in proximity to the current Student Center, and "Fort X" on Marietta Street where the Habersham Building now sits. Fort X—featured in the photograph on the preceding two-page spread—was the westernmost line of Atlanta's inner defenses.

Unfortunately for the South, these fortifications didn't come much into play, says Hollengreen. They were primarily a no man's land that prevented direct, frontal attacks that never came.

To avoid major loss of life of his Union troops following the bloody Battle of Kennesaw Mountain, Sherman instead put Atlanta under siege, bombarding it from a relatively safe

distance away. Artillery pummeled military and civilian targets while Sherman continued to try to cut off the Confederates' supply lines. Eventually Sherman succeeded, and the bulk of the Southern forces pulled out of the city. Those left brokered a surrender with the Union.

Hollengreen and her students hope their initial findings will seed a larger exhibition to be held this fall in conjunction with the sesquicentennial of the Confederates' surrender of Atlanta to Union forces. "However, it's a lot of work, and we could use help from others interested in the subject—alumni, Atlantans or anyone who cares about the history of the war and this place," Hollengreen says. ▲

OF COURSE: BEYOND STICKS & STONES

INTA 4011: Technology and Military Organization



Instructor:
S.E. Goodman

Objective: "Investigates the impact of technological developments on the evolution of military organization and on international conflict from the Battle of Agincourt (1415) to the Gulf War (1991)."

Prerequisites: None

Problem Question: "How did a large and rapidly expanding set of technologies qualitatively and quantitatively transform the economies and militaries of some of the most powerful countries across three stages of the Industrial Revolution?"

Course Project: "Examining such enormous scope, complexity and

importance with an eye for both the forest and the trees, students organize themselves into a working 'commission' to pursue their answer to the problem question. The policy-technology-implementation framework from the Sam Nunn Security Program is used to develop an explicit presentation of their solution."





Cyborg Drummer

Melissa Weinman

A robotic prosthesis built by Tech's Gil Weinberg keeps Jason Barnes banging away.

The nuanced improvisations of a jazz and blues drummer seem far more like art than science. But when Jason Barnes lost part of his right arm in a freak accident, it was science—specifically a first-of-its-kind robotic prosthesis—that helped him regain much of his musical abilities and, in some areas, even improved them.

Two years ago, Barnes was electrocuted at work by getting too close to power lines. His burns were so severe, doctors eventually had to amputate his right arm below the elbow. A student at the Atlanta Institute of Music and Media, Barnes was determined to get back behind the drums and he built his own prosthetic device shortly after the accident. Unfortunately, it wasn't very flexible, and he couldn't control the speed or bounce of the stick without a wrist or fingers.

Barnes was discouraged, but then discovered Gil Weinberg's work with robots and music, and wondered if the founding director of the Georgia Tech Center for Music Technology could help. Weinberg had previously built a robotic percussionist and marimba player that both use computer algorithms to play along with human musicians.

"I'm very interested in artificial creativity," Weinberg says. "And it was great to be able to apply my unique knowledge to help someone truly in need. Drumming has always been his life."

In accepting the challenge, Weinberg built upon his early work and took the idea of a drumming prosthesis a step further. He added a second stick and gave it a "musical brain," which takes cues from the human body as well as its own algorithms.



The robotic prosthesis has motors that power two drumsticks. One is controlled physically by the musician's arm, as well as electronically by electromyography sensors that respond to his biceps muscles. "Now I can flex and send signals to a computer that tightens or loosens the stick and controls the rebound," Barnes says.

Meanwhile, the other stick "listens" to the music being played and even improvises. "The second drumstick has a mind of its own," Weinberg says. "The drummer essentially becomes a cyborg. It's interesting to see Barnes playing and improvising with part of his arm that he doesn't totally control."

The robotic drumming arm has opened up new areas of research for Weinberg, who is using a National Science Foundation grant to expand the technology. He believes the underlying

anticipation algorithms have the potential to be employed by professionals—such as astronauts or surgeons—to perform complex, physical tasks in synchronization with robotic devices.

Weinberg aims to find ways to use human brain waves to control the drumming prosthesis, too. "We can look at what patterns happen in the drummer's brain and use this to drive the arm—to play ideas and patterns he's been thinking about," Weinberg says.

The technology also offers the possibility of enhancing humankind's natural capabilities. Because an embedded chip controls the speed of the drumsticks, the prosthesis can play two sticks at a different rhythm. It can also move the sticks faster than humanly possible. "I'll bet a lot of metal drummers might be jealous of what I can do now," Barnes says. ▲



the BASELINE

2,835

Number of undergrad and grad students who "got out" of Tech during the May 2014 commencement ceremonies.



28

Percent of batches of emergency contraceptive pills from Peru found by Tech chemistry researchers to be substandard or fakes.

Philanthropy at Work

“This scholarship lets me get a quality education, do something I love — and make my family proud.”

**Trae Golden,
STC 2014**

Holds the Garry Betty Scholarship in Men's Basketball, which was established in 2007 in memory of C. Garry Betty, ChE 1979.

Passed the 1,000-point mark for his career on November 24, 2013, and aspires to play basketball professionally.

Trae Golden is a leader on and off the court. He enjoys speaking to kids about life and basketball, and sees himself one day coaching and mentoring high school players. He's also a big fan of movies. Among his current favorites are Lone Survivor and The Wolf of Wall Street. Hometown: Powder Springs, Georgia

The goal of fully endowing athletic scholarships is a top priority for Campaign Georgia Tech, the \$1.5 billion effort to enable Georgia Tech to define the technological research university of the 21st century.



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2014 InVenture Prize Winners

Rebecca Bowen

A record 564 aspiring inventor-entrepreneurs set their sights on this year's InVenture Prize—Tech's annual undergrad innovation competition that awards the winning team with \$20K, a free U.S. patent filing and a spot in the Institute's startup accelerator program, Flashpoint.



These scholars proved to be brimming with more bright ideas than ever. “Our students are all very brilliant and most of them have a technical skillset, so the actual invention is the easy part,” says Christopher Reaves, Tech's director of undergraduate research and student innovation. “The hard part is the execution.”

Competitors attended workshops on team-building, motivation and intellectual property. They met with experts and conducted research to determine how much their product aligned with real-world needs. They fine-tuned their prototypes and practiced their pitches.

In the end, six finalists were chosen to convince a panel of judges their products could truly change people's lives. These weren't glamorous fantasies of hoverboards or Iron Man suits (we're waiting, Nick Selby!), but practical solutions to real-world problems: a portable sanitary toilet, a more soothing pacifier, a comfortable crutch, a sleep apnea aid, a music trainer, a safer stroller.

WINNER - SAFICHOO TOILET

Developed by Jasmine Burton (ID), Erin Cobb (ID 14), Brandie Banner (CE)

“If you know right now where the closest bathroom is, you are among the world's privileged half that has continual access to a toilet,” says Jasmine Burton. In the

developing world, she adds, most people use pit latrines—mere holes in the ground, prone to overflow.

Such conditions contribute to diseases that kill an average of 4,000 children per day, according to the World Health Organization. Team Sanivation decided to develop a way to prevent this problem,

rather than treating it after the fact.

Burton and her teammates focused on a specific use case: Muslim refugee camps in Kenya, where squatting to use the bathroom—rather than sitting—is the cultural norm. The team's SafiChoo (“clean toilet” in Swahili) mobile toilet is an aboveground structure that separates waste via a simple



the BASELINE

\$31K

Money awarded by the Student Alumni Association to Klemis Kitchen, a new campus effort that will provide meals to students in need.



2

Number of Tech students—Thomas F. Kieffer and Mohamad Ali Najja—who earned a prestigious Goldwater Scholarship in science and engineering.

system of filtered drawers made from chicken wire and cheesecloth. Separated waste contains fewer pathogens, and can be turned into biomass energy briquettes.

"There are a lot of creative ways to treat waste, but it's not sustainable," Burton says. "We had to figure out what is feasible in the real world. For example, if it breaks, can people buy the materials to fix it?"

Team Sanivation took both the top prize and the \$5,000 People's Choice Award, with the monies helping fund a pilot program at the Kakuma refugee camp in Kenya. "We have to source the materials, build the 10 to 20 working prototypes and test them in the camp before the end of June," Burton says. "It's a fast turn around, but we're excited."

"We had to figure out what is feasible in the real world. For example, if it breaks, can people buy the materials to fix it?"

RUNNERUP: SUCETTE SMART SOOTHER

Developed by Rachel Ford (BME), Esteban Ongini (BME), Will McAllister (BME)

Despite 60 years of research associating pacifier usage with skeletal and dental problems, as well as speech impediments, team Sucette Smart Soother says the convex bubble shapes of popular models remain overly obstructive. They even popped a few of these pacifiers in their own mouths to test them out. "They didn't feel right," says team member Will McAllister. "Why do you want something that big and bulky to sit in your child's mouth?" The team engineered a smaller, concave design that positions the tongue in the middle of the baby's mouth and even changes color to warn of fever. In addition to a free U.S. patent filing and a spot in Flashpoint,

the team earned \$10,000 to put toward a manufacturing scale-up and experimental trials.

THE BETTER WALK CRUTCH

Developed by Partha Unnava (BME), Frankie Swindell (BME 14), Andrew Varghese (BME 14)

Partha Unnava knows first-hand (or perhaps, first underarm) how uncomfortable crutches can be. After breaking his ankle playing basketball, the biomedical engineering student spent six weeks hobbling around in pain. ("Ever hung your arm over the back of the chair, and it gets numb?" he asks. "If you rest on your crutches too long you get that feeling every single day,

all of the time.") So he and his fellow biomedical engineering students fashioned the Better Walk Crutch, which spreads resting weight over the forearms and side stability pieces. "The product is almost 100 percent ready," Unnava says. "Late this year is when we'll be able to start delivering crutches to hospitals."

SLEEPWELL SLEEPWEAR

Developed by Geries AbuAkel (EE 14), Michael Duke (BME 13), Dershika Patel (BME 13), Saranya Karthikeyan (BME 14)

For the millions of Americans with sleep apnea, treatment often involves invasive surgery or annoying CPAP machines. Team Lights Out discovered symptoms can be reduced by as much as 60 percent by changing the resting position, and looked for a way to nudge people back to a good night's sleep. The students conceived

a T-shirt with sensors that detect when users are sleeping on their backs; this activates an air bladder, which swells and rolls them onto their sides. Team Lights Out is working with the Emory Sleep Center to further refine the product.

ENLIGHTEN MUSIC TRAINER

Developed by Richie Choy (CE 13), Jacob Howard (EE 14), Ian MacKenzie (EE 13), Garrett Wade (EE 14)

Learning to play guitar isn't easy. It can involve months of expensive lessons and frustrating practice before you remotely sound like a guitar hero. To combat the kind of discouragement that often leads beginners to abandon their axes, Team Guitar Guys created the Enlighten Music Trainer. It's a modular learning tool that uses LED technology to guide players' fingers along the fretboard. The team is working to market the product through guitar trade magazines, and hopes to expand this technology to other instruments.

UPSADAZY STROLLER ATTACHMENT

Developed by Zachary Churney (ME 13), Charlie Lemons (ME 13), James Hess (ME 13) and AJ Yllander (EE)

During the InVenture Prize finals, team Upsadazy rolled a clip of someone hastily dragging a baby stroller up outdoor steps, its wheels banging against the concrete before tumbling over. The audience laughed at the graceless, infomercial-like slapstick—but team member Zachary Churney was impassioned. "Currently, going up and down stairs with a stroller is extremely unsafe," he said, noting that every hour, a child is injured from being carried in such a manner. To remedy this, he and his teammates developed an electrically powered stroller attachment that allows you to more easily climb and descend steps with a baby in tow. The team is currently meeting with manufacturers and distributors to create a second, lighter prototype. ▲



10/1/14

Date Georgia Tech will go completely tobacco and smoke free.

6

Overall ranking of the College of Engineering's graduate programs, with 11 specialty programs ranked in their respective top 10, according to U.S. News & World Report.



Fourth (Year) and Goal

✍ Roger Slavens

Over the past four years, the *Alumni Magazine* has closely followed the progress of several exceptional students in Tech's Freshman Class of 2010. Their senior year proved to be a memorable one filled with challenging coursework, rewarding internships, exciting research projects, and even a little bit of Ultimate Frisbee. Some of them finally "got out" of Tech last month, while a few still have a little more work to do.

Anirudh Sundararaghavan, BME 14

How do you feel about finally "getting out" of Tech? As my time at Tech came to an end, I have definitely been feeling



nostalgic. Over the past four years, I've been able to study abroad, intern at a hospital in India, do undergraduate

cancer research, apply for a patent and meet some amazing people along the way. However, I am definitely looking forward to beginning the next chapter of my life.

What is that next chapter? I took the MCAT last summer and the application process to med school is nearly complete. The internship I had last year in India had a lot to do with it. I was able to work in the general surgery department of a hospital and witness many major surgeries that cemented my interest. I was also able to volunteer at various community health centers in the region, and seeing the lengths that volunteer doctors went to give people a better life was truly inspirational.

What will you miss most at Tech? I was lucky enough to have made many friends at Tech who have served as a

great support group throughout my college career—especially my fraternity brothers at Delta Chi.

Lily Ponitz, EnvE 14

How's your final year at Tech been? I took lighter course loads in my fourth and final year at Tech, so I had more time to dedicate to relaxing, hanging out with friends, working out and playing Ultimate Frisbee. I didn't really plan for this to be an easier year, but I'm glad it turned out that way. I came into Tech with 17 credit hours, which shaved a semester off.



Proving once again how smart Tech students are. Well, it hasn't all been loafing. I had a great experience last summer intern-

ing for an engineering firm called CH2M HILL, and it really helped me refine my career goals.

What's next for you? After graduation, I'm moving to northern Virginia to start a job as a water resources engineer for Arcadis in Arlington. I've had an amazing time here and will miss Georgia Tech and Atlanta dearly, but I am really

looking forward to living in the Washington, D.C., area.

Norquata D. Allen, AE 15 (May)

Has this year been easy for you?

I wish! This past year I finished my fourth co-op rotation with Delta Air Lines, joined a sorority, became



a Georgia Tech Ambassador, and essentially went for broke at the new food trucks on campus. I must say, having new

food on campus has been the highlight of my semester!

What's surprised you the most during this time? I let go of the obsession with grades and geared myself more towards learning. Once you become a senior, you realize that with satisfactory completion of your courses, your GPA isn't really going to move. At this point, learning trumps all.

What comes next? I'm going to be conducting optics research in Paris this summer as part of an International REU with the University of Michigan. It's not only a much needed break from the rigorous coursework



20x

How much better a new polymer thermal interface material, developed by Tech researchers, can conduct heat than the original polymer.



838

Number of alumni who attended the 31st annual Georgia Tech Alumni Career Fair on May 13.

of Tech, but a completely new experience as I have not conducted research before. Besides that, I am excited for senior design in the fall. Hopefully, the stars will align and I will graduate in May 2015 as a HELLUVA ENGINEER!

Michael Jasper, ME 14

What thing surprised you the most about your final year? Georgia Tech helped me form a more sophisticated view of civic service. A lot of high school students (myself included) think of community service as picking up



trash or working at the soup kitchen. That's a good start, but Tech students and alumni have to be leaders in service. That means taking the next step and using our problem-solving skills to develop more sustainable solutions.

Have any of your career goals changed since you were a freshman? I think I'm in the minority of Tech students in that the major I wrote on my freshman application is ultimately the degree I graduated with. However, to be fair, mechanical engineering is a very broad field and I've come to prefer some subjects to others.

"Tech students and alumni have to be leaders in service. That means taking the next step and using our problem-solving skills to develop more sustainable solutions."

Is there any advice you'd give to incoming freshman? I'm happy that I "got out" of Tech, but I wish I had known how quickly the last four years

would go by. You've really got to seize opportunities early, especially for things like study abroad programs. I always assumed there would be time next semester or next summer, but I let a lot of really great things pass me by with that way of thinking.

Hope Brown, ChE 14 (December)

You're getting close to graduating; is the end in sight? I'm excited to finally get out this December, but I'm definitely a little scared of the real world. I plan to intern this summer and finish up the chemical engineering curriculum this fall. And while



I'm hoping to strengthen my relationships with my bosses and my teachers, I am really looking forward to a relaxing fall semester. If all goes according to plan, I will be only taking seven credit hours, which should leave time for my job search.

You say you need a break; has this past year been difficult? It's been a challenge to stay positive throughout all the struggles that being a student at Tech brings. But I have definitely grown because of these struggles and I'm happy that I'm still on track.

What's the most important thing you've learned? It's amazing how much coffee I can drink and how little sleep I actually need!

Ronnie Foreman, AE 14 (December)

Did you have a good year? My senior year has absolutely been the best yet. Over the summer, I had the privilege of working



with Dr. Joseph Saleh in the aerospace department on some fascinating research, for which I was recently awarded the College of Engineering Outstanding Undergraduate Researcher in Aerospace Award. I grew tremendously as a student by working with him, and I can now confidently say that my plans will involve graduate school. I still want to be an astronaut. And to be honest, after 21 years, I doubt that that will ever change—it's pretty much Mars or bust.

But we heard this past winter was even better. Right! In early December I took off for a different research trip to Antarctica. From studying penguin hydrodynamics to camping out on the ice, it was the most amazing adventure I've ever been on. President G.P. "Bud" Peterson even sent me with a Georgia Tech flag to fly down there in the deep-DEEP south. He was incredibly encouraging of my research project, and it was such a privilege to take our colors with me.

What do you have left before you graduate this coming winter? I'll be interning for SpaceX this summer, and I cannot wait to head out to Los Angeles. It's such a privilege to be working with them and I'm eager to get started. After that, I'm heading back to Tech for a victory lap before I graduate in December. Tech has given me the most phenomenal opportunities, and I can't wait to see where my experiences take me next. Wherever that is, I'll be taking my white and old gold with me! ▲



Hats Off to Veterans

Georgia Tech has partnered with Operation Hat Trick and the '47 Brand to offer a variety of specially designed baseball hats—including one in a classic camouflage pattern—that let alumni show off their school pride while helping wounded military veterans.



Ten percent of all Operation Hat Trick sales go to the Veterans Affairs General Post Fund, which provides assistance to wounded vets for their care and

rehabilitation. In addition to showcasing the GT logo on the front, the hats are also emblazoned with the OHT logo on the back. Currently more than 100 universities,

colleges and schools nationwide participate in the OHT program.

You can order Georgia Tech OHT hats online at www.gatech.bncollege.com. ▲



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Matt Rawlins

President, Rawlins Mechanical

2013 Project Management Certificate



From Boots to Suits

Suzanne McAuliffe

As a retired Army lieutenant colonel, James Wilburn understands firsthand the challenges of transitioning from the military to civilian employment. That's why one of his first priorities as the military academic program director for Georgia Tech Professional Education was to launch the Veterans Education Training and Transition Program (VET²)—among the first of its kind in the nation—last August. He spoke with the *Alumni Magazine* about how this program is changing lives.

Why is this type of continuing education important to Georgia Tech?

The high unemployment rate for veterans is a national concern, and the challenge veterans face in successfully transitioning to the civilian workforce will remain in the spotlight as the size of our military is reduced to pre-World War II levels. With so many of our veterans deciding to make Georgia their home, the Institute's president has put a high priority on veteran outreach, access to jobs and success.

How did you come up with the nickname VET²?

VET², pronounced "V-E-T squared," signifies the academic training and job transition aspects of the program while capitalizing on Georgia Tech's roots in engineering. It was a fun way to blend the uniqueness of this program with a mathematical twist.

What is the program designed to do?

At the most basic level, our goal is to help veterans find good jobs after leaving the military. While there is no shortage of resources to help with the transition, the services tend to be spread out and difficult to access. Some offer help with resumes and interviewing. Others provide a credential or certificate. And there are plenty of support networks as well. Our program offers all this in one place. We also help veterans understand the differences between the military and civilian workplace and how to make the

necessary adjustments so they can be successful in an office environment.

What key obstacles do veterans face when making the boots-to-suits transition?

Once veterans get past resume preparation and interviewing, the top challenges are social integration in the workplace, interpersonal communication and how they present themselves to employers. These three issues were the driving force behind the creation of VET².

How does the program work?

We partner with corporate sponsors interested in hiring former military members for specific positions. The basic program consists of a four-week curriculum that includes an academic and placement phase. The first week is the familiarization phase in which students learn about their corporate sponsors. The next three weeks focus on socialization, communication and presentation. During that time, veterans are paid to work a 40-hour week at the employer's office and participate in online coursework at night. We also have customized programs through a partnership with the nonprofit Workforce Opportunity Services for companies wishing to develop a skill set not immediately available in the workforce.

What's the cost?

There is no cost to veterans. The corporate partner pays the cost of

tuition and the hourly wage for the internship.

Who is eligible to participate?

We recommend that those who apply have at least four years of military service, although this requirement can be waived. Most participants are post-9/11 veterans.

Is there a competitive selection process for a limited number of slots?

It is a very competitive program with a 16 percent selection rate. I try to offer the four-week program at least once every other month, but the availability of slots depends on the hiring needs of the corporate sponsors. We give feedback to those who apply but are not selected, and we work with other organizations to help these individuals increase their marketability. No one gets left behind.

What is your success rate?

All of our veterans are employed as a result of the program. We have a 100 percent completion and retention rate.

What's the most important advice you received during your military transition that you want to share with others?

You will need to adapt to be successful, but never deviate from the value system you practiced while wearing the uniform: loyalty, duty, respect for others, selfless service, honor, integrity and personal courage. ▲





 Jennifer Chappell Smith

Running a Tight Ship

Managing any kind of enterprise has its challenges. But try putting it afloat, then feeding and providing sleeping quarters for 3,200 of your closest colleagues—all while keeping them ready for combat or humanitarian relief missions. That's just part of what Capt. Dana R. Gordon, EE 89, does as executive officer of the U.S.S. *Iwo Jima*—a Landing Helicopter Dock class amphibious assault carrier in the U.S. Navy fleet. Gordon's job description may sound simple and straightforward: As the Executive Officer (XO) he runs the day-to-day operations of the ship. "But it's far more complex than I could have ever imagined," Gordon says.

The Tech alumnus and Columbia, S.C., native manages 16 different units on the ship and directly oversees a cadre of department heads, officers and chief petty officers. He's responsible for the 1,100 Navy sailors on board, who in turn are responsible for feeding and housing the 2,100 Marines who man the ship's aircraft and amphibious assault vehicles. Gordon's sailors also run the ship's propulsion plants, provide fuel, repair and maintain the ship and aircraft, and offer medical and dental care to everyone aboard. Talk about logistics.

role. As CO, he will then have full command of the 40,000-ton, 884-foot long ship—which is equipped for missions ranging from Marine combat to disaster relief—for another 18 months.

Charged with getting the best performance from the crew and protecting their welfare, the long-time aviator trained for a year to learn how to drive the ship and understand its various systems. Now he knows not only how to handle the carrier, but also how to provide the roughly 10,000 pounds of food per day to feed the full crew—including

great pass that led to a successful basket," he says, reminiscing about his college days shooting hoops with friends on campus. "That's what I get most out of this job as XO and eventually as the CO—the satisfaction of seeing those who work for me succeed."

His current work to-do list includes relocating the *Iwo Jima*, its crew and their families from Norfolk, Va., to Jacksonville, Fla.—part of an initiative to disperse Navy assets along the East Coast. The change will reunite Gordon with his wife and two daughters, who stayed at their home in Jacksonville during his various assignments in recent years.

As he works toward his eventual role as CO of the *Iwo Jima*, Gordon credits his education, experiences and NROTC training at Georgia Tech for fostering the right mentality to help him take on his unique, high-level workplace challenges. The deductive reasoning and problem solving skills he learned while studying to be an engineer stick with him today, and his rigorous education prepared him to memorize the intricate systems on which his life depended as a pilot and, now, as XO of a combat-ready ship.

"Tech is a tough school, but that foundation and hard work clearly prepared me for this role," Gordon says. "That mindset of getting things done—and done well—certainly started there." ▲

"Tech is a tough school, but that foundation and hard work clearly prepared me for this role."

A heavily decorated Naval officer as a helicopter pilot and helicopter squadron commander, Gordon has made his workplace on the high seas and the skies above it—working on five continents and in 17 countries, and sailing on every major ocean except the Arctic during his 24-year Naval career. That's one way to avoid the typical office view.

Gordon is halfway through his 18-month stint as XO of the *Iwo Jima*, training under the current commanding officer (CO) to eventually rotate into that

ing supplies for the 18,000 pancakes per month that keep his sailors happy.

Despite his Navy ROTC training at Tech and his extensive Naval experience, nothing prepared Gordon for the level of problem solving required to manage the equipment and personnel on the *Iwo Jima*. "There really is no training for it anywhere," he says. "My role demands incredible levels of coordination and a ton of teamwork."

Gordon likens his role to that of an NBA point guard. "I always loved the





Mr. Consistency

Roger Slavens

Former Tech golf star Matt Kuchar, Mgt 00, leads the PGA Tour with nine Top 10 finishes so far this year. And in four consecutive tournaments, the pro called “Kuch” by his fans found himself with at least a share of the Sunday lead—ultimately winning the RBC Heritage championship on a gutsy chip-in on the last hole. *The Alumni Magazine* recently caught up with Kuchar to get his take on why he’s been such a force on the course of late.

You’re currently ranked No. 3 in the FedEx Cup standings and No. 4 in the Official World Golf Rankings—you must be doing something right. What’s the secret to your recent success?

The last couple of years my game has gotten better and I’ve established a more consistent swing, thanks to my instructor Chris O’Connell. A few years ago I was introduced to Chris through Matt Weibring [Mgt 02], a close friend and former Tech teammate. Chris and I have put in a lot of work together to make my golf swing as stable and repeatable as possible, and he’s helped me take it to a completely new place.

in a row I had at least a share of the lead. I really came close in Houston [at the Shell Houston Open] where I had a one-shot lead heading into the 18th hole but lost to Matt Jones with his dramatic chip-in. Needless to say, losing that tournament bummed me out. It’s a really tough thing to win on the PGA Tour, so I’ll take a win whenever I can get one.

You’ve set the bar high with your performance so far; what do you hope to achieve the rest of the season?

I just want to keep playing strong. I don’t set exact goals with my golf game. There are so many things that you can’t control,

like a lot, but half a shot off your score per round of golf adds up to two full shots lower over the course of a tournament—that’s a really big deal.

How about for your career?

I approach every tournament as if it’s a major championship. Everybody sets their goals on winning a major, like The Masters. But the more I treat every tournament the same, the more I’m likely to win—whether it’s a regular tournament or a major. I play to win every tournament I enter.

Do you have a favorite tournament or course?

Hilton Head, where I won the RBC Heritage, is one of my favorite destinations, and Harbour Town at Sea Pines is probably my favorite course. The Heritage tournament always has a great atmosphere with great fans.

Besides developing your game at Tech, what’s the most important thing you learned while you were a student that helps you succeed as a pro golfer today?

I’d say time management. There’s so much thrown at you at GT, especially being an athlete, that you have to become very good at balancing all your responsibilities. That’s a critical part of being a professional golfer because you have so

“The more I treat every tournament the same, the more I’m likely to win—whether it’s a regular tournament or a major. I play to win every tournament I enter.”

What has been your most memorable moment of the golf season so far?

Definitely the chip-in to win the RBC Heritage. Three weeks in a row I had good chances to win, and four Sundays

and it’s not healthy to focus on winning a certain tournament. My overall goal is to continually improve. But playing at this level, those improvements are small and hard to come by. It may not sound



the BASELINE

3 Number of Yellow Jackets selected in the 2014 NFL Draft, including Jeremiah Attaochu (2nd round), Jemea Thomas (6th) and Brandon Watts (7th).



