

# NSSC This Week

Natick Soldier Systems Center Public Affairs Office



March 14, 2014

## NSSC This Week

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*NSSC This Week* is a biweekly newsletter covering NSSC news within the Army and commercial media.

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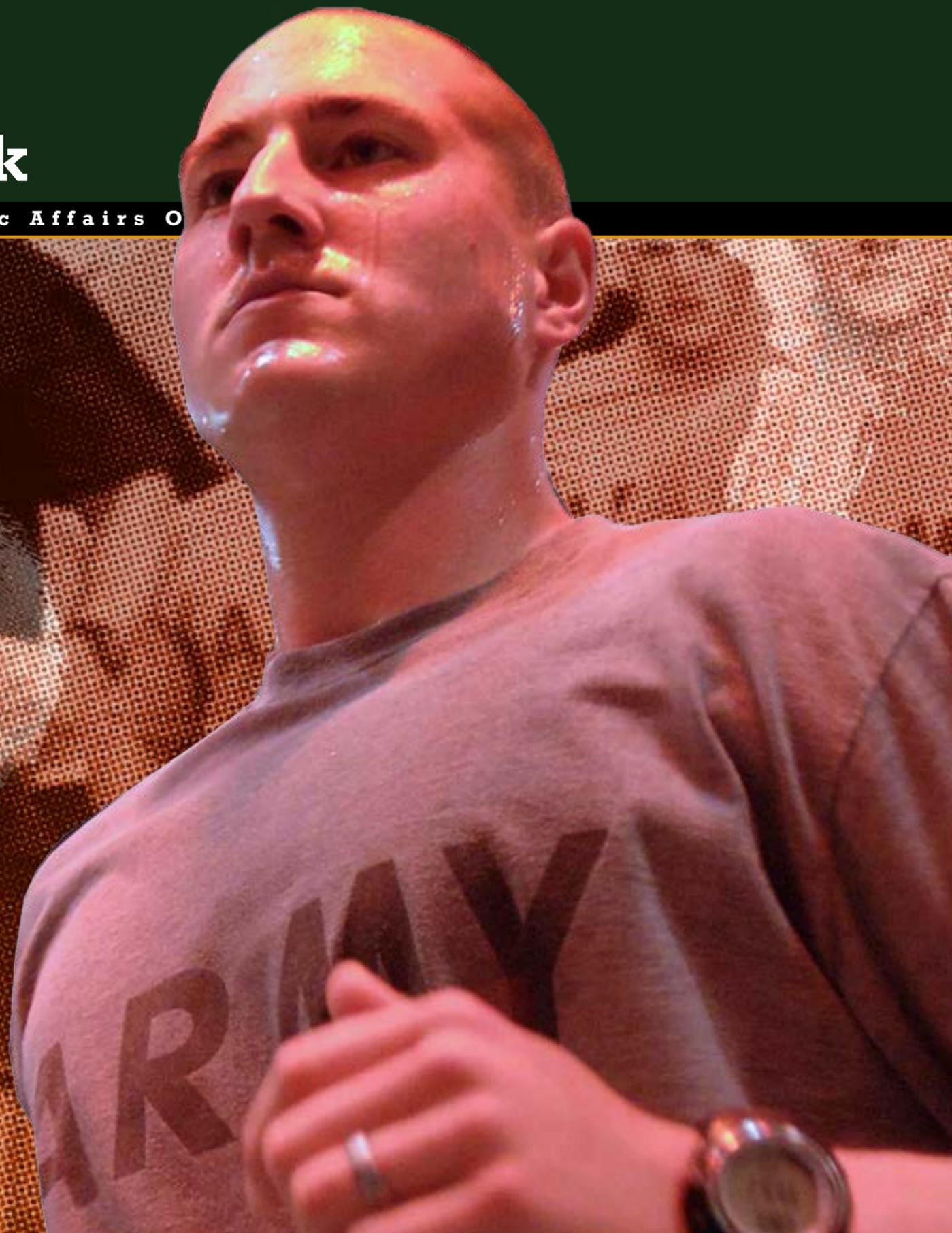
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**USARIEM researchers study Soldiers' running styles**

**Also:**

**NSSC This Week**





## Director's Chair

John P. Obusek  
Director, NSRDEC



### Some final thoughts ...

After serving many years at Natick and in several leadership roles, I offer some thoughts on “Natick Labs” for this edition of *NSSC This Week*.

