

October 2015

NSSC This Month



U.S. Army Garrison Natick Professional Affairs Office

Farewell, Justin ...

Cancer claims crusader
against veteran suicides





Publisher's Note

John Harlow
USAG Natick and NSSC Chief of Public Affairs



Table of Contents

October 2015

NSSC This Month

Every Day a Blessing



On Oct.1, I celebrated my sixth anniversary as the Garrison Chief of Public Affairs. These have been the most rewarding and heart-wrenching years of my career.

Our team has been blessed by winning many awards. We have told many stories about how the great work done at Natick benefits our Soldiers serving in harm's way every day.

One of those stories solidified a friendship and made me a better person.

That was the story of Justin Fitch, which most of you know. He came close to taking his own life while serving in Iraq in 2007. He was diagnosed with terminal stage 4 colon cancer and was given only months to live in March 2014. He told his story to whomever would listen to raise awareness that 22 veterans a day take their own lives.

Justin lost his battle with colon cancer Sunday.

I last talked to him when Kristen Heavens, Shaun Morand and Sonya Edler were starting the FIDO 220-mile ruck march from Boston to New York City. FIDO was the motto that Justin lived by.

Justin told his story to CBS News, Fox News, MSNBC, USA Today, Army Times and locally to Channels 4, 5 and 25, NECN and the MetroWest Daily News. I had the best seat in the house, right beside him.

Here was a guy who was living in constant pain, but no matter what his condition, when the camera lights came on or the recorders started rolling, he told his story honestly and with one purpose. If he could get one veteran to hear his story and realize that his or her life mattered and help that person get help, his story was worth telling. When the lights went off or the recorders stopped, you could see how much of a toll it took on him physically.

There was something Justin would say that I want to share with you.

Every second of every day is a blessing. What you do with that blessing is on you. Make the most of every blessing that you have been given.

Please keep Justin's wife Samantha in your prayers and make the most of the blessings that you have been given.

John Harlow
USAG Natick and NSSC Chief of Public Affairs

NSSC This Month

NSSC

Senior Commander
[Brig. Gen. William E. Cole](#)

Garrison Commander
[Lt. Col. Ryan Raymond](#)

Command Sergeant Major
[Command Sgt. Maj. Erika M. Gholar](#)

Public Affairs Officer
[John Harlow](#)

About this newsletter

NSSC This Month is a monthly newsletter covering NSSC news within the Army and commercial media.

NSSC This Month is maintained by the USAG Natick Public Affairs Office.

Art Direction by Philip Fujawa, NSRDEC Strategic Communications.

To subscribe to NSSC This Month, please contact Bob Reinert at robert.j.reinert.civ@mail.mil.

On the Web: www.army.mil/natick

Photos by Dave Kamm, NSRDEC Strategic Communications, unless otherwise noted.



NSSC This Month Feature Stories

Farewell, Justin 8
Cancer claims crusader against veteran suicides

Ring the Alarm10
Fire inspector retires at Natick

Planting the Seed.....12
Combat Feeding tests hydroponic farming

NSSC News

Natick developing new 'Battlefield Kitchen'4

Solid waste characterization study conducted at Natick.....5

Natick observes 9/11 anniversary6

New family housing planned at NSSC ..6

Natick researchers are developing overhead protection for base camps7

'Scoring in Transition' career fair held at Hanscom Air Force Base 14

Science in Small Drops: researcher measures barrier effectiveness..... 15

Natick researcher collaborates with North Carolina State on textile technologies 16

Natick cultivates its future STEM workforce 17

Natick Remembers Justin Fitch 18



Natick developing new 'Battlefield Kitchen'

By USAG Natick Public Affairs / NATICK, Mass. (Sept. 30, 2015)

Mention "BK" to some people, and a certain fast-food establishment might come to mind. At the [Natick Soldier Systems Center](#), however, those two letters refer to the latest in field feeding technology.

The Battlefield Kitchen, or BK, being developed in a cooperative effort between the [Natick Soldier Research, Development and Engineering Center](#), or NSRDEC, and [Product Manager Force Sustainment Systems](#), or PM FSS, is a self-contained, efficient mobile kitchen that can provide up to three hot meals daily to as many as 300 Soldiers during military operations. The BK can serve a full range of individual and group rations.

"It's like walking into a restaurant. It's like walking into a real kitchen as opposed to a piece of military equipment," said Joe Jordan, team leader, Food Service Equipment Team, PM FSS/[Combat Feeding Directorate](#), NSRDEC, who added that the BK would provide "a better ability to provide good meals to the Soldiers."

A trailer-mounted system, the BK can be towed by a truck and can be transported by sea, rail or air. It will replace the [Mobile](#)

[Kitchen Trailer](#), or MKT, which was introduced in the 1970s and uses inefficient open-flame combustion appliances that also vent burner exhaust into the kitchen. The BK features closed-combustion, thermostatically-controlled appliances that will make roasting, grilling, boiling, frying and baking food a cooler, cleaner and quieter process.

"In hot ambient conditions, it gets very, very hot inside of the current kitchens," said Tim Benson, program integrator, field services and field feeding, PM FSS. "[The BK is] going to be a healthier environment for the cooks and the customers, not having the burner exhaust going into the kitchen."

The process also becomes significantly more energy efficient, according to Benson.

"We're looking for at least a 20-percent improvement in fuel efficiency over the current set of appliances, with an objective of 40 percent," Benson said. "But the main benefit of the appliances is that they're closed combustion. The current appliances are open combustion, which means that all the heat and the exhaust and the noise from burners

The BK features closed-combustion, thermostatically controlled appliances that will make roasting, grilling, boiling, frying and baking food a cooler, cleaner and quieter process.

goes into the kitchen environment, and less [heat goes] into the food."

"Using heat from combustion to directly heat the appliances is so much more efficient than using electrically powered appliances," Jordan said. "A kitchen this size can use a 3kW generator as opposed to a 30kW or 60kW generator required by electric appliances. That allows the kitchens to be truly expeditionary, carrying the generator right onboard the kitchen while still providing a quiet and quality product."