14 Number of Georgia Tech’s varsity sports that improved or equaled their Academic Progress Report scores from the previous year.



many demands on your time, including media interviews, charity events and the tournaments themselves.

Have you been following the success of the Tech men's golf program this year?

I'm very proud of the team. I'm particularly

happy that Coach Bruce Heppler has continued a tradition of excellence. He's racked up so many ACC titles and top 5 NCAA teams. That's really hard to do year after year.

You've been very supportive of Tech with your time and money—why?

What I got out of Tech was so valuable; it was such a great experience. My education and experiences there helped develop me into the person I am on and off the course. I knew that when I got out, I hoped I'd be able to give back. I know there were alumni ahead of me who gave back that helped pave the path for me and my classmates, and I'm happy to do the same. My wife, Sybi [Mgt 99], is also an alum and we're a very strong Tech family. We love the school.

TECH MEN'S GOLF TEAM STINGS ACC

The Yellow Jackets won their 15th Atlantic Coast Conference Men's Golf Championship this year, and seven of the last nine under Coach Bruce Heppler. In addition, Ollie Schniederjans led wire-to-wire to win the

tournament's medalist honors, and wound up capturing the crown as the ACC Men's Player of the Year. He's also one of three finalists for the 2014 Ben Hogan Award, given to the NCAA's overall top golfer. Meanwhile,

Coach Heppler was named ACC Coach of the Year for the eighth time. Tech was ranked No. 4 in the country as it headed into the NCAA Championship, but lost its quarterfinal match against the second-ranked Oklahoma State Cowboys.

Final question: Sybi was an excellent tennis player at Tech. But who is better—you at tennis, or your wife at golf?

(Laughing) I'm a pretty good tennis player—better than she is a golfer. Tennis is a fun thing for us to share together, and it's a nice break from golf. It's also something we're able to share with our boys. ▲



Throwing Heat

A team-first attitude and tunnel vision on the mound have helped pitcher Kylie Kleinschmidt make huge strides as the ace of the Yellow Jackets softball team.



How did you get your start in softball? I watched my brother play T-ball and wanted to give it a try. I started playing in recreational leagues at age 10, and I started pitching at age 12.

How do you handle the stress of being on the mound? I've always been good at putting everything in the back of my mind—having a sort of tunnel vision—while I'm pitching.

What's behind your considerable improvement this season? Definitely a change of mind and attitude. Coach [Charlotte] Morgan and the staff made it a priority to let me know they believe in me no matter what. And I wanted to show my team they can trust me out there the same way I trust them. My game got better as soon as I wanted to play for a reason other than myself.

What do you do for fun off the field? I like to hunt deer with my dad. We have land to hunt and ride four wheelers on, and I love spending time out there. I also love going to the lake. My family rents a house and a boat every summer, and I like to take my teammates out there and water ski and tube.

Will softball stay a part of your life after you graduate? I would like to volunteer coach softball at the high school level. I also want to work in sports and use my marketing degree—something behind the scenes, planning events maybe.

What's the most important thing you've learned on the field? That there's more to life than just softball. Not that it shouldn't be taken seriously, but putting too much pressure on myself will not help me perform my best.



GOING THE DISTANCE

Brandon Lasater started running competitively in high school to stay in shape for soccer. Now he's one of the ACC's most feared distance runners.

Are there any secrets to your success in distance running? There are no secrets, at least that I know of. It's all about putting in the hard work, physically and mentally, and then taking care of the little things like recovery and nutrition.

What's the biggest difference between cross country and track events? Cross country is a lot more relaxed for me. Because the races are longer, there's a lot of time that passes before you necessarily worry about who is next to you.

What's your favorite memory with the Yellow Jackets so far? Probably anchoring the 4x800m at the Florida Relays last year. I love the team aspect and being able to bring it home was great.

What's the best advice a coach ever gave to you? The one thing always in my mind is my mom's constant reminder to have a killer instinct when racing.

What goals do you want to achieve with your distance running? I just hope to take it as far as I can. I don't want to ever look back and wonder what I could have done.

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Dollars & Sense: Jaime Weston

✎ Jennifer Chappell Smith

Raised in Manhattan, urbanite Jaime Weston, Mgt 94, longed for a college experience down South. But her Georgia Tech education and a strategic route led her back to New York City, where she started her pro marketing career with magazines such as *Esquire* and *Sports Illustrated*. Eventually Weston rose through the ranks until she landed a dream job as vice president of brand and creative with the National Football League. Despite league rules, the *Alumni Magazine* won't throw a flag on Weston for celebrating that score.

The NFL brand is one of the most powerful in sports. What exactly is involved in managing it on a day-to-day basis?

In my position, I lead the long-term brand and marketing strategy for the league, while working with our 32 teams, our sponsors, our licensees and broadcast partners to protect and grow the NFL brand. I manage the creative department, which is a team of about 25 people. In particular, I oversee all the NFL's advertising, including the ads we produce for Super Bowl. It's fun but scary since there are so many eyeballs watching.

The Super Bowl is the most watched event on TV virtually every year, isn't it?

Yes. Super Bowl Sunday is the most unifying day in this country. The reach of the Super Bowl extends beyond just TV, much more than the fans may ever see. If you walk into a Super Bowl city, we're responsible for the whole brand-related experience—from the minute you get off the plane to the coin toss in the middle of the field.

Is there anything you do to help the different NFL teams with their individual brands?

We've helped teams with uniform and logo redesigns. For instance, the Buccaneers just redesigned their uniforms, including an updated color scheme. We also reworked the traditional Dolphins logo, removing the helmet from the dolphin's head.

How did Tech prepare you for your role?

You learn what you're made of. There was a great class where the professor taught using the Socratic method. As a junior walking into that class, it was scary and amazing. He helped prepare me to think on my feet.

What kind of career experience did you have before the 11 football seasons you've worked at the NFL?

I worked in marketing at several magazines including *Esquire*, *Seventeen*, *Sports Illustrated* and *Time Out New York*. I was interested in getting the best marketing experience, especially related to emerging brand web sites in the 1990s. I worked for a menswear fashion label based in Milan, Italy, then for Bloomingdale's, launching its website. I had the experience of a lifetime working with the wife of Michael Dell on the website for her fashion label, which sold luxury gowns online the same way Dell sells computers.

How did you get your foot in the door?

When a friend went to work at the NFL, I learned about an open marketing role there. That's where all the bits and pieces—all that I had been building towards in my career—came together.

What's one of the most challenging aspects of your job?

Well, it's a creative field—creative and

stressful. We have very passionate fans. So, when you present a new idea, like a new logo or uniform, 50 percent of the fans are going to like it and 50 percent are going to dislike it. You're putting your ideas and imagination out there for people to scrutinize, but it's fun.

What recent creative project are you most proud of?

This year's NFL Draft [held in May]. What's so great about the draft is that for three days, we get the most avid NFL fans from across the country in one place in New York City. It was once again a huge success.

Speaking of that, we also heard you had a hand with the movie, "Draft Day."

My team was responsible for creating the 2014 NFL Draft materials for the film, so although they filmed the movie a year earlier during the 2013 NFL Draft, all the scenery would appear to be from the 2014 event. There were even some cameos in the film from some of my colleagues which was fun to see. It was all very exciting.

Do you root for a certain team? Are you allowed to say?

Around here, we say we're a fan of all 32 teams. But being from New York, I bleed green, and people can take what they want from that! ▲





by Roger Slavens

The Expertly Engineered Bartender

Robotic mixologist Monsieur serves up drinks quickly—and with great style.

What the Coca-Cola Freestyle machine does for soft drinks, Monsieur does for cocktails. The brainchild of Barry Givens, ME 08, this Android-driven, robotic bartender was first conceived while Givens and his college friends were watching the NBA Finals at a restaurant in Atlanta several years ago. After placing an order for some cocktails before the game started, they found themselves waiting until half-time before their drinks finally arrived.

"The place was packed, and the bar was slammed with orders," Givens says. "Being an engineering student, I couldn't help but think there had to be an easier and faster way to make and serve those drinks."

Givens sat on the idea for Monsieur for a few years, but after working in the corporate world, decided to start his own business and turn his idea into reality. He and co-founder Eric Williams, EE 08, MS ECE 12, built their first working prototype for the cocktail-mixing appliance in 2012. In the summer of 2013, they started demoing Monsieur to investors and interested parties. Along the way, startup veteran Paul Judge, MS CS 01, PhD CS 02, joined as an angel investor and company chairman, as did Mario Taylor, Mgt 08, as chief operating officer, and Donald Beamer, Econ 05, as president.

Last fall, Givens and team showed Monsieur off at TechCrunch Disrupt in San Francisco, where the company was one of 30 startups—out of more than 2,000 applicants—selected to participate in the renowned Battlefield competition. Monsieur didn't win, but it received significant buzz from the tech press, as well as much-wanted momentum.



Soon after, the company launched a Kickstarter campaign that raised \$140,000, and secured additional angel and seed funding totaling more than \$350,000. With promises to deliver home models to their investors, Monsieur's creators finally had to figure out how to turn their working model into a manufacturable appliance.

"Luckily we secured a spot at Tech's incubator, the Advanced Technology Development Center (ATDC)," says Williams, who serves as Monsieur's chief technology officer. "The ATDC has been invaluable in helping us take the next step. For example, when developing an electrical appliance, you have to obtain numerous certifications we knew little about." Tech's incubator also gave the Monsieur team some prime office space, and helped it connect to myriad startup resources.

At first glance, Monsieur looks like a boxy, modern vending machine, complete with a sophisticated Android-based touchscreen interface that makes choosing a mixed drink an easy and familiar process. "Inside, it's connected to a

microcontroller that orchestrates thermoelectric coolers, peristaltic pumps, sensors and other mechanical components to mix cocktails precisely," Williams says. "And most drinks can be poured in less than 15 seconds, all to your specific tastes."

What's more, the Android interface can be controlled with smart devices via its Wi-Fi and Bluetooth 4.0 connectivity. You can order up an after-work drink at home before you even walk in the door, and in commercial settings, concessions managers can monitor ingredient levels in real time. Rather than take a bag-in-a-box approach like soda machines, Monsieur uses fresh ingredients and standard bottles of alcohol that you can buy straight from your liquor store.

Monsieur is available in a home version that's starting to ship this summer for \$3,999. However, larger commercial models are likely where this robotic mixologist will be most in demand. A recent pilot with Levy Restaurants at Atlanta's Philips Arena proved to be a huge success, and Givens says that Monsieur may soon be found at the Georgia Dome and World Congress Center, among other venues. ▲

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A Calling to Care for Those in Harm's Way

 Jonathan Crowl

Army surgeon Amy Vertrees, Bio 95, found her life's work healing wounded soldiers.

After graduating from Georgia Tech in 1995 with a bachelor's degree in applied biology, Amy Vertrees struggled to figure out just where she belonged. She applied to medical school during her senior year at Tech but grew cold feet. A brief stint in a PhD program didn't take. Vertrees wound up working at a mortgage bank and teaching MCAT classes for Kaplan in an obstetrics office before she considered medical school again. She was accepted at the Uniformed Services University and signed on for a 10-year contract with the United States Army. Even then, however, Vertrees didn't fully understand her purpose as a soon-to-be military surgeon.

Then 9/11 happened. For Vertrees, the attacks inspired a moment of clarity.

"I became more aware that I was in the right place," Vertrees says. "Before 9/11, I didn't really understand my role in life. Once we went to war and everyone was engaged, it felt like there was a greater purpose."

Vertrees earned her doctor of medicine degree from the Uniform Services University in 2004 with a 3.8 GPA. In 2010, she completed her general surgery internship and residency at the Walter Reed Army Medical Center. That year, she was named the hospital's D'Avis Outstanding Surgical Resident.

Her first combat deployment came the following year, when she spent eight months working in Jalalabad, Afghanistan. Vertrees went into her deployment knowing she would be working at a base with limited personnel and medical equipment.

She also knew she would be close to the action.

"The hardest part for me was knowing that I was deploying where no one is 100 percent safe," Vertrees says. "The first thing I worried about was my safety. But I also worried about whether or

not I was going to do a good job. I asked myself, 'Am I the right person for those wounded soldiers? Are they going to be better off because I was there?'"


On that 2011 deployment, Vertrees worked with a 20-person medical crew and leaned on the support and experience of her team. But in 2013 on her second deployment, this time to Camp Dwyer, Afghanistan, she found herself as the chief medical officer on a staff of just 13.

Vertrees still remembers the worst case she ever encountered in the field. The soldier's primary wound was a head injury, but there wasn't a single part of his body that wasn't injured, Vertrees says. Even worse, the orthopedic surgeon had left early that day. "I rushed him off to surgery because his blood pressure was dropping, and his abdomen was getting larger. He needed immediate stabilization or he was going to die." The patient was transported to the next level of care where he succumbed to a devastating head injury a few days later.

During urgent situations like these, no matter how horrific, her training quickly takes over. She's too busy diagnosing a soldier's injuries and leaping into action to think. It isn't until later, when the action slows down, that the gravity of the moment sets in.

But Vertrees's impact extends far beyond the soldiers she served directly in combat zones. Prior to her last deployment, the Army major conducted extensive research on complex abdominal wall closures—a surgical procedure commonly performed in the field on wounded soldiers.

Doctors lacked a good surgical solution that could more effectively close up the abdomen without a high risk of complications or long-term health problems. Vertrees helped pioneer a new technique that uses a mesh implant to serially close large abdominal wounds. Her research gained plenty of attention from her peers and academics, leading to numerous publications about her technique, as well as a few chapters in medical textbooks.

 **Know a Ramblin' Wreck with a fascinating job?** Tell us all about their interesting career at publications@gtalumni.org.



Today, Vertrees works as an attending general surgeon at Walter Reed National Military Medical Center in Bethesda, Md. Her focus—luckily—has turned away from abdominal wall closures.

“Thankfully, the number of military

wounded is decreasing,” Vertrees says, “so I’ve had to reinvent myself.”

She’s now involved in better training the next generation of military surgeons, particularly where resident education is concerned. It’s possible that she will be deployed yet again,

although nothing has been scheduled.

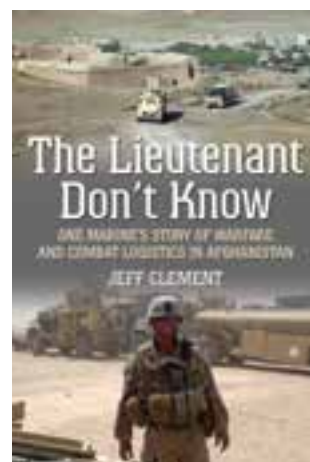
She’s under contract with the U.S. Army until 2017, but she says she hasn’t thought much about whether she will extend her service or pursue other interests. Says Vertrees: “We’ll see how I feel in 2016.” ▲



The Lieutenant Don't Know (A Book Excerpt)

✉ Jeff Clement, ME 08

Not all accounts of war dwell on courageous acts of heroism and self-sacrifice. Case in point: Jeff Clement's recently published book *The Lieutenant Don't Know: One Marine's Story of Warfare and Combat Logistics in Afghanistan* details the nitty-gritty realities of a young officer entrusted to lead supply convoys across treacherous terrain where his vehicles and Marines were a constant target of enemy attacks and IEDs. In this excerpt shared with the *Alumni Magazine*, Clement recounts an ill-fated support mission.



Never According to Plan

After deploying, one of the reasons that it took so long to relax, to not be on edge, was that nothing in Afghanistan ever went according to plan. We always had to be ready for anything.

May 23, 2010, was supposed to be a routine day.

"Alright, guys, another recovery mission. 3rd Battalion, 7th Marines is up north of us. They hit a couple IEDs last night, but they've pulled the two trucks and one mineroller back to a relatively secure area." A mineroller was a 9,000-pound sled with wheels that would be attached to the front of our trucks to limit the damage from IEDs — the IED would go off under the mineroller instead of under the truck with Marines inside.

I was five months into my deployment as a truck platoon commander with Combat Logistics Battalion 6, a Marine Logistics unit. We had the cranes, trailers, and wreckers needed to recover vehicles that were damaged by IED strikes.

I continued the briefing. "The idea is that we're going to move fast. This isn't a resupply, so we've only got 15 trucks. We know that the insurgents will try to target us with IEDs on the Tabletop, this ridge in the middle of the route. So we are going to try to run up to the objective, load up and get back. Mission time, six to eight hours."

I looked up. Calm, dirty faces stared back at me. Dirty was good. It meant they had spent time on maintenance. Calm was good, too. They knew what they were doing.

My routine mission was disrupted right from the start. At the last minute, we had to bring some supplies up to 3/7, so we left about six hours late.

Still, the trip up to the recovery site was smooth, and I thought we were back in a groove. I found the officer in charge and asked him where the equipment for us to recover was. "Alright, so we got three MRAPs," he said, "and one mineroller."

"Three?" I cut him off. "The request was only for two." Another change.

"Can you show me where this mineroller is?" I asked.

"Yeah," he pointed to the map. "It's a ways down here by itself."

"You left it?" I was incredulous.

"Well yeah. It's pretty heavy," he laughed. "I don't think anybody can take it."

"I'm not worried somebody could take it. I'm worried that somebody could booby-trap it!"

"Hadn't thought of that. Well, can you still get it?"

"Don't have a choice, do I?" The risk went up.

My driver drove in a circle around it with our mineroller. It would be much better for our mineroller to be destroyed by a booby-trap than to damage one of our wreckers, which were in very short supply.

"Bump that mineroller with ours. Don't crash into it, but hit it hard enough that any hair triggers or pressure-release

Are you an author? Send details about your book and a cover image to Editor, *Georgia Tech Alumni Magazine*, 190 North Ave. NW, Atlanta, GA 30313, or publications@gtalumni.org.



After the shock and adrenaline of the IED strike wore off, everyone in the truck had a splitting headache. We would have to push through.

switches will trip.” No explosion, but my adrenaline was still pumping.

Once we got everything loaded up on the wreckers, we headed back down south.

WHUMP.

“IED!” my gunner called down. Our first vehicle had struck an IED. The Marines in the truck had concussions, but could go on.

The only mineroller left was on my truck. My platoon sergeant demanded that we switch places, that he ride in my truck since it would be in the front of the convoy.

“Sir, you shouldn’t be up front. You know that.” Our tactics didn’t allow platoon commanders in the first vehicle.

“You’re right, but I can’t switch trucks with you. It might be right by the textbook, but how could I ask you to ride up front if I’m not willing to do it myself?”

A few hundred meters after we started moving, the ground under us erupted.

WHUMP.

In slow motion, the air filled with brown moondust and the front of the truck was lifted off the ground.

“Lepinski!” I grabbed at the gunner’s leg. He had been in the turret, exposed to shrapnel.

“I’m OK!”

Umoren, my driver, was visibly in pain, but said he could continue. After the shock and adrenaline of the IED

strike wore off, everyone in the truck had a splitting headache. A few of us had some torn muscles and damaged vertebrae (we later found), but nothing that seemed to warrant a medevac.

We would have to push through. The convoy continued south.

The radio crackled, “I think the truck in front of me just rolled over!”

I could see a pair of headlights off to the side of the path. They appeared to be about 15 degrees from level. Well, that wasn’t too bad. We could just tip the truck back down and it’d be fine.

As we got closer, I realized that the headlights were 15 degrees from level because the truck had slid down a ridge, rolling 195 degrees. The Marines inside the truck were OK. With the truck weighing over 100,000 pounds, we had nothing that could recover it.

I sent a request to higher asking for an M88 Tank Retriever. We would have to wait until it arrived before we could flip the truck upright. The six-hour mission had stretched over 36.

We couldn’t relax yet. ▲



Jonathan Crowl

Fighter Pilot Mom

Raising an infant son hasn't stopped this Tech grad from pushing the envelope in her F-18.

When her F/A-18 Super Hornet launches from the deck of a Naval aircraft carrier, Lt. Jenny Lentz Moore, AE 05, accelerates from 0 to 150 mph in about 2 seconds. And that's the best part of her job. The worst part? When she has to land the fighter plane back on the carrier. "But only at night," Moore says. "Landing during the day is very fun." Moore's casual tone understates the true challenge and risk of her work. Becoming a fighter pilot marks a major accomplishment in its own right. But as someone who lands F-18s on aircraft carriers at night, Moore grades as one of the elite fighter pilots in the world.

It's the type of career Moore dreamed of as an undergrad at Georgia Tech, where she majored in aerospace engineering while competing for the school's swimming and track and field teams. Because of her athletic commitments, Moore couldn't join the Institute's ROTC programs. So she began working as a research assistant for the Aerospace Systems Design Laboratory, with the goal of launching a career at NASA after she graduated.

Moore accepted the Navy's offer in the middle of her junior year. After graduating from Tech in 2005 and going through officer training, she moved to Charleston, S.C., to become an instructor at the Navy's Nuclear Power School, teaching sailors about the operation and maintenance of the nuclear systems powering Naval ships and submarines.

Two years into that position, Moore was brought out to an aircraft carrier

"In my mind, I really thought I was going to apply to flight school and not get in, and I would be at peace with myself," Moore says. "I made the decision to apply thinking I didn't really have a great chance of getting in."

But Moore was accepted. In February 2009, she moved to Pensacola, Fla., to begin her flight training. Moore earned her wings in May 2011, officially becoming a Naval aviator. The next month she moved out to Lemoore, Calif., where she's currently stationed, to fly the F/A-18 Super Hornet.

The difficulty of Moore's job isn't so much the takeoff, which is automated by a steam-powered catapult that shoots the airplane into the air. It's the landing that really demands expert precision and timing. Pilots landing back on the carrier are aiming for a 2-by-2-foot target, which offers a slim margin for error.

In the dark, poor depth perception and minimal visual references make this a harrowing task, no matter how many times you've performed it. In fact, nighttime landings are so difficult that only the United States and France execute them. Among the U.S. Armed Forces, only the Navy lands on carriers

There aren't many mothers working as fighter pilots in the U.S. By the time she starts her combat deployment, Moore says she will be the only mom flying fighter planes in a combat zone for the Navy.

Her research drew the attention of a U.S. Navy recruiter, who offered Moore a job within the Navy's famed nuclear power program. "To me, it seemed like a great option," Moore says. "I could see what the military was all about, get my master's paid for, then try to get into flight school or something."

to assist in sailor training. While there, she stood on the carrier's deck watching fighter planes perform carrier training runs. That was when Moore decided to resume pursuit of her childhood dream.

Know some Ramblin' Wrecks who juggle multiple roles without breaking a sweat? Send us a note about their multitasking prowess to publications@gtalumni.org.



in the dark, and only with the F/A-18.

Even though Moore has been a Naval aviator for three years, she's still waiting for her first combat deployment, which is coming up this summer. After so many years of preparation and training, Moore says she is eager to put her skills to use.

But at the same time, Moore's life is much different now than when she applied to flight school six years ago. She has since married another F/A-18 pilot. And last summer they welcomed their first child.

There aren't many mothers working as fighter pilots in the U.S. By the time she starts her combat deployment, Moore

says she'll be the only mom flying fighter planes in a combat zone for the Navy. In fact, she knows of only three or four other moms to have flown F/A-18s over the last 15 years.

Those life changes have stirred up mixed feelings about her impending deployment. Moore says she and her husband are used to spending time apart, but being away from her son for an extended period is difficult to accept. "There are those days where I think I really just want to be a stay-at-home mom," she says.

Even so, Moore says she feels honored to make the same sacrifices of

many service members before her. She views those sacrifices as necessary to preserving freedom and liberty on the mainland.

Moore isn't sure where her future will take her. She's less than 10 years from retirement in the Navy and might finish out her career before moving on. But Moore also enjoyed her teaching experience at the Nuclear Power School, and she won't rule out a return to that line of work.

"I love flying, but also I really love teaching," Moore says. "Whatever I do next, I'm looking forward to being able to spend more time with my family." ▲

BY ROGER SLAVENS | PHOTOGRAPHY BY JOSH MEISTER

brave faces

Since World War I, thousands of Georgia Tech students and alumni have served in the United States military. Some served their nation in times of war. Some served in times of peace.

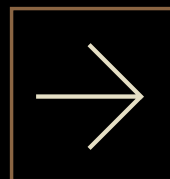
Some were drafted. Some volunteered. And some made the ultimate sacrifice and died fighting for their country.

Some embarked on long careers as soldiers, sailors, airmen and Marines—many of them after completing Tech's ROTC programs and being commissioned as officers. Some of them stayed in service for just a short while.

And some came to the Institute as students after their service ended, looking to build upon their military experiences with a rigorous education that only Tech could provide.

Georgia Tech stands proud of all these veterans who honorably carried out their duties and bravely defended our freedoms. While we can't share every one of their stories, we've identified seven remarkable veterans who represent a wide range of experiences, from a World War II bomb disposal expert to a current student who recently transitioned out of the military.

They are leaders, teachers, heroes and survivors. You can read it on their faces.



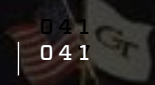


Wayne Waddell, EE 56 COLONEL, AIR FORCE (RETIRED)



Waddell flew the Thunderchief F105 fighter-bomber during the Vietnam War, and was captured on July 5, 1967, after his plane succumbed to anti-aircraft fire. He spent six years as a POW before he was released on March 4, 1973. "I flew 46-and-a-half missions before I was shot down. Everyone thought I was gone. And then the North Vietnamese found

me. ... It was bad at first, and I had to fall back on my training and my willpower to stay alive. My accommodations were no Hogan's Heroes or Stalag 17, but they were livable. There I met some of the finest people in the world, my fellow POWs. We were not heroes. Those are the names on the wall. We consider ourselves fortunate survivors, able to enjoy the life that we were almost denied."