First, I refer to the collective organizations that comprise [NSSC](#) by the popular name “Natick Labs” because that is precisely how we are viewed by the outside world. The separate tenant organizations make tremendous innovative individual contributions to protect and sustain our warfighters. However, the real power of NSSC is that, together, we are much greater than the sum of our individual contributions. The synergies that we all have created here at NSSC are unparalleled and result in truly amazing capabilities for the [Department of Defense](#). Everything from MRE pizza (the “holy grail” of operational rations), through high-efficiency basing, to medical knowledge products that are critical for warfighter health and performance, the Natick team keeps innovating, fielding and sustaining cutting-edge products.

Second, as I look forward, I believe Natick's future is, indeed, a very bright one (to paraphrase Army Chief of Staff General Raymond Odierno). Our incredible scientists and engineers are exploring new materials for protective equipment that will enable unprecedented Soldier protection at lower weight, designing new power-efficient systems to replace the high demand for fuel and batteries on the battlefield, new self-guided parachutes that will pinpoint resupply squads on the move, human augmentation to give Soldiers unmatched physical capabilities, and they are creating the systems engineering architecture that will take Soldier as a System to the next level.

Finally, with the challenges that will continue as budgets are reduced, keep your eye on the mission and always remember that America's sons and daughters are counting on you to continue doing great things!

John P. Obusek  
Director, NSRDEC

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### Within the Gates

#### Monthly Caregiver Support Group

Are you following the most important rule of caregiving ... taking care of yourself first?

Join elder care consultant Sherrie Whittemore to discuss the issues, challenges and solutions of being a working caregiver.

The program will run on the second Tuesday of each month, 11:30 a.m.-12:30 p.m. in the ACS Conference Room. Registration is not required.

For more information, contact Lauren Anzivino at [lauren.m.anzivino.civ@mail.mil](mailto:lauren.m.anzivino.civ@mail.mil) or (508) 233-4946.

### Upcoming Events

#### March Madness/St. Patty's Day

A March Madness/St. Patty's Day trivia night will be held March 14 at 4:30 p.m. in the Lord Community Activities Center Ballroom.

Put your team together now, or let us match you up with three eager participants. Friday's winning team will be awarded \$100 in Amazon.com gift cards.

The cost per person is \$10 in advance; \$12 at the door. Contact Sherita Baker at [sherita.m.baker.naf@mail.mil](mailto:sherita.m.baker.naf@mail.mil) or ext. 4791.

#### Silent Scream

In support of Child Abuse Prevention Month and Sexual Assault Awareness Month, the Family Advocacy and SHARP Programs present an April 23 presentation by Barbara Joy Hansen, an award-winning international speaker, author, chaplain, prevention advocate and warrior.

Hansen, a survivor of domestic violence, child sexual abuse and pre-teen crime, will share her story in Hunter Auditorium at 9 a.m. and 1 p.m.

For more information, call Julie Lindahl at ext. 6925.



**A**t a time when running barefoot or with so-called minimalist shoes has gained increasing traction, researchers at the [U.S. Army Research Institute of Environmental Medicine](#) decided to study how Soldiers run during physical training and if running style contributes to training-related injuries.

“Running as part of physical training, for a long time, has been implicated as a source of injury in the Army,” said Maj. Bradley Warr, deputy chief of the Military Performance Division at USARIEM. “(If) teaching people how to run differently could potentially mitigate those injuries, there would be a huge payoff.”

As Warr pointed out, most people land on their heels first as they run. Going barefoot or wearing minimalist shoes allegedly forces them to make contact on the midfoot or forefoot.

“Proponents of these alternative styles say that running in a way other than (heel) strike will prevent you from getting injured, and you can run faster,” Warr said. “That’s really the background of ... this study.

“Eighty-five percent of people run with a heel strike naturally. And then the other 15 percent run with a midfoot or a forefoot strike. So we decided to compare injuries between runners who already run with these different styles.”

Nearly two years ago, Warr and Dr. Joseph Seay, a biomechanist with the Military Performance Division, began studying Soldiers’ running styles to see if they affected performance or the likelihood of

injury. Initially, they looked at 341 members of the 1st Battalion, 66th Armor Regiment at Fort Carson, Colo., to see how they compared to the general population.

“Nothing like that’s (been) done before,” Warr said. “Before we would implement new policy or training, we have to really evaluate

(if) that really makes a difference in injury profiles amongst runners or Soldiers, in particular, because runners and Soldiers aren’t necessarily the same thing.”