The BK appliances aren't only more efficient, they produce better results.

"The appliances are designed with heat exchangers that better distribute the heat so that you get more uniform, better quality cooking, on average," Benson said. "You're capturing all that heat that used to escape into the environment, [and] putting it [where] it needs to go."

The Army expects to acquire about 1,500 of the systems, which also include running water, refrigeration and on-board power generation. Development should take place in fiscal years 2016-18, and production is planned to begin in FY 2019.

Personnel from the Army Public Health Center weigh individual pieces of trash during a solid waste characterization study recently completed at the Natick Soldier Systems Center.

A team of three from the [Army Public Health Center](#), or APHC, were recently at the [Natick Soldier Systems Center](#), or NSSC, conducting a solid waste characterization study to assess the amount of trash the installation is producing.

"[The study] will help the installation save money in the long run when we determine how much of the solid waste that goes out in our trash cans is recyclable, how much is organic material, [and] how much of it is truly solid waste," said Rich Valcourt, an environmental engineer with [U.S. Army Garrison Natick](#).

This study gives Valcourt valuable information to better assess the installation's needs. Valcourt said the study is "going to dictate how we see down the road [and] whether we need to strengthen our recycling policies."

Performing the study will also give Valcourt a better idea of what NSSC's footprint will look like going forward.

The APHC's mission included receiving trash from each building, sorting through each bag, and weighing the trash by each of 30 categories. The main categories were paper, plastic, metal, glass, organics, construction and demolition waste, and special waste.

Kim Fleischmann, an environmental scientist with APHC, said in a majority of instances,



Photo: Tazanyia L. Mouton USAG Natick Public Affairs

Solid waste characterization study conducted at Natick

By Tazanyia L. Mouton, USAG Natick Public Affairs / NATICK, Mass. (Sept. 28, 2015)

these studies are done to help an installation set up or improve a recycling program.

"The recycling here is pretty good," Fleischmann said. "We're not getting a lot of white office paper, [and] people are doing a very good job with cardboard and aluminum cans."

"We usually try to give real data to figure out how you should focus, where you can improve or set up your programs."

Fleischmann said here at Natick, programs are already in place; they just need to be improved.

"The Army's goal is to try to [get] to net zero waste, which means you are recycling or reusing everything and there's no actual waste," Fleischmann said.

Valcourt said that each time you throw something away, you should think about recycling it, instead.

"It doesn't matter what you wear on your shoulders or what your pay grade is," Valcourt said. "We all work here, and we need to do the right thing."



Photo: Tazanyia Mouton, USAG Natick Public Affairs

Domestic Violence Seminar

Dr. Emily Rothman, an associate professor at the Boston University School of Public Health and a visiting scientist at the Harvard Injury Control Research Center, addresses the workforce of the Natick Soldier Systems Center Oct. 6, during the National Domestic Violence Awareness Month program, "Young Adult Dating Violence from a Scientific Perspective." The program also included a guest panel from the Start Strong Initiative, and a moving poetry piece by spoken word artist and actor in the social justice acting troupes, Yevin Roh.



Natick observes 9/11 anniversary

By Bob Reinert, USAG Natick Public Affairs / NATICK, Mass. (Sept. 11, 2015)

Fourteen years to the minute after the tragic attacks of 9/11, [Natick Soldier Systems Center](#) remembered the civilians and Soldiers lost during and since that day.

At 8:46 a.m., the time when American Airlines Flight 11 struck the north tower of the [World Trade Center](#) in New York City on that clear, crisp Tuesday morning in September 2001, NSSC observed a moment of silence before a bell tolled 11 times. Then a wreath was laid in memory of the victims.

“The weeks and months that followed 9/11 were filled with immense sadness, grief, and no small amount of anger,” said [Brig. Gen. William E. Cole](#), NSSC senior commander. “But, as American people, we also began to see a growing sense of resolve amongst us. We

stand united as a nation and are committed to eliminating terrorism and those who plot the murders of innocent people throughout the world.”

Nearly 3,000 civilians died in that day’s terrorist attacks, and more than 6,000 service men and women have given their lives in the continuing war against terrorism.

Cole recalled that one of the civilians who died heroically was Army veteran [Rick Rescorla](#), director of security for Morgan Stanley Dean Witter in the south tower when [United Airlines Flight 175](#) abruptly ended there.

“Rick was a decorated hero of the Battle of the Ia Drang Valley in Vietnam,” Cole said. “He was known in Vietnam not only for his fearlessness, but also his odd habit of singing

to his troops in the height of battle to keep them calm.”

Cole noted that Rescorla’s actions that day saved most of Morgan Stanley’s employees.

“Unfortunately, Rick was not one of the survivors,” Cole said. “Once he was sure that the Morgan Stanley employees were safe, Rick ran back into the building ... even though it was burning, to help evacuate more employees from other firms. He was last seen on the 10th floor staircase, moving upwards and singing to the evacuees.”

As Cole pointed out, the spirit that Rescorla exhibited that day continues to live on in other Americans.

“Fourteen years after small and hateful minds conspired to break us, America stands tall and America stands proud,” Cole said. “Guided by the values that sustain us, we will only grow stronger.”



New family housing planned at NSSC

By Bob Reinert, USAG Natick Public Affairs / NATICK, Mass. (Sept. 29, 2015)

[Army Family Housing](#) units located at Heritage Lane will be replaced with new townhomes beginning in fiscal year 2017 if funds for the project are approved by Congress.

The \$14.5 million military construction project at [U.S. Army Garrison Natick](#) would include the demolition of the existing housing units built in 1973 and the construction of new units.

“Across the Army, there has been an initiative to modernize Army Family Housing as both a quality-of-life and a readiness issue at all posts, camps and stations,” said [Lt. Col. Ryan Raymond](#), USAG Natick garrison commander. “The other services are doing it, as well.”

Currently, USAG Natick has 75 units spread across four housing areas. That number



would be reduced in the future, according to Raymond.