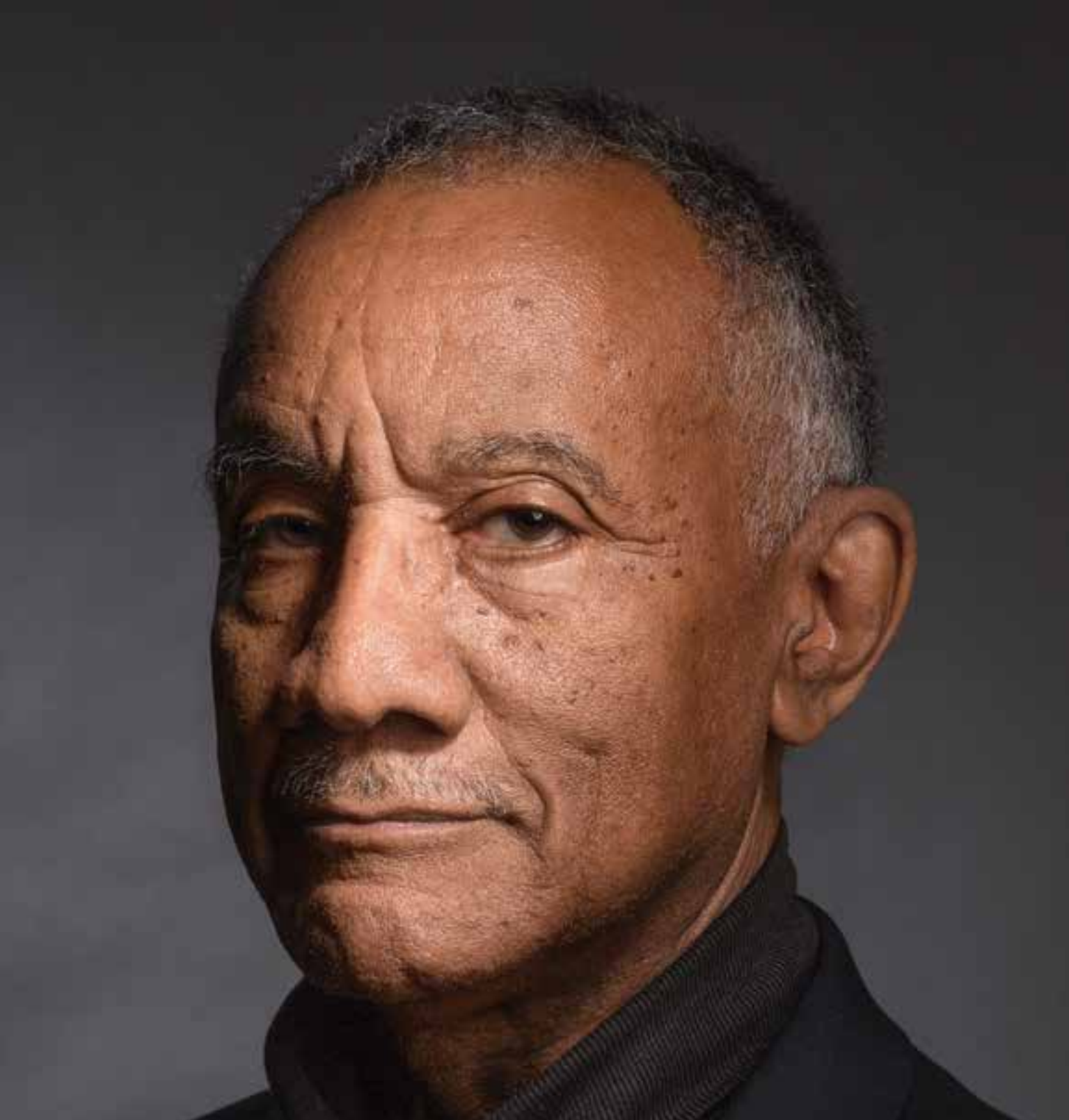


J. Scott Gilliam, Mgt 15 CORPORAL, U.S. ARMY [VETERAN]



After serving six years in the U.S. Army, Scott took a second try at earning a degree at Tech. He's not only well underway in his pursuit of a bachelor's degree in management, he also co-founded the Georgia Tech Student Veterans group on campus. "I enrolled at Tech in 2004 as an architecture student, but I wasn't ready for it. I wasn't mature enough. I needed to grow up and get out on my own. So I left

and joined the Army. ... I served as a combat engineer, looking for IEDs and clearing routes for supply convoys and soldiers. For every 10 hours of boredom there were 10 seconds of insanity whenever we came under fire or struck an improvised bomb. ... I've never laughed harder than I did during deployment—it was necessary to cope with my friends getting hurt and sometimes even killed around me."



Fred Espy, AM 66

LIEUTENANT COMMANDER, U.S. NAVY (RETIRED)



Tech's second black graduate, Fred earned a degree in applied math and served in the Navy ROTC before becoming an officer in the Navy. He served as an F-4 pilot and air intelligence officer during the Vietnam War, and later helped found and lead ROTC programs at Southwest DeKalb High School and Morehouse College. "As an intelligence officer, I knew we weren't

winning the war, no matter what Gen. [William] Westmoreland said. Most of us didn't want to die. We didn't want to be John Wayne. ... Despite the outcome of the war, I felt like I made a real difference with my military career. Later on, through my involvement with recruiting and ROTC programs, I was able to help many young people find their way. That means so much more to me than dropping bombs on a bridge."



James McGarrah, MS ME 79

REAR ADMIRAL, U.S. NAVY [RETIRED]



Currently the chief of staff at the Georgia Tech Research Institute, Jim served in the Navy and Navy Reserve for 37 years. He rose from a junior officer aboard the USS Belknap to the rank of Rear Admiral, a post where he, in his last assignment, oversaw the review of enemy combatants detained at Guantanamo Bay. "I've had three defining stages to my

Naval career, from a peace-time sailor and engineer to a battalion commander during Desert Storm to a chief administrator. I've been lucky to serve for nearly 40 years in support of causes much bigger than myself, to contribute directly to the safety and security of my country.... Perhaps the most important thing I've learned is that you can't manage people in times of conflict, you have to lead them."

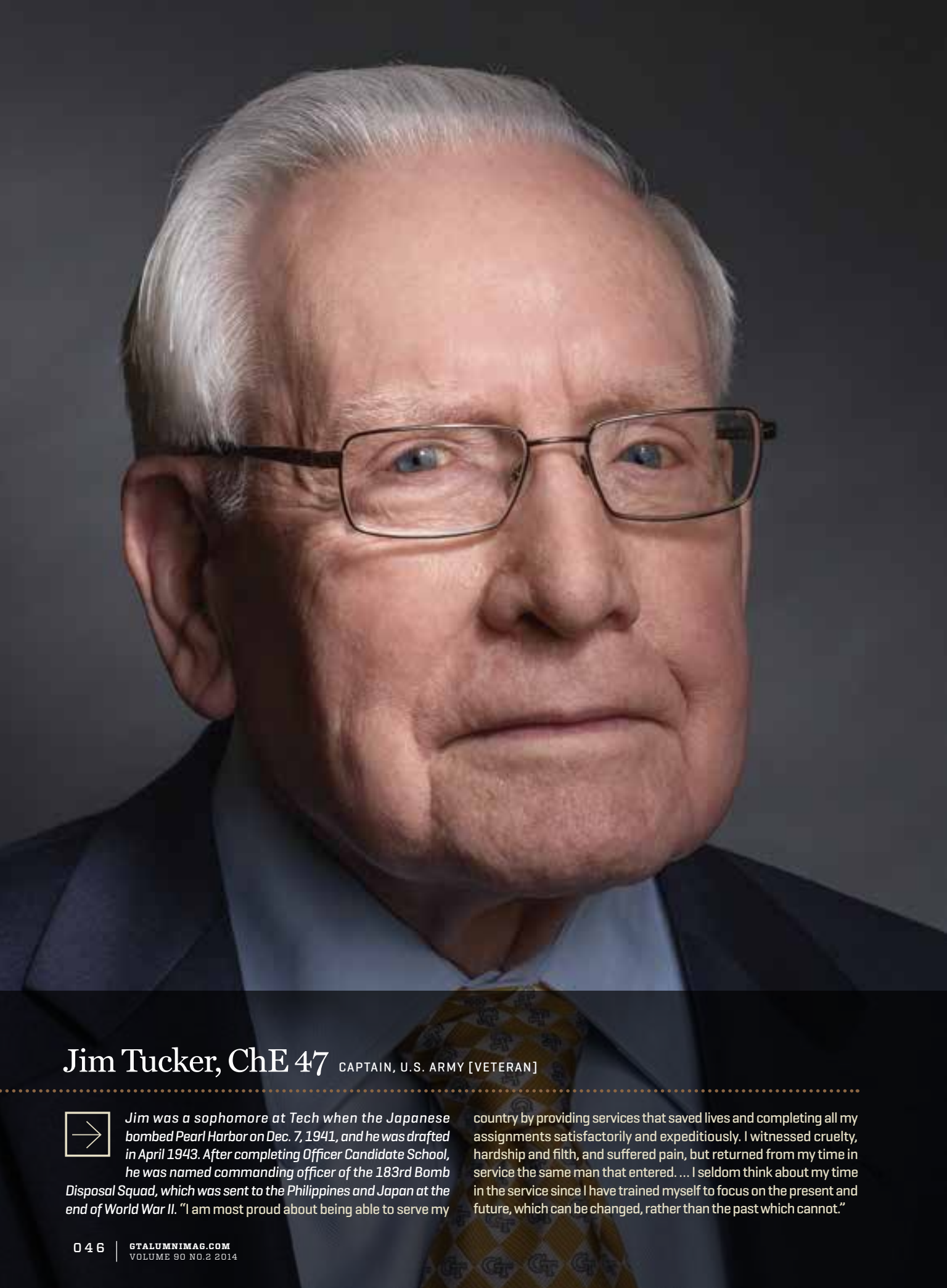


Jasmine Walker, MS OR 14 CAPTAIN, U.S. ARMY [ACTIVE]



A graduate of West Point, Jasmine served on deployments to both Iraq and Afghanistan in military intelligence and counterinsurgency command roles. She applied for grad school at Tech, but before she could return to the States, she was wounded in action and awarded a Purple Heart. Jasmine just completed her degree and began teaching systems engineering at West Point this summer. "In Afghanistan, my soldiers conducted more

than 600 combat patrols, cleared more than 650 pounds of home-made explosives off the battlefield and detained multiple high-value targets. ... I was wounded during a firefight out on patrol, sustaining blast injuries from multiple rocket-propelled grenades and 82mm recoilless rifle rounds. I lost over 40 percent of the strength on my right side and suffered some cognitive deficits from traumatic brain injury. I was hospitalized for 10 days to allow my brain to heal."



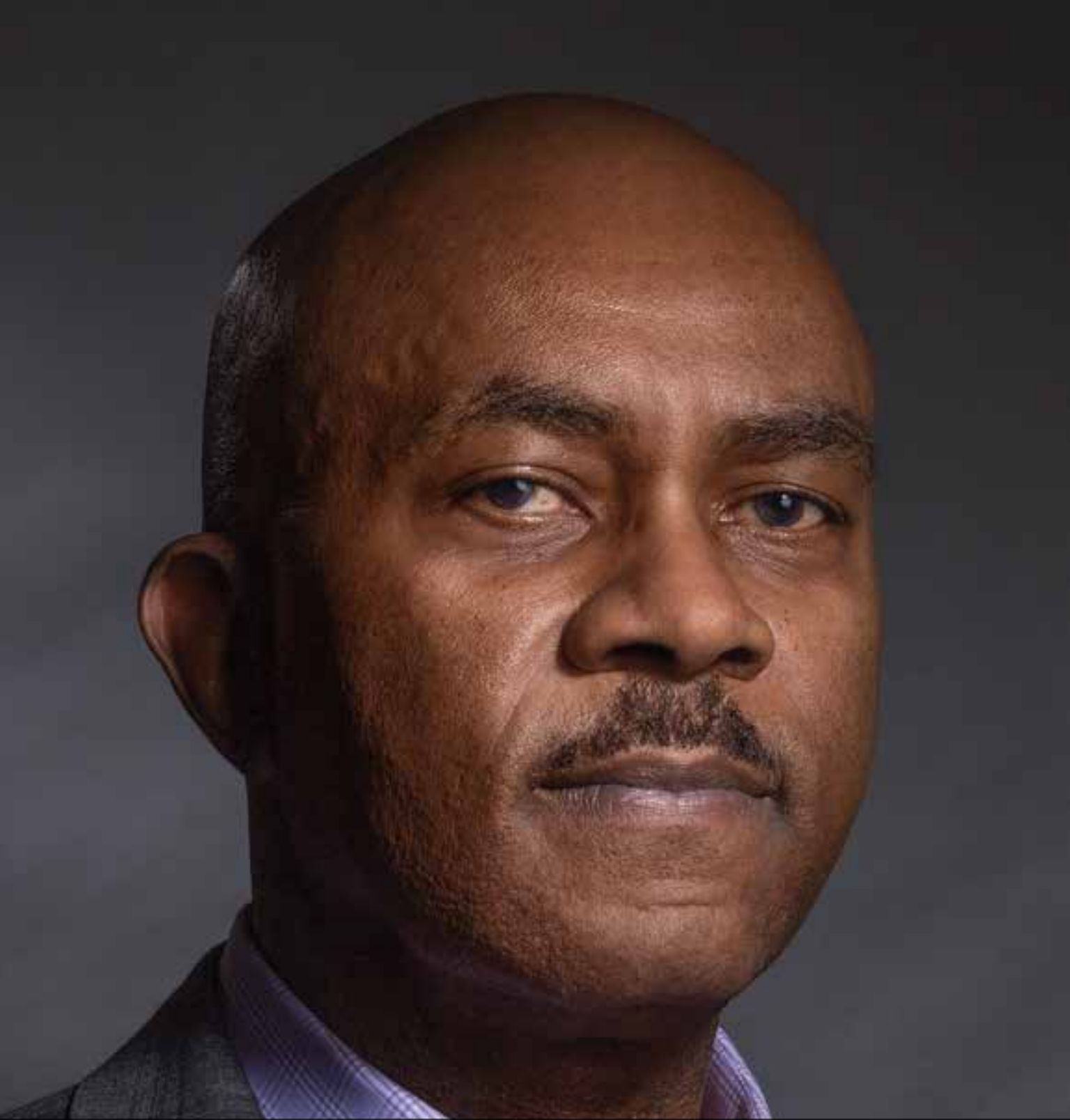
Jim Tucker, ChE 47

CAPTAIN, U.S. ARMY [VETERAN]



Jim was a sophomore at Tech when the Japanese bombed Pearl Harbor on Dec. 7, 1941, and he was drafted in April 1943. After completing Officer Candidate School, he was named commanding officer of the 183rd Bomb Disposal Squad, which was sent to the Philippines and Japan at the end of World War II. "I am most proud about being able to serve my

country by providing services that saved lives and completing all my assignments satisfactorily and expeditiously. I witnessed cruelty, hardship and filth, and suffered pain, but returned from my time in service the same man that entered. ... I seldom think about my time in the service since I have trained myself to focus on the present and future, which can be changed, rather than the past which cannot."



Ron Johnson, MS OR 85 GENERAL, U.S. ARMY [RETIRED]



After being dared by a Junior ROTC instructor to seek admission to West Point, Ron served in the Army for 32 years, rising to the post of commanding general. He oversaw the \$18.4 billion reconstruction program in Iraq, became the CDO of the Army Corps of Engineers, and now is a Tech Professor of the Practice for industrial and systems engineering. "Tech gave me some of the tools I needed to command,

lead and manage at the highest levels of the Army. Understanding data, process improvement, lean thinking concepts, supply chain management, project management, stochastic processes, simulation, optimization... all these subjects prepared me for the challenges of running organizations like the Army's Installation Management Command or being the CDO of the largest public engineering company in the nation, the Army Corps of Engineers." ▲



BY ERIK SCHECHTER
AND DAVE MAJUMDAR

EQUIPPING A SMARTER & SAFER MILITARY

Artificial clotting agents for minimizing blood loss from battle injuries. A radar jamming system that literally learns on the fly. Security systems designed specifically to protect utilities from cyber attacks.

Georgia Tech has been on the cutting edge of defense research and development for decades, and these are just a few of the latest technologies being developed on campus for military purposes. Tech researchers may not specialize in big-ticket, high-profile weapons projects—those are usually the purview of major defense contractors—but they play an instrumental role in developing the underlying technologies and platforms to help determine how future wars may be fought and how lives may be spared.

“We have the license to think ahead of what might be next, to think about the military scenarios that might eventually involve the United States, and the kind of technologies that can be most useful,” says Steve Cross, executive vice president for research at Georgia Tech. As such, Tech ranks among the top 10 academic institutions in the country that support the U.S. Department of Defense, and the overall defense industry and intelligence community, Cross says.

Bryan Clark, senior fellow at the Center for Strategic and Budgetary Assessments—a nonprofit public policy think tank—agrees about Tech’s crucial role in defense R&D. Clark says Tech stands apart from most research universities in its strong relationship with the U.S. government and defense contractors. Only a few such as Tech “act as kind of an adjunct to government labs,” Clark says. Through the Georgia Tech Research Institute (GTRI) and within Tech’s nationally ranked academic units, the Institute as a whole conducts a broad array of both basic and applied research, including in areas such as unmanned systems, computer miniaturization, electromagnetics and cyber warfare, that’s beyond the norm for academic institutions.

In FY2013, Tech received a total of \$640 million in research awards from all sources. Of that, the DoD granted the Institute

\$301.4 million for defense research, with the lion’s share (\$263.6 million) going to GTRI. Established as the Engineering Experiment Station in 1934, GTRI took off in World War II when researchers, supported by faculty at the School of Physics and the School of Electrical Engineering, started work on microwave technology in support of military radar development. Then, with the beginning of the Cold War, researchers deepened their involvement in electronic warfare while adding computers to their arsenal. Most recently, GTRI has been focusing a lot of its efforts countering cyber attacks. “That’s been a large growth area here as the cyber threat has become a much greater risk,” Cross says.

Though defense-funded technology developed at Tech clearly has a military use in mind, there are civilian applications as well. For example, a pattern-recognition software program designed to anticipate an adversary’s moves could be used to analyze a patient’s electronic medical history and suggest courses of treatment. Similarly, all the robotics, manufacturing, sensor and computer vision technologies employed in a weapons system could help “automate an industrial processing plant, which may be dirty, smelly and really an unsafe place,” Cross says.

In the pages to come, we examine some of the newest defense technologies being researched and developed at Tech.

STAUNCHING BLOOD LOSS ON THE BATTLEFIELD

Tech biomedical engineers are developing a new medical treatment that could save the lives of troops who have suffered serious injury on the battlefield. Funded by the Department of Defense (DoD) and the National Institutes of Health, a GT team is developing artificial blood platelets that, when injected intravenously, would force wounds to form a scab much faster than the human body does on its own.

“The goal is to develop technology to help wounded warriors stop bleeding,” says Thomas Barker, associate professor of biomedical engineering. The hope is that, for frontline troops fighting at remote locations, the artificial blood platelets could significantly reduce combat fatalities. Barker imagines scenarios where the injection could even be taken prophylactically by soldiers.

“Obviously the technology allows you to treat combat wounds, but we think you might be able to take this before battle to boost your clotting system, too,” he says.

The artificial blood platelets, which are composed of hydrogels, are activated by the body’s own mechanisms when a person is wounded. “The particles stick to the wound where bleeding is occurring and help the body stop blood loss,” Barker says.

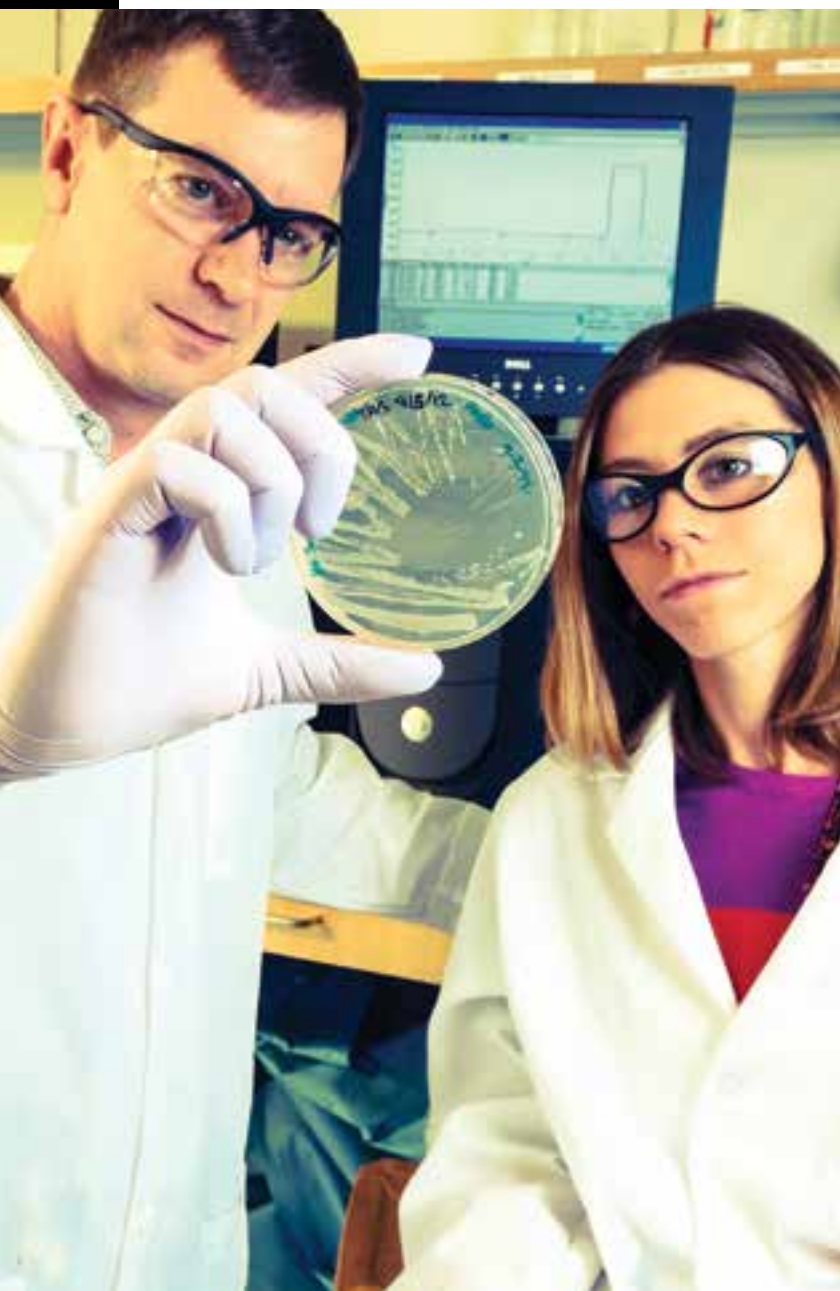
Barker and his team have been working on the new technology for about two years and have already demonstrated the artificial blood platelets in animal models. Those trials showed that the artificial platelets could clot blood 30 percent faster than the body’s own natural processes alone. However, the researchers have yet to perform human testing.

In the civilian world, there are even more immense ramifications of this research. Not only could artificial blood platelets help stop blood loss from injuries, they could also improve recovery from surgery and aid those suffering from blood disorders.

“They could be used following massive trauma or in patients with clotting disorders like hemophilia, or to solve clotting problems associated with chemotherapy,” Barker says.

The platelets research is currently in preclinical trials, and Tech’s biomedical engineering team is in discussion with the Food and Drug Administration (FDA) to move the process forward. Though the technology is still in its early stages, with the FDA’s approval, it could find its way into the hands of doctors both on and off the battlefield soon.

“We’re hoping that these blood platelets could be available and making a positive impact within a few years,” Barker says.



PROTECTING PUBLIC UTILITIES FROM CYBER ATTACKS

There are many ways to attack a nation's weak points. One of the sneakier methods is to hack the computer network of a public utility and wreak all sorts of sabotage, such as programming turbines to fail or, in the case of a power company, causing a blackout.

Last September, the Department of Energy awarded a consortium led by the Georgia Tech Research Institute (GTRI) and other Georgia Tech academic departments \$5 million to develop a security suite to safeguard electrical utilities from cyber attack. At present, a determined hacker can insert malicious commands into the industrial control system of a utility, trip a circuit breaker and cause an electrical grid to fail, says GTRI research scientist Seth Walters, one of the principal investigators on the three-year project.



The idea, of course, is to stop such malicious commands. But how can you identify them?

"One of the challenges is that the electrical grid and the utilities on it are all designed to operate in a certain way," Walters says. "And part of their fundamental operations includes command-and-control messages that might be dangerous at one particular time but harmless at another time."

In the past, IT security professionals tended to apply traditional corporate network solutions to the electrical grid. However, this cut-and-paste approach did not quite work out given the differences between the two systems, Walters says.

One major issue is that a utility network has serious data sequencing requirements to function properly. "You can't just take an enterprise system security tool and apply it to an industrial control system network because you might harm the timeliness of information that's being transmitted," he says.

To defend a utility, a software engineer needs to understand the industrial control system network well enough to distinguish a harmful command-and-control message from an innocuous one. That means installing the right intrusion detection sensors and having a simulation tool that can model a command's future effect immediately in the present.

"The key to this technology is the ability to perform faster-than-real-time simulation of the system," says Sakis Meliopoulos, MS EE74, PhD EE 76, professor of computer engineering at Tech. "This means we need to determine what will happen to the system for the next one to two minutes with computations that can be performed in fractions of a second."

This approach will require more computing power of the network. In addition, there will be time delays on commands, but that, Meliopoulos says, "will be minimal."

The project is set to begin in another month or two.

TESTING UAV SENSORS ON THE CHEAP

Got an unmanned aerial vehicle (UAV) sensor payload in need of testing? Well, Georgia Tech is set to offer defense customers an experimental aircraft on which to place it—at a fraction of the cost it would take to integrate that same payload on a conventional UAV.

The new test bed is called the GTRI Airborne Unmanned Sensor System (GAUSS). “It gives us the ability to offer proof of principle tests to customers at a price that’s reasonable, at a schedule that’s reasonable,” says Mike Brinkmann, MS EE 91, principal research engineer for sensor packages for the Georgia Tech Research Institute (GTRI).

GAUSS is based on the Griffon Aerospace Outlaw ER test UAV, which Tech purchased from Griffon and subsequently modified. The test bed has a 16-foot wingspan and weighs about 140 pounds, with a 35-pound payload capacity. Under Georgia Tech’s authorization from the Federal Aviation Administration (FAA), GAUSS can operate at a maximum ceiling of 5,000 feet, but it is capable of flying higher.

Some of the modifications GTRI researchers made to the Outlaw ER are immediately apparent. “In particular, we put pods on the wings to carry the radar system and power supply, and we made some modifications internally,” says Mike Heiges, AE 85, MS AE 86, PhD AE 89, GTRI’s principal aircraft research engineer for the project.

To prove it can test a variety of sensors on GAUSS, GTRI is integrating three different systems. The first is a visual light camera, the second is an RF signal detection package; and the third is a four-channel, side-looking radar designed to map the ground.

The radar is one of the first systems with these capabilities designed to be fitted on an aircraft as small as the GAUSS, and should be flying onboard it soon. “The two sensors that we have—the signals recorder and also the radar—we’re hoping will open some doors for GTRI to conduct sponsored research with a number of customers that would like to have combinations or variations on those things,” Brinkmann says.

Heiges adds that GTRI has an advantage over potential competitors because the Institute has authorizations from the FAA to allow it to fly the GAUSS at several locations around the country.

“That’s a huge deal,” Brinkmann says.

RADAR JAMMING WITH AN ‘ANGRY KITTEN’

The rules of electronic warfare are simple. Make the most of the electromagnetic spectrum and deny the other guys access to it. In other words, jam them. But actual radar jamming is easier said than done given the emergence of frequency-hopping radar and communications networks being used by today’s military aircraft.

So Georgia Tech Research Institute engineers began work last June on integrating machine-learning algorithms into Angry Kitten, a developmental jamming system designed to employ new electronic attack and shielding techniques.

The Angry Kitten team hopes that, by incorporating an adaptive learning approach into jammers, they will get a system “that can think on the fly” and overcome the electronic protection of advanced targets, says GTRI research engineer Stan Sutphin, MS ECE 12.

The result of three years of internal R&D projects, Angry Kitten probes the vulnerabilities of friendly sensor systems before they are deployed on the battlefield. In addition, Angry Kitten serves as a test bed for new forms of electronic attack, which might be used against an opponent. In doing so, it explores techniques and technologies not employed in jammers built under programs of record, which tend to focus on broader bandwidth and more power.

The current challenge the GTRI electronic warfare tool is tackling is waveform agile systems.

The standard approach to jamming is to first identify the target and then choose a corresponding electronic attack from a library of jamming techniques. However, this attack-by-rote does not account for enemy adaptation. As emitters—communications systems and radars—get more advanced, they behave less predictably and finding “a canned response for them gets to be very difficult,” Sutphin says.

By contrast, a machine-learning algorithm will teach the jammer to learn from past experiences, so that when it encounters the same type of target again, its response will be more sophisticated and hopefully, faster and more successful. If a technique failed the last time, a jammer might try a variant and watch how the target responds to it and adjust accordingly with a feedback loop.

“There has been a huge interest from the Department of Defense in Angry Kitten-like technology,” Sutphin says, noting that the Defense Advanced Research Projects Agency (DARPA) is pursuing its own Adaptive Radar Countermeasures program, which takes a similar approach.



HELPING HELICOPTERS FIGHT A DREAD ENEMY: ICE

The American Helicopter Society does not give just anyone a Howard Hughes Award. In April, Lakshmi Sankar, MS AE 75, PhD AE 77, associate chair of Georgia Tech's School of Aerospace Engineering, shared this honor with a government-industry team seeking to model ice formation on helicopter rotors—an effort that aims to improve flight safety, reduce the cost of all-weather certification and help develop the U.S. military's Future Vertical Lift helicopters.