Seay said he liked this study because it was basic.

“Really, the study is less about what is or is not worn on your feet than it is about how your foot hits the ground and how that relates to getting injured,” Seay said. “You’re getting to something that’s very relevant, that everybody can understand.”

Warr and Seay, runners themselves, filmed and analyzed the foot-strike patterns of participants and had the Soldiers complete surveys about potential running-related injuries, training history, and 2-mile run times. They presented their results at last spring’s [American College of Sports Medicine](#) annual meeting.

“As far as we’re concerned, there does not seem to be a benefit to modifying Soldiers’ running style,” said Warr, adding that there was no statistical difference between running styles when it came to 2-mile run times or the number of injuries. “If it’s not broke, don’t fix it, is essentially our perspective at this point, I would say.”

“Neither group was faster,” Seay said. “Neither group got injured less frequently. A finding of no difference is still important information to report; we’re just documenting that there might not be a magic bullet.”

Warr and Seay did point out that other studies have indicated that a change in running style might be warranted for Soldiers with such injuries as anterior compartment syndrome.

“There is some research that has shown that retraining those people to run with a different technique – maybe more forefoot, instead of heel striking – relieves shin pain,” Warr said.

“It relieves their pain, and it measurably relieves pressure in the anterior compartment,” Seay added.

Warr and Seay are far from done with their own study. Data have been collected on a group of more than 1,000 Soldiers to allow for comparisons between men and women, and traditional and minimalist running shoes.

“It’s very relevant right now,” said Warr of the study. “You could talk to anybody about it (who) has any interest in fitness or running — they want to know what we’re doing with this.”

# Hoofin’ It

## USARIEM researchers study Soldiers’ running styles

By Bob Reinert, USAG-Natick Public Affairs / NATICK, Mass. (March 14, 2014)

# Waste Not

Turning base camp refuse into energy

By Bob Reinert, USAG-Natick Public Affairs / NATICK, Mass. (March 11, 2014)

**One 150-person base camp in Afghanistan can produce as much as 1,000 pounds of solid waste a day.**

One 150-person base camp in Afghanistan can produce as much as 1,000 pounds of solid waste a day.

That waste can become one big headache, according to Amy Klopotoski, the Contingency Basing Science and Technology lead in the Expeditionary Basing and Collective Protection Directorate of the Natick Soldier Research, Development and Engineering Center.

“The waste generated on base camps, it’s a big challenge and a problem, because Soldiers are either burning it — which is hazardous to your health, the environment, the host nation — or you have to backhaul it,” Klopotoski said. “Soldiers have to leave the protected camp to backhaul this waste to some other location for it to be processed.

“So it’s a logistics burden, it’s a safety hazard, it’s a health hazard, and quite a bit of waste is generated on these camps. So it is a continuous problem.”

Klopotoski would like to turn a negative into a positive, and solve another problem simultaneously, by converting that waste into energy that could help power U.S. base camps overseas.

“You can thermochemically process (the waste) so that you reduce the volume of it,” Klopotoski said. “It can be reduced ... up to 90 percent of the volume of the waste, so it basically turns it into an ash. Then you can actually use it as an energy source so that you can provide energy to the camp.

“That cuts down on the fuel dependence of the camp itself. Fuel, it’s a logistics burden for the Soldiers, as well.”

NSRDEC serves as technical manager of a group known as **Joint Deployable Waste to Energy**, or JDW2E, which is looking at how to take technology now available on a municipal scale and shrink it to a size that would be deployable and would work at base camps.

“It’s sort of been growing as an effort because people see the benefit,” said Klopotoski, “and you look at the technology that exists today, and you feel pretty confident that we can get this capability into a deployable package.”

Klopotoski said that JDW2E, which also includes Natick’s **Product Manager Force**

**Sustainment Systems**, is looking for systems that require no specialized training and are durable and transportable.

“It’s a new capability that doesn’t exist, so there aren’t really test procedures,” Klopotoski said. “So that’s part of the effort, too, is establishing the test procedures to assess these systems.”

In addition to establishing test procedures and assessing technology, JDW2E will conduct a workshop to solicit Soldier input.

“To find the right technology, you need to know ... what is acceptable or not acceptable in the field,” Klopotoski said. “How would the Soldiers prefer it to be used and operated, or how might they use it?”

“There’s such a wide mix of things that come up in a waste stream on a base camp. You want a system that can accept anything. You don’t want to have Soldiers sifting through stuff.”

