# The R&T Connection Newsletter

**A Publication for the Research and Technology Directorate**

June 2010

**Upcoming Meetings/Conferences**

**June 8-11, 2010**
10th International Symposium on Protection Against Chemical and Biological Warfare Agents, Stockholm, Sweden
http://cbwsymp.foi.se

**June 21-24, 2010**
International Symposium on Spectral Sensing Research, Missouri
http://www.isssr.com/2010/scope.shtml

**September 19-24, 2010**
Tactical Operations, Pennsylvania
http://www.ntoa.org

**November 2-5, 2010**
CBRNe Convergence, Florida
http://www.icbrnevents.com/cbrne-convergence-2010/conference-programme

**Connecting Through Social Media**
Can't get enough of ECBC? Connect to the Center through Facebook (Edgewood Chemical Biological Ctr) and Twitter (@Army_ECBC).

**R&T Connection**
Have an item for the R&T Connection? Whether it's a technical accomplishment, an upcoming speech, an employee award or any other news story, please share it with R&T Communications Officer Mia Scharper at mia.scharper@us.army.mil or 410.436.2262.

## Message from the Director

*"Just because everything is different doesn't mean anything has changed."*
*~Irene Peter, American author*

During the last few months, we've seen several changes in our chem-bio defense leadership – including the addition of John Harvey, acting principal deputy assistant to the Secretary of Defense for CB Defense, and within the Joint Science Defense Threat Reduction Agency (Director Ken Meyers III), Joint Science and Technology Office (Acting Director COL Mike O'Keefe), the Research, Development and Engineering Command (Commanding General MG Nick Justice) and of course the Edgewood Chemical Biological Center, with the retirement of our technical director, Rick Decker, succeeded by former DPI Director Joe Wienand.

While we are tracking these changes in CBDP leadership and continuing to build a strong network in Washington, D.C., nothing has changed in our day-to-day priorities: excellent service to our customers, commitment to our staff and organization, and a strong sense of mission. As you read this issue of the R&T Connection, you'll see how those priorities are rewarded. Congratulations to the many R&T staff who have been recognized recently for their contributions to chem-bio defense.

## Success of TGER Project Earns Valdes a 2009 Army Presidential Rank Award

James Valdes, Ph.D., of the U.S. Army Edgewood Chemical Biological Center's (ECBC) Research and Technology Directorate, has been awarded a "Meritorious Senior Professional Rank Award" as part of the 2009 Army Presidential Rank Awards.

Valdes will receive his award at the 2009 Presidential Rank Awards ceremony, scheduled for June 28, 2010, at 2 p.m., at the Women in Military Service for America Memorial, Arlington National Cemetery.

"The Army is truly fortunate to have these leaders of the highest caliber, dedicated and selfless leaders who are innovative and who are present in shaping the Army of the future. They have inspired us and made the Army institution better," said Secretary of the Army John McHugh during his announcement of the winners.

Valdes, the Center's scientific advisor for biotechnology, was recognized for his work on the Tactical Garbage to Energy Refinery (TGER), a hybrid waste-to-energy *(continued on page 5)*

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# Employee Spotlight: Susan Yim, Research Scientist

Your first impression when you step into Susan Yim's condo is the sunlight flooding into the big glass patio doors. The light bounces off the bright walls painted in warm shades of yellow, peach, green and sky blue.

The door has opened for you automatically, so you walk in, glance at the big bike leaning against the front wall, and turn the corner to enter Yim's office.

Here, framed by what seems like hundreds of photographs and watercolor paintings, Yim works as a research scientist, supporting scientific research and business development at the U.S. Army Edgewood Chemical Biological Center (ECBC).

She communicates in a rhythm of dots and dashes, her right thumb controlling a Morse code input device that operates her computer. Sitting in a wheelchair, she uses a hair dryer and heating pad to keep her hands warm and agile so she can work the switches that keep her connected.

***"Don't let anybody tell you that you can't do something. Of course you can - all things are possible, just probably not in the conventional way."***

Technology enables Yim to operate the patio door and welcome visitors, to send light-hearted emails punctuated with exclamation points, to conduct serious research that will ultimately support national chemical and biological defense.

Yim, 52, became a quadriplegic and lost her ability to speak when she had a brainstem stroke at age 23. Stories in several media – including the Baltimore Sun, Baltimore Business Journal, Maryland State Department of Education Division of Rehabilitation Services website, and a University of Maryland

*Susan Yim identifies and analyzes funding opportunities, conducts literature searches, reviews and summarizes research articles, and prepares technical reports from her computer at home.*

School of Medicine magazine – have chronicled the aftermath of her stroke and her refusal to let her disability prevent her from living a full life.