Ice formation on the blades of a helicopter is a serious problem. “The leading edge is very important for lift production,” Sankar says. “If you have a big chunk of ice over the leading edge, then the rotor may stall and the helicopter will lose altitude.”

What's more, uneven ice formation on the blades can cause vibrations, putting stress on components, and ice flying off the main rotor can damage the tail rotor or another sensitive part of the helicopter. Finally, even if the worst does not happen, ice on the blades increases drag on the helicopter and increases fuel consumption.

Airplanes typically rely on anti-icing technology to melt ice on their wings. However, helicopters have limited



heating capabilities given their small engines, which supply the electricity on the heaters to the blades. “So this is a very important issue, to be able to

predict how much ice will accumulate, how much will it melt, is it going to break or fly off because of the centrifugal forces on the blade,” Sankar says.

In 2011, Georgia Tech partnered with NASA Glenn Research Center and leading aerospace companies to work on the High Fidelity Icing Analysis and Validation for Rotorcraft project. As part of that project, Sankar and his team developed a software model that combines aerodynamics with the structural dynamics of a rotor blade bending under a load—and then combined it with LEWICE, a NASA Glenn program that models ice accretion.

If the model is proven accurate, certifying helicopters for all-weather operations will be cheaper because fewer test flights will be required. Likewise, it could prevent mid-development redesigns of rotor blades because the computer model could test designs even before a vehicle is built. In addition, Sankar sees the model supporting the development of Future Vertical Lift, i.e. the next generation of, helicopters.

So far, the model has fared well against wind tunnel and flight tests, but more research is required. “Hopefully, the government will give us some more funding,” Sankar says.

SAVING ENERGY AND MONEY ON MILITARY OUTPOSTS

Transporting fuel to a remote U.S. military outpost in Afghanistan is no easy feat. There are unpaved roads; there are Taliban ambushes. So it's best that when the fuel does arrive, it's to be used sparingly.

That's why researchers at Georgia Tech are working with the Office of Naval Research to develop computer modeling tools that optimize energy consumption at forward operating bases, says Yogendra Joshi, the John M. McKenney and Warren D. Shiver Distinguished Chair at Georgia Tech's Woodruff School of Mechanical Engineering.

To fully appreciate the situation, consider that it reportedly takes 22 gallons of fuel per day to sustain a soldier or Marine in the field, and thanks to the difficult logistical situation in Afghanistan, the price per gallon is astronomical. “We're talking about fuel that is not \$3.90 per gallon, but about an estimated \$200 per gallon delivered at a forward operating base,” Joshi says.

The software tools Joshi and his team are working on would



allow the military to use its liquid fuels as efficiently as possible by simulating the power consumption of appliances found on a given base. Georgia Tech is focusing its efforts on heating, cooling, lighting and energy storage technologies because of its significant resident expertise in those fields, Joshi says. The idea is to optimize the electricity consumption by those systems.

Once the software tools are proven to match real-world power consumption at remote bases, they could be scaled

FIGHTING THE HIDDEN EFFECTS OF BOMB BLASTS

Time will tell whether the data collected from soldiers caught in roadside bombings will correlate with late-onset brain injuries. But thanks to the Integrated Blast Effects Sensor Suite (I-BESS), developed at the Georgia Tech Research Institute (GTRI), medical professionals may have some incident histories from which to draw conclusions about the effects of high G-force acceleration and overpressure on the human body.

In July 2011, the U.S. Army Rapid Equipping Force tapped GTRI to create what became I-BESS. Then-vice chief of staff of the U.S. Army, Gen. Peter Chiarelli wanted to address the “invisible injury”—traumatic brain injury—and he needed to do it quickly. The opportunity to collect data was disappearing due to the impending drawdown in Afghanistan, says Brian Liu, EE 05, the head of the Advanced Human Integration Branch at GTRI’s Electronic Systems Laboratory.

Racing against the clock, GTRI researchers started fielding I-BESS in the summer of 2012. For dismounted soldiers, a mix of accelerometers, gyros and pressure transducers were installed into standard vests and headgear. These devices record,



up and applied to large installations, potentially reducing liquid fuel consumption significantly. In addition, the models, while being developed for the military, could also be used for disaster relief or other civil applications—anywhere that might be “off-grid,” Joshi says.

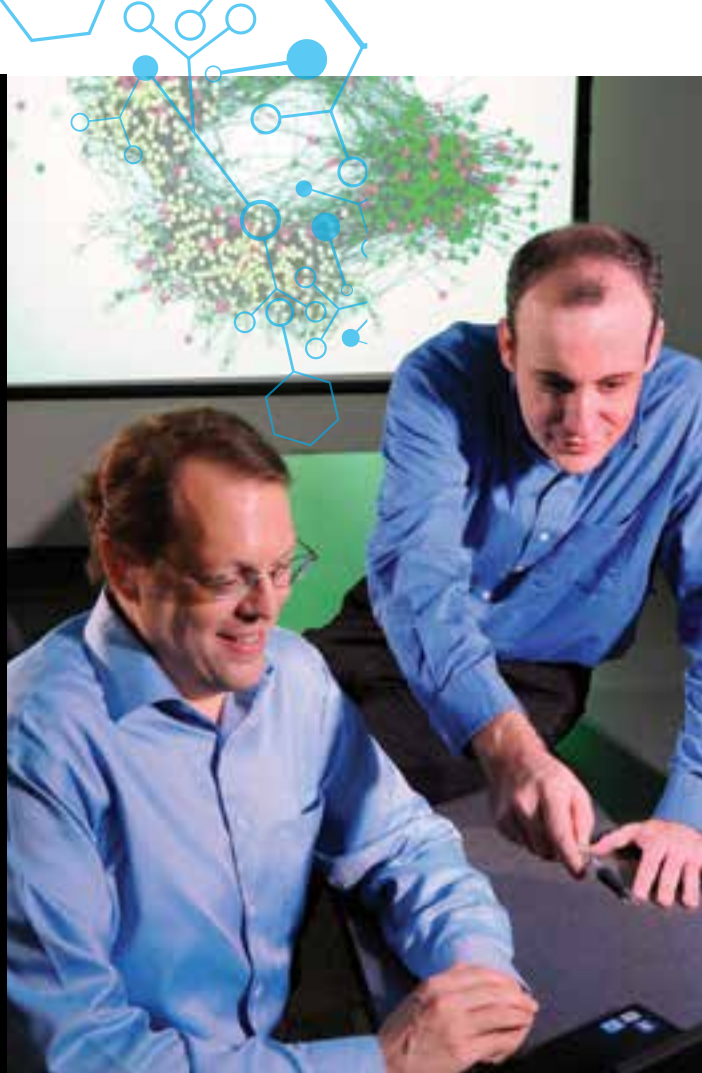
The project started this January and is projected to run for four years.

time-stamp and measure the effects of an encounter with a roadside bomb. Similarly, there are sensors affixed to the hull of soldiers’ vehicles and inserted inside their seats, with all the systems uploading data to a central storage unit.

“So the system not only is on the soldier, but it’s also on the frame of the vehicle and also on the seat of the vehicle. And those are all integrated and time-tagged so that the data would allow you to go back and reconstruct which soldier was in which seat and what the soldier experienced,” Liu says.

In developing I-BESS, Liu and his team looked to leverage componentry already used in the commercial world. However, the wholesale borrowing of equipment was simply not possible. They couldn’t just take, for example, a vehicle sensor used in NASCAR races to record crash data because the crumpling of a car frame “is a very different event, dynamically, from an explosion,” he says.

Since I-BESS’s initial fielding, GTRI has already collected data from troops and passed it along to the Army’s Joint Trauma Analysis and Prevention of Injury in Combat Program. Now the GTRI team is discussing next steps. “We are working with the Army to look at some of their requirements for future soldier sensor systems that are not identical to I-BESS, but are similar in nature and similar in mission,” he says.



PUSHING THE ENVELOPE WITH MINI-RADARS

The Institute has a long history in developing radar systems, which harkens back to World War II. Today, Tech researchers are working to develop radar systems that are much smaller and lighter than anything currently deployed through a new type of wideband, tunable, true time delay.

Modern active electronically scanned array (AESA) radars are complex affairs. They rely on electrical delay cabling to help keep all the electromagnetic pulses firing to and from individual transmit/receive modules in proper sequence.

But separating electrical pulses, which travel essentially at the speed of light, requires lots of cabling—meters of it, in fact. And all this cabling takes up space, weight and power inside the radar, says Kyle Davis, EE 09, MS ECE 13, a research engineer at the Georgia Tech Research

DESIGNING SUPER LONG-LASTING COMPUTERS

Think of the perfect embedded computer. Think of a computer so energy-efficient that it can last 75 times longer than today's systems. Researchers at Georgia Tech are helping the Defense Advanced Projects Research Agency (DARPA) develop such a computer as part of an initiative called Power Efficiency Revolution for Embedded Computing Technologies, or PERFECT.

"The program is looking at how do we come to a new paradigm of computing where running time isn't necessarily the constraint, but how much power and battery that we have available is really the new constraint," says David Bader, executive director of high-performance computing at the School of Computational Science and Engineering.

If the project is successful, it could result in computers far smaller and orders of magnitude more efficient than today's machines. It could also mean that the computer mounted tomorrow on an unmanned aircraft or ground vehicle, or even worn by a soldier would use less energy than a larger device, while still being as powerful.

Georgia Tech's part in the DARPA-led PERFECT effort is called GRATEFUL, which stands for Graph Analysis Tackling power-Efficiency, Uncertainty and Locality. Headed by Bader and

co-investigator Jason Riedy, GRATEFUL focuses on algorithms that would process vast stores of data and turn it into a graphical representation in the most energy-efficient way possible.

The ultimate goal is to get an algorithmic framework that delivers supercomputer capabilities on a small, power-restricted platform.

One approach to reducing power consumption is to reduce the level of data collection. For example, when looking for a needle in a haystack, you don't necessarily need to inspect every piece of hay. "What we're looking at is collecting the minimal data necessary to make accurate decisions," Bader says.

For now, the Tech team is applying GRATEFUL to social network analysis. But that same technology could also be used for any number of security applications, such as identifying hackers trying to break into a network. And, eventually, the technology developed under GRATEFUL could find its way onto smaller, more efficient computers in unmanned aerial vehicles or worn by soldiers.

The team is currently one year into a potentially five-year effort. Bader says most of the work is still in the elementary stages, but the team is developing proofs of concept software. "Our goal is to create architecture-independent software that can run across multiple hardware platforms and still perform extremely well," he says.

Institute (GTRI). By contrast, Georgia Tech's new wideband, tunable, true time delay, which is a device used to slow down an electronic signal, uses thin strips of coated film to convert radio frequency (RF) energy into sound waves and then back into RF energy.

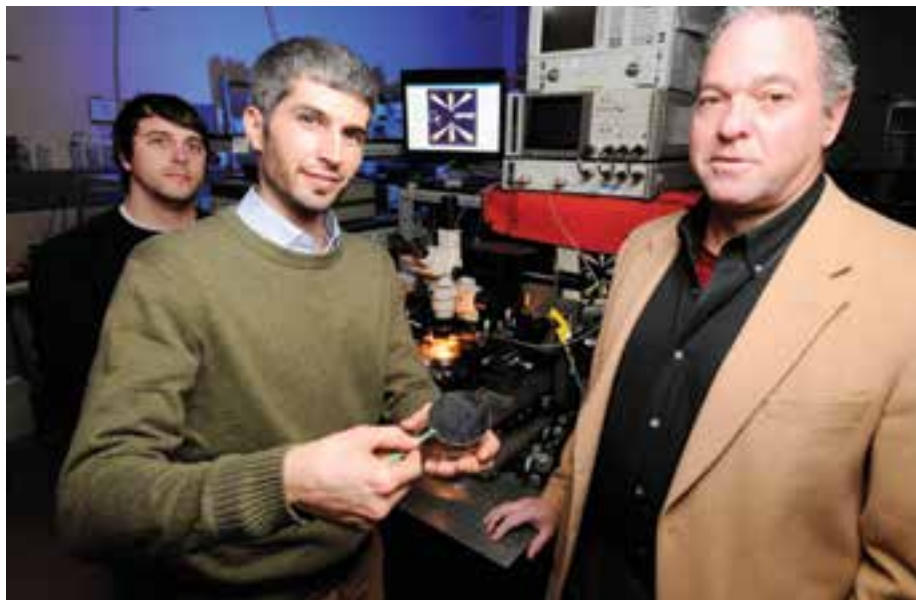
Sound waves travel far slower than light waves, so the new device does not require meters of spooling between Point A and Point B to create a signal delay. "Our lengths are on the order of micrometers," says Davis, adding that this translates into smaller, lighter radars.

Facilitating the operation of the Institute's acoustic time-delay device are film-based strips of material. "Our materials were sputtered thin films: metals and dielectrics and a piezoelectric layer of zinc oxide," says Ryan Westafer, CmpE 05, MS ECE 06, PhD ECE 11, a GTRI project research engineer.

Davis says the RF energy-acoustic wave technology being developed at Tech could be used for beam-steering in AESA radars. In addition, it could be leveraged for electronic warfare beam-forming

and beam-steering, power amp linearization, electronic countermeasures, radar and antenna testing, and RF interferometers.

The wideband, tunable, true time delay project started about three years ago using internal Institute funding, and with enough money, the team could finish development relatively quickly. "The current components have a path to being very robust," Davis says. "If a program had sufficient funding to rapidly mature this technology, two to three years would not be out of the question." All the team needs to make this happen is an external funding partner.



STUDYING ANIMALS TO BUILD SMARTER ROBOTS

Can studying the mating behavior of birds help the U.S. military develop better unmanned systems? That's what Ronald Arkin, a roboticist at Georgia Tech's College of Computing, and other researchers aim to find out as part of the U.S. Navy-funded Heterogeneous Unmanned Networked Teams (HUNT) Project.



Initiated in 2008, the HUNT Project is a multi-phased study that looks at assorted animal interactions—from wolves stalking an elk to squirrels hiding acorn caches—as inspiration for developing new algorithms to guide intelligent autonomous systems. For now, Arkin has been working with computer

models and little bots in the lab. But things can always scale up to larger, more robust unmanned vehicles.

"That's the beauty of the basic research," he says. "It's not limited to a physical type of platform."

One of the earliest subjects of HUNT was "lekking" behavior in birds, in which a group of males gathers around—but not too closely—a very handsome specimen (a "hotshot") in order

to mate with females. This became the basis for seeing how one could distribute autonomous systems behind enemy lines "without using strict formation control" but in a way that "maximizes the likelihood of encounter" with the enemy, Arkin says.

In 2010 and 2011, Arkin and his team moved on to wolf packs. Initially, they thought the wolves coordinated with each other when hunting elk. But Dan MacNulty, a professor of wildlife ecology at Utah State University, disabused them of that notion. "When we brought Dan in the first time, he informed us that there is no coordination," he says. "They are all individual, greedy agents."

So how exactly did they work as a pack without explicit rules or communication? One possible explanation was that a predator chasing down an elk indicated to the others that the hunted animal was weak. So applying a probabilistic model to the stage of a hunt, Arkin tried to "replicate that behavior in robotic systems to see if we could do the same sort of thing both in simulations and platforms". And he succeeded.

Following on the wolf pack research, Arkin then looked at bird mobbing, in which birds gather to drive off a stronger predator. Did it make sense for a weak bird to feign strength and participate in the mobbing? His simulations demonstrated that under certain conditions, yes, it did. And those same lessons could be applied to a low-power robot or one that's out of ammo.

Arkin is now looking more broadly at robot deception. But, he explains, ultimately all of the pieces of HUNT relate to one another as examples of biologically inspired group behaviors. ▲

DECADES AGO, SERVING IN THE RESERVE OFFICERS TRAINING CORPS USED TO BE MANDATORY FOR ALL GEORGIA TECH STUDENTS, AND THE RANKS OF THE CAMPUS BATTALION ROUTINELY NUMBERED IN THE THOUSANDS. TODAY, TECH'S ROTC PROGRAMS PROVIDE ADVANCED TRAINING FOR ONLY AN ELITE FEW, SUCH AS ANDREW TOWNSEND AND SHELBY DOWNING. COME FOLLOW A DAY IN THE LIFE OF THESE MARINE CORPS OPTIONS.

G.T.

STORY BY OSAYI ENDOLYN
PHOTOS BY GREGORY MILLER
AND JUSTEN CLAY

R.O.T.C.

N.O.W.



“I always wanted to be a Marine, ever since I was young,” says Andrew Townsend.

The 21-year-old and economics major speaks plainly, just a couple of weeks before commencement. He is within days of achieving his childhood goal. When Townsend graduates, he'll be commissioned as a second lieutenant in the U.S. Marine Corps.

“I didn't even think I'd go to Georgia Tech,” he continues, his hands in his lap. He grew up in Tucker, 20 minutes away from campus. “But I knew Tech was a good school and had the Naval ROTC. That's what I wanted to do.”

The plan seems surprisingly simple for a student who has surpassed every benchmark laid out for him since he started in 2010. Townsend not only secured one of the coveted four-year national scholarships in the Reserve Officers Training Corps that would eventually train him to be a junior officer: During his tenure at Tech, Townsend also earned a slew of awards.

He was recognized as the Officer Candidates School Honor Graduate last summer, then named the Navy ROTC's midshipman of the year by USAA. Last fall, he served as battalion commander, helping train younger students preparing to attend Officer Candidates School. It's the highest leadership a Marine option can attain.



“I knew Tech was a good school and had the Naval ROTC. That's what I wanted to do.”



Townsend's leadership responsibilities mean that he looks out for his fellow students, including junior Shelby Downing. Her path to Tech's ROTC Marine program took on a different nature.

“I had so much free time my freshman year,” the 22-year-old recalls, her right knee elevated on a chair. It's sore and a bit swollen after her unit's physical training that morning. “I do better when I'm busy.”

At the time, Downing was majoring in nuclear radiological engineering, but still felt stressed by what she calls the “lack of structure” in her life. She got a job as a facilities assistant at the Campus Recreation Center,

then took a full-time internship position over the summer to fill up her calendar. It wasn't enough.

“I was like, *is this it?*” she says, looking around quizzically for emphasis. Downing's stepmom joked around with her, suggesting she might as well join the military. “I thought, wait—what if I did?”

Downing is the first in her family to attend a university—so she knew she wanted to stay enrolled and not drop out to enlist. So the Montgomery, Ala., native set her sights on the NROTC Marine Corps program. She introduced herself to the unit's Marine officer instructor, Capt. Joshua Roberts. Unfortunately for Downing, there were no Marine option scholarships available. Not only that, she didn't meet the rigorous physical requirements.

“I said, ‘I'm sorry, it's great that you want to be here but you don't meet standards,’” Roberts says. “Usually when that happens, you'll never see that person again. Downing walked out of my office and said she would find a way, that no one was gonna tell her no for an answer.”

Six months passed before she could earn a scholarship as a Navy option student. But even then, she kept her focus. A

TECH ROTC SNAPSHOT

ARMY ROTC

Founded: 1917

Commander: Lt. Col Charles K. Chang, MP Professor of Military Science, YJB Commanding

Current full-time

Georgia Tech cadets: 27

Full-time Georgia Tech cadet commissions in 2014: 7

Summary: The majority of students contracted to join the Army ROTC do actually commission as second lieutenants, and most cadets get the billets they desire upon graduation. Some may go on to active duty, the U.S. Army Reserves or the National Guard Reserve. Reserve and National Guard commissioned officers continue on to pursue civilian careers

Quote from Commander:

“The Army ROTC is a great leadership training program, and we have a solid commissioning record. We posture students for success whether they are in the service or working in the corporate world.”



year would pass before Downing had the opportunity to compete for a Marine Corps slot. When it finally became available, her fitness abilities had improved tenfold, says Capt. Roberts. She earned the scholarship on her first attempt. Downing is scheduled to graduate in spring 2015 with a bachelor's in business with an IT concentration.

Townsend and Downing are bright representations of what Georgia Tech's ROTC program looks like today. They are two of 18 students on track to commission as Marine Corps second lieutenants upon completion of their studies at Georgia Tech. Those 18 Marine options round out the 67 students participating in the Georgia Tech NROTC battalion, which includes students from Georgia State and Southern Polytechnic State.

Andrew Townsend excelled in Tech's Navy ROTC program as a Marine option, eventually becoming battalion commander his senior year. Now that he's graduated from Tech, his next stop is The Basic School, a rigorous six-month Marine Corps program for newly commissioned officers.

They make up just over half of the 124 students who are the Atlanta Region Consortium.

The consortium includes a second battalion that's based at Morehouse College, which includes students from Spelman College and Clark Atlanta University. The consortium came into effect in 1982, a result of pooled resources as ROTC numbers drew down over the years. But it wasn't always that way. At its peak enrollment, Tech ROTC units held memberships of thousands of students every year.



Senior Shelby Downing enjoys the structure that ROTC adds to her life as a student, even though it calls for an extremely demanding schedule. She's up at 6 a.m. for physical training with her unit three days a week, and on her busiest days she's in class until 6 p.m.



A Brief History of ROTC at Tech

Much has changed in the world since the ROTC was first established at Georgia Tech in 1917, not long after the United States declared war on Germany. In a 1969 military science paper on the history of Tech's Army ROTC, Major John H. Matthews wrote that the 1917 faculty voted to make ROTC participation obligatory for all physically capable students.

This decision was a precursor to the Student Army Training Corps bill of 1918, which Congress passed under the shadow of the Great War. The bill would allow draft-eligible

men to be readied for military service without simultaneously depleting colleges and universities of their student body. Whether or not to keep the ROTC in place after the end of World War I caused considerable discontent on campus. Students protested throughout 1919 to terminate the program, Matthews wrote. The unrest continued until President Kenneth Matheson and faculty elected to continue the ROTC.

In the years following, the program grew—freshmen and sophomore students were required to participate, while juniors and seniors could elect their participation once basic courses were completed successfully. In light of Georgia Tech's notable track record with the Army ROTC, the Department of the Navy selected Tech as one of six universities to launch the Navy ROTC in 1926. The program received prominent attention—Winston Churchill and President Franklin Roosevelt both visited in the early 1930s. For the first 10 years, NROTC annual membership ranged from 200–270 midshipmen. An expansive naval armory was built in 1935 at the center of campus.

TECH ROTC SNAPSHOT

AIR FORCE

Founded: 1946 (though part of Army ROTC in 1920)
Commander: Lt. Col. Shawn Bevens,

Professor of Aerospace Studies, AFROTC Detachment 165
Current full-time Georgia Tech cadets: 65
Full-time Georgia Tech cadet commissions in 2014: 6

Summary: Detachment 165 is a recipient of the High Flight Award (2011, 2013), which recognizes Air Force ROTC excellence in the region. It also received the national honor Right of Line, #1/53 units (2011, 2013). Both awards measure students' GPA, fitness ability, community involvement and the number of STEM majors in the program. Graduates become pilots, combat system operators, cyber officers and oversee remotely piloted aircraft.

Quote from Commander:

"This detachment sent 100 percent of our officers who wanted to fly into rated positions in 2011 and 2013. In 2012, we were at 80 percent. In general, the Air Force sits at about 75 percent. If you really want to fly, enrolling in Georgia Tech's AFROTC is the way to go. The Air Force has great careers in space, cyber and key logistics and support functions."

The Technique ran images of cadets practicing drill, interviewed midshipmen before their summer cruises, and discussed how the War Department's latest changes would impact the day-to-day of Tech ROTC students.

And times continued to change. By the early 1960s, Matthews wrote, other considerations impacted the outlook Tech faculty had on ROTC programs. Namely, the unpopular Vietnam War and a shift from a drafted military force to an all-volunteer one. In 1965, the faculty voted to end mandatory ROTC service, which coincided with the implementation of scholarship programs, passed by Congress.

As membership in ROTC decreased, so too, did its ubiquitous presence on campus. In 1980, the naval armory was torn down to make room for the Edge Athletic Center Building. The NROTC moved to the corner of Bobby Dodd Way and Fowler Street, then moved again in 2007 to its current residence on the second floor of the O'Keefe Building, a space it shares with the Army and Air Force ROTC units.

O'Keefe is where Townsend and Downing report to Capt. Roberts and their commanding officer, Capt. Mario Mifsud. It's where they have their NROTC classes on naval science, leadership and ethics. It's also the home of a makeshift student center: one well-lit room with a couple of couches and a handful of computers. It's where midshipmen do homework, discuss upcoming drill assignments, plan events and play foosball. It's also where the platoon of Marine options meet up before piling in the "govvies," large passenger vans that take the group up to the obstacle course in Marietta, at the home of the Marine Corps Forces Reserve, 4th Reconnaissance Battalion.

A Day in the Life

Downing is upset, though she's trying not to show it. Today is "O Course" day, one of three during the semester where the Marine options practice on the Marine Corps Recon obstacle course. They train for this course throughout the semester, trying to save the practice times for the warmest days of the season. Downing will not be able to participate.

"I went to the doctor," she says, fighting back tears. "Something is going on with my hips."

That morning, Downing's doctor explained that the constant pain in her hips was due to the friction of her hip bone and socket rubbing together on each side. They were out of alignment and she's been told not to continue. The physical strain of being a Marine might prove to be too much. She doesn't want to believe it.

"I've barely even started," she says, looking away.

Nearby, Townsend listens in. Later, he'll encourage Downing to get a second opinion. But for now, he's focused on organizing the platoon to tackle the course. It's about a 20-minute drive to the 4th Recon Battalion, a couple of miles off the I-75 Windy Hill exit. Civilian vehicles drive past regularly, and curious pedestrians will peer through the chain-link fence as they stroll by. The assistant Marine officer instructor, Staff Sgt. Jermaine Vereen, is already waiting for the platoon, along with a Reserve corpsman with a stretcher and safety kit in tow. The Georgia Tech platoon is joined by their counterparts from Morehouse, Clark Atlanta and Spelman. They are all outfitted in boots and fatigues. They look ready to work.

O Course practice is meant to help orient midshipmen for the training they will receive at Officer Candidates School at Marine Corps headquarters in Quantico, Va. OCS trains and screens officer candidates to make certain they have the intellectual, physical and moral qualities expected of those who will be commissioned in the Fleet Marine Force. The OCS training is called BULLDOG, and this course time is BULLDOG Prep. At OCS, midshipmen are evaluated on their academics (25 percent), physical training (25 percent), and leadership ability (50 percent). They will be tested on weapons performance, knowledge



“It’s important for your training,” he tells the group. “This will help you at OCS. All that being said—” he pauses to smile slightly, a genuine display of empathy, “this is really gonna suck today.”



of general military subjects and history, tactics, fitness, combat readiness, and their approach to leading peers—including peer evaluations. Townsend went last summer, right after completing his junior year.

“It’s a different beast,” he says of the six-week period. “Nothing can really prepare you for it. I was thankful I could come back and share my experience, to try and help the others get ready. But it will break you down. There’s no way around it. If they haven’t broken you down they didn’t do their job.”

They may have broken him down, but Townsend put himself back together. He completed OCS at the top of his class, a fact shared by someone else, and confirmed by Townsend somewhat reluctantly. None of what he did at OCS matters today, his expression says. Today, he’s interested in contributing to his friends in the platoon who have not yet been.

With the guidance of Staff Sgt. Vereen, Townsend explains what each midshipman must do to complete this afternoon’s workout. No one here, midshipman or active duty Marine, can recall the proper names of the different O Course obstacles or if the obstacles even have proper names (“how’s really friggin’ tall barrier?” one says, laughing). They just know what to do as they approach each one.