Klopotoski said that JDW2E is striving to get a prototype to the **Pacific Command** area of operations for testing. “A lot of their island nations have a lot of the same challenges that some of our contingency bases do,” she added.

Given waste-to-energy conversion, solar technology and smart power management, Klopotoski said she can envision a day when base camps could be energy self-sufficient, taking vulnerable convoys off dangerous roads.

**“The waste generated on base camps, it’s a big challenge and a problem, because Soldiers are either burning it — which is hazardous to your health, the environment, the host nation — or you have to backhaul it.”**

Amy Klopotoski, NSRDEC

“You’re attacking two problems,” Klopotoski said. “It’s the waste problem, and it’s also the fuel-consumption problem. If we can get this to work, which we feel pretty confident that we can, that could tackle two of those pretty big problems that currently exist at camps.”

Master Sgt. Darryl Sterling tosses trash into a burn pit on March 10, 2008, at Balad Air Base, Iraq. (U.S. Air Force photo/Senior Airman Julianne Showalter)

Soldiers at the [Army Mountain Warfare School](#) here are slated to receive new equipment designed to improve their performance and give them “Spiderman-like” abilities. The equipment is part of the improved Army Mountaineering Kit.

# Cliff Hanger

**Army  
Mountaineering  
Kit is fielded**

By Doug Graham, Army News Service / JERICHO, Vt. (Feb. 24, 2014)

The new kit, developed by [Product Manager Soldier Clothing and Individual Equipment](#), will help Soldiers traverse cliffs and mountain faces, and cross snow and ice. The Army Mountaineering Kit, or AMK, will help Soldiers function more effectively in harsh, high-altitude environments similar to that of the mountains in Afghanistan.

The AMK will be fielded in four kits tailored to meet different mission requirements. These kits will replace the mix of older Army-issued equipment and commercially available mountain gear currently being used by most units.

“Mountain combat is unforgiving. In addition to fighting a determined enemy, you are dealing with high altitudes, rocky and often dangerous terrain, and extreme temperatures,” said Maj. Laverne Stanley, assistant product manager for Nuclear, Biological and Chemical, or NBC, and Load Carriage Equipment. “The AMK gives our Soldiers the equipment they need to take and keep that vital high ground and complete their missions at peak levels of performance.

“The AMK will also provide Soldiers with proven standardized gear, which will simplify both training and logistics for units that specialize in mountaineering,” Stanley added. “PM SCIE worked closely on this effort with the Army Mountain Warfare School in Jericho.”

Former sergeant major and Army Mountain Warfare School chief instructor, [Darren Bean](#), said the new kits for Soldiers contain about 80

percent of the same equipment that the Marine Corps presently uses. The similarity in kits should prove beneficial to joint operations.

Bean, who was heavily involved in the development of the AMK, said the effort began in earnest in 2006. It was then the Army increased operations in the eastern part of Afghanistan. In that part of the country, mountains tower from 10,000 to 14,000 feet and require mountain-climbing expertise.

“You always want to fight from the high ground,” said Bean, adding that high vantage points are also necessary for observation points and sniper positions.

“Getting to those locations by helicopter is not always a good idea because of the high altitude, high winds and rocky terrain,” Bean noted. “Therefore, Soldiers have to be able to climb.

“We identified a need for a new kit because the old Special Operations Forces Mountaineering Kit that had been supplied to units was outdated. Much of the equipment did not meet the standards set by the UIAA,” Bean said.

The UIAA is the Union Internationale des Associations d’Alpinisme. The organization, known in English as the International Mountaineering and Climbing Federation, says on its website that its mission is to “promote the growth and protection of mountaineering and climbing worldwide.”



Photo: U.S. Army

Warfighters in extreme, demanding operational environments need additional sustenance to complete their missions successfully — they simply need MORE.

In this case, MORE is the [Modular Operational Ration Enhancement](#), developed by the U.S. Army Natick Soldier Research Development and Engineering Center's [Combat Feeding Directorate](#) as a direct result of requests from deployed warfighters.

“We received feedback from the field that some warfighters were losing weight and they needed extra calories,” said Julie Smith, a Combat Feeding Directorate, or CFD, senior food technologist.

Smith, along with Jim Lecollier, chief of the Individual Rations Branch, Defense Logistics Agency Troop Support, worked with their respective teams from 2008 through 2013 to develop the MORE family of ration supplements specifically to meet this need.