"It's a wonderful life no matter how you have to go through it. Doing everything the world has to offer reaffirms your place in humanity, disabled or not," Yim said via her computer screen.

"Becoming disabled doesn't have to signal the beginning of a dependent and sedentary existence; it does signal having to figure out new, creative and different ways of doing things – in both work and life," Yim said. "Don't let anybody tell you that you can't do something. Of course you can – all things are possible, just probably not in the conventional way."

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## Employee Spotlight: Susan Yim, Research Scientist

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No one could accuse Yim of being conventional. She attended a White House ceremony four years after her stroke and met President Ronald Reagan. She lives on her own, paints bright watercolors, and enjoys biking, rock climbing, surfing and whitewater rafting. She'd like to hike the Amazonian rainforest and scuba in Australia. Having already earned a BS and an MS in biology, she's interested in pursuing a degree in art history. "I think science and art are intimately related; both require creative, out-of-the-box thinking," she says.

*Sampling of artwork located in Yim's workspace.*

At ECBC, Yim identifies and analyzes funding opportunities, conducts literature searches, reviews and summarizes research articles, and prepares technical reports. She communicates with her supervisor via e-mail and visits the organization about once a month for training. "Reading and learning about cutting-edge research in a variety of areas" has kept her motivated during her 17 years with the organization.

"She's my hero," said Jay Markarian, a consulting Intergovernmental Personnel Act (IPA) staff member, who helped launch Yim in her current position at ECBC.

"Ms. Yim is an extraordinary asset to the organization," said Business Program Coordinator Melinda Francisco-Hayes, Yim's supervisor. "She is a true inspiration and is determined to seek areas of improvement for future growth."

## R&T Scientists Receive TTCP Achievement Awards

Wade Kuhlmann, Ph.D., chief of the CB Protection and Decontamination Division, and Paul Gardner, chief of the Respiratory Protection Branch, were among the U.S. recipients who attended The Technical Cooperation Program (TTCP) 2008/2009 technical achievement awards. The ceremony was held in February at the Pentagon and hosted by Director of Defense Research & Engineering Zachery Lemnios and Director for Research Dr. David Honey of OSD. Kuhlmann and Gardner were recognized for their participation and contributions on the Chemical and Biological (CB) Defense, TTCP Technical Panel-11 (TP-11) for Low Burden CB Individual Protection Equipment. The award was made to TP-11 members for their significant technical contributions towards the co-development of test methods and apparatus to enable realistic system level evaluation of CB individual protective equipment (IPE). Each nation played a key role in advancing the development of system-level test equipment including fully articulated robotic mannequins and animatronic head forms, which have now become internationally accepted standards for demonstrating and quantifying IPE performance.

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## Recent Years of Service and Staff Awards

*"Congratulations and a warm thanks to those R&T employees who have served with ECBC for five years and beyond. We are grateful that you have contributed your knowledge and expertise to our organization, our country and the Warfighter."*
*- Dr. Joseph Corriveau, R&T Director*

5 Years
Dr. Jerry Cabalo
Dr. Warren Gardner
Kenneth Hoang
Jeffrey McGuire

10 Years
George Wagner

15 Years
Laurie A. Fazekas-Carey

20 Years
Christopher Byers

25 Years
Dr. Wade Kuhlmann
Dr. Harry Salem
Daniel Wise

30 Years
Jeff Hinte
Dr. John White
Alan Zulich

40 Years
Dr. Edward Stuebing
(retired)

**Recent Patent Awards**:
Mr. Paul D. Gardner
Patent no. 7,614,280
"Quantitative Fit Test System and Method for Assessing Biological Fit Factors"

Jennifer Horsmon, Mark Gostomski, Dr. James Valdes
Patent no. 7,642,082
"Methods for Determining the Presence of Staphylococcal Entertoxin A Gene in a Sample"

Dr. Jennifer W. Sekowski
Patent no. 7,629,129
"Hair Follicle Bulb as a Biodosimeter"

Dr. Jennifer W. Sekowski
Patent no. 7,625,708
"Immunohistochemistry Method for Intact Plucked Hair Follicles"

Dr. George Wagner
Patent no. 7,678,736
"Modified Reactive Sorbents Exhibiting Enhanced Decontamination of Chemical Warfare Agents"

**Commander's Award for Civilian Service Certificate and Medal:**
Dr. David J. McGarvey

## R&T Scientist Receives 2009 Army Research and Development Achievement Award

Paul Gardner, chief of the Respiratory Protection Branch, and Jennifer Becker, Ph.D., of the