The course is a mixture of large wooden logs, metal poles and rope. There is the high bar that stands about 8 feet tall, which you must propel yourself over. There are the double bars at an angle that you must reach by climbing, then shimmying yourself down inch by inch. Then there’s the high wall, about 6 feet high, followed by several lower wooden bars and another high

bar. Once they finish that, they must climb up a rope and touch the top that stands about 12 feet high. That’s just the beginning.

The obstacle section is followed by a 2-mile run with a 9-pound dummy M16 rifle in-hand, then a low crawl through muddy grass. Still clutching the M16, the midshipmen must race over to the faux Quigley, a giant outdoor tub of black-colored water, bug-infested and covered with pollen. They will walk into the abyss, down one side, up the other, as the water creeps chest-high at the crux of their exhaustion, all while singing the *Marines’ Hymn*.

“This is a lot better than the Quigley up in Quantico,” Vereen says.

The Quigley is a water obstacle infamous in the Marine Corps for its nastiness and difficulty. Officer candidates must navigate its cement culverts, logs and barbed wire. It’s named for Lt. Col. William J. Quigley, who strove to better prepare troops for Vietnam. This tub, in comparison to what officer candidates will experience, is a session in a Jacuzzi.

The midshipmen will then tackle the obstacle course again, run another mile, then flip a tire large enough to fit onto a 7-ton truck for 20 feet. The tire for women is smaller and lighter. It also happens to be pink. Everything else is identical. The last run requires that the midshipmen carry a 30-kilogram sandbag over their shoulder for a last dash to the finish line. Then, only then, will they be done.

Townsend explains the course twice, and Vereen illustrates the proper technique for moving the tire. “If you don’t use your legs, you will throw out your back,” he says, looking in each midshipman’s face.

Townsend shares a few tidbits from his personal experience. “It’s important for your training,” he tells the group. “This will help you at OCS. All that being said...” He pauses to smile slightly, a genuine display of empathy: “This is really gonna suck today.”

TECH ROTC SNAPSHOT

NAVY ROTC

Founded: 1926

Commander: Capt. Mario Mifsud, Professor of Naval Science

Executive Officer: Lt. Col. Christi Saddler, Professor of Naval Science

Current full-time Georgia

Tech midshipmen: 49

Full-time Georgia Tech midshipmen commissions in 2014: 2

Summary: A midshipman in the NROTC will attend mandatory drills twice weekly, where sessions cover current events, personal finance, CO briefs, and response to assault or hazing. Naval Science courses are scheduled throughout the midshipman’s tenure, ending with leadership and ethics, where students apply military law and philosophy to real-life challenges that a junior officer might encounter.

Quote from Executive Officer: “Our students take eight Naval Science classes, four additional calculus and physics courses, a physical fitness test and summer training. That’s about 40-plus hours added on to their major coursework. You have to really to become an officer and serve your country.”

The “O Course” presents considerable physical, mental and emotional challenges for Tech’s Marine options and helps them prepare for the ordeals of Officer Candidates School.





The timer goes off and the first group gets started, two at a time. Townsend jogs alongside the pairs, encouraging each person by name, giving technical tips if someone gets stuck. Downing stands at the ready near the front line. She cannot practice, but she will not sit idly, either. As her fellow midshipmen pass her, she tosses out cheers and reminders of what to do next, when her winded counterparts look like they need help. Within the first few minutes, there are midshipmen at every stage in the course workout. Townsend fans out, dropping in to check on people as they make their way through.

Someone sprays down the muddy grass with a hose to make sure it's muddy enough. The first midshipman hesitates at the low crawl, not sure how to hold the M16. Vereen shows him the proper placement, explaining how he must keep it both out of the mud but ready to engage in the case of enemy contact. The M16 slung over his back, he runs over to the makeshift Quigley.

"Tight to the right," Vereen yells at a midshipman named Lockett. Vereen stands over the edge listening for the familiar lyrics of the hymn. Later, Lockett will admit he blanked out on the words. Vereen, a former drill instructor, is not about to let that pass. "You didn't finish my song, Lockett!" He yells as the midshipman struggles out of the tub to the next obstacle. "You didn't finish my hymn!"

While everyone seems to be in good shape, Townsend ascends the obstacle course himself. He wants to get a couple of quick runs on the bars, just for his own maintenance. He bounds through each high and low bar, up and over the high wall, and finishes with the rope. "He is so fast," someone says. People nod.

Within the hour, almost every midshipman has completed the course. Townsend says his goodbyes—he has to make his senior seminar back on campus in about 30 minutes. He motions to his sweaty self: "They usually love me in there."

In class, both Townsend and Downing bring the same level of commitment to their coursework that they do their future careers. Their schedules are rigorous representations of how much they love what they do, and how seriously they take the opportunities they've been given.

Neither Townsend nor Downing get much sleep. They're up early to make 6 a.m. PT with the platoon every Monday, Wednesday and Friday at Piedmont Park. On Downing's busiest days she starts off with class at 9:30 a.m., drills with the platoon (or leadership labs, as their instructor calls it) then an hour of PT, BULLDOG Prep, then class again from 4:30 to 6 p.m. "I don't really get a break until the end of the day," she grins.

The schedule can be taxing, Townsend agrees. But he recalls his time at OCS, saying it could be worse. "I was trying to study for a test. You're getting 3-4 hours of sleep each night, so I'm falling asleep as I'm studying. It's dark, because I'm using a red lens to read because that's the only thing they let you use. I remember thinking, 'I will never complain about school again.'" Of course, that didn't last, he says. He still complains sometimes. But he appreciates the flexibility available.

"Even if you are in a stressful situation, you know that you can get through it if you put in the time and energy. No one's stopping you from succeeding. Whereas at OCS, sometimes it felt like people were trying to stop you from succeeding—they're kind of trying to weed you out."

Both Townsend and Downing managed to squeeze in a little time for family, friends and fun this year while tackling their Tech degrees and ROTC commitments, but they had to stay focused to succeed.

Being weeded out is still a possibility for both midshipmen. Downing still has to complete OCS this summer, and her participation may depend on medical advice about her hip injury. Townsend will face The Basic School (TBS) in the months following his commission, a six-month program that the Marine Corps uses to invest in the education, training and further evaluation of its newly commissioned officers. If OCS is a beast, TBS is a monster. Capt. Roberts believes both midshipmen will be just fine. He has glowing things to say about each of them.

"Downing is an intellectually gifted person," Roberts says, and tells the story of her tenacity, her refusal to give up on becoming a Marine option. Then he cites Townsend's development as a leader, a senior who has come far and is leaving soon—someone who has been prepared for the challenge of being a junior officer, for the challenge of TBS.

"One of my biggest pet peeves is to have a Marine Officer focus inwardly, whether they're physically hurt, tired, lonely, cold. Doesn't matter," Roberts shakes his head firmly.

"If you want to be a true leader you can't worry about yourself. I look at Townsend and he gets through running a phenomenal run, almost Olympic athlete pace type-stuff," Roberts says. "And he gets done and he doesn't go over and lick his own wounds, he doesn't sit on the side of the field and stretch out. Immediately when he gets done, he looks around and goes back down the course to find more people to help them finish at a better time."

Downing anticipates the training OCS will give her one day soon. She wants to be able to lead her peers successfully. She looks forward to a potential career using logistics skills in combat engineering, or possibly going into intelligence. Townsend isn't sure about what Military Occupational Specialty, or MOS, he'll pursue, or if the decision will even be up to him. Much like the child he once was, he still just wants to be a Marine.

Downing, for her part, is determined to get there. She's worked too hard, and seen her Navy ROTC friends work too hard alongside her, to not make it.

"They work their butts off for every grade they get, for every mile they run," she says. "They have a lot of discipline. And they have a lot of heart." ▲

TECH ROTC SNAPSHOT

MARINES (NROTC)

Current # of midshipmen: 15
Full-time Georgia Tech midshipmen commissions in 2014: 3

Summary: The mission of the Marine program is to develop the midshipmen to become a leader of Marines. The goal is to train midshipmen to the highest possible mental, physical and moral standards for prompt, active service in the fleet Marine force.

Quote from Executive Officer: "We're primarily war fighters. Our commissioned officers must be able to think tactically so Marines under their charge will act decisively. It's a rewarding job seeing students grow and mature from when they first join the unit, asking questions, to taking charge and planning the training schedule themselves."



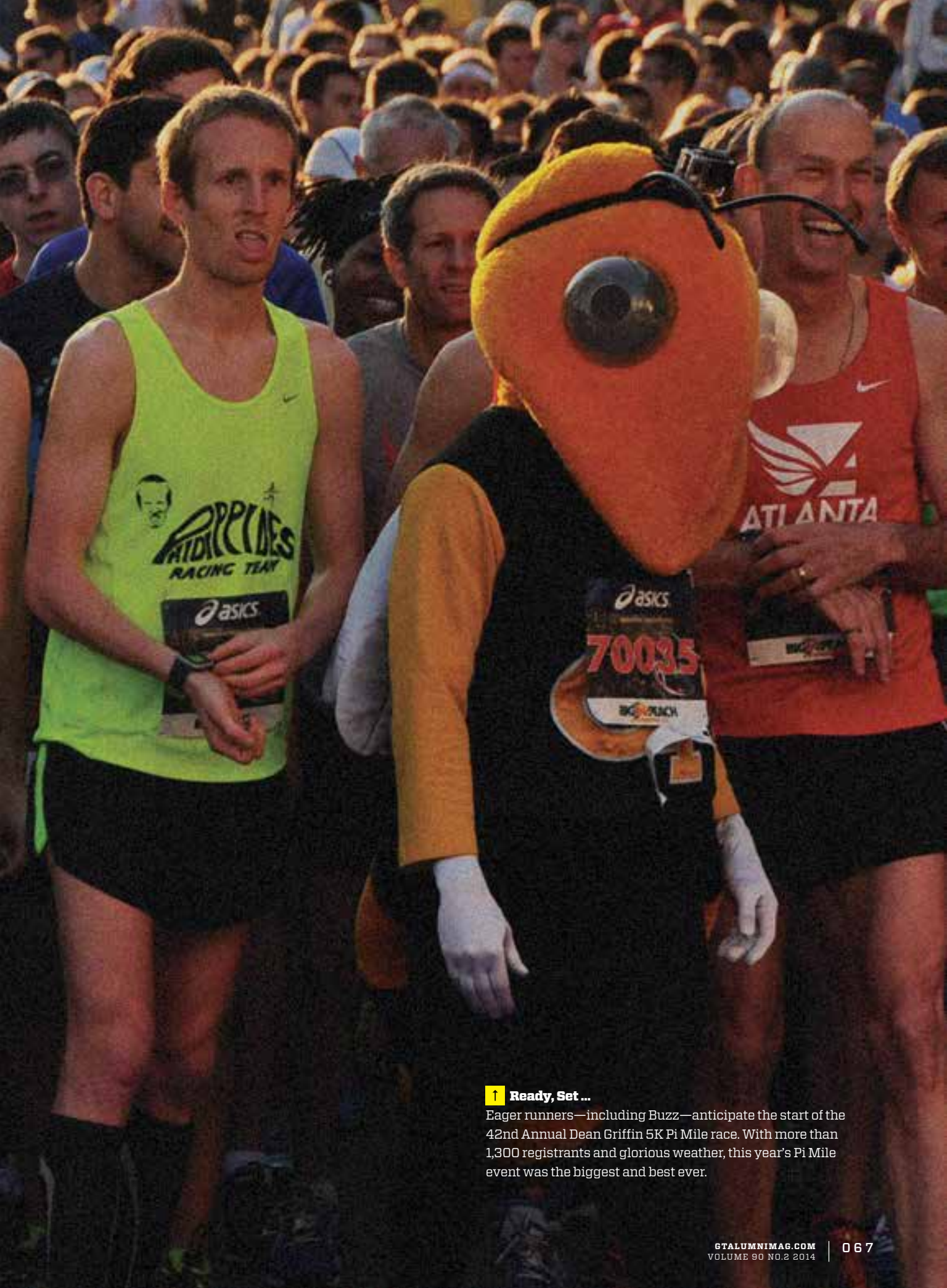
alumni house



MORE THAN A RACE



The Pi Mile isn't just a race. It's also a 3.14-mile running trail (on which part of the race is run) on Tech campus that was the pet project of former student and SGA president Tyler Brown, MGT 01, HTS 01. Tyler ran most mornings for ROTC training and pushed the administration for a well-lit trail to make running safe for all. The plans for the trail were almost complete in the fall of 2004 when Tyler was killed in Iraq on active-duty service as a first lieutenant in the U.S. Army. The Tyler Brown Pi Mile trail was dedicated in April 2005 in his memory.



1 Ready, Set ...

Eager runners—including Buzz—anticipate the start of the 42nd Annual Dean Griffin 5K Pi Mile race. With more than 1,300 registrants and glorious weather, this year's Pi Mile event was the biggest and best ever.



Alumni Association Appoints New Board of Trustees Members

Melissa Weinman

The FY2015 class of the Alumni Association's Board of Trustees were elected this spring and will begin their terms on July 1. The 45 members of the Board serve as the governing body of the Alumni Association. Trustees attend quarterly meetings and are actively engaged in efforts to further the mission of the Association.

EXECUTIVE COMMITTEE



Bob Stargel, EE 83, will become Chair of the Association. Stargel, of Alpharetta, is the vice president of Global Nonwovens for

Kimberly-Clark Corp. He is responsible for the development, commercialization and supply of materials used to support Kimberly-Clark's branded personal health and hygiene products.



Steve Chaddick, EE 74, MS EE 82, will become past Chair. Chaddick, of Atlanta, is a mentor capitalist at Ridgewood Ad-

visors LLC. He is a past member of the Alexander-Tharpe Fund board and a current member of the Georgia Tech Foundation board of trustees, the Georgia Tech Research Corporation board of trustees and the College of Engineering advisory board. He is a College of Engineering Distinguished Alumnus.



Andrea L. Laliberte, IE 82, MS IE 84, will become Vice Chair, Finance. Laliberte, of Jacksonville, Fla., is a retired senior

vice president of distribution for Coach Inc., and is currently the Edenfield Executive in Residence at Georgia Tech.



Ben Mathis, IM 81, will become Vice Chair, Roll Call. Mathis, of Marietta, is managing partner of Freeman, Mathis

& Gary LLP. Mathis is an accomplished lawyer who is also a leader in civic organizations including the Cobb County Chamber of Commerce, the Georgia Chamber of Commerce and the United Way of Cobb.

MEMBERS AT LARGE



James Trimble Jr., Mgt 91, will serve the second year of his two-year term through fiscal year 2015. Trimble is the

senior vice president and director of private banking for the Buckhead office of Fidelity Bank.



Eric Pinckney Sr., ME 86, MS CP 93, will serve the second year of his two-year term through fiscal year 2015. Pinckney

is the vice president of operations at The Integral Group.



Paul S. Goggin, Phys 91, vice president of Technology for Free All Music LLC, will join the Executive Committee for a two-year term as an at-large member.



Elizabeth H. Wallace, Arch 96, management consultant for NeighborWorks America, will join the Executive Committee for a two-year term as an at-large member.

TRUSTEES

Stan Anderson, IM 75, is president of SimpleC and is returning for a second consecutive term. As a student, Stan was a member of Phi Gamma Delta fraternity. He is married to Susan Anderson and lives in Atlanta.

Rich DeAugustinis, IE 92, is vice president of global strategy for Coca-Cola's McDonald's division. He was a member of Sigma Phi Epsilon fraternity at Tech and was active in the Inter-Fraternity Council. Rich is returning for a second consecutive term. He and his wife, Tara, IE 92, live in Norcross, Ga.

Keith Edwards, ICS 89, MS ICS 91, PhD ICS 96, is a professor of Interactive Computing and the director of the GVU Center in the College of Computing at Georgia Tech. Keith is a member of the Computing Affinity Group. Keith and his wife, Beki Grinter, live in Atlanta.

Shawn Fowler, MGT 88, is a partner with Frazier & Deeter. Shawn was a co-op student at Tech and was a member of Delta Sigma Phi fraternity. He and his wife, Laura, live in Mableton, Ga.

Jeff Giglio, EE 77, is chairman of Inglett & Stubbs. As a student, Jeff was a member of Kappa Alpha fraternity and was a co-op student. He is involved with the Co-op Affinity Group. Jeff is married to Bonnie Giglio, IM 77, and lives in Fayetteville, Ga.

Wonya Lucas, IE 83, is working on developing a new television network. As a student, she was a member of Alpha Kappa Alpha sorority and the chorale. Wonya is also involved in the Co-op and Georgia Tech Black Alumni Organization affinity groups. She lives in Atlanta.

Shan Pesaru, CmPE 05, is owner of Sharp Hue Inc. As a student, Shan was a member of Delta Tau Delta fraternity. He is past president of the Young Alumni Council and a current representative of the Northwest Arkansas Network. He lives in Fayetteville, Ark.

Vicky Polashock, ChE 90, PhD ChE 95, is a technical leader at Kimberly-Clark Corp. She was a President's Scholar at Tech. Vicky and her husband, Mike, live in Roswell, Ga.

John Reese III, BC 80, is secretary-treasurer of LRA Constructors Inc. in Albany, Ga. As a student, John was a member of Phi Delta Theta fraternity. He lives with his wife, Mary, in Albany.

Valerie Montgomery Rice, Chem 83, is dean and executive vice president of the Morehouse School of Medicine. She will become president on July 1. Valerie earned her doctorate of medicine degree at Harvard University. She was a member of Delta Sigma Theta sorority at Tech, a co-op student and participated in student government. Valerie and her husband, Melvin, live in Atlanta.

Kary Saleeby, NE 77, MS ME 78, is senior technical consultant, machinery, at ExxonMobil Production Co. He was a resident assistant and member of the ice hockey club as a Tech student. Kary lives in Houston.

Ricardo Salgado, IE 00, is a managing director of fixed income at Goldman, Sachs & Co. in New York City. At Tech, Ricardo was on the board of the Student Foundation and currently is a member of the Hispanic Alumni Affinity Group. Ricardo lives in New York City. ▲

KUDOS!

The Alumni Association's Programs, Networks and Affinity Groups depend on volunteers to donate their time and effort, and leaders to organize gatherings and projects. The following alumni deserve thanks for their hard work.



OUTGOING NETWORK LEADERS

Trang Huynh, Mgt 06, outgoing president of the Georgia Tech Southern Company network, oversaw vast membership growth, improved social media efforts, the elimination of network dues and a big increase in scholarship monies raised.

Amanda Pritchett, BC 04, M BCFM 08, outgoing president of the Georgia Tech San Diego network, has renewed the Yellow Jacket spirit in the area through her hard work and fresh ideas, including a signature annual scholarship event.

Christy Stager, BCh 09, outgoing president of the Georgia Tech Golden Isles network, has been a fundraising dynamo, with her crowning achievement being the full funding of the Bill Dart Endowed Scholarship at Tech. She also led efforts to raise more than \$10,000 for additional student scholarships.

MENTOR JACKET'S AWARD WINNERS

Malachi Bennett, EE 07, was named the 2014 e-Mentor of the Year. Claire Powell, ME 14, said of her mentor: "The best advice Malachi gave me is to plan and be aware. With a plan of action, the likelihood of reaching my goals becomes much greater."

Julian "Alex" Brown, Mgt 97, and **Annemarie Cardell, ME 07**, were named local 2014 Mentor Jackets of the Year. Amanda Snell said of Alex: "I no longer need him to constantly tell me 'you can do it' or 'they'll love you,' because he's made it a part of my nature." And Chandler Brandenbug said of Annemarie: "She's always available to take time out of her busy schedule to meet with me or talk me through tough processes."

HARDWORKING AFFINITY GROUP LEADERS

Timothy Boone, president of the Georgia Tech Military Affinity Group, leads one of the GTAA's largest and most engaged groups. He speaks to fellow veterans at a Veterans' Happy Hour every month, and fosters many networking opportunities.

Joy Jordan, CE 92, secretary of the Black Alumni Organization, has been a dedicated leader of the affinity group for years. She shares her passion for people and organizational development, and demonstrates incredible dedication and support.

Charles Brian Quinn, CS 03, president of the Computing Alumni Organization, is an engineer, developer and entrepreneur, and he uses his many talents to lead the group and to work to provide scholarships for Tech computing students.



A Tricky Transition: From Military to Civilian Workforce

 Melissa Weinman

Finding a job can be challenging for anyone. But the task can be particularly daunting for military veterans looking to break into the private sector after leaving the service. Adding to the challenge is the increased competition for those civilian jobs. The U.S. Department of Defense estimates that within the next five years, 1.5 million servicemembers will transition out of the military and into the traditional workforce.



Unfortunately, many employers are wary about hiring veterans, especially those who served long deployments overseas. Studies show that companies may be concerned about the mental and emotional traumas of war spilling into the workplace, or worry that highly specialized skills learned in the military won't translate to the business world.

"There's a definite void between veterans getting out of the military and companies that are openly interested in hiring veterans," says Chip Starns, NRE 02, chief operating officer of ScanTech, an Atlanta-based developer and manufacturer of electron beam and X-Ray technologies for homeland security and food safety industries. Starns himself faced the challenges of this transition

"Having a military background can give you a leg up in the job market—especially when you position your experiences and skills correctly."

when he left the U.S. Navy in the late 1990s.

However, "having a military background often can give you a leg up in the job market—if you position your experiences and skills correctly," Starns says. "Many employers may not realize it, but you're likely armed with a lot of great assets that they're after."

Starns adds that personal traits

developed in the military, such as discipline, respect for protocol and motivation to execute tasks successfully, should appeal to a wide range of employers.

As for those highly specialized skills and demanding life experiences picked up in the service—whether earned at times of war or peace—Starns believes they should be a hot commodity for the

right employer. Case in point: While in the Navy, Starns served as a nuclear reactor operations supervisor and dive supervisor aboard nuclear fast attack submarines. Those are both very demanding and technical roles that Starns wisely emphasized during his job search. After all, the Navy's nuclear propulsion program is one of the most rigorous of its kind in the world, and the Navy dive school has a 50 percent failure rate even if you make it in. By taking the time to help companies understand his unique background, Starns found himself in demand.

Caroline Player, the Alumni Association's director of networking and career services, agrees that it's critical to properly positioning your skills and experiences in a way that employers can comprehend and translate to their working needs. "Translating them isn't always easy, and it can be a stumbling block to overcome at the beginning," Player says. "It's important to avoid using military acronyms and jargon that won't commonly be known by civilian hiring managers. You want those transferable skills to shine through."

Another important strategy is to research companies with a strong record of recruiting and hiring military veterans, Player says. There are many who recognize the unique talents and personal traits military veterans offer, but you have to seek them out. (See "Top 10 Military Friendly Employers" below.)

Tech and the Alumni Association can help veterans make the transition in many ways. For one, the Institute's Professional Education program (see



VETERAN CAREER SERVICE RESOURCES

Thankfully there are several organizations and efforts dedicated to helping veterans make the transition into the civilian workforce. Here is just a small sampling that you can easily find online:

- American Corporate Partners**
acp-usa.org | Offers veterans tools for long-term career development through mentoring, career counseling and networking opportunities.
- Call of Duty Endowment**
callofdutyendowment.org
Helps veterans by supporting and promoting groups that help prepare them for the job market.
- eBenefits**
ebenefits.va.gov/ebenefits/jobs
Recently launched resource allows users to upload résumés and find job openings. It also has a "military skills translator" to match military training with civilian occupations.
- GI Jobs**
gijobs.com | Print and online publication that publishes education, transition assistance and job opportunities for military transitioners.
- Helmets to Hardhats**
helmetstohardhats.org
Connects veterans to job opportunities in the building and construction industries.
- Hire Heroes USA**
hireheroesusa.org
Free, personalized assistance for veterans and spouses to market themselves and find employment.
- Operation RE/MAX**
operationremax.com
Offers career opportunities in the real estate industry for veterans and their spouses.
- Return To Work**
return2work.org
Offers personalized vocational rehabilitation and employment services to veterans and their spouses.
- Transition Assistance Online**
TAOnline.com | Offers resources and assistance to veterans and military spouses searching for employment at military-friendly companies.
- U.S. Department of Labor Veterans' Employment and Training Service (VETS)**
dol.gov/vets | Department of Labor service that provides employment resources and expertise for veterans.

"From Boots to Suits" on Page 22) offers many advanced courses and training opportunities to help those transitioning out of the military to build upon their specialized skill sets that employers are actively seeking.

The Alumni Association, of course, offers direct assistance with career planning, transitions, networking and job

searching. And these services aren't just available to recent graduates. Anyone looking to make a change or advance in their career can take advantage of its career services. Veterans can schedule an individual advisement session by contacting Debra Ruddell at (404) 894-7283 or simply visit gtalumni.org/career for more information.

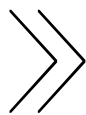
Finally, good old-fashioned networking with other veterans is a great way to learn about job opportunities and employment strategies.

The Georgia Tech Military Affinity Group (GT MAG) is one of the Alumni Association's most active groups and holds monthly happy hours and other events where you can get connected with alumni with shared experiences. (See "More than Just Swapping War Stories on Page 74.) ▲

2014 Top 10 Military Friendly Employers

Believe it or not, many companies are actively seeking veterans for employment. The following are the top 10 as ranked by GIJobs.

- | | |
|--|--|
| 1. USAA usaa.com | 5. Corporation MANTech mantech.com |
| 2. Union Pacific Railroad up.com | 6. Combined Insurance Company of America combinedinsurance.com |
| 3. Verizon Communications Inc. verizon.com | 7. Booz Allen Hamilton Inc. boozallen.com |
| 4. CSX Corporation csx.com | 8. Southern Company southerncompany.com |
| 5. ManTech International | 9. Allied Barton Security Services alliedbarton.com |
| | 10. Schneider National Inc. schneider.com |



*The Alumni Travel Program
takes Tech alumni to exciting
locales around the globe.*

Ocean to Ocean

 Catie McCoy, STC 07

A recent alumni cruise celebrated the 100th anniversary of the Panama Canal.



Panama 100 Years Later

TRIP ITINERARY

- 1 CARTEGNA, COLOMBIA**
Colonial city tour
- 2 PANAMA CANAL TRANSIT**
8-hour trip through 12 locks
- 3 FUERTE AMADOR AND PANAMA CITY, PANAMA**
City tour, Miraflores lock tour and evening performance
- 4 GOLFITO, COSTA RICA**
Region tour
- 5 PUERTO QUEPOS, COSTA RICA**
Region tour and return flight



Forty ships a day, 365 days a year, for more than 100 years: In total, the Panama Canal locks have lifted and lowered nearly 1.5 million ships passing from the Caribbean Sea to the Pacific Ocean, and vice versa. After traveling through the Gutan, Pedro Miguel, Miraflores and the other nine locks, there was little doubt among the 35 members of our tour group why the Panama Canal is still considered one of the foremost engineering marvels of the modern world (and one that Ramblin' Wrecks helped to build).

Our 10-night Georgia Tech Alumni Cruise aboard the adventurously named *Azamara Quest* started on the Caribbean side of the Canal. And instead of heading right through, we got a brief glimpse of Cuba before being deposited on dry land in richly historic Cartagena, Colombia.

We thoroughly explored this colonial city—a walled peninsula on Colombia's northern coast—at least as much as you can in about nine hours. We visited the Castillo San Felipe de Barajas fortress and walked the colonial streets; we stopped at Bolivar Square and watched the history of Cartagena unfold through dance; we were dazzled by the country's incredible emerald jewelry; and, of course, became intoxicated by the sweet smell of coffee. After a dizzying day, we then continued our journey toward the Panama Canal.