MORE provides additional nutrition to warfighters operating in high-stress environments when their caloric requirements exceed those provided by their daily operational rations. MOREs are designed to augment the Meal, Ready-to-Eat, or MRE, First Strike Ration, or FSR, and Meal, Cold Weather/Long Range Patrol, as well as the family of

Unitized Group Rations.

The MRE satisfies the Army surgeon general's strict requirements for nutrition in operational rations. Each MRE provides approximately 1,300 calories. An FSR, which replaces three MREs, has an average of 2,900 calories per ration. The MORE has an average of 1,110 calories per package.

Army Regulation 40-25, “Nutrition Standards and Education,” a joint regulation of the surgeons general of the Army, Navy and Air Force, establishes nutritional standards, termed “military dietary reference intakes,” for military feeding. Among these are nutritional standards for operational rations and restricted rations.

When warfighters conduct dismounted operations in challenging terrain, carrying more than 100 pounds of equipment up and

down the mountains of Afghanistan with elevations as high as 12,000 feet, they can burn significantly more calories than when operating at sea level.

The MOREs are designed to provide the additional calories and nutrients to supplement their MREs or FSRs and give them the nutrition they need.

#### **MORE, HOT AND COLD**

Currently, there are two types of MOREs targeted for the different extremes of operational environments — high altitude and cold weather, and hot weather. Each type has three different varieties, for a total of six different MORE packs.

CFD collaborated with the U.S. Army Research Institute of Environmental Medicine to understand the unique nutritional needs of warfighters in these operational environments, said Smith.

“We reviewed literature and conducted focus groups to identify food preferences of warfighters when conducting missions in high altitude and cold weather, and hot weather environments.”

Three MREs a day provide warfighters with a minimum of 3,600 calories, satisfying their nutritional needs for most missions.

“However, there are some instances during exceptionally heavy activity where warfighters

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“Feedback from warfighters indicated they preferred ration components that were easy-to-consume, eat-on-the-go, snack-type foods, rather than meals that would require time to heat and prepare.”

Julie Smith, Combat Feeding Directorate

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## Extreme environments demand

# MORE

By Joseph Zanchi and Alexandra Foran, U.S. Army NSRDEC / NATICK, Mass. (March 10, 2014)



# 'Armed with Science'

Pilot episode features defense breakthroughs

By U.S. Army Research Laboratory Public Affairs / ADELPHI, Md. (March 10, 2014)

The [Pentagon Channel's](#) pilot episode of *Armed with Science* aired March 10 and delved into [Army Research Laboratory](#) and [Naval Research Laboratory](#) science that shapes the future of defense.

The show took viewers inside the minds of military scientists who improve national defense with infrared imaging, robotic satellite repair and novel weapons design during its debut.

Defense producers from the [Defense Media Activity](#) conceptualized the program to shed light on the "seed corn of science and technology," or basic and applied science.

"'Armed with Science' tells the military's story about scientific discovery and innovation that begins decades before an application reaches the military market," said Thomas Moyer, U.S. Army Research Laboratory public affairs director. "The pilot will be successful if it gets people thinking about technological advances for our nation's warfighters."

The best-kept secret in innovation is the scientists and engineers behind the military's scientific breakthroughs, Moyer said. "The American public often has no idea of the research and development that military scientists tirelessly put into a single application to protect men and women in uniform," he added.

The pilot episode explored the Army's super materials that operate across a spectrum of extreme environments to protect Soldiers against threats they haven't seen yet. The materials that scientists and engineers design at an atomic scale will make up game-changing electronics, munitions and armor for the military of the future.

In the show's second segment, host George Zaidan visits the NRL Space Robotics Laboratory, where scientists are developing robotic technology that can help repair, reposition, or update satellites that are beyond human reach, about 20,000 miles higher than the Hubble Space Telescope. These satellites are critical for Navy and Marine Corps operations, but cannot be repaired in orbit currently.

The show wraps up with "super vision," or enemy detection made easier and faster with infrared radiated light that gives Soldiers the capability to see when there is zero visibility. It took countless hours and the aid of the Army's super computers to make thermal image detection good enough to detect very cold objects and fast-moving targets. The Army scientists behind the technology talk about how the discovery was made.

# Career Choices

## NSRDEC chemical engineers talk with WPI students about options

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (March 14, 2014)

Dr. Natalie Pomerantz and Laurel Doherty are helping [Worcester Polytechnic Institute](#) freshmen envision careers in the science, technology engineering and math, or STEM, fields.