“The Army has determined, based on our Soldier population, that we only require 48 (units),” Raymond said. “So, we’re going to try to go with fewer but better housing units to really entice Soldiers to want to occupy the family housing.”

While the plan is to build only 19 units at Heritage, overall square footage there would actually increase from 35,325 to 41,130. As Raymond pointed out, larger residences with more bedrooms and bathrooms would bring the housing in line with community standards. He added that the new units also

would be more energy efficient and environmentally friendly.

“I think everything that you see in this project when (it has) materialized will be representative of the Army’s commitment at the strategic level to a more efficient, more environmentally friendly footprint,” Raymond said.

Funds approval would be followed by final design work and the evacuation and demolition of the existing units.

“We’d hope to have that wrapped up by the end of fiscal year (2018),” Raymond said.

Natick’s ideas for protecting the warfighter are looking up.

Researchers at the [Natick Soldier Research, Development and Engineering Center](#), or NSRDEC, are developing Overhead Threat Protection, or OTP, to be used primarily in expeditionary base camps.

The OTP protects both shelters and equipment, providing warfighters with overhead ballistic protection that is easy to deploy and set up. Four people can set up the system in fewer than two hours.

“Having the addition of overhead protection really gives Soldiers peace of mind from day one,” said Karen Horak, lead program engineer, Collective Protection Systems Team, [Expeditionary Basing and Collective Protection Directorate](#) at NSRDEC. “With this system, the Soldiers have protection from multiple threats affecting base camps. This really allows them to be mission focused.”

The OTP system provides protection against prevalent base camp threats and leverages technology developed by NSRDEC and the [University of Maine](#) for the Modular Ballistic Protection System, or MBPS. The MBPS provides sidewall protection against similar basecamp threats.

Natick researchers are developing overhead protection for base camps

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (Sept. 16, 2015)

Like the MBPS, the OTP system is highly mobile, re-deployable, reusable and quickly erectable.

“It can be set up over an existing shelter so the shelter doesn’t need to be taken down,” said Horak. “It can be used in conjunction with the MBPS.”

The OTP uses a two-layer system, which increases its protection capability and greatly lessens the impact of a hit.

“The Overhead Protection System has to be super strong because it protects against direct hits,” said Horak.

“The round will hit the pre-detonate layer (top layer),” said Lisa King-Schiappa, a mechanical engineer on the Collective Protection Systems Team. “Then it will detonate and the second layer will catch the fragments.”

“The idea is to keep the explosion above and away from Soldiers,” said Horak.

NSRDEC is overseeing the research and development of the system and has partnered with universities and private industry.

“This is a collaborative program,” said Laura Biszko of NSRDEC’s Collective Protection Systems Team. “We are working with TPI (Technical Products Inc.). TPI is making the frame and Compotech, a spin-off from the University of Maine’s Advanced Structures and Composite Center, is providing the panels for this system.”

NSRDEC has also partnered with the University of Rhode Island, which operates a satellite campus with a blast range, to test the system.

“We test and re-test,” Horak said. “We want Soldiers to be confident in the protection.”

“Our work is extremely gratifying — helping warfighters by providing expeditionary day-one protection, giving them peace of mind and allowing them to focus on their mission,” said King-Schiappa.



Farewell, Justin ...

Cancer claims crusader against veteran suicides

By Bob Reinert, USAG Natick Public Affairs / NATICK, Mass. (Oct. 5, 2015)

A retired Army major who had devoted the final months of his life to raise awareness of veteran suicides died of colon cancer after a long, courageous fight.

Maj. (Ret.) Justin Fitch, 33, the former Headquarters Research and Development Detachment commander at [Natick Soldier Research, Development and Engineering Center](#), died Oct. 3 in his hometown of [Pleasant Prairie, Wisconsin](#).

Fitch used his own story to shed light on veteran suicides. While serving in Iraq in 2007, Fitch had contemplated taking his own life. He got to the point where he was sitting in his shipping-container sleeping quarters with the barrel of his M-4 rifle in his mouth.

"It's OK to seek help," Fitch said later. "You can get help. Look at me."

His victory over suicide and subsequent three-plus-year cancer fight became a compelling human interest story that attracted national media attention, giving a platform from which he pointed out that 22 veteran suicides were occurring daily. He often noted that some 8,000 veterans — more than all those service members who had died in the entire Global War on Terrorism — had killed themselves each year.

"We're raising awareness, and that's very important," Fitch said last April. "Part of fixing a problem is knowing that a problem exists. (Suicide is) a very taboo topic with a lot of stigma. It's just not talked about."

Fitch endured dozens of chemotherapy treatments and numerous surgeries while continuing his duties as HRDD commander at Natick, serving as a powerful example for his Soldiers. In his off hours, Fitch participated in long ruck marches as the leader of "Team Minuteman," part of the ["Carry the Fallen"](#) organization that works to raise awareness of veteran suicides.

Though doctors once gave him just months to live, Fitch shrugged off their estimates to continue what he always called his "final mission," reducing the number of daily veteran suicides to zero. He would go to any lengths to tell that story — even if it meant allowing a TV crew in to shoot video while he received chemotherapy.

More than once during a media interview, Fitch had to apologize, stop suddenly, and allow a wave of pain to wash over him. He would then collect himself and continue to answer more questions.

Because his own story of near-suicide was playing out so publicly, Fitch was often approached by other veterans who were at risk. He gave out his cell phone number freely, and he answered that phone whenever it rang — day or night.

Though doctors once gave him just months to live, Fitch shrugged off their estimates to continue what he always called his "final mission," reducing the number of daily veteran suicides to zero.

"If all we do is just save one life, one that wouldn't have been saved otherwise," Fitch often said, "I say that's mission success."

Soldiers and civilians at [Natick Soldier Systems Center](#), Fitch's last duty station before his medical retirement in December 2014, paused for a moment of silence Oct. 5 at the flagpole in front of the NSSC headquarters building. Many also took time to share their favorite memories of him.

"He was a commander who took care of his Soldiers," said [Brig. Gen. William Cole](#), NSSC senior commander. "He took the time

to get to know them, learn about them and share with them. He gave them wise counsel on how to succeed in the Army and also in life.