As we approached Limon Bay, on the northern side of the Canal, our pilot Mark Goodrich boarded the ship. What a proud moment it was for the Georgia Tech tour group to learn that the son of one of our fellow travelers, Catherine Goodrich, was going to navigate us through the Canal! We all congregated at the front of the ship, cameras in hand, to see the 600-ton, 85-foot gates of the Canal loom in front of us.

Being lifted through the Canal was a sublime experience. Our ship sat in a 1,050-by-110-foot lock as more than 26 million gallons of water filled in beneath us. And then mules—yes, good old, naturally engineered, self-powered mules—glided us through. Eight hours and 12 locks later, the *Azamara Quest* and her Georgia Tech travelers were in the Pacific Ocean.

Our journey continued in Fuerte Amador and Panama City. Some of us navigated the old city while others, fascinated by the Canal, took a trip to explore the Miraflores locks in greater depth by land. In the evening, we all ventured together to the National Theater of Panama for a performance of “The Spirit of Panama,” a cultural showcase of the country's rich culture, costumes, music and dances. Many of us bought traditional Panamanian hats before we headed back out to sea.

The final stops of our trip took us to some of the more remote coastal towns in Costa Rica—specifically Golfito and Quepos. There, we saw an abundance of flora and wildlife, enjoyed some of the sweetest pineapple I've ever tasted, and were greeted by the locals with the national slogan, a happy and welcoming “Pura Vida!”

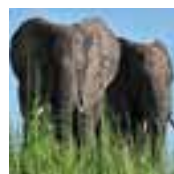
The luxury of our ship, the awe-inspiring engineering of the canal, the adventures in South America and the incredible travelers I shared the experience with made this a trip of a lifetime. ▲



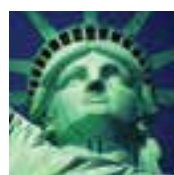
If you're itching to travel the world, who better to globe-hop with than your fellow Yellow Jackets? The Georgia Tech Alumni Association has a bevy of trips planned for the rest of 2014 and beyond. For more information or to register for any of these trips, visit gtalumni.org/travel.



India and Nepal, Oct. 5-20 Take in India's interwoven religions, colorful rituals and architectural marvels of marble and mud, as well as Nepal's majestic mountains and ancient traditions, on this two-week journey sure to excite the spirit as much as the mind and senses.



South Africa, Oct. 8-22 Tour southern Africa's historic, cultural and natural wonderland, ranging from Cape Town's cosmopolitan port to the wide variety of wildlife at the Thornybush Nature Reserve to the rumbling Victoria Falls in Zimbabwe.



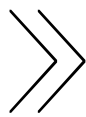
Thanksgiving in New York, Nov. 26-30 Start the holiday season off in New York City with your fellow Yellow Jackets. Catch the Macy's Thanksgiving Day Parade, Radio City Christmas Spectacular and a Broadway show, as well as enjoy Thanksgiving Day dinner at a top restaurant.



Ancient Mysteries of the Americas, Jan. 16-Feb. 3 Weave your way from Miami to Lima, Peru, aboard Oceania Cruises' elegant *Regatta*, and discover unspoiled natural wonders, dramatic coastlines and mesmerizing ancient relics along the shores of Central and South America.



Antarctica, Jan. 26-Feb. 8 Set out for a spectacular 14-day adventure to icy Antarctica, featuring a nine-night cruise on the exclusively chartered, luxurious M.S. *Le Boreal*. Accompany the ship's expert team of naturalists as you explore the White Continent in its unspoiled state.



More Than Just Swapping War Stories

✎ Melissa Weinman

It's not every day that you hear a story about a runaway pig throwing off a Sikorsky H-34 helicopter's center of gravity and causing a near crash over the jungles of Laos. But stop by one of the Georgia Tech Military Affinity Group's monthly happy hours, and you're likely to listen in to some pretty incredible tales.

At their get together in May at the Alumni House, members of the group sipped beers and watched the Georgia Tech Glee Club perform before reminiscing about old friends from Tech and swapping colorful war stories. All Georgia Tech alumni share common experiences from the rigors of their education here, but the tight-knit bond between graduates who served in the military is something pretty special.

Combat veterans, in particular, have a unique connection with one another, says Tim Boone, the Military Affinity Group's president. "Combat is an intense experience that they've faced at some point in their lives, and an experience other people can understand conceptually, but can't understand on an emotional level," Boone says. "So veterans do like to get together and talk to other veterans."

But the Georgia Tech Military Affinity Group (GT MAG) is about more than just talk. It's one of the Alumni Association's most active affinity groups—alumni who share common interests from their Tech experiences. Debra Thompson, senior manager of affinity groups, says that the members of GT MAG work hard to raise money for scholarships, provide networking opportunities for alumni and mentor students.

And like all affinity groups, GT MAG isn't just open to alumni—others affiliated with or interested in Tech are invited to participate, too. "We have a

lot of faculty, staff and friends of Georgia Tech that are military veterans and participate in the group, as well," Thompson says.

Case in point: Boone himself did not graduate from Georgia Tech. But the Vietnam War veteran, who works as a senior research associate for the Georgia Tech Research Institute, was recruited to lead the affinity group two years ago, he says.

"I've met some phenomenal people who have accomplished tremendous things and have wonderful hearts," Boone says.

Proving the point that GT MAG is about more than socializing, Boone points out that this past spring, he and a few of the members of the group presented scholarships to some of the ROTC's most promising students. The group created a new scholarship called the Arthur Hughes Award. Named for a Tech alumnus and retired Army National Guard veteran who served in Operation Desert Shield and Desert Storm, the \$1,000 annual award goes to an ROTC student with top scores in physical fitness tests.



The Military Affinity Group also raises scholarship money every year for the 1st Lt. Tyler Brown Leadership Award, named for the popular Georgia Tech class president who was killed in action in Iraq in 2004.

Boone said the group is also dedicated to helping veterans who have transitioned out of the military and are now attending Georgia Tech as students. "A few years ago, we started getting a lot more student veterans coming back from their tours in Afghanistan and Iraq," Boone says. "And we successfully lobbied for the hire of a full-time coordinator on campus to help them. I think GT MAG has found the role we can play on the campus, and it's just getting better and better." ▲

If you're interested in getting involved with the Military Affinity Group, you can stop by the group's next Veterans' Happy Hour. The events are held from 4:30-6:30 p.m. the first Thursday of each month at the Alumni House, 190 North Avenue NW. For more information about the group, visit www.gtmag.net.

The Leadership Circle is the cornerstone of Roll Call, Georgia Tech's annual fund. By becoming a member of the Leadership Circle, you help ensure Tech's prominence and adaptability in an ever-changing world.

Join one of our leadership giving clubs and enjoy benefits such as a limited edition tie or scarf and an invitation to the annual President's Dinner.

A tradition of leadership has evolved at the Georgia Institute of Technology over many generations ... we hope you'll join us.

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ramblin' roll



Have a new job or other news to share? Email details to ramblinroll@gtalumni.org.

1940s

Thomas J. Thomas, IM 49, sold the city-owned Jacksonville Electric Authority (JEA) to the Florida Power and Light Group (FPL).

1950s

Joseph "Ron" Coursey, ChE 59, was honored by the Dayton Section of the American Chemical Society for achieving Emeritus status after 50 years of membership. His project at General Motors reduced energy usage and chemical emissions.

Allen Ecker, EE 57, MS EE 58, was honored with HR 1124 by the Georgia House of Representatives on January 28. This honor recognizes Ecker's business accomplishments and contributions to the state of Georgia. He lives with his wife, Sandra, and children in Atlanta.

Linden Longino, IE 58, was honored by the Sochi, Russia, Olympics Committee with a portrait painted by a well-known Russian artist. Longino founded a non-profit youth art organization called "International Paint Pals." Longino has curated many worldwide exhibitions for the United Nations and Olympic Games, involving more than 200,000 kids in 75 countries.

1960s

Tom Fleming, ID 68, was recognized by the Museum of Modern Art for Excellence in industrial design. He has had several products on exhibit.

Paul Flower, CE 68, was named the new chairman of the Business Council of New Orleans and the River Region. He is the president and CEO of Woodward Design+Build.

Lawton M. "Mac" Nease, III, IM 65, president of Nease, Lagana, Eden &

Culley Inc., has been elected to the National Association of Estate Planning Council's Hall of Fame. This designation recognizes significant and outstanding lifetime achievement and contributions to the practice and profession of estate planning.

Grady Thrasher, IM 64, founded Thrasher Brothers Aerial Circus with his two brothers. The circus was inducted into the Air Show Hall of Fame by The International Council of Air Shows Foundation.

1970s

Dean Alford, EE 76, received the Georgia Society of Professional Engineers Engineer of the Year in Industry Award. Alford is president and CEO of Allied Energy Services, based in Conyers, Ga., where he is currently responsible for more than \$5 billion of energy projects in both Central and North America. He also serves on the Board of Trustees for the Georgia Tech Alumni Association.

Shailendra joins University System of Georgia Board of Regents

Sachin Shailendra, CE 01, has been appointed to the Board of Regents of the University System of Georgia.

The Board of Regents is the body that oversees the 31 public colleges and universities in the state. The board also has oversight of the Georgia Archives and the Georgia Public Library System.

Shailendra, of Atlanta, is president of SG Contracting, a full-service construction management and general contracting company based in Atlanta.

Shailendra sits on the Advisory Council for Woodward Academy, where he is an alumnus and past president of its alumni association. He is also a member of the Atlanta Opera Board and the Children's Healthcare Sports Network Board. He is a past member of the Board of Trustees for the Alexander-Tharpe Fund, Board of Visitors for Emory University, the Georgia Network to End Sexual Assault and the Government Affairs Council of the Georgia Chamber of Commerce.



PATEL NAMED 2014-15 FULBRIGHT SCHOLAR



Dr. Sandip Patel, MS ICS 88, has been selected as a 2014-15 Fulbright Scholar.

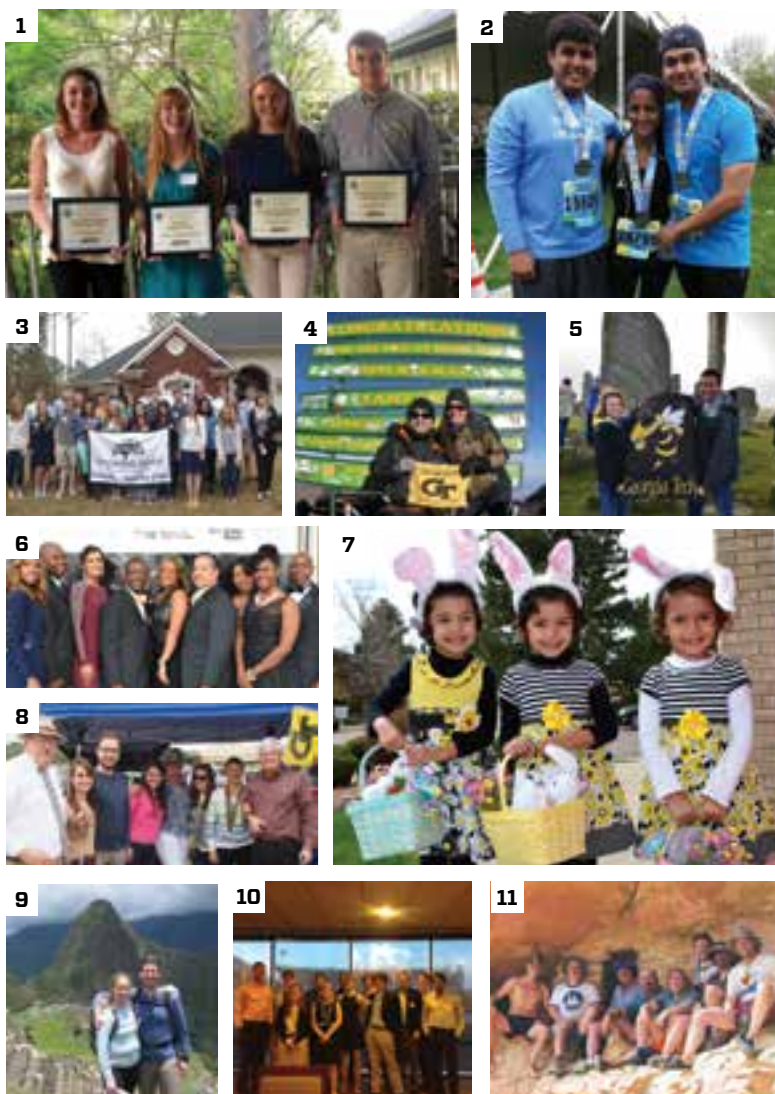
Patel is an associate professor of information science and systems at Morgan State University.

The Fulbright Research Scholarship award for research is given to an elite group of Americans who have an extraordinary track record in their respective fields. Dr. Patel's research focuses on "Smart Farming with SCADA-Sensor Based Irrigation for Coastal Areas of Gujarat State, India" and will be conducted at Junagadh Agricultural University, India.

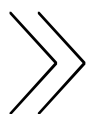
The Fulbright Program is highly competitive. Recipients of Fulbright awards are selected on the basis of academic or professional achievement, as well as demonstrated leadership potential in their fields. The Fulbright Program is the flagship international educational exchange program sponsored by the U.S. government and is designed to increase mutual understanding between the people of the United States and the people of other countries.

Patel will be joining an impressive group: Fulbright scholars have won 53 Nobel Prizes and 78 Pulitzer Prizes since the program's inception more than 60 years ago.

Out & About



1. Incoming Tech freshmen (L-R) Sarah Goodroe, Anna Laura Davenport, Johanna Blair and Joseph Tucker receive \$3,000 scholarships from the Georgia Tech Columbus, GA Alumni Network. **2.** Yellow Jackets (L-R) Munir Pathak, ISyE 10, Praachi Pathak, ME 10, and Mihir Pathak, ME 08, MS ME 10, PhD ME 13, finish the 10-mile Broad Street Run in Philadelphia in May. **3.** The 2014 Coweta-Fayette GT Network Accepted Student Reception host 29 local students who were accepted into Georgia Tech. **4.** Olivia Campos, ChE 09, and Raul Pino EE 89, MS EE 90, made it to the summit of Mt. Kilimanjaro on Feb 2013 with Trekking for Kids, a nonprofit founded by another Tech alum, Jose Montero, IE 95. **5.** Glenn Damanti, Mgt 97, and Vicki Berry Damanti, IA 97, celebrate their 15th wedding anniversary with a trip to Scotland, including a tour of the Standing Stones on the Isle of Lewis. **6.** Members of the Georgia Tech Black Alumni Organization pose for a picture at the Leaders and Legends Awards Gala at the Academy of Medicine on March 15. **7.** Tech alum Orson Swindle, IM 59, shows off his triplet granddaughters (L-R) Ariana, Marina and Leila Morgan decked out in their Easter best. **8.** Georgia Tech Equestrian Society members tailgate at the 50th running of the Atlanta Steeplechase. **9.** J.T. Genter, Mgt 07, and Katie Genter, CS 09, from the Georgia Tech Heart of Texas Alumni Network pose above Machu Picchu, Peru. **10.** The Georgia Tech Pride Alumni affinity group recognize LGBT and LGBT ally graduates at the Lavender Graduation celebration in April. **11.** Keith Eubanks, ME 85, led an 18-day private white-water expedition down the Colorado River through the Grand Canyon in July 2013. Here Tech participants enjoy a side hike at the Nankoweap Granaries: L-R, Henry DeGrazia, PhD Biol 89, Chip Morgan, MS ChE 86, Barry Hart, ICS 92, Toad Smith, AE 89 MS AE 90, Ken Kirk, CE 86, Wiley Holcombe, ES 77, Greg Hunt, PhD ISyE, 98, and Keith Eubanks.



*Have a new job or other news
to share? Email details to
ramblinroll@gtalumni.org.*

Rembert “Chip” Jarrell, Chem 78, retired from the Central Intelligence Agency after 33 years of service as a professional intelligence officer. He received gold service medals from the CIA and the National Reconnaissance Office. He lives in Nokesville, Va.

Blair Caplan Marks, CerE 78, was installed as president of Women of Reform Judaism, an international organization of approx. 65,000 women in nearly 500 local women's groups. Professionally, she is director of ethics awareness and international operations for Lockheed Martin.

Nathan Meehan, Phys 75, was nominated to be president of the Society of Petroleum Engineers.

Gary A. Smith, IM 79, was named vice president of Supply Logistics for MTA, New York City Transit. He and his wife live in Manhattan.

1980s

Ben Atha, EE 83, MS EE 88, and Michael Valletutti, IE 91, MS IE 92, founded Applied Global Technologies (AGT) in

1993 while working together at Georgia Tech Research Institute and established it as a Georgia Tech Advanced Technology Development Center company. AGT is now the leading provider of video conferencing technology and cloud services. Its headquarters are now in Kennesaw, Ga.

Raymond Bruttomesso Jr., AE 83, MS AE 84, returned to his position as chief patent counsel and associate general counsel for Human Design Medical after supporting Operation Enduring Freedom in Afghanistan. He is an engineering duty officer in the U.S. Navy Reserve and was mobilized to be the branch chief of the Ministerial Development of Ministry of Interior Facilities Department with-in NATO Training Mission.

Dan Carey, AP 85, was selected to move to Round 2 of the Mars One astronaut selection program on Dec. 30, 2013. He survived the 99.5% cut selection process of individuals willing to travel and permanently live on Mars beginning in 2024. He lives in Annandale, Va.

Dr. Pat Culligan, Mgt 89, received a patent and Federal Drug Administration

approval for a device called Stitchkit, which will make laparoscopic surgery more effective and less painful. He is a urogynecologist and operates using robots.

Keith Daniel, EE 85, has been promoted to senior vice president of transmission policy at Georgia Transmission Corp. in Tucker, Ga.

Elizabeth De Armond, CS 84, was named director of IIT Chicago-Kent's Legal Research and Writing Program. She is a professor at IIT Chicago-Kent in Illinois, as well as a contributing author for National Consumer Law Center publications.

Daniel Gallagher, Arch 87, and his design firm NADAAA, received a Progressive Architecture Citation for the University of Melbourne Faculty of Architecture, Building and Planning in Australia. The project is slated for completion later this year.

Roger Grabman, MS Mgt 88, founded Grab Innovations & Services LLC, which is a new professional engineering firm with machine design and equipment development expertise.

Casnocha inducted into AIMBE College of Fellows

Susan A. Casnocha, ChE 81, has been inducted into the American Institute for Medical and Biological Engineering College of Fellows. The College of Fellows is composed of the top 2 percent of medical and biological engineers in the country.

Casnocha is the Portfolio Lead for the BioProcess Research and Development Leadership Team at Pfizer Inc. Casnocha was nominated, reviewed, and elected by peers and members of the College of Fellows for important

contributions to bioprocess development for production of therapeutics and diagnostics from large-scale mammalian cell culture reactors.

AIMBE Fellows are regularly recognized for their contributions in teaching, research, and innovation. Fellows have been awarded the Presidential Medal of Science and the Presidential Medal of Technology and Innovation, and many also are members of the National Academy of Engineering, Institute of Medicine and



the National Academy of Sciences.

A formal induction ceremony was held during AIMBE's 2014 Annual Meeting at the National Academy

of Sciences Great Hall in Washington, DC on March 24. Dr. Casnocha was inducted along with 117 colleagues who make up the AIMBE College of Fellows Class of 2014.

Bo Hagler, Mgt. 88, was named CEO of MFG.com, an online manufacturing marketplace. Previously, Hagler served as vice president of research and development at QAD Inc.

Derrell James, Mgt. 89, has been appointed president and CEO of Stradis Healthcare, a leading supplier of custom surgical pack, accessories and other health care products.

Harry Maddox, EE 83, was recognized by the Georgia Senate with Senate Resolution 1160 for his contributions to the Georgia Department of Transportation upon his retirement.

Ben Owens, ME 87, was selected as a 2014 National Teaching Fellow by the Hope Street Fellow.

Two Tech alums tapped for presidential appointments

Ann Dunkin, IE 86, MS IE 88, was nominated by President Barack Obama to serve as the assistant administrator for Environmental Information at the Environmental Protection Agency. Dunkin is



the chief technology officer for the Palo Alto Unified School District, a position she has held since 2012. Dunkin was the director of technology for the Palo Alto Unified School District from 2009 to 2012. She held a number of positions at the Hewlett-Packard Company. Since 2012, she has served on the Consortium on School

Networking SmartIT Advisory Board and the CoSN CTO Council since 2013.

Leigh M. May, Mgt. 93, was appointed by President Barack Obama to the federal court. She is a nationally recognized trial attorney at Butler, Wooten, & Fryhofer LLP. "I am honored to put forward these highly qualified candidates for the federal bench," President Obama said in a White House press release. "They will be distinguished public servants and valuable additions to the United States District Courts."





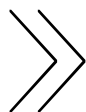
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Patrise Perkins-Hooker, IM 80, will be sworn in as the president of the State Bar of Georgia in June. The State Bar of Georgia is composed of more than 40,000 attorneys licensed to practice law in the state of Georgia.

Steve F. Pierce, MS IE 87, has been named chief technology officer for the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command.

1990s

Matthew Cohen, Psy 99, joined First Long Island Investors as an Assistant General Counsel in January. He and his wife live in Jericho, N.Y.

Maël L. D. S. Disseau, AE 94, MS AE 95, Ph.D. AE 02, graduated with a Ph.D. in Systematic Theology from Southwestern Baptist Theological Seminary in Fort Worth, Texas, on May 9. Disseau will begin teaching as an associate professor of Theology at Truett-McConnell College in Cleveland, Ga. in the fall of 2014.

Tara D. Elliot, CmpE 98, has joined Washington, D.C.-based firm Wilm-Hale as a principal of the IP Litigation Group.

Sherry Goldstein Hodor, Mgt 93, has become a partner at the fee-only wealth management firm Brightworth. She joined Brightworth in 1995 as a financial planner and now serves as the firm's chief compliance officer and director of operations.

Ronald Grover, ME 98, was presented with the Most Promising Scientist: Industry award at the 2014 BEYA STEM Conference in Washington, DC. He is a staff researcher at Propulsion Systems Research Lab at GM Global Research and Development.

David Herring, MgtSci 96, received the Federal Reserve Bank of Atlanta's President's Award for Excellence. It's the district's top recognition of outstanding staff performance and recognizes individuals who make significant contributions to the success of the Bank or the Federal Reserve System.

Kim Justus, IA 94, was promoted to partner at Womble Carlyle Sandridge &

Rice LLP in January. She represents financial institutions in real estate-secured commercial lending and resolves troubled loans. She lives in Atlanta.

Omar Khawaja, EE 99, was hired as the chief information security officer and vice president at Highmark, the third largest integrated health network in the nation. He and his wife, Nadia, Mgt 00, and their two daughters, Aiyla, 3, and Amalie, 5, recently relocated to Pittsburgh, Pa.

Joe McMahon, CS 92, is the director of solutions for the Washington, D.C., office of Ringtail Design. Ringtail Design is a software development firm, specializing in developing great user experiences.

Jeffrey Osterlund, MS AE 98, is the Houston functional and engineering operations manager for Boeing Space Exploration, accountable for engineering and technology integration. Previously, he served as the exploration chief engineer for United Space Alliance in Houston. Prior to that, he was a project engineering manager at Lockheed Martin Aeronautics in Marietta, GA.

WEDDINGS

1



2



1. Whitney Hagan, STC 05, and Mark Dietel, on Oct. 6, 2013, in Culver City, Calif. Whitney is a digital production manager at Scanline VFX and her husband is a pipeline developer at South Park Studios. They live in Los Angeles.

2. Jordan Jones, Mgt 10, and Sarah Jeffcoat, Mgt 11, on May 4, 2013, on Saint Simons Island, Ga. Jordan is a CPA with Jones & Kolb, and Sarah is a senior associate at Triage Consulting Group. They live in Atlanta.

Charles "Chad" Pannell, ChE 99, was awarded the Distinguished Service Medal by the Linn Inn Alliance in recognition for his work and contributions to the success of the alliance, which was founded in 2008 to unite the existing intellectual property law focused American Inns of Court.

Val Porter, Mgt. 93, was elected to the Board of Directors of the National Council of Nonprofits. Porter has worked in public service and non-profit management for nearly two decades.

Michael Sobers Jr., AE 98, PhD AE 10, was promoted to lieutenant colonel, U.S. Air Force, in October 2013. He and his family will be moving to Colorado Springs to join the U.S. Air Force Academy as an assistant professor in the department of astronautics.

Birkin Weith, ChE 99, was promoted to vice president of aromatics and higher olefins at CB&I in Bloomfield, N.J.

2000s

Roger D. Anderson, Mgt 04, was hired as a United States Tennis Association National Coach in the player development department. He lives in New York.

Jason E. Barton, EE 03, has been named an associate at the consulting and engineering firm Newcomb & Boyd.

Christopher Booth, AE 06, was presented with the Most Promising Engineer: Industry award at the 2014 BEYA STEM Conference in Washington, D.C. He is a flight test engineer at Gulfstream.

Jessica S. Clements, AP 01, has been named an associate at the

consulting and engineering firm Newcomb & Boyd.

M. Wayne Craige, MBA 09, is the founder and CEO of CiDrep Informatics, an integrative clinical-genomic informatics consulting firm specializing in the technical implementations of clinical and research informatics infrastructures.

Richard O. Dozier III, EE 06, has been promoted to senior associate at the consulting and engineering firm Newcomb & Boyd.

Brian Emfinger, CS 04, joined Banner & Witcoff, Ltd. in 2012 as an elected shareholder. He prepares and procures patents and also provides legal and technical support. He was formerly a software engineer.

Suzanne Fulcher Fowler, Mgt 03, accepted a position of Sales Manager for Graphisoft North America, which is based in Atlanta.

John M. Goodman, ChE 02, was named partner at Bradley Arant Boult Cummings LLP in Birmingham, Ala. He is a member of the firm's Litigation and Construction Practice Groups.

Robert C. Grant, ME 07, has been named an associate at the consulting and engineering firm Newcomb & Boyd.

Jeremy Haile, CS 03, is founder and CTO of Sideqik, a company that simplifies the management of marketing partnerships and cross-promotions with other brands. Sideqik was a Georgia Tech Flashpoint company in 2012 and kicked off Venture Atlanta in 2013.

Walker C. Jones, ME 06 has been promoted to senior associate at the consulting and engineering firm Newcomb & Boyd.

Heeyoung Kim, MS Stat 08, PhD IE 11, is now an assistant professor at KAIST, a top school in South Korea.

Nicholas A. Mazzolini, EE 03 has been promoted to senior associate at the consulting and engineering firm Newcomb & Boyd.

Sean Padfield, AE 06, was awarded Chartered Engineer status with the United Kingdom Engineering Council and elected member of the Royal Aeronautical Society. He also accepted a new role at Rolls-Royce Corp. as integrated project team lead in Indianapolis.

Jeffrey Reese, BC 08, has left his position as a judicial law clerk to handle contracts for PAREXEL International.

Jeffery L. Waters, EE 05, IE 00, was promoted from Associate to Counsel at Cantor Colburn, LLP. He drafts and prosecutes patents for mechanical and electrical innovations.

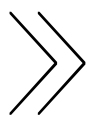
2010s

Salvatore M. Lizzio ME 10, has been named an associate at the consulting and engineering firm Newcomb & Boyd.

Kurt Luther, PhD HCC 12, has accepted a tenure-track position as an assistant professor of computer science at Virginia Tech.

Friends

Kenneth J. Knoespel, interim dean of the Ivan Allen College, has received a prestigious honorary doctorate from the University of Umeå in Sweden in recognition of his engagement with Swedish institutions of higher learning.



Welcomed a future Yellow Jacket into your family? Send a photo and note to ramblinroll@gtalumni.org.



