

The field of battle is the open market. The objective: convince some of the most innovative minds in the country -- those trained in science, technology, engineering and math (STEM) -- to work for the Air Force.

MENTALWAREARE

The Air Force fight to attract top-flight minds

STORY AND PHOTOS // J.M. EDDINS JR. | MULTIMEDIA // ANDREW ARTHUR BREESE | LAYOUT & DESIGN // MAUREEN STEWART

"I absolutely align with Secretary (of Defense Ashton) Carter that we are in a war for talent and one of the initiatives that is under his 'Force of the Future' allows us to go directly to a university and hire talent from that university," Goldfein testified. "What we have done in the past is to tell those that are interested in joining us to go ahead and get on USA Jobs, post all their resumes and maybe we'll get back to them in six months; (by then) they're gone. It's unacceptable in this environment."

The order of battle proposed by Carter looks to streamline hiring practices to position the Defense Department as a hotbed for scientific research talent. It also has new tactics that include opening the Defense Innovation Unit

Experimental (DIUx) in California's Silicon Valley, building cooperation between the military and tech companies, and career intermission programs that allow military researchers to get a taste of the research being pursued at private companies. The defense secretary has even invited vetted hackers to test the Pentagon's cybersecurity.

These new tactics are designed to keep control of territory already held: retaining STEM talent currently employed by the Air Force Research Laboratory (AFRL). By allowing Air Force researchers more latitude in their research and flexibility in career paths, the hope is that job satisfaction will increase and, therefore, retention.



A FANTASTIC OPPORTUNITY
here in the AIR FORCE
and the
AIR FORCE RESEARCH LABS
to shape my job

It's a tactic that has kept Ryan Helbach, a hypersonic engineer for AFRL at Wright-Patterson Air Force Base in Dayton, Ohio, studying Supersonic Combustion Ramjet technology for the Air Force.

"I was thinking of leaving the Air Force, but after talking with friends and coworkers I realized I have a fantastic opportunity here in the Air Force and the Air Force Research Labs to shape my job," he said. "I get to do the engineering, but I also get to create programs that have a lot of influence on the careers of other scientists and engineers that work within the research labs."

Create he has. Helbach is involved in two programs designed to increase workplace satisfaction among his peers and build bridges between AFRL and the private sector.

"We have set up this program called the Intellect to Intellect (i2i) Exchange where we are working with a number of different (smaller private tech) companies to try to take some of our folks that are working with deep learning or autonomy or robotics and embed them (with those companies)," Helbach said. "We want to work with them and tap into some of those innovative technologies that we are not working on currently or that we are working on, but we could tap into some different ideas."

Helbach has also co-created the AFRL Entrepreneurial Program, which allows for scientists and engineers to pursue personal business projects utilizing AFRL technology through one-year sabbaticals. If the technology is successfully commercialized, they can separate from AFRL to pursue the venture with an agreement that they can return within five years. If the project shows no promise, they can return to their old jobs at the end of the sabbatical year.

The Air Force is also fighting this battle on another front -- the nation's schools. To create a constant stream of new technological talent flowing toward AFRL, the Air Force must educate students to the scientific opportunities that exist at its research labs before they choose an employer or career path.



Cassandra Stanfill, an Associate Research Engineer with the Intelligence, Surveillance Augmentation and Reconnaissance Branch at the Air Force Research Laboratory at Wright Patterson Air Force Base in Dayton, Ohio, in a lab where she uses eye tracking technology, and other methods, to examine the response of ISR analysts to displays, tools and interfaces used in their jobs. The research strives to relieve user fatigue and stress due to data overload and increase the efficiency of data assessment and transference by analysts.



In this challenge, the Air Force has achieved some pockets of success within the geographical spheres of influence surrounding bases hosting research labs. In these geographical areas, STEM outreach programs are plentiful and assisted by word of mouth and familial ties to the Air Force.

"I come from a family of nerds and we are a family of military nerds... I was genetically predetermined to be a nerd," said Cassandra Stanfill, a human factors engineer at AFRL who uses eye-tracking technology and other methods to measure the physical response and stress of intelligence, surveillance and reconnaissance analysts.