The two chemical engineers, who work at the U.S. Army Natick Soldier Research, Development and Engineering Center, have taken the time to talk to students in Dr. Terri A. Camesano's "Introduction to Chemical Engineering" class.

"First-year students greatly benefit from seeing and hearing from professionals," said Camesano, assistant dean of engineering and a professor of chemical engineering. "It helps them to envision their future career paths, and see whether this is the right path for them. Once they get interested in a certain area, they start asking more specific questions about which courses to take, which major/minor is best for them, and how to define their internships or other educational experiences."

Camesano pointed out that Pomerantz earned her doctorate and Doherty picked up her bachelor's degree at WPI.

"It was nice for the class to see very different perspectives," Camesano said. "Laurel also talked to the students about her plans to pursue graduate work. These are all important ideas for the students to consider."

It's also important for students to learn more details about what the field entails.

"When students go into chemical engineering, they don't always know exactly what it is. That was the case for me," said Pomerantz, a research chemical engineer on the Chemi-

cal Sciences and Engineering Team. "I think the professor wants them to understand how broad a field chemical engineering can be. As far as careers go, you can do water filtration, semiconductors, biomedical."

Doherty, a chemical engineer on the Biological Sciences & Technology Team, added, "I interviewed for jobs ranging from pharmaceuticals to R&D to food processing to cement. There is just a huge variety of things you can go and do."

Pomerantz works with chemical protective clothing; particularly research involving selectively permeable membranes that block chemical warfare agents from getting in but let water vapor go through so Soldiers can sweat and cool off. She said another approach to chemical protection is to embed reactive compounds within the fabric of the uniform to decontaminate the agent on contact.

In addition to helping the Soldier, Pomerantz said she believes another important aspect of her job, and her duty as a civil servant, is to help the next generation by sharing her expertise and knowledge. She added that she believes in promoting STEM. She said she is thrilled to interact with students ranging from middle school to college.

"I love STEM outreach," Pomerantz said about the time she has spent with middle school students touring NSRDEC. "I can see in their eyes that I am inspiring them."

Pomerantz said that students in WPI's freshman engineering class "have chosen that major. And they are really into it. They want to participate. They want to see exactly what it is that you do. They ask a lot of questions.

You get to be the person that says, 'Yes! What I do is fascinating.'"

Pomerantz is judging an upcoming science fair and also a WPI graduate student competition. The latter gives her the chance not only to provide students feedback, but also to scope out future collaborations.

A senior project at WPI led Doherty to NSRDEC, and she liked the place and the work so much she wanted to return after graduation.

"I am on the bio end of things," Doherty said. "So I spend a lot of time in the lab with a lab coat, goggles, and gloves — that whole thing. A lot of what I do where I think chemical engineering really comes into play is method development/experiment development. You can take a set of parameters and try to optimize it to get the best result. I have also done some work with automation. For example, right now I'm automating a fermentation process."

"I brought a fermenter into the class, which is actually a small reactor, so they actually got to see what that was, and most of them will be using them in the future."

Doherty is working as a part of collaboration with the Combat Feeding Directorate to look at gut bacteria.

"Gut bacteria break down some foods that your body can't digest on its own," Doherty said. "They can have a lot of positive effects on your health, but what gut bacteria you have depends on a lot of factors, including what you eat. Learning more about gut bacteria can help with the design of future Soldier rations, along with any other supplements that would help them to stay healthy in the field."

What's the best part of Doherty's job?

"Do I have to pick just one?" she said. "I like that it helps the Soldier. That I can look at my work, and I can see some benefits down the line. I like that what we do will make their lives better."

Both Pomerantz and Doherty want students to consider working at NSRDEC. They also said it is helpful for students to see people — women, in particular — pursuing science and engineering.

"If they see an example right in front of them, it really helps," said Doherty.

"It is important for them to see the face," Pomerantz said.

**Cliff Hanger** continued from page 5

Many units began supplementing their Special Operations Forces Mountaineering Kits with rope and equipment purchased from commercial sources. The AMK was developed to meet the needs of these units. It will not only reduce the burden on unit funds, it will ensure Soldiers receive equipment they can trust. Each AMK component had to earn UIAA certification and then pass a rigorous Army evaluation before it was added to the kit.

**“You always want to fight from the high ground. Getting to those locations by helicopter is not always a good idea because of the high altitude, high winds and rocky terrain. Therefore, Soldiers have to be able to climb.”**

Darren Bean, PM SCIE

Stanley said the AMK is also mission-tailorable.