BIRTHS

1. Baabak Ashuri, MS BC 04, MS OR 06, PhD ISyE 08, and his wife, Rokhsana Sanai, welcomed daughter Audrina on Oct. 2, 2013. Baabak is assistant professor in the School of Building Construction at Georgia Tech. They live in Roswell, Ga.

Megan (Lukken), IA 09, and **Trey Birch (James Michael III), Econ 10**, welcomed son James Michael IV on March 31.

2. Kathleen, ISyE 11, and **Matthew Braman, Mgt 09**, welcomed daughter Julianna Marie on May 9, 2013. Matthew is a product manager for PanTheryx. They live in Longmont, Colo.

3. Tony Burkhardt, Econ 07, and his wife, Ashley, welcomed daughter Mikayla Marie, on Oct. 6, 2013. Tony is an IT director for a local school. They live in Phoenix.

4. Stephen Clawson, ME 07, and his wife, Dawn, welcomed daughter Eliza Mae on Sept. 10, 2013. Stephen works for software company Epic and the family lives in Madison, Wis.

5. Justin Davis, EE 97, MS EE 99, PhD EE 03, and his wife, Shannon, welcomed son Victor Dean on Aug. 16, 2013. Justin is a lead electrical engineer at Perceptron. They live in Toledo, Ohio.

6. Daniel DeCicco, ISyE 00, and his wife, Jessica, celebrated his return from his fifth military deployment on Jan. 2, and birth of their son, Grayson James, on Jan. 14. Daniel is a lieutenant commander and helicopter pilot in the U.S. Navy.

7. Jennifer Dodd, IA 94, M IA 00, and **Reggie Graham, Mgt 93**, welcomed daughter Elodie Sloane. They live in Atlanta with daughter Gabrielle and son Mick.

John Michael Doyle, IE 05, and his wife, Lauren, welcomed daughter Olivia Rose on March 3. John Michael, after returning from a two-year work assignment in Amsterdam,



Netherlands, is plant manager at CSM Bakery Products in Atlanta. They live in the Atlanta area.

8. Shannon Goodman, M Arch 98, and William 'Erik' Poole, Arch 94, M Arch 98, welcomed daughter Madison Sloane Poole on Aug. 21, 2013. Shannon is executive director of Lifecycle Building Center, and Erik is a senior design and plan review consultant at Intercontinental Hotels Group. They live in Atlanta.

9. Melissa (Vander Wood), IE 05, and Brian Holman, EE 06, welcomed son Bennett Timothy on March 19. Melissa is the lab manager for MVA

Scientific Consultants. Brian is a research engineer for GTRI. They live in Roswell, Ga.

10. Pete Jenior, BS CE 05, MS CE 07, and his wife, Elizabeth, welcomed son Thomas on Aug. 1. Pete is a transportation engineer with Kittelson. They live in Baltimore.

11. Andrew Milburn, MSE 07, and his wife, Amy, welcomed son Jason Emerson on Sept. 6, 2013. Andrew is an EOD officer in the U.S. Navy and they are currently stationed in Virginia Beach, Va.

12. Christina O'Neill, CS 10, and Darin Yawn, ME 08, welcomed their

son Conner Thomas O'Neill Yawn on Jan. 10. They live in Villa Rica, Ga.

13. Greg Popowitz, ME 02, and his wife, Ashley, welcomed son Noah Aaron on April 23. Greg is a patent attorney for Assouline & Berlowe, P.A. They live in Cooper City, Fla.

14. Sean Rastsmith (Smith), Mgt 08, and his wife, Brittany, welcomed son Saul Thomas on Nov. 21, 2013.

15. Stephen Watts, IE 01, MS IE 02, and his wife, Stephanie, welcomed their second daughter, Anna Grace, on Feb. 7. They live in Marietta, Ga.



in memoriam



1930s

Ernest Howard Atkinson Sr., ME 35, of Atlanta, on Feb. 18. Fulton Metal Bed Company. Field engineer, Lord Manufacturing Company. Son: Ernest H. Atkinson Jr., ME 68, MS NE 70.

James H. Morgan, Arch 34, of Swainsboro, Ga., on March 8. Army (Capt.). World War II. Georgia Power Company. Owner and president, Franklin-Overstreet and Company Inc. President, Georgia Automobile Dealers Association. Time Magazine's Dealer of the Year Award recipient. Chairman, Board of the Citizens Bank. Swainsboro Housing Authority. Swainsboro Planning Division. Chairman, Emanuel County Hospital. Georgia Council of Arts.

Shelley "Slide" Rule, ME 39, of Sheldon, S.C., on Jan. 7. Naval Academy. Naval Reserves. Vietnam. Pan American Health Organization. Sailor.

Chester Marion Smith Jr., CE 31, of Hampton, Ga., on Nov. 27. Founder, Metro Engineering and Surveying Company Inc.

H. Lowrey Stulb, Arch 38, of Augusta, Ga., on Jan. 8. Architect. Member, American Institute of Architects. Member, Beech Island Architecture Club.

Frank H. Whaley, ME 38, of Palm City, Fla., on Jan. 5. Army (Col.). Professional engineer. Founder and President, Transport Engineering Company Incorporated. Member, The American Society of Automotive Engineers. The National Defense Industrial Association. The University Club of New York. Piper's Landing Country Club. Georgia Tech Alumni Association.

Harold Smith Williams, TE 38, of Decatur, Ga., on Feb. 9. U.S. Civil Service.

1940s

Jack Alexander Jr., CIs 49, of Palm Beach, Fla., on Feb. 28. Air Force (Pilot). Alexander-Seewald Company. Automotive Warehouse Distributors Association. Member, Society of Automotive Engineers. Automotive Hall of Fame Inc.. Sons: R. Jack Alexander III, Mgt 78; David Lee Alexander, Mgt 80, MS Mgt 82. Grandson: R. Jack Alexander IV, Chem 07.

Spencer L. "Lew" Binns Jr., IE 45, of Toledo, Ohio, on April 6. U.S. Navy. WWII Veteran. Purchasing Manager for Owens-Illinois, Inc.

James J. Bresnahan Jr., ChE 48, of Sandy Springs, Ga. on April 11. U.S. Navy. WWII Veteran. AT&T.

Richard O. Collier, AE 48, of Englewood, Fla., on April 9. Navy V-12. Consolidated Aircraft. Lockheed Georgia Company. Boeing. Georgia Tech Baseball. Georgia Tech Basketball (1944-45 High Scorer, Southeastern Conference). National Senior Tennis Games (Gold Medal). World Senior Tennis Games (Gold Medal).

Robert Austin Collinge, IM 49, of Atlanta, on Feb. 23. Navy. World War II. Engineer. Brother: Kenneth Collinge, IE 55.

George W. Counts, EE 49, MS EE 50, of North Augusta, S.C., on Dec. 29. Navy, World War II. Engineer, Army Corps of Engineers. Chief of South Atlantic Division's Hydropower Test Section. Chapter president, Augusta Chapter of Georgia Society of Professional Engineers.

James M. Cox, EE 47, of Knoxville, Tenn., on March 16. U.S. Air Force (Lt. Col.), Korean War. Tennessee Valley Authority. Federal Emergency Energy Group.

Robert H. Crossfield, ME 40, of Lakeland, Fla., on Dec. 17. Navy (Lt. Cmdr.). Son: Matthew D. Crossfield, ME 81, MS ME 83.

Chester Arthur Crowell Jr., Arch 42, of Dahlonega, Ga., on April 22. Army Corps. World War II. Businessman. Member, Macon Lions Club. Kiwanis Club. Member, Gainesville (Florida) Fine Arts Association. Barber Gators. Decrepit Birdmen. Son: C. Arthur Crowell III, EE 75. Grandson: Chester Crowell, EE 12. Granddaughter: Ciera Crowell, Arch 13.

Fred Blaylock Culwell Jr., CIs 45, of Atlanta, on Dec. 10. Navy, World War II. Sales engineer, Fred B Culwell and Associates. Pilot.

Charles W. Cunningham, Arch 49, of Carrollton, Ga., on Feb. 10. Marine Corps. World War II. Founder, Barker and Cunningham architectural firm. Member, Architectural Institute of America.

Thomas R. Curtner, IM 47, of Newport, Ark., on April 20, 2013.

Frederick Dixon, Phys 48, MS Phys 49, of Bethlehem, Penn., on Sept. 28. Principal research scientist, Georgia Tech Research Institute. Son: Dr. F. Earl Dixon, Bio 75.

Marcellus Hallman Dodd, CIs 49, of Atlanta, on Dec. 14. World War II. Insurance agent. Tennis player. Son-in-law: William Anton Schuh, Mgt 94

Robert O. Dodd Jr., IM 43, of Clayton, Ga., on Dec. 13. Navy (Lt.). Owner, R.O. Dodd Company. President, National Sporting Goods Agency Association.

Carlton Stanley Duggan, IE 48, of Columbus, Ga., on Jan. 23. Sam Duggan The Chevrolet Dealer Inc. Chairman, Carlton Farms Incorporated. Brother: Robert Duggan, IM 52.

George "Dixie" B. Dunbar Sr., CIs 50, of Saint Simons Island, Ga., on Jan. 13. Frederica Bank and Trust. Chairman and CEO, E.V. Dunbar Company. Brother: Martin W. Nicholes, IM 43.

John Oscar Gerson, Jr. ME 48, of Spartanburg, S.C. on March 8. Southern Railway Company, Hayne Car Shop, S.R.

G. Ray Harris, CIs 46, of Spartanburg, S.C., on Jan. 29. Navy. World War II. Citizen and Southern National Bank. Teacher, Fairforest High School. Professor, Lander University. Derrick, Stubbs & Stith. Founding partner, Harris, Swaim, Brown & Elliott.

James Lamar Henderson Jr., IM 49, of Hampton, Ga., on Feb. 21. Navy. World War II. J.M. Tull Company. Founder and principal, J & J Inc. Member, Henry County Development Authority. Advisory committee member, Fortson Charitable Trust.

William Howard Hughes, ME 49, IM 50, of Savannah, Ga., on Jan. 20. Air Force. World War II. Ductile Iron Company. U.S. Army Corps of Engineers.

Ray Inglett, EE 49, of Atlanta, on March 31. U.S. Air Force. Founder of Inglett & Stubbs Inc.

Frank Dugger Jamison, IM 41, of Fort Valley, Ga., on Jan. 24. Navy (Cmdr). World War II. American Camellia Society. Founding director, Citizens Bank in Fort Valley. Chairman, Fort Valley Planning and Zoning Commission.

Robert Granger Jessup, CE 45, of Raleigh, N.C., on Feb. 8. Navy. World War II. Soil Conservation Service, U.S. Department of Agriculture. Consultant, Agricultural Extension Service at North Carolina State University.

Joseph Laurel Johnson Jr., AE 44, of Atlanta, on Feb. 25. NASA. Researcher.

Kenneth E. Johnson, ME 48, of Madison, Ga. on March 18. Architect and engineer. chief designer for Johnson, Smith, Reagan, architects for the Ferst Center

for the Arts and the Student Galleria at Georgia Tech. Co-founder, Passive Solar Society of Georgia.

Jason Douglas Koesy, ME 49, of Cleveland, Ohio, on April 22. Army Air Corps (Pilot). World War II. Maintenance engineer, Eastern Airlines. Director of Aircraft Maintenance. Systems Director.

Francis Clark Laseter, IM 49, of Decatur, Ga., on Jan. 17. Army. World War II. Allstate Insurance. Northbrook Insurance. Consultant, Arthur J. Gallagher & Company. Son: Joel Tyler Laseter II, MS Arch 81.

Robert Lurie, ChE 47, of Clearwater, Fla., on Feb. 16.

Richard Henry Maddux Sr., IM 43, of Macon, Ga., on Feb. 2. Navy (Lt., Bronze Star). World War II. Member, Kiwanis Club. President, Riverside Cemetery Board. Board of Directors, Georgia Bank. Sons: Eugene Maddux, IM 77. Richard Maddux, Mgt 74.

James Hagood Martin, Text 49, of Rock Hill, S.C., on Dec. 9. Air Force, World War II (Lt. Col., Bombardier). Plant Chemist, Reeves Brothers Printing and Finishing. Manager, Verona Dyestuffs. Golfer. Founder, OMEGA Club.

Henry W. Mauldin Jr., EE 43, of Fairfax, Va., on Feb. 3. Engineer, Melpar. E-systems.

William "Mac" Reece McWilliams Sr., ME 41, IE 46, of Lexington, S.C., on April 24. Army Ordinance Division, World War II. President and CEO, Columbia Cooling and Heating Company. Member, National Society of Professional Engineers. American Society of Heating, Refrigerating and Air-Conditioning. President, Mechanical Contractors Association of South Carolina. Member, Columbia Sertoma Club. Son: Robert H. McWilliams, Arch 75, ME 79.

Mary Todd Shaw

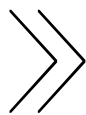
WWII DRAFTSWOMAN AND ARTIST

Mary Todd Shaw, CIs 42, of Charlotte, N.C., on Dec. 20. Shaw was one of the first women to attend Georgia Tech as part of the Manpower Act under the U.S. Chemical Warfare Service. According to her obituary, she went on to become a draftsman for the U.S. War Department during World War II. Working at home to support the troops abroad, she designed gas masks and flame-throwers. In the 1970s, Shaw attended the University of North Carolina in Charlotte and earned a bachelor's degree in Fine Arts. She enjoyed all types of art, including painting, drawing, sculpture, printmaking, and collage. One of her favorite forms of expression was three-dimensional assemblage. Her work has been shown worldwide and published in several books as well as in museums and private collections.

Mary Todd was an adventurous traveler who explored the world with a life-size black-and-white mask of a handlebar-mustachioed relative she named "Henry the Victorian Man." Mary Todd chronicled her travels with photos of a vast array of people assuming his likeness. According to family, she was never afraid to take risks or to appear undignified as she pursued her artistic vision and joy of life.



in memoriam



Hugh Campbell Moore, EE 41, of Dunwoody, Ga., on Feb. 24. Army Air Corps. Air Force (Col.). World War II. Korean War. Vietnam War. Business manager, Pathology and Laboratory Medicine. Son: Hugh C. Moore Jr., IE 67.

Thomas George Moskal Jr., EE 48, MS EE 50, of Lafayette, La., on Dec. 30. Westinghouse. Armor Elevator Company. Creak, Moskal and Associates.

William Bruckner Owens, ME 40, of Decatur, Ga., on Jan. 6. Air Force (Ordinance officer). Army Reserve (Lt. Col.). Georgia Railroad, State Highway Department Link Belt Company, Georgia Power Company, Ohio Brass Company. Executive director, Southeastern Electric Exchange. Grandson: Taylor R. Owens, BC 08.

James Donalson Pearce, IM 47, of Hendersonville, N.C., on Dec. 6, 2013. Silent Service submarines. Stock broker.

Tirso Waldo "Ralph" Presmanes, EE 47, of Atlanta, on Dec. 5, 2013. Gymnast.

Engineer. Contractor. Consultant. Granddaughter: Alison G. Presmanes, Psy 02.

Perrin Reynolds, CE 49, of Gainesville, Ga., on March 3. Navy. World War II. Laudermilk Insurance. Day, Reynolds and Parks Insurance Agency. Kiwanis Club. Gainesville City School Board. Wall Street Investors Club.

William J. Rivers, ME 42, of Leesburg, Ga., on Jan. 12. Navy (Cmdr.)

John Curtis Roy, IM 40, of Fayetteville, Ga., on Dec. 26, 2013. Army. World War II. Lockheed Martin.

Martin David Siegel, IM 48, of Fort Worth, Texas, on April 3. World War II veteran. Manufacturing businessman.

Arthur Riddick Smith Jr., Arch 48, of Valdosta, on Jan. 25. U.S. Army Air Corps. World War II veteran. Distinguished Flying Cross. Professional engineer and architect. Smith and Smith, Architects.

Jan R. Smith, IE 49, of Madison, Ala., in Dec. 2013. Owner, President, Jan R. Smith Construction.

James Cosby Stanton, ME 49, of St. Augustine, Fla., on Sept. 19, 2013. World War II. Test engineer, General Electric Company. Sonoco Products. Celanese. Citi Service.

Robley Henson Tatum, IM 46, of Dunwoody, Ga., on Jan. 17. Vice president, Georgia Tech Research Institute.

John Stuart Thibadeau Sr., IM 46, of Cumming, Ga., on Jan. 16. Navy (Lt.). World War II. Founder, Thibadeau Company. President, Georgia Multiple Listing Service. Trustee, Georgia Tech Alumni Association. Sons: James Thibadeau, IM 71; J.S. Thibadeau Jr., ME 69; Thomas Thibadeau, Mgt 73.

Alfred Truan, ME 44, of Hiram on March 12.

Harry Bradford Urey Jr., ME 49, of Dallas, on Feb. 5. Army Air Corps. Air Force (Col., pilot). Georgia Air National Guard. Korean War. Project engineer. Weapons Guidance Laboratory, Wright-Patterson AFB. Member, Military Order of World Wars. Coach.

Barksdale E. Williams, IE 49, of Atlanta, on Dec. 29. World War II.

Zelvin Levine NUCLEAR ENGINEER

Zelvin Levine, ChE 51, PhD ChE 56, of South Boston, Va., on Jan. 15. Levine spent nearly 30 years in the service of the U.S. Maritime Administration in Washington, D.C., and pioneered many advances in the fields of atomic and nuclear energy. Levine earned his doctoral degree in chemical engineering from Georgia Tech in 1956. He was a member of the American Nuclear Society and the Atomic Industrial Forum and held chairs in several organizations in his field. While working at Babcock & Wilcox Company from 1956-1961, Levine designed the nuclear propulsion system for the first nuclear-powered cargo-passenger ship, the *NS Savannah*. The ship was designated a National Historic Landmark in 1991, and now serves as a museum in Baltimore's harbor. While at Martin-Marietta, then the Martin Co., Levine was project manager of the converted Liberty ship Sturgis, the first floating nuclear power plant. In 1991 he was awarded the Bronze medal, the Maritime Administration's highest honor, for outstanding performance and leadership in the agency's research and development program.

1950s

Emory D. Ayers, CE 50, of Stonington, Conn., on Jan. 11. Navy (Korean Service Medal 5 Stars, United Nations Medal, Navy Occupation Medal). Korean War. Union Carbide Corporation. Theodore Barry Associates. Founder, Emory Ayers Associates. President, New York Management Consultants. Founder, Avatar Meher Baba Foundation Inc.

Edwin Britton Barrineau, IM 56, of Saint Johns, Fla., on March 9. U.S. Navy (Rear Adm., Pilot, Legion of Merit, Meritorious Service Medal). Manager, HARM Missile Program.

Clinton Bastin, ChE 50, of Decatur, Ga., on Jan. 17. Marine Corps. World War II. Atomic Energy Commission. Department of Energy in Germantown, Maryland. President, National Treasury Employees.

Lloyd Bernier Baylay Jr, EE 51, MS EE 53, of Campbell, Calif., on Feb. 28. Navy. Lockheed Missiles and Space.

Sam H. Berkowitz, EE 53, of Atlanta, on Dec. 27. Army. Engineer, Lockheed Martin Aeronautics Company. Son: Steven Berkowitz, Arch 88.

Robert Henry Bohler, EE 50, of Marshallville, Ga., on March 14. World War II. Georgia Power Company. Son: Robert H. Bohler Jr, IE 73.

William D. Branch, EE 57, of Atlanta, on Jan. 22. Martin Company. Senior staff engineer, Magnavox Research Labs. Musician.

Irving Lawrence Brand, Text 51, of Madison, N.J., on May 22, 2013. Army. Stock exchange trader. Retired owner, Neemi Corp. Commander, Power Boat Squadron of Lake Hoptacong, N.J.

Albert Carl Brevetti, Arch 50, of Schenectady, N.Y., on Feb. 2. Navy. Chapman, Evans and Delehanty. NYS Capitol architect. Director of design, Office of General Services. President of Easter NY Chapter, AIA. President, Guilderland Free Library.

Daniel Crowell Browning, AE 55, of Madison, Ala., on Feb. 17. U.S. Air Force. Lockheed Martin. Chrysler. Martin Marietta.

Roger Henry Brown Sr., CE 52, of Gainesville, Ga., on Jan. 14. US Navy 78th Construction Battalion. Georgia Department of Transportation. President, Southeastern Highway Contracting Company. Georgia Tech Hall of Fame.

Gus John Caras, ChE 58, MS IS 67, of Dunwoody, Ga., on Jan. 28. Army. Chemist, Thiokol Corporation. Army Missile Command. Statistician, Centers for Disease Control and Prevention. Professor. Georgia State University. DeKalb College. Daughters: Vicki Bitzis, IM 85. Lisa Caras Taylor, Mgt 93. Son: John Caras, EE 82.

Victor Louis Cohen, IM 52, MS IM 53, of Decatur, Ga., on April 25. Army Reserves (Col.). World War II. Lockheed Martin Aircraft Corporation.

Sidney Johnston Cook III, Cls 56, of Moultrie, Ga., on Feb. 13. Pilot, Air Force.

Jere Craddock, AE 56, of Arlington, Texas, on Jan. 12. Navy. Engineer, LTV. Lockheed Martin.

Warren Bowers Crouch, Phys 50, of Gray, Tenn., on July 28, 2013. Army (Lt. Col.).

Daniel Behrens Curtis, Arch 58, of Tampa, Fla., on Jan. 7. U.S. Army Corps of Engineers. National Guard. U.S. Army Reserve (Col.). Chairman, Barrio Latino. Kennedy Boulevard Council. Tampa Chapter of the American Cancer Society. Operating Partner, Curtis Caribbean Construction Limited. Brother: William E. Curtis, IE 63.

T. Earl Dudley, IM 50, of Kingsport, Tenn., on Dec. 28. Navy. World War II. Tennessee Eastman Corporation.

William E. Durrett Sr., IM 59, of Aiken, S.C., on Dec. 9, 2013. Navy. Korean War. Columbus Georgia Economic Development. Gulf Power. Macon-Bibb County Georgia Industrial Development Authority. Secretary, Georgia Industrial Development Association.

Charles Wesley Dupree, EE 57, of Ormond Beach, Fla., on Jan. 23. Navy. Engineer, Florida Power and Light Company. Brothers: Daniel Dupree, IE 68. Isaiah Dupree, Arch 68.

William Hugh Edmiston, EE 58, of Columbus, Ohio, on Jan. 19. Electronics Instructor, Tampa Technical Institute. Army.

Dan Warren Estes Sr., Arch 50, of Columbus, Ga., on Aug. 2, 2013. Project manager, construction industry. Freeman and Associates.

William E. Florance, IE 53, of Pittsford, N.Y., on March 18.

Phillip Larry Galloway, Text 58, of Norcross, Ga., on Feb. 8. Owner, PAK Unlimited.

Wallace Russell Gambill, ChE 52, of Oak Ridge, Tenn., on Jan. 25. Heat transfer research engineer, Oak Ridge National Laboratories.

Harry Leonidas Gilham Jr., Cls 51, of Atlanta, on Feb. 2. Founder, Georgia Lighting. World Imports Company. Member, Board of Advisors for the Georgia Museum of Arts. Board of the Brookwood Hills Civic Association.

Walter Burton "Burt" Grant, IM 56, of Southern Pines, N.C. on April 7. Rhodes Scholar. Football, basketball and baseball player for Georgia Tech. U.S. Air Force. Carolina Power & Light.

James W. Gray Jr., IM 50, of Winter Haven, Fla., on Aug. 9, 2013. Navy (Rear Adm.), Korean War. Gray Truck Line Co. Son: James W. Gray III, MgtSci 74.

John Key Griffin Jr., Text 52, of Pensacola, Fla., on Dec. 6. Army Corps of Engineers. Korean War. Engineer, Texaco Oil Company; Monsanto Company.

Beverly Irwin Grimes, Text 52, of Williamsburg, Va., on March 1. Navy. World War II. American Heart Association. Kiwanis Club.

Edward Russell Holladay, Cls 53, of Atlanta, on Jan. 31. Navy. Korean War. Delta Air Lines. Golfer.

James Stevens Holmes Jr., IM 50, of Traphill, N.C., on Dec. 18. Navy. World War II (Pilot). Director of Labor Relations, BellSouth. Son: James S. Holmes III, Cls 77.



in memoriam



Harry Wilson Howell, Arch 53, of Marietta, Ga. on April 2. Navy. Partner, Armistead and Saggus. President and treasurer, Harry W. Howell Associates. Son Bob Howell, ME 82. Grandson: Andy Howell, Cls 12.

William E. Jameson Jr., Arch 58, of Columbus, Ga., on Dec. 22. Project Architect, Sidney Barrett Associates. Son: Andrew Jameson, IA 97.

Walter L. Kilbourn, IE 53, of Pearland, Texas, on April 5. Army. Korean War. John's Manville Insulation. SIP Incorporated. Parson Corporation.

Louis "Tony" M. Landolfi, IE 59, of Asheville, N.C., on Feb. 18. American Enka. BASF.

Norman Willis Lee Jr., AE 57, of Edgewater, Md., on Feb. 27. Air Force (Col., Legion of Merit.) Marathoner and ultra marathoner.

Willis O'Neal Martin, AE 53, of Lynn Haven, Fla., on Feb. 2. Air Force (Capt.). Member, American Institute of Aeronautics and Astronautics.

Lou Mason, ChE 52, of Plainview, N.Y., on May 21, 2013. Navy. World War II. Founding partner, AIRPOL.

William Elliott Matthews IV, EE 50, of Birmingham, Ala., on Dec. 30. Navy (Lt.). President, Southern Natural Gas Company. El Paso Energy Corporation. Board of Trustees of Alabama Independent Colleges. Board of Directors of Blue Cross-Blue Shield. Metropolitan Development Board. Advisory Board of Birmingham-Southern College. Chairman, Childcare Resources. Mayor, Mountain Brook, Ala.

Dennis Herman Matthews, ME 54, of Jacksonville, Fla., on Jan. 23. Army (2nd Lt.). Florida Machine and Foundry. FLECO. Design engineer, Balderson.

Roland E. Moseley, MS EE 59, of Melbourne Beach, Fla., on March 9. Air Force (Staff Sgt.). NASA.

Donald Franklin Owen, IM 50, of Clarkston, Ga., on Dec. 30. U.S. Navy. Korean War (Navy Reserves, Lt.). Owner, Investment Property Company. Tennis player.

Marvin Elliott Perlman, Text 53, of Dunwoody, Ga., on March 21. U.S. Army. Executive vice president, Permna Color Corp.

Blanding DeSaussure "Dan" Roberts, IE 51, of Buford, Ga., on Dec. 10, 2013. Navy. Roberts Engineering Corporation.

William Wilson "Pete" Scogin, IM 55, of Sandy Springs, Ga., on April 6. Georgia Tech football player. Owner, Stasco Mechanical Contractors.

Joel Thompson Severinghaus, IM 53, MS IM 59, of Carl Junction, Mo., on Dec. 23. Manager, Chelsea Woods Association. AT&T.

Samuel Farrar Smith III, EE 50, of Savannah, Ga., on Feb. 14. Army. World War II veteran. Federated Mutual Insurance. Board of Director of Durden Banking Co. Member of Emanuel County Historical Preservations Society Board. Member of Georgia Trust for Historic Preservation Board. Board member of Tift College. Farmer. Daughter: Sandra S. Westcott, MgtSci 73.

John J. Stetina, IE 52, of Basking Ridge, N.J., on Feb. 3. Coca-Cola Company. Colt Industries. J.P. Stevens. Becton Dickinson.

James Prescott Talentino, ME 59, of Severna Park, Md., on Dec. 6, 2013. Project engineer, Naval Ordnance Laboratory. Engineer, NASA Goddard Space Flight Center. Committee member on Energy Research. Consumer Product Safety

Commission. National Highway Traffic Safety Administration.