She grew up near Wright-Patterson AFB with a mother who was active-duty Army, and later became a statistician, and a father who was active-duty Air Force and a human factors engineer.

Growing up in a military culture and having the inside scoop on AFRL ingrained in her some of the big selling points of doing research for the Air Force.

We are A FAMILY of MILITARY NERDS

"The research labs have a multitude of things you can study and work on and you get job security here, which is difficult to find right now," Stanfill said. "There is so much we can do here that can make an impact. When our Airman can do their jobs more effectively, more efficiently, it helps secure the freedoms and the privileges that we enjoy. I work with cool stuff, I make a difference and I have job that I know I am safe in."

Stanfill uses eye tracking technology, and other methods, on test subject Lt. Michael Emard to examine the response of ISR analysts to displays, tools and interfaces used in their jobs. Second Lt. Scott Seidenberger was commissioned May 28, 2016, the day he graduated with a degree from the Industrial and Labor Relations School at Cornell University in Ithaca, New York.

Before reporting for air battle management training at Tyndall AFB, Florida, he and his dissertation committee are editing his thesis, titled "Can the Government and Military Compete with Private Sector Companies for Technical Talent?" in hopes of it being published in a leading academic journal of human resource management.

His research, which probes how technical job seekers evaluate opportunities in different sectors and with different firms, sheds light on one of the main obstacles to luring STEM talent away from the warm, for-profit glow of Silicon Valley; so much of what the Air Force Research Labs do is classified, producing few commercial products that civilians use in their daily lives.

Former Cadet and now Second Lt. Scott Seidenberger, of AFROTC Detachment 520 at Cornell University in Ithaca, NY, stands in a commons area of Duffield Hall where science, technology, engineering and mathematics (STEM) students gather to study and work on team projects



"It's called the Halo Effect... So we all use products from Google, Apple and Microsoft day to day and a lot of us evaluate those products favorably," said Seidenberger. "So there is a spillover effect where we are much more likely

to subconsciously think 'Hmmm... Google must be a good employer'... the defense sector struggles with this effect because most young people do not interact with the defense sector on a day-to-day basis; they are not as familiar with

the products and the services that we provide. That's the challenge for us, trying to build an employer brand and an image for ourselves that is able to compete with the private sector."

The Air Force is attempting to promote the selling points at universities and conferences far from the gate of an Air Force base. The Air Force Diversity and Inclusion office, in coordination with Air Force Recruiting Service, AFRL, U.S. Air Force Academy and Air Force Civilian Service, has developed a nationwide recruiting effort at STEM-focused professional conferences that attract a large number of students. Also, programs do exist to reach college

undergraduates, such as the AFRL Scholars program, the Minority Leaders Research Collaboration Program and the Pathways Internship Program. However, getting the word out about research opportunities in the

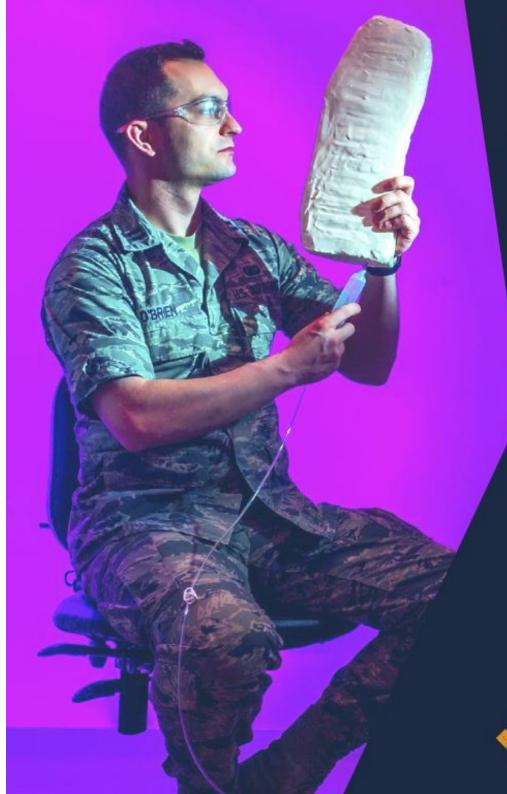
That's the CHALLENGE for us, trying to BUILD an IMAGE that is able to COMPETE with the PRIVATE SECTOR

Air Force on STEM-heavy campuses, not adjacent to a base, is often limited to an occasional job fair. On that battlefield, the service must fight for attention in a hall surrounded by the glitz of consumer tech company recruiters armed with a

well-known brand, workplaces that resemble playgrounds and better pay and benefits.