“Users told us that they wanted the mountain kit to be modular,” she said.

The AMK consists of four different kits:

- The High Angle Mountaineering Kit enables a platoon to traverse steep obstacles, such as cliffs.
- The Assault Climber Team Kit is used by Soldiers who are trained as assault climbers. It provides them with the capability to configure ropes and gear to enable a platoon to traverse difficult and challenging high-altitude terrain.
- The Snow and Ice Mobility Kit contains the equipment a platoon requires for traversing snow and ice.

- The Squad Mountain Leader Kit provides Special Operations mountain teams full operational capability. It is essentially a compilation of all of the gear found in the other AMK kits. This kit accommodates 12 Soldiers.

While much of the equipment included in the AMK is available commercially, the Army made some changes.

“Mountaineering equipment usually comes in wild colors,” Bean said, noting that the colors

found in the AMK are typically more subdued.

For example, the static rope comes in a general digital pattern, while the static rope is black. PM SCIE selected 10mm thick ropes that were as light as possible, easy to manipulate and strong enough to meet UIAA standards.

“In the beginning of the process, we determined the characteristics of each item,” Bean said. “We went out and bought 20 brands of everything we thought would be in the kit; 20 different harnesses, 20 different belay devices. We checked with the Army Mountaineering Warfare School to determine what would ultimately be in the kit. Then we would go out and do tests, which included climbing and rappelling in the snow and ice.”

PM SCIE tested the AMK at the Natick Soldier Research

Development and Engineering Labs in Massachusetts, with more than 100 Soldiers. Additionally, Soldiers serving with the [Vermont National Guard](#)’s famed mountain unit, the 3rd Battalion, 172nd Infantry, also evaluated the AMK.

“The key is we had a lot of Soldier input on the kit,” Stanley said. “We have conducted extensive user evaluations and saw that the AMK earned solid Soldier approval, even from Soldiers who participate in recreational mountaineering.”

The AMK will be fielded first to the training schools, and then to the [10th Mountain Division](#), Fort Drum, N.Y.

Afterwards, the Army will field the AMK to each infantry brigade combat team, including active and National Guard units. Each brigade will get 15 of the High Angle Mountaineering Kits, eight of the Assault Climber Team Kits, and one Snow and Ice Mobility Kit. Units will no longer be authorized to buy their own mountaineering equipment.

“Everything is standardized, and each component will have a National Stock Number,” said Stanley. “If units require a replacement carabiner or rope, they can order a new one through the supply system instead of purchasing it off of the shelf.

“Mountain combat is unforgiving. In addition to fighting a determined enemy, you are dealing with high altitudes, rocky and often dangerous terrain and extreme temperatures,” said Stanley. “The AMK gives our Soldiers the equipment they need to take and keep that vital high ground and complete their missions at peak levels of performance.”



**MORE** continued from page 6

will need between 4,500 and 6,000 calories per day,” said Smith. MORE provides that additional nutritional “oomph,” giving warfighters approximately 1,000 extra calories in a balance of carbohydrates, caffeine, electrolytes and vitamins for these operational environments.

The first MORE enhancement pack developed by CFD was the MORE — High Altitude/Cold Weather. At the time, military service representatives tasked CFD to develop an enhancement pack to counter weight loss and fatigue, and to improve the cognitive and physical performance of warfighters operating in the mountainous terrain of Afghanistan. Increased energy requirements during high-altitude operations, coupled with symptoms of acute mountain sickness, made this a challenging requirement to meet.

Acute mountain sickness, with symptoms including anoxia, headache, nausea and vomiting, is caused by reduced air pressure and lower oxygen levels at high altitudes. The faster you climb to a high altitude, the more likely you are to get acute mountain sickness.

“The MORE is designed to be high in carbohydrates to combat acute mountain sickness. Research has shown that consuming a diet high in carbohydrates can lower the symptoms,” Smith said.

In hot weather environments, hydration is particularly important, which is why the MORE — Hot Weather includes two carbohydrate-and-electrolyte beverages. These two drinks are similar to sports drinks, providing not only pure energy in the form of carbohydrate, but also electrolytes such as potassium and sodium that warfighters sweat out. The electrolyte beverages are energy gels that come in mixed berry, orange and lemon-lime flavors. The carbohydrate beverages come in mixed berry, fruit punch and lemon-lime flavors.