Robert Lane Tarrant, IE 54, of Waddy, Ky., on Feb. 26. Army. Owner, Tarrant Service Agency. Gardener.

James Edward Trent, EE 51, MS EE 52, of Raleigh, N.C., on Nov. 12, 2013. U.S. Navy. World War II veteran. Research Triangle Park, IBM. Son: Douglas Trent, EE 78, MS CS 79.

Harry Lan Tucker, Cls. 57, of Winter Park, Fla. on April 6. U.S. Air Force veteran (Bronze Star). Orthopedic surgeon.

Edgar Daniel Vaughan Jr., IM 53, of Pell City, Ala., on Jan. 13. Army. Co-founder, Indusco Incorporated.

E.T. Young, IM 54, of Atlanta, on Feb. 19. Army (Anti-Aircraft officer). Business owner.

1960s

Edwin Joseph Alston Jr., IM 60, of Raleigh, N.C. on April 3. U.S. Navy. Korean War. Lockheed Aircraft. IBM. Developed supermarket scanners to read bar codes.

Tom Beaird Sr., BC 62, of Dacula, Ga., on Dec. 19. Army (1st Lt.). Lockheed Martin. Dekalb County School System. AT&T Corporation.

William Lee Bowers, AE 60, of Gainesville, Fla., on Jan. 20. Lockheed Martin. Golfer.

Earl Eugene Callens, AE 62, MS AE 63, of Provo, Utah, on Dec. 5, 2013. Arnold Engineering Development Center. Engineering professor, Louisiana Tech University. Academic Director. Von Karman Institute for Fluid Dynamics.

Robert K. Sigman

ROCKET SCIENTIST

Robert K. Sigman, AE 64, MS AE 68, PhD AE 69, of Atlanta on Feb. 26. A rocket scientist and senior research engineer emeritus at Georgia Tech, Sigman was well-respected among his peers for his voluminous research on combustion and propulsion. Sigman was a member of Georgia Tech's aerospace engineering general faculty from the time he received his PhD until his retirement in 2000. In retirement, he was delighted to receive calls from NASA officials interested in talking with him about his research. Sigman was an avid model builder and was active with the International Plastic Modelers Society. He built his first model at age 10 and continued until he became ill. He also was a racing enthusiast and worked for several years as a corner worker at Road Atlanta. He even made two trips with friends to France to watch the Le Mans sports car race. Sigman was fascinated by history and read constantly—sometimes up to four books at a time, according to his family.

Tim L. Chasey, EE 65, of Greenville, Tenn., on March 2. Navy. Boeing Incorporated. Kennedy Space Center. Knights of Columbus.

Charles William Crowe, IM 61, of Greensboro, Ga., on Dec. 31. President, Crowe Marine Incorporated.

George Nelson Dickinson III, Cls 66, of Lookout Mountain, Ga., on Dec. 10, 2013. Tennis player, Georgia Tech. Greater Chattanooga Hall of Fame. UTC Hall of Fame. Lookout Mountain Hall of Fame. Real estate executive. Fickling and Walker. Bank of America Commercial Mortgage. Fletcher-Bright Company. Member, Atlanta's Capital City Club.

Robert C. Evans, EE 61, of Eatonton, Ga., on Dec. 20. Director-Utilities Engineer, Georgia Public Service Commission. Son: Lee M. Evans, EE 87, EE MS 91.

Millard Wayne George, IM 62, of Saint Augustine, Fla., on Jan. 3. Air Force (1st Lt.). Vietnam (Air Force Commendation Medal). IBM Corporation. NASA Apollo Achievement Award.

President, CEO, Millard-Wayne Inc. Commissioner, St. Augustine Airport Authority. Member, Flager Hospital. Advisory board member, Limelight Theatre. President, St. Augustine Airport Pilots Association.

Alfonso Wendell Gerhardt Jr., IM 69, of Macon, Ga., on Feb. 3. Football player, Georgia Tech. Marine Corps (2nd Lt.). Vietnam. Founder, Gerhardt Construction Company. Macon Sport Hall of Fame. Golfer.

Alpheus C. Grist Jr., ME 61, of Signal Mountain, Tenn., on Jan. 20.

Blake Benjamin Harwell, IM 61, of Mount Pleasant, S.C., on Dec. 16. Air Force. Vietnam (Pilot, Armed Forces Expeditionary Service Award). Member, Order of the Eastern Star. East Cooper Kiwanis Club (president, vice president). DEA, Delta Air Lines.

Paul Joseph Henon Jr., EE 60, of Vienna, Va., on Jan. 11. Army. U.S. Patent Trademark Office. Adjunct Professor, George Washington University. Patent Attorney, Board of Patent Appeals and Interferences. Partner, Nixon and Vanderhye PC law firm.

Paul King Howard, CE 61, MS CE 63, of Palm Beach Gardens, Fla., on Dec. 1, 2013. U.S. Navy veteran. Mel Conner and Associates Inc. Traffic engineer. Harland Bartholomew and Associates Inc. Kimley-Horn and Associates Inc. Transportation coordinator.

William Carl Keesee, ME 68, of McDonough, Ga., on Feb. 2. Owner, W.C. Keesee and Co.

Patrick White Kelly, ME 60, of Chattanooga, Ga., on Feb. 11. President, Kelly Cadillac Inc.

Joe Lamar Lynch, Cls. 60, of Fayetteville, Ga., on Feb. 27. Georgia Power Co.

Luther Gillis MacKinnon III, Arch 64, of Glenville, N.C., on June 16, 2013. Architect.

Karl A. Morris, IE 67, of Papillion, Neb., on Dec. 18. Air Force. Vietnam War. Civil Service. Supervisory engineer, United States of America.

William Vincon Pardue, BC 67, of Cleveland, Ga., on Jan. 18. Structural engineer. Co-owner, Alaska Southern Company Inc.

Yalcin Mehmet Peker, Cls 61, of Stone Mountain, Ga., on Dec. 10, 2013. Southern Electrical Equipment Distributors. Financial manager, Georgia Tech Research Institute. Son: George M. Peker, Arch 93.

Dennis James Ratay, EE 69, of Lincoln Hills, Calif., on Feb. 5. Golfer. Hiker. Brother: David J. Ratay, EE 69.

James Haynes Reeves III, IM 63, of Huntersville, N.C., on Jan. 26.

Clarence Leonard Rowland II, Cls 64, of Atlanta, on Jan. 17. Army National Guard. Stockbroker, Courts & Company. Trust officer, Wells Fargo Bank. Brother: Grattan Rowland, IE 59.

Joseph Clyde Roy Jr., BC 63, of North Augusta, S.C., on Feb. 18. Army. Homebuilder.



in memoriam



John Robert Schiffli, IM 60, of Highlands, N.C., on Feb. 15. Army. Korean War. Yancey Brothers. Frank Cook Real Estate. General manager, Wildcat Cliffs Country Club. Owner, Galax Theater. John Schiffli Real Estate.

Richard Hampton Slate, IM 69, of Blanchard, Okla., on Dec. 20. US Coast Guard. Drafter, Harris Enterprises Incorporated. Drafter, Resource Consultants Incorporated.

William Ross Stevens, ChE 66, of Greenville, Del., on Feb. 25. DuPont Company. Business owner. Opera Delaware Chorus.

William Henry Vernon Sr, IM 66, of Rehoboth Beach, Del., on March 10. Officers Candidate School. Coast Guard. Anderson-Stokes Real Estate. Owner, Vernon Real Estate. Senior vice president of commercial and investment real estate, Coldwell Banker Realty. Lifetime Achievement Award recipient of Sussex County Board of Realtors. Delaware House of Representatives.

Henderson Otto Van Zandt, EE 61, of Port Orange, Fla., on Jan. 13. Flight instructor. Airline Pilots Association. TWA Retires Pilots Association. Quiet Birds. Experimental Aircraft Association. Volunteer tax aide, AARP.

1970s

Terry E. Akins, Text 70, of Jacksonville, Fla., on April 13. Basketball player, Georgia Tech. Founder and President, Alarm Association of Florida.

John R. Bridges, IE 73, of Atlanta, on Dec. 20, 2013. Engineer, Lockheed Martin Aeronautics Company.

Gregg Bradford Dana, IM 70, of Lilburn, Ga., on Dec. 22. System Analyst, ConsulTec Incorporated. Affiliated Computer Services. Daughter: Alison Dana, BC 08.

Mike Stilman

TECH PROFESSOR AND ROBOTICS PIONEER



Assistant Professor Mike Stilman, an emerging leader in humanoid robotics research, died following an apparent accident at his home on May 6. Stilman founded the Humanoid Robotics Lab, also known as Golems.org, where he led a team of graduate students and researchers on projects designed to develop algorithms, or “robot brains,” capable of the same level of dexterity, intelligent planning and interaction as human brains. Stilman received several significant research contracts involving his two humanoid robots, Golem Krang and Golem Hubo, including a \$900,000 grant from the Office of Naval Research to develop a “hybrid reasoning system” for military robots. Stilman was among 25 researchers nationwide selected for a 2013 Young Faculty Award by the Defense Advanced Research Project Agency (DARPA). Stilman, who was recently awarded tenure, was scheduled to be promoted to associate professor effective Aug. 16. Stilman was not only a gifted researcher, but a charismatic teacher who was a favorite in the classroom. He earned the Class of 1940 W. Roane Beard Outstanding Teacher Award for the past academic year.

Donald Egbert Doyle, EE 73, MS EE 74, of St. Simons Island, Ga., on Feb. 14. Army. Research and development, IBM. Information systems manager, Hercules Incorporated.

Aubin Mura, IE 73, of North Augusta, S.C., on Jan. 12. Navy. Project engineer, Iran Electronics Industries. Training instructor, US Army Signal Center. Sons: Cambiz Mura, CS 05, MS CS 07. Cameron Mura, Chem 96.

Larry M. Nations, Mgt 73, of Suwanee, Ga., on March 5. Stock Building Supply.

Ramzi Nassar, ME 78, MS ME 79, of Brookfield, Conn., on Dec. 7, 2013. EBASCO. Managing director, General Electric.

Rickey Arthur Kolb, MS AM 76, MS OR 76, PhD IE, of Richmond, Va., on Dec. 30. U.S. Military Academy (Legion of Merit, Meritorious Service Medal, Parachutist Badge, Ranger Tab). Consultant, Kolb Consulting.

Paul W. Ogle, EE 71, of Cary, N.C., on Feb. 9. Vice president, marketing for Activelogix. Pilot. Photographer. Son: Lt. J.G. Jason Ogle, ME 10.

George Charles Roberts, ME 72, of Atlanta, on Jan. 18. Sangamo Metering Corporation. Golfer.

Stephen Noble Roberts, IM 70, of Tallahassee, Fla., on Feb. 26. Army (Maj.). Banker. Florida Division of Anchor Savings Bank. Partner, Daws-Roberts General Contracting.

John Benton Tindall, PhD IE 72, of Savannah, Ga., on Dec. 5, 2013. U.S. Military Academy. Pilot. Professor of Mathematics, Air Force Academy. RCA. ITT. ARS.

Edward Eugene Traynham, Psy 75, of Beaufort, S.C., on Feb. 11. Greenville Memorial Medical Center. Andrews Medical Center. Eastern Carolina Pediatric Associates. Brother: Kenneth Traynham, EE 68.

1980s

Franklin Bruce Clark, III, ME 81, of Forsyth, Ga., on March 15. International Paper Company. Graphic Packaging.

David Ray Dettmer, EE 82, of Austin, Texas, on Jan. 19. Engineer, MicroSemi.

J. Madison "Ducky" Drake, MS AE 77, of New Orleans, La., on Feb. 3. Army (Lt.). Engineer, Department of Energy. Petroleum Reserve. Member, Louisiana Engineering Society. President, American Institute of Aeronautics and Astronautics. Member, American Society for Quality. Certified Quality Engineer Institute of Industrial Engineers. Member, American Society of Safety Engineers. Member, Certified Safety Professional National Society of Professional Engineers. Fellow Member Project Management Institute.

Wesley L. Ivey, CS 81, of Gainesville, Ga., on Feb. 10. Milan Arsenal.

Peter Joseph Linek, HS 81, of Ormond Beach, Fla. on April 4. Dentist.

Michael E. Noyes, CE 80, of Kennesaw, Ga., on Nov. 1, 2013. Engineer, Exxon Mobil. Arthur Anderson. Clifton Larson Allen.

Hardy E. Pickering III, M Arch 85, of Atlanta, on March 6.

Edwin J. Stula, ID 83, of Decatur, Ga., on Nov. 30. Artist, Honda Power Equipment. Patent illustrator. Horticulturist.

1990s

Robert L. Byers, AE 94, of Hollywood,

Md., on April 7. U.S. Navy. Pilot. Operation Iraqi Freedom and Operation Enduring Freedom veteran. Meritorious Service Medal. Navy Marine Corps Commendation Medal with five gold stars. Navy Marine Corps Achievement Medal with gold star.

Nathan Michael Chandler, EE 98, of Raleigh, N.C., on Dec. 24. Georgia Tech Research Institute. Engineer, Nortel Networks. Product marketing manager, Ditech Communications. Product manager, Communications Test Design, Incorporated. Brother: Michael Gerber, BME 07.

Susan L. Minehart, MS Mot 97, of Roswell, Ga., on Jan. 5. Content and Knowledge Manager, Hewlett Packard.

Robert W. Perry, ME 95, of Louisville, Ky., on Jan. 30. Engineer.

2000s

Tate L. Neilson, EE 01, of Atlanta, on Oct. 14, 2013. Engineer, Coin Acceptors for Control Microsystems Incorporated. Sailor.

Nandita Ysehula, MS AE 06, PhD AE 10, of Hyderabad, India, on Jan. 16. Software engineer, Intel Corporation.

2010s

Brian Edmonds, Cls 16, of Va., on April 17. Georgia Tech Crew.

Bryan Michael Ward, CmpE 13, of Hinsdale, Ill., on Feb. 26. Eanes ISD Information Technology Department. Onsite Associate Technician, Ricoh USA.



Tech marketplace



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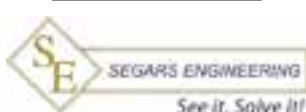
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fraternity brothers in arms

By Roger
Slavens

Georgia Tech alumni Phil Breedlove, CE 77, and Sandy Winnefeld, AE 78, rank among the most important military figures in the world today. They also happen to be Pi Kappa Alpha fraternity brothers—and former PIKE house dwellers—who have leaned on their Tech experiences and close friendship throughout their careers.

Unless you attended Tech in the mid-to-late 1970s, you've likely only seen Sandy and Phil on TV, dressed in uniform, acting as military spokesmen or carrying out their official leadership roles. Sandy serves as the Vice Chairman of the Joint Chiefs of Staff, the second-most powerful position in the U.S. Armed Forces. Meanwhile, Phil serves as Commander of the U.S. European Command and as the 17th Supreme Allied Commander Europe for NATO.

Despite their impossible schedules and incredible responsibilities, Phil and Sandy gave the *Alumni Magazine* a glimpse into their lives as students—and self-proclaimed "gentlemanly rebels"—before they earned their engineering degrees and started moving up the chain of command. Neither of them ever imagined they'd be in the top positions they occupy today; at the time they simply hoped they'd "get out" of Tech.

What did you think when you first met each other on the Georgia Tech campus?

Sandy: I first met Phil when we were both pledges at Pi Kappa Alpha, in the swirl of football, fraternities, not enough food, finding my way to class and figuring out college-level academics. I was taken by Phil's friendly southern accent, smarts and outgoing attitude. It is impossible to not like Phil, and I saw this from day one. Clearly, we were both excited to be at Georgia Tech—it was a very special time.

Phil: Likewise, I met Sandy when we first pledged Pi Kappa Alpha. I was amazed that someone who could have gone to any school or academy in the land chose Georgia Tech. Clearly GT was my first choice and I was impressed that he had made the same choice. By the way, he did show up with long hair, and I had to marvel at his first ROTC haircut.

“All I ever wanted to do was fly fighter aircraft; I wanted to be the most effective, efficient, weapon in my nation's Air Force. Tech was tough for me; my grades were good, but not great. I wondered several times if I would make the cut for flight training.”

—Phil Breedlove



Sandy Winnefeld and Phil Breedlove pose with the rest of their Pi Kappa Alpha brothers for the 1976 *Blueprint*.

What do you most remember about your time together at Pi Kappa Alpha?

Sandy: The most important thing I remember is the fantastic people with whom we were blessed to spend every day. Our group was a gentlemanly and close bunch of rebels who challenged every assumption and questioned every authority—which pretty much describes the Ramblin' Wreck mindset and why so many Georgia Tech graduates,

including many of our fraternity brothers, tend to be so successful in life.

Phil: To say we were rebels was so accurate. Our brothers were a mess, but all really good at what they did. The successes that have come from our year-groups across business and military life are truly impressive. I think it all started from a fierce attitude of independence. My fraternity, and

“Our group was a gentlemanly and close bunch of rebels who challenged every assumption and questioned every authority—which pretty much describes the Ramblin' Wreck mindset and why so many Tech graduates, including many of our fraternity brothers, tend to be so successful in life.”

—Sandy Winnefeld

that includes Sandy, saved me as I was ready to quit midway through my sophomore year. My Big Brother, Raymond "Rocky" Jabaley, laid down the law, I went on to graduate, and the rest is history. The men that surrounded me were, and remain, incredible human beings.



Adm. James "Sandy" Winnefeld Jr. attends the Baltimore Orioles' opening day game against the Boston Red Sox at Camden Yards, where he threw out the ceremonial first pitch.

Can you share a funny or interesting story about each other from fraternity days?

Sandy: One year we had the most incredible, huge, Ramblin' Wreck for the Wreck Parade. I'm not sure how many tons it weighed, or if we really had a theme. It had literally thousands of welds—just amazing. The hours (and yes, beers) we put into that thing was staggering. In the end, I do not think we even cared if it won; we were just proud that it made it through the parade. Sadly, one year it did not.

Phil: Much later, when some in the Pentagon learned of our connection, I think a few expected us to conspire on a few unpopular decisions. Early in Sandy's tenure as the vice chairman and mine as the vice chief of the Air Force, we found ourselves in a very senior decision making forum, which Sandy chaired,

with a tough decision on the table. We found ourselves on distinctly different sides of a very important weapons-system-acquisition decision. We went at each other's arguments with passion—and some finely honed Tech-like logic on each side. I think the crowd was a bit stunned. Two steps out of the room we were both laughing as if nothing had happened.

How and have you crossed paths with each other since graduating from Tech?

Sandy: We really didn't see each other much during the

first two decades of our careers, as Phil was moving around Europe and the Far East, while I was deploying aboard aircraft carriers to the Middle East. It was one of those situations where friends don't have to be in constant contact in order to remain good friends. We nearly overlapped in the same office in the Pentagon around 2008, and we now do business together nearly every day—even more so after Russia invaded Ukraine. We've each attended, and spent time together, the last two Homecomings at Tech. Each time we return to

campus, Phil and I are thoroughly impressed by the quality of the faculty and students and very gratified to see how much the institution continues to reach upward every day.

Phil: Our military paths were very different geographically. What is gratifying is that late in life our paths merged once again, and the friendship never missed a beat. Sandy has crushed every job and challenge he has had.

Did you ever imagine while you were at Tech that you'd one day reach the position of command and service you've achieved so far?

Sandy: I think our only ambition was to be able to excel in our respective services and enjoy the ultimate in motor sports while serving our country. Phil graduated a year before me, but I don't think we fully appreciated the degree to which we were spared the anxiety our fellow seniors were experiencing, simply by knowing what we were getting into. And, of course, I don't think either of us ever had any idea—much less the ambition—that we would both end up at a senior level in the military. But I do tell people that our fraternity brothers at the time would have expected Phil to succeed.

Phil: All I ever wanted to do was fly fighter aircraft; I wanted to be the most effective, efficient, weapon in my nation's Air Force. Tech was tough for me; my grades were good, but not great. I wondered several times if I would make the cut for flight training. Gradually, as I got to my junior and senior years, I figured out Tech, my grades drastically improved, and I knew I'd get that chance. But I never even thought of the possibility of senior command or service. By contrast, Sandy was a natural. We all knew Sandy would make it big in some way—he is wicked smart.

How did your experiences and education at Tech prepare you for your career in the military?

Sandy: There is so much I can trace back to my Tech experience that is responsible for any subsequent success, starting with the world-class undergraduate engineering education I received. It helped me better understand the

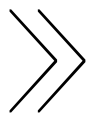


Gen. Philip Breedlove (third from left), Supreme Allied Commander Europe, receives details about armed road clearance operations in Mazar-e-Sharif, Afghanistan.

business of being a Navy pilot, and years later helped me survive the Navy's rigorous nuclear propulsion program and commanding the *USS Enterprise*. But there's much more to it than that. My whole Tech experience gave me much-needed maturity and confidence—as well as a willingness to challenge the status quo—that have served me well to this day. And the many friends I made were the icing on the cake.

Phil: I serve on the Civil and Environmental Engineering board at Tech, and sometimes I think they cringe when I say this, but here it goes: My CE education is the basis of everything I did as an aviator, but I rarely actually used the CE subject matter. However—and most importantly—my GT and CE education is the basis for the way I think. Tech taught me to solve problems: See and understand the problem, formulate a plan to gather the facts and then really define what it is I am to do. Formulate an executable plan to get to the result. Make it happen in a practical way, and then finally measure the results and move back through the process to adjust if required. Tech taught me to think, and I am thankful for this every day. ▲

James "Sandy" Winnefeld Jr., AE 78, is a four-star admiral with the U.S. Navy, and currently serves as the 9th Vice Chairman of the Joint Chiefs of Staff, making him the second highest-ranking member of the U.S. Armed Forces. He's also the former commander of the U.S. Northern Command and of the North American Aerospace Command (NORAD). **Philip Breedlove, CE, 77**, is a four-star general in the U.S. Air Force, and currently serves as the Commander of the U.S. European Command and as the 17th Supreme Allied Commander Europe of NATO. He previously held the post of 36th Vice Chief of Staff of the U.S. Air Force, among other top roles.



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First a bit of history.

The battleship USS *Georgia* was christened in 1904, and was recognized as one of the fastest and most formidable ships in the U.S. Navy (and the world). Its most prominent feature was her prow—a 2,000-pound cast bronze eagle with a wingspan of 35 feet.

Two years later, however, the Navy mandated its fleet to be painted drab gray, and the ship was put in dry dock to be “modernized.” Her magnificent prow was removed and sent to storage, and the USS *Georgia* returned to service, looking much like her sister battleships.

The battleship was plagued with a series of mishaps, including two minor collisions and a serious explosion on board that killed several members of her crew. The USS *Georgia* was part of Teddy Roosevelt’s “Great White Fleet” and used for an extensive, around-the-world PR tour, but never fired a shot in battle.





1



2



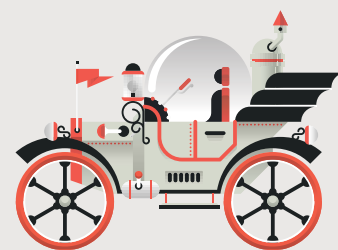
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The battleship was decommissioned in 1920 and sent to the scrap heap in 1922. In 1926, the Navy selected Georgia Tech for one of its six national ROTC programs, and in the following year, the State of Georgia acquired the USS *Georgia's* bronze prow and presented it to the Institute. For a time, the prow hung over the entrance to Grant Field.

The Navy also sent Tech the ship's bell and a cannon. The eagle eventually was removed from Grant Field, and the surrounding scroll work was melted down by artist Julian Harris, Arch 28, and recast into a gate for the Naval Armory on campus. The 24 panels of the gate depict the history of Georgia Tech.

All four items—the eagle, bell, cannon and gate—still remain on campus, but few know where they reside as they are tucked away in less-traveled locations. ▲

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1. The bell and cannon sit on display outside the eastern entrance of the O'Keefe Building, home to Tech's ROTC, just off Sixth Street. **2.** The eagle, which has been painted, perches at the end of an indoor hallway in O'Keefe, next to the Navy ROTC commander's offices. **3.** The gate currently hangs in the Stephen Hall Building on Bobby Dodd Way, and you can see it immediately as you walk in from the southern entrance.



Time Machine

5 years ago, in 2009,
 G.P. "Bud" Peterson was appointed as Tech's 11th president.



10 years ago, in 2004,
 1st Lt. Tyler Brown, former SGA president at Tech, was killed in action in Iraq at age 26.



25 years ago, in 1989,
 The section of 3rd Street that crosses campus was renamed Bobby Dodd Way.



50 years ago, in 1964,
 cameras, telescopes and special optical devices assembled and manned by Tech personnel photographed the first flight of the Saturn space booster's second stage.



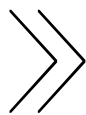
75 years ago, in 1939,
 the first freestanding research facility on Tech Campus, the Hinman Research Building, was designed.



100 years ago, in 1914,
 Douglas "Froggy" Morrison, EE 17, was named the starting quarterback for the Yellow Jackets football team.



125 years ago, in 1889,
 called by many the greatest Tech professor of his time, John Saylor "Uncle Si" Coon arrived on campus to teach mechanical engineering.



The War We Won't Expect

✉ Margaret E. Kosal

What's scarier: Unknown technologies used to wage war in the future, or the lack of tools and policy to anticipate them?

Today's most cutting-edge innovations—designed for a diverse range of applications—also carry the potential to revolutionize tomorrow's military capabilities. And they're not the stuff of science fiction. Wars of the not-so-distant future *will* undoubtedly be fought using nanotechnology, robotics, artificial intelligence, biotechnology, neuroscience and information in ways most of us can't begin to fathom.

This unknown frightens many people, including our military leaders.

"Surprise is what keeps me up at night," once said now retired Air Force Gen. Robert Kehler when he was in charge of the U.S. Strategic Command. The threat of disruptive technologies are of constant concern for our military leaders, and Kehler acknowledged there's a fair amount of uncertainty on how to assess and address such potential perils to the U.S.

Some top policymakers and military minds have argued that today's groundbreaking scientific developments could pose a greater risk to humanity and the fate of our planet than nuclear weapons. Whether or not you believe in such doomsday scenarios, the truth is these yet-unknown technologies could, at the very least, radically shift the balance of power among nations and factions. (Some of those shifts may be in our favor, but others may not be.)

However, the notion that dangerous new technologies alone can determine the outbreak or outcome of conflict, or even that they're the most important factor, is shortsighted.

After all, the wars of the last decade should remind us that co-option of existing, broadly available commercial technologies—for example, cellphone-activated IEDs in Iraq and Afghanistan—may actually present the most significant operational threat at a given point in time. Yet to deny or dismiss the role of groundbreaking scientific and technological innovations in affecting the outcome (as well as outbreak) of war is also perilous.

In this global information age, being the most technologically advanced military power no longer guarantees national security. New developments are more accessible and affordable than ever to a large number of nations, and within the grasp of terrorists and other non-state actors. Advanced science is no longer the domain of the few or even the most powerful. And "owning" a scientific discovery or new military weapon is no longer a protected position, if not outright impossible.

Understanding these changing paradigms, as well as their geopolitical origins and implications, must start with an awareness of the underlying factors at hand—both the technical and non-technical ones. A strong foreign policy constructed from an improved understanding of the relationships between science and security has never been more critical.

The need to bridge gaps between the technical and human domains are increasing rapidly, and the challenges are both organizational and strategic. Most importantly, we need the right people to implement and execute strategic foresight. Otherwise, without strong partnerships and without better analytical tools at our disposal, the U.S. and its allies will continue to struggle with assessing how, when, where and in what form future wars will be fought, as well as preparing for and responding to military aggression. ▲

✶ **Margaret Kosal** is an assistant professor in the Sam Nunn School of International Affairs at Georgia Tech.

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