In 2014, AFRL sought to improve its visibility with STEM undergraduates by initiating the University Relations Program to establish formal relationships with the country's prominent technical universities and visit as many as possible during the year. Members of the AFRL senior executive service and senior scientists assist with maintaining and growing these relationships, according to Kevin Gooder, chief of the program integration division for the assistant secretary of the Air Force for acquisition.





However, any influence the Air Force gains during the rest of the semester is largely dependent on the presence of personnel pursuing advanced degrees and the service's emphasis on volunteerism within its ranks. The service's STEM workforce strategy, Bright Horizons, was signed by former CSAF Gen. Mark A. Welsh, who encouraged all Airmen to "embrace the innovation culture, participate in education and training endeavors and continue to be Air Force STEM ambassadors in your communities."

Capt. Kevin W. O'Brien, the operations flight commander for ROTC Detachment 520 at Cornell University, was one of Seidenberger's instructors. O'Brien not only teaches AFROTC classes at Cornell, but, with Air Force funding, is also pursuing his Ph.D. in morphing wing technology there. His doctoral research allows him to rub shoulders with civilian undergraduate engineering students who are often surprised to see an Air Force officer getting a technical Ph.D. at an Ivy League institution.

Capt. Kevin W. O'Brien, Operations Flight Commander of AFROTC Detachment 520 and a Ph.D. candidate in Engineering at Cornell University in Ithaca, NY, where he is doing research on using air pressure to morph the shape of aerodynamic wings.

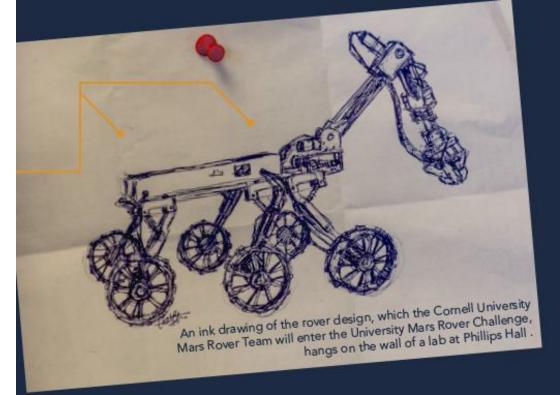
O'Brien also volunteers in the engineering community on campus by assisting an undergraduate project team building a robotic rover to compete in the University Rover Challenge held each summer at the Mars Desert Research Station near Hanksville, Utah. For the team members, working with their defacto faculty advisor was their first contact with a military member in the STEM field.

"I lived in the eastern New York City suburbs and went to high school in Connecticut," said team member Nicole Polemeni-Hegarty, a rising junior at Cornell majoring in mechanical engineering, and currently an intern at Lockheed Martin working in a lasers and sensors lab. "I had never seen anything in high school about the possibility of doing scientific research or engineering in the Air Force. Until I met Capt. O'Brien, I had not even gotten a whiff of doing an internship with the military. Now the Air Force and DOD are definitely on my radar."

However, O'Brien thinks the Air Force should be placing scientific ambassadors at centers of technologic education.

Student members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the University Mars Rover Team, Matthew Filipek and Thomas llyevsky, talk with the members of the Matthew Filipek and Thomas llyevsky, talk with the members of the Matthew Filipek and Thomas llyevsky, talk with the members of the Matthew Filipek and Thomas llyevsky, talk with the members of the Matthew Filipek and Thomas llyevsky Student members of the Cornell University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the University Mars Rover Team, Matthew Filipek and Thomas Ilyevsky, talk with the team will enter in the on the rover the team will enter in the university mars hover.

Challenge at Phillips Hall on the campus of Comell University.



In 2014, AFRL established the University Relations Program to establish formal relationships with the country's prominent technical universities and visit as many as possible during the year. Members of the AFRL Senior Executive Service and senior scientists assist with maintaining and growing these relationships.