#### **MORE RESEARCH, TEST AND DESIGN**

During the course of research and development on MORE, CFD conducted several focus groups and field evaluations. NSRDEC’s Operational Forces Interface Group and the Consumer Research Team collected feedback and input. Small focus groups involved warfighters from the 10th Mountain Division’s Light Fighter School at Fort Drum, N.Y., units that had deployed to Afghanistan and Army medical personnel.

Additional component selection and survey participation on the design selection, acceptability, convenience and benefit involved warfighters from the U.S. Army Mountain Warfare Training School at Camp Ethan Allen, Vt., and the Connecticut National Guard’s 1st Battalion, 102nd Infantry Regiment Mountain Training Group.

CFD received an urgent-need request from the U.S. Army Special Operations Command in 2009 for 10,000 units of MORE — High Altitude/Cold Weather to support the increase in troops deployed to Afghanistan.

MORE — Hot Weather prototypes were field-tested with the [75th Ranger Regiment](#) at the Pre-Ranger Course at Fort Benning, Ga. MORE prototypes were also provided to special operations forces during high-altitude training in Colorado; deployed units of Combined Joint Task Force 82 in Afghanistan; and to Engineer and National Guard Scout units at Bagram Airfield, Afghanistan, during Operation Enduring Freedom.

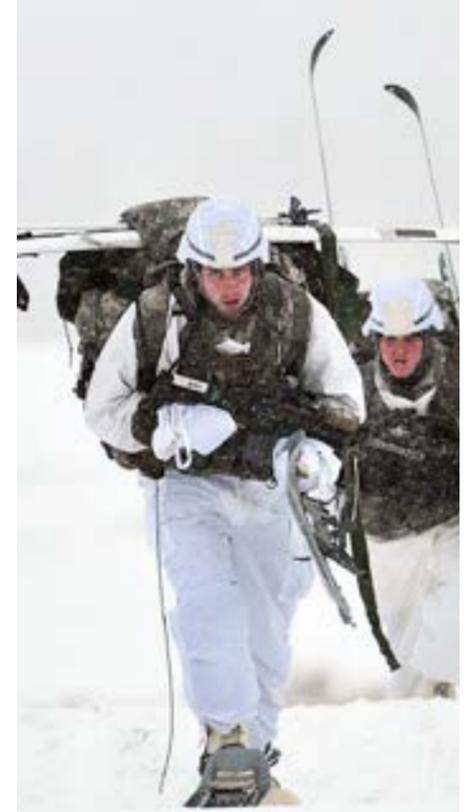
“We assessed results from individual ration field evaluations to identify ration components with the highest acceptability and consumption rates,” said Smith. “Feedback from warfighters indicated they preferred ration components that were easy-to-consume, eat-on-the-go, snack-type foods, rather than meals that would require time to heat and prepare.”

Each pack is calorically dense and weighs only three quarters of a pound. Packs are filled with popular items including caffeinated pudding, energy gels, carbohydrate-enhanced beverages, First Strike bars, nut mixes, crackers, caffeinated gum and Zapplesauce, which is applesauce fortified with maltodextrin, an energy-dense carbohydrate and a source of energy to help maintain physical performance.

“Zapplesauce and First Strike bars provide the warfighter with essential complex carbohydrate,” said Smith. Each food item serves a specific purpose for the warfighter. As with other operational rations, the goal is for the warfighter to consume every item to meet appropriate caloric needs.

#### **AWARD-WINNING WORK**

For their work in developing MORE, Smith and Lecollier received the prestigious Col. Rohland A. Isker Award in 2013 for leading their respective teams in developing, transitioning, acquiring and fielding MORE. The award is an annual honor from the



Research and Development Associates for Military Food and Packaging, better known as R&DA, to recognize civilian employees of the federal government or military personnel for outstanding contributions to national preparedness. Isker, a pioneer in Army food service research and development, founded R&DA in 1946.

“Our review board at R&DA felt the MORE project and the ultimate fielding of the ration supplement itself had the most beneficial impact on warfighters (Soldiers, Marines and special operators) of any recently introduced operational ration product,” said John McNulty, executive director of R&DA.

“MORE met a very compelling need to introduce much-needed calories and other nutrients into the diets of these warfighters during particularly stressful situations on the battlefield during extreme weather conditions. It was a success story that worked and received very high accolades from the field,” McNulty said.

MORE also provides warfighters with important enhancements to improve mental alertness and physical endurance and, like all CFD products, is “Warfighter Recommended, Warfighter Tested, and Warfighter Approved.”