"If anyone represented what Ready and Resilient means ... it was Justin Fitch. Our Army is better because Major Fitch served. The Natick Soldier Systems Center is better because Major Fitch touched so many here."

Kristen Heavens said that she found it difficult to find enough words to describe Fitch.

"He woke up every morning knowing that he would be in pain, yet he made the decision to not only fight it head on, but to have a positive outlook," Heavens said. "This man embodied each of the Army values deeply, and I'm honored to have known him."

His former first sergeant, Brian Gemmill, recalled how Fitch always went the extra mile to achieve what others thought couldn't be done.

"His mental resiliency far outmatched his physical state, and he never let his cancer slow him down," Gemmill said. "I think that everyone who knew him feels the same way. Justin Fitch lived his life and died trying to solve complex problems, never giving in to common excuses and absolutely never taking no for an answer."

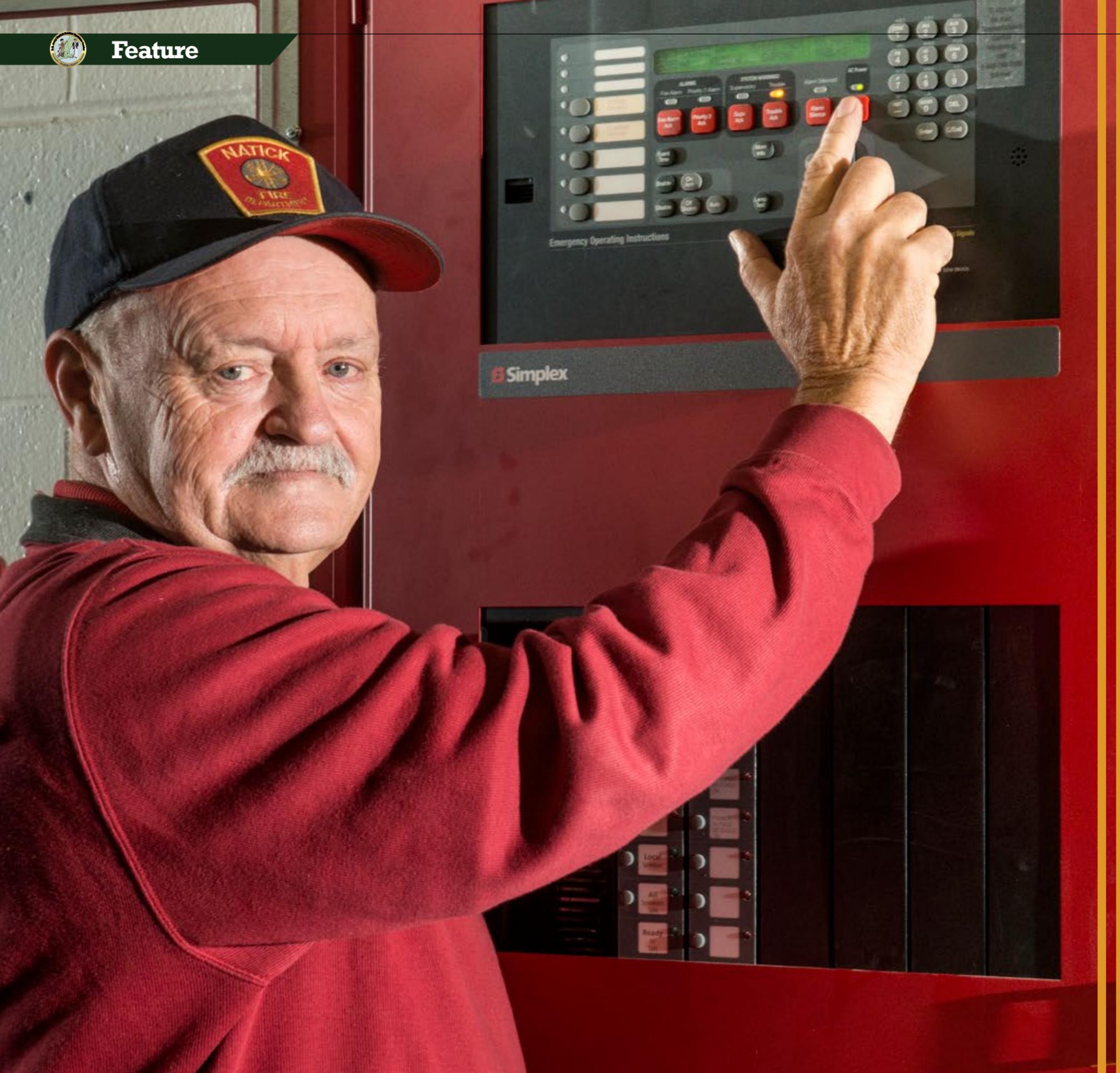
Staff Sgt. Shaun Morand spoke of Fitch's leadership qualities, which he witnessed at Natick.

"He didn't stop leading Soldiers when their military time was done, or even when his was," Morand said. "He just took care of them with every bit of strength he could muster and until his final breath. I'm proud to have known him, and I hope to carry on his mission and make him proud."

"His legacy carries on in the lives he saved and the lives he changed."

"If all we do is just save one life, one that wouldn't have been saved otherwise, I say that's mission success."





Ring the Alarm

Fire inspector retires at Natick

By Bob Reinert, USAG Natick Public Affairs / NATICK, Mass. (Oct. 2, 2015)

Joe Murphy was never one to sit in an office. In fact, the lasting image is of him walking around [Natick Soldier Systems Center](#).

“That’s my job, really,” Murphy said. “I am not good at desk work.”

Today, after 34 years on the job, Murphy retires as the fire inspector in USAG Natick’s [Directorate of Emergency Services](#). One of only three inspectors in the installation’s 61-year history, he had the longest tenure, by far.

“Just the nicest place on Earth to work,” said Murphy of Natick. “I feel I should give this place a party, rather than the other way. They’re nice people. They’ve really been great.”

It has been Murphy’s responsibility to protect those people during more than half of NSSC’s existence. He noted that he was born in this town six years before the earliest foundations were laid at the center.

“There was nothing here,” said Murphy of the site where NSSC now stands. “It was empty.”

Murphy has also seen major changes since he first stepped foot on the base in April 1981.

“When I started here, the place was totally different,” Murphy said. “A lot of these buildings weren’t here. A lot of them have been built since I’ve been here.”

The Vietnam veteran, who also spent three decades with the [Town of Natick Fire Department](#), oversaw the installation of a modern fire protection system at NSSC.

“Smoke detectors are the biggest advancement,” Murphy said. “They really changed the game. Fire prevention is like smoke detectors. You’ll never know how many lives you saved, because (something) didn’t happen. It’s the way prevention should be.”

As Murphy pointed out, people are a big part of the fire prevention equation.

“You’re never going to stop all fires or accidents, but people here have been great,” Murphy said. “The directors I’ve always had and the garrison commanders have always supported fire prevention and safety. They’ve just flat-out done it.”

They have had plenty of help from Murphy, who has won a number of awards, including Army fire inspection officer of the year.

Murphy admitted that NSSC is different than other Army installations for a fire inspector.

“A lot of the larger bases, they have fire departments,” Murphy said. “Here, we rely on the Town of Natick Fire Department. They’re a good town to work with.”

The 67-year-old Murphy and Pamela, his wife of 43 years, will spend more time with the four children and seven grandchildren. Beyond that, Murphy has no plans.

“No, I never made plans in my life,” Murphy said. “Make your plans in pencil, because they’re always going to change.”

“Just, things happen as you go along, kind of like God takes you where you’re supposed to be.”



Planting the Seed

Combat Feeding tests hydroponic farming

By Bob Reinert, USAG Natick Public Affairs / NATICK, Mass. (Oct. 15, 2015)

Don Holman was raised on a farm in Michigan and served 30 years in the Navy, which makes him a perfect fit to help test whether American warships could one day grow their own fresh vegetables.

Inside a re-purposed former refrigerated shipping container tucked behind the [Combat Feeding Directorate at Natick Soldier Research, Development and Engineering Center](#), Holman has been growing lettuce since August in a climate-controlled, 40-by-8-foot “hydroponic farm.” What will be a year-long effort has been undertaken for the Navy, which aims to explore the capability of growing produce at sea utilizing hydroponics technology.

“I want to see what can grow and what can’t grow,” said Holman, an engineering technician with the Joint Foodservice and Engineering Team at CFD and a retired command master chief. “We want to experiment with all varieties of vegetables and see how much produce we can produce.”

“The end goal is to provide the Navy a technical report detailing the test results of the equipment, its possibilities and limitations.”

Currently, ships on long deployments receive fresh fruit and vegetables by helicopter or by tensioned cable between ships with pulley system.

“Much of it comes from locally procured overseas sources,” Holman said.

The hydroponic farm is growing produce from seeds without using soil. Seeds germinate and grow first in peat moss plugs placed in trays and then are transferred into vertical “towers.” Through each step, the seedlings and, later, plants are moistened with nutrient-enriched water that is pH balanced.

“I want to see what can grow and what can’t grow. We want to experiment with all varieties of vegetables and see how much produce we can produce.”

Dan Holman, Combat Feeding Directorate

“You can grow more plants in a vertical arrangement, rather than a horizontal configuration,” Holman said. “It takes up very little floor space when it’s hung vertically. There is more growth in less area.”

The space is illuminated with light-emitting diode lights, and the 24-hour operation simulates daytime and nighttime conditions and accelerates plant growth. The container has Wi-Fi and Bluetooth capability and is equipped with an infrared camera.

“All functions are instrumented and automatically controlled, which simplifies data collection,” Holman said. “The Wi-Fi allows one to monitor the farm from an iPhone at home, to ensure the farm’s operating correctly.”

The current hydroponic farm runs efficiently, consuming approximately 6.8 kilowatt-hours of electricity during daytime operations and 1.2 kWh at night.

“The power requirements are minimal,” Holman said. “We’re still collecting power consumption data, as well.”

Only 10 of the 280 gallons of water circulating through the farm’s vertical towers are consumed daily.

“You can’t do that on a dirt farm,” Holman said. “It’s going to take a lot more water than that. The manufacturers estimate a 90-percent reduction in water consumption.”

As Holman pointed out, there are other advantages over outdoor farming.

“There are no insects,” Holman said. “We do not have the diseases normally associated with a dirt farm. The atmosphere is controlled for temperature and humidity as well as the nutrients and pH levels of the water — an obvious advantage over a dirt farm.”

The first lettuce crop was harvested Oct. 14. After it’s thoroughly tested by a Combat Feeding microbiologist, the produce may be used in the [Natick Soldier Systems Center](#) dining facility.

“We continued for several weeks planting lettuce to learn the farm and to make necessary modifications,” Holman said.

Broccoli, Brussels sprouts and bush beans — currently growing in trays — will move to the towers next.

“Now that we’ve learned how to operate the farm, we’re going into full test mode, to determine the farm’s production output,” Holman said.

According to the manufacturer, the farm will produce the equivalent of an acre of land.

“It remains to be seen,” Holman said. “That’s why we’re testing.”

Does an old salt such as Holman believe that hydroponic farming technology will translate well to today’s warships?

“Space is always a premium aboard ship,” said Holman, “but once that issue is resolved, I don’t think the challenges are going to be that great.”

Holman went even further than that.

“If the farm tests well, its potential wouldn’t be limited to just the Navy,” Holman said. “The Army and Marine Corps would benefit greatly from reduced produce costs, shipping costs, and the logistics of moving produce on the battlefield. I think the applications for all the services are great.”

By the Numbers

Hydroponic Farm



90%

Percentage reduction over water consumption used on an acre of land

24 Hours a day that it operates

10

Days it took to get the farm up and running

12 Heads of lettuce in each grow tower for first harvest



Photo: U.S. Air Force



‘Scoring in Transition’ career fair held at Hanscom Air Force Base

By Tazanyia L. Mouton, USAG Natick Public Affairs / NATICK, Mass. (Oct. 13, 2015)

More than 120 job seekers and 50 employers were in attendance at the 2015 [Hanscom Air Force Base](#) career fair, Oct. 7. The [Hanscom Airman and Family Readiness Center](#) partnered with the [U.S. Army Natick Soldier Systems Center](#) and the [Boston Celtics](#) to host the event.

Prior to the career fair, Dan Mazzuca, the Transition Assistance Program manager, spoke about the advantages of having a career fair for troops and their families getting ready to leave the service.

“The benefits of a career fair are easier access to employment and networking opportunities for people transitioning from the military, as well as providing opportunities for family members seeking employment,” said Mazzuca. “With low veteran unemployment rates and an increase in employment opportunities, this is a particularly ideal time for transitioning service members and their family members to seek employment.”

Mazzuca added that employers look to military applicants for specific qualifications and knowledge.

“Employers repeatedly tell me that they seek veterans due to their skills in leadership, teamwork, and ability to perform under pressure,” Mazzuca said.

One vendor, Greg Rosa, director of business development for Aquila Technology, said he was satisfied with the high-quality potential employees he had a chance to speak with.

“We at Aquila were very pleased with the professionalism of all job seekers that we were fortunate to meet,” said Rosa. “We look forward to a continued dialogue with the prospective talent and are eager to help them identify new opportunities.”

Sam Taub of the Celtics’ community relations department said the feedback he received from job seekers, employers and Celtics VIPs who attended the event was overwhelmingly positive.

“The Celtics have a long history of working with local military branches,” said Taub. “Our involvement at the Hanscom Career Fair was just the next step in continuing to build upon our current partnership with the [\(Department of Defense\)](#).”

The Celtics’ involvement in the career fair was part of the DOD/National Basketball Association initiative, [“Commitment to Service,”](#) a collaboration in which service members and athletes voluntarily work side-by-side to serve and improve communities throughout the United States.

The career fair focused on one of the program’s “pillars,” transition.

Through the other pillars of the program — community, health, and leadership — the Celtics have partnered with local Sailors, Coast Guardsmen and Soldiers on a number of events, such as lending a helping hand at the New England Center for Homeless Veterans, working with youth during basketball camps, and stressing the importance of what it means to be a leader to young children.

In the first year since its inception, Commitment to Service is proving to be beneficial not only to the community, but to the professional athletes and service members who have volunteered their time to give back to the community.

For Molly Clay, great science comes in small drops.

Clay works on the Integrated Protective Fabrics System project and is a research chemical engineer on the [Chemical Technology Team](#) at the [Natick Soldier Research, Development and Engineering Center](#), or NSRDEC. Researchers on the team measure chemical agents entering barrier materials, such as clothing, by using different experimental techniques. Clay is working on a new approach that involves tracking a minuscule drop of liquid placed on the surface. The method is convenient and well-suited for working with toxic materials in the laboratory.

“We have all these new protective barrier materials that can be applied to uniforms, boots, gloves, face masks — anything you use to protect yourself,” said Clay. “We needed a way to characterize these materials. We wanted a way to measure how liquid chemical agents go through the materials to see if these materials have the qualities we want.”

“NSRDEC researchers look to innovate in many ways,” said NSRDEC’s [Dr. Ramathan Nagarajan](#), Senior Research Scientist Soldier Nanomaterials. “Molly’s work is an example where the experimental technique has been known in the literature and is not new. However, the technique is not used as a routine test method because the data analysis requires time-consuming and costly numerical computations.

“Molly’s innovation is in the creation of a simple analytical model, which totally eliminates the computational complexity and is also very accurate. This innovation in modeling will allow us to use this drop-image technique as a standard test method to evaluate how well any barrier material prevents the entry of a liquid chemical agent.”

Sometimes in the past, immersion methods were used and relied upon large quantities of liquid. Clay explained that measuring changes in large quantities can prove difficult



Science in small drops: researcher measures barrier effectiveness

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (Sept. 29, 2015)

at times, and she has instead has opted to work with very small quantities, using only one to two microliters.

“We first look at the droplet on an impermeable surface, like stainless steel or aluminum, because you know liquid is not going to diffuse into the surface,” said Clay. “Any changes in volume are due to evaporation going into the air — so we first account for any evaporation. I then monitor a droplet on a permeable substrate. I can take any evaporation into account and only look at what is going into the substrate. This is going to give me a diffusion coefficient and show how fast something is going to diffuse into the barrier material. And from that you can determine the level of protection.”

Using only a drop is a safer, more cost-effective and more efficient way to test the level of protection than using larger quantities of liquid. To measure contact angles, Clay uses a goniometer, which is an automated instrument that monitors continuously the drop shape on the surface.

“We’re taking that one to two microliter droplet, and we are placing it on the surface,” Clay said. “I’m monitoring it over time and measuring the contact angle of the liquid with the surface. And through the geometry of the shape of the droplet, you are able to determine the volume. So, now we have volume versus time on a specific surface. From there I developed a model that will determine the diffusion coefficient.”

That information is then used to improve products for the warfighter.

“We can use the information to determine the most effective existing materials or to aid in the development of novel materials,” said Clay.

A little drop of science can have a huge effect.

“My work is at the basic research level, including developing new tests that will help enable us to make better decisions regarding products for the Soldier,” said Clay. “To have that kind of impact, to be doing something that is going to benefit the Soldier down the road, is the best part of the job.”



Photo: U.S. Army



Natick researcher collaborates with North Carolina State on textile technologies

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (Oct. 15, 2015)

Army researchers are partnering with universities to improve Soldier capabilities and protection.

At the U.S. Army [Natick Soldier Research, Development and Engineering Center](#), or NSRDEC, senior research biologist Kris Senecal collaborates with [North Carolina State University](#), which has resulted in the development of nonwoven, multifunctional materials. Senecal partnered with NC State's Nonwovens Institute, or NWI.

In a separate effort, she is developing novel textile coatings using atomic layer deposition, or ALD, with Dr. Gregory Parsons, director of the [NC State Nanotechnology Initiative](#).

"NC State University is one of the largest textile colleges in the United States," Senecal said. "The fact that Natick has a significant textile focus makes it very important that we continue to interact with NC State."

NWI is a consortium that encourages cooperation among government, private industry and academia. Senecal will be the chair of the consortium's Industrial Advisory Board's Executive Committee in 2016.

"Companies, such as Nike and Kimberly Clark, are involved," she said. "It's really a special consortium that is getting national attention."

Rather than being knitted or woven, nonwoven fabrics are made by connecting fibers with adhesives or by entangling fibers mechanically, chemically or thermally.

"Nonwoven materials include felt, cleaning wipes, filters for cars and air conditioners, or brake pads for your car," Senecal said. "As more demands come up for the warfighter, nonwoven materials could help solve certain needs. The institute is investigating nonwoven topics that we have a lot of interest in, including conductive textiles and antimicrobial textiles."

Through the institute, NC State graduate students are involved in research work on projects selected by the companies involved.

"The students love the chance to do Soldier research," Senecal said. "The students are very well trained, and the work gives them real-world experience. We give them input and provide feedback, and we interact with the main professors, as well. In return, it gives us fresh perspective, and we can leverage the research that is accomplished through the NWI."

As part of her own research, Senecal will be working with nonwoven materials supplied from member companies associated with the Nonwovens Institute on textile capacitors. The goal is to provide lightweight materials for wearable energy storage.

"Soldiers will have extra power capabilities built into the uniform, with no added weight penalty," Senecal said.

Senecal's collaboration with Parsons on ALD textile coatings will increase capabilities on existing fabric systems. In addition to being the director of the NC State Nano-

technology Initiative, Parsons is an Alcoa professor in the department of Chemical and Biological Engineering.

"This research area applies a deposited conformal coating that is in the nanometer range," Senecal said. "You can tailor fabric properties specifically for differing environments by applying metal oxides and/or organic coatings using this coating technology, yet not increase fabric weight."

Research indicates that coatings could be used to improve Kevlar protection, she said.

"I was looking at putting the coatings on Kevlar, to improve cut- and puncture-resistance, and at the same time not degrade ballistic protection capabilities," Senecal said. "Initial results using ALD coating showed improvement on both cut- and puncture-resistance on Kevlar."

Coating technologies allow for the creation of multifunctional capabilities for the Soldier.

"The multifunctional capabilities include flame resistance, antimicrobial protection, and additional cut protection, as well as other capabilities," Senecal said. "You can tailor the coating technologies depending on what you need. The coating technologies can be added directly to an already existing uniform fabric."

"Working with Kris Senecal has been tremendous," Parsons said. "She is a highly energetic and highly creative researcher dedicated to new technology to promote Soldier safety and well-being. By sharing her passion with our group at NC State, she inspired us to find new solutions to protect Soldiers in the field from physical harm. She has helped teach students in my group the importance of DOD basic and applied research, and her insights push my students to address problems and create solutions well beyond the obvious next steps."

"It is great when something theoretical becomes everyday use," Senecal said. "I love to do the research, but I actually love to see that it has an impact. If it can make the Soldier safer, more comfortable, without adding any weight, that's rewarding."

"Kris is an excellent research partner who is willing to take on and solve the most challenging problems," Parsons said. "Her skills in personal engagement and enthusiasm for her work make her a tremendous asset for our research group and for the Army in general."

Natick cultivates its future STEM workforce

By Jeff Sisto, NSRDEC Public Affairs / NATICK, Mass. (Oct. 2, 2015)

After spending a busy summer working in the laboratories, test kitchens, parachute shops and shelter systems at the [Natick Soldier Research Development and Engineering Center](#), or NSRDEC, the nation's next generation of top scientists and engineers are ready to launch their careers.

More than 40 college undergraduate and graduate students from leading schools across the country served as summer interns and volunteers after pursuing NSRDEC's science, technology, engineering and mathematics, or STEM, outreach initiatives.

Students were hired through the Pathways program, the [Oak Ridge Institute for Science Education](#) program, the [Science, Mathematics and Research for Transformation](#) program, the University of Massachusetts Lowell's [Harnessing Emerging Research Opportunities to Empower Soldiers](#) program, and the [STEM Future Workforce Initiative](#).

These programs provide highly-motivated students the opportunity to gain STEM-based work experience in their fields as well as invaluable, professional mentorship from NSRDEC's senior researchers. In turn, students provide a fresh perspective to researching and developing STEM-based solutions for Soldier-domain challenges, injecting a dose of youthful innovation into NSRDEC's mission.

That innovation was highlighted at the 9th Annual Future Workforce Poster Presentation, held in late August of this year.

"This is one of our major recruitment tools," said Sharon Menard, manager of NSRDEC's Workforce Development team, the organization's human resource arm. "Many of these students will be graduating soon and, hopefully, we'll have an opportunity to retain them as full-time employees or have them back as student interns."

The event is a big driver for increasing interest in STEM occupations and civilian government service.

"That's why it's called 'the future workforce presentation,'" said Menard, whose team is responsible for hiring and managing NSRDEC's civilian personnel. "We've already

made an investment in their future by training and mentoring them, so we want them to come back and work for us full time."

The event routinely draws a large crowd of Natick employees, especially NSRDEC team leaders and mentors looking for new additions to their teams. It's also a chance for fellow scientists and engineers to see all the students' body of work and evaluate their presentation skills, with an eye toward future employment.

"The poster session is the culmination of the work they did here," said Melissa Tobin, a business student and senior at Stonehill College who has worked the past four summers on Menard's team. For the last two years, Tobin has led the event's coordination as her own student project.

"It's an opportunity for students to show what they've learned here, hone their presentations skills and network with the NSRDEC workforce," said Tobin. "At the same time, they are being evaluated as potential employees so it's really a mutually beneficial event."

This year's student presentations demonstrated a wide-range of innovative projects that supported NSRDEC's existing science and technology efforts to improve Soldier-performance. Students supported the research and development of everything from environmentally-friendly ration packaging to energy efficient shelter systems and unmanned aerial surveillance vehicles.

Thomas Pritchard, a physics and engineering major at Washington and Lee University, worked with the [Aerial Delivery Directorate's](#) Personnel Airdrop Systems team conducting parachute service life evaluations.

"The goal of my project was to identify any trends that might extend the current 12-year service life of personnel parachutes," said Pritchard. "By analyzing the data of time versus the number of jumps, we can measure the air permeability and determine if it validates the current service life."

"I was struck by how many factors go into parachute engineering, how they affect performance, and how much data analysis occurs," said Pritchard. "It never stops."

Jenna Domek and Alexander Leccese, both computer engineering students at UMass Lowell working for the Aerial Delivery Directorate, teamed up to develop the "Video Quadcopter," a small, four-armed, unmanned aerial vehicle, mounted with two high-quality cameras designed to fly near airdrops to capture video of falling payloads.

The system could help units confirm a successful drop and evaluate their aerial resupply operations.

"We noticed how much time Army personnel were spending searching for the payload," said Domek. "The Quadcopter would allow more time recording video data and less time manually searching for the airdrop after it lands."

"Simply mounting Go-Pro's on a payload during a drop limits the data available to planners," said Leccese. "The Quadcopter provides a wider scope of visual information to analyze how well the drop functioned."

Caitlin Wertz, a food science major at Framingham State University, worked in NSRDEC's [Combat Feeding Directorate](#) under the guidance of senior food technologist and mentor, Mary Scerra.

Wertz investigated how the retort process, by which food is cooked at extremely high temperatures over an extended period of time, affects food products in the [Meal, Ready-to-Eat](#), or MRE. Wertz was struck by the stringent requirements MREs must meet in order to survive extreme conditions before they even get to a warfighter in the field.

"I wanted to experience - from beginning to end - how retorting works and how it impacts the flavor, texture, color and nutritional value of the food Soldiers eat," said Wertz. "And see if I could develop a side-dish that maintains more of those qualities after the retorting process."

Wertz then designed and conducted her own experiment that evaluated how different formations of polenta, an Italian-style porridge made from cornmeal, could be used as a potential side component in the MRE.

"It was nice to be able to create my own project," said Wertz. "Now I understand how difficult it is to overcome all the shelf-life challenges, and how the retort process mitigates them," said Wertz.

"I have a new-found respect for military food technologists."



NATICK REMEMBERS JUSTIN FITCH



“His very presence on this planet made it a better place to live. He wasn’t super human; he was a regular man. He had the foul mouth and dry sense of humor of a true veteran, but he had more drive, resolve and focus than anyone else I know. Major Fitch was a leader by trade, but Justin was leader by choice and by necessity.”

Staff Sgt. Shaun Morand

“It was truly amazing to me that Justin was always more concerned about how others were doing than he was. Even though we had many emotional and very heartfelt conversations, he always remained positive and hopeful. Even though he will be greatly missed by so many, it should give us all comfort to know that he is in a better place now.”

Alison Spurr

“Having served as his first sergeant for over 30 months, I have collected a vast repository of memories of Justin, all revolving around his unrelenting willingness to go the extra mile to achieve that which was deemed by many as unachievable. From combating Soldier and veteran suicides across the country to taking care of the Soldiers under his command, to making sweeping organizational improvements within NSRDEC, Justin never backed down.”

Brian D. Gemmill

“He fought cancer harder than anyone I have ever met. While battling this deadly disease, he also fought to stop veterans’ suicide. He shared his personal story with anyone who would listen. His unrelenting will to stop veterans’ suicide probably saved hundreds of lives. The Army, Natick Soldier Systems Center and our nation lost a faithful Soldier and an inspirational leader.”

Brig. Gen. William E. Cole



“How do you put into words what someone who is so selfless, giving, and inspiring means to you? It wasn’t about him. It was about what he could do, and the message that he wanted to get out. He sacrificed his health and his limited time to make this world a better place. He placed the mission first as always, because that was more important to him. He may be physically gone, but the values and lessons he instilled in all of us will live on, and ultimately, that’s what he wanted. His mission continues, and we will fight on, but it’s with heavy hearts that we carry his load.”

Kristen Heavens

“The big ruck march in 2013 is the way I will remember Justin Fitch. In August of 2012, after a particularly long and invasive surgery, the doctors told him that he had stage 4 colon cancer and that microscopic portions of the cancer had spread throughout his body. That is when he knew he only had a few years left to live. He pursued a good cause and captained the Minutemen Team for Carry the Fallen. He has probably raised a half-million dollars for veteran causes. What a great guy! It was a privilege to know him.”

Kevin Hillman



“His memory and what he stood for will always remain in the forefront of my thoughts. He personified the Army Values and set a very high standard for all of us to reach and maintain. I believe we are all better off for having the opportunity to work with and support Justin’s tireless support of veterans and their associated challenges. His life and energy will live in my memories and the great conversations we will all share as we regale the life and great work and achievements of Major (Retired) Justin Fitch.”

Col. Charles May

I had the opportunity walk the last mile or so with Justin during his first Ruck March in November 2013. It was dark, and he was beat, really beat. We were all worried that he had pushed too hard. He was literally shuffling, he had been rucking for more than 12 hours but he was unwilling to give in. We offered rides. We offered rest stops. He just kept going. A couple of blocks from the finish, he stopped, reached into his pocket, pulled out some bills, bent down and put it into the cup of a homeless person who was sitting on the sidewalk. I stood there dumfounded. He turned and shuffled away, as the homeless person called out a thank you.

Collier Slade

“He always had a clear message - every day is a gift use it wisely! He lived this message in an authentic way that I will always admire. Even on his worst days he was able to provide a hug and a grin so that when you walked away you didn’t feel bad — you felt good! This was a gift he gave to all of us. The work he did to raise awareness of military/veteran suicides has forever changed so many of us that we will continue his work — that is his true legacy. He will be in my heart forever.”

Donna Bulger