O'Brien said another hindrance to attracting STEM talent to uniformed service is the rigor, regimentation and rigidity of the military, especially the rank structure. "It's possible that you could be coming out of college and be more competent and qualified than a major and, at that point, you have to wait up to 10 to 12 years until you are able to make the same impact as they are," O'Brien said.

The Air Force is currently exploring options in certain career fields to address these issues for uniformed researchers, according to Gooder.

Even if the Air Force changes its very culture to elevate its appeal on college campuses, it may be too little, too late. AFRL researchers believe that reaching farther back into the educational system to influence younger STEM students is key to establishing a long-term pipeline of a diverse research talent headed for AFRL.

While individual STEM outreach programs that send scientists and engineers into local high schools and primary schools have existed at Air Force bases for decades, the service did not begin to coordinate its battle plan until three years ago, with the formation of the STEM Outreach Office at Wright-Patterson AFB to coordinate the programs at 30 bases in the U.S. and overseas.





Members of the Cornell University Mars Rover Team test the rover design they will enter in the University Mars Rover Challenge.

Getting to KIDS in MIDDLE SCHOOL is the "SWEET SPOT" for STEM OUTREACH

"One of the first things that needed to be done was to get our arms around the activities that were already happening out there," said Richard Baker, director for Air Force K-12 STEM Outreach. "We get the obstacles out of their way and provide them the resources that they need to help enhance the programs that they are already doing... and to point them all in generally the same direction from a strategic standpoint."

Baker says that getting to kids in middle school is "the sweet spot" for STEM outreach. At this tween-age, students with an overall interest in pursuing science and math start to really consider what they want to be when they grow up.

Sending Air Force engineers into local classes to work with teachers on establishing rocketry or solar car projects not only excites the students, but it also makes them aware of national-level partner programs like the Air Force Association's CyberPatriot to engage computer students, the StellarXplorers to encourage the study of space and the Air Force-sponsored Junior Science and Humanities Symposium.





In FFL, children construct robots made of LEGOs and learn to program those robots to perform certain tasks, like carrying a small object to a specific area, dropping it there and returning to its starting point. Many of the kids go on to FIRST Robotics Competition and FIRST Tech Challenge, using other materials to build more complex robots with more sophisticated programming.

Samuel Snowden, 9, who is homeschooled, loves his pets, baseball and reading magazines, has a special place in his world for LEGOs. When he learned about FLL and that he could make those LEGOs move and follow his commands, he was hooked.

I was BORN with a LEGO in my HAND

"I was born with a Lego in my hand...
then I realized that when you get into
FIRST LEGO League you get to build and
program robots," Snowden said. "I thought it
sounded challenging and I like things that are
challenging and I also thought I might like to
program sometime in my life."

Samuel's experience at a weeklong FFL program hosted by Wright-Patterson AFB, ended with the teams' robots going Lego-to-Lego in a tournament complete with cheerleading mentors, a public address announcer, loud music and goofy hats. However, building and programming a winning robot is just the hook for achieving FLL's ultimate goals: teaching teamwork and understanding that the scientific process is all about learning from failed experiments and finding new ways to solve a problem.



Left to right, Samson Scheie, 12, Brendan Marx, 12 Samuel Snowden, 9, and Joeseph Yoeder, 11, [cq] test out their robot before competing in a First Lego League tournament at DoD's Starbase building

"I think FIRST (Lego League) is really cool and even though the robot is really fun, you shouldn't focus on that," he said. "You should focus on learning the First Core Values: We have fun. We are a team. We display gracious professionalism in all we do. Our coaches and mentors don't have all the answers; we learn together as a team."

Samuel did admit that while FFL was great fun, he had previously learned about the Air Force through its most tried and true recruiting tools: family ties and cool planes.

"My brother is actually in the Air Force. When I was 4 years old I thought about going into the Air Force," he said. "I would probably want to fly F-16 (Fighting Falcon), because they are my favorite plane."

If the whole pilot thing doesn't work out for Samuel, the seed has been planted through STEM outreach and FLL that he can, one day, work for the Air Force, just like his brother, as a scientist or engineer. Maybe he will even design and program systems for an aircraft way cooler than the F-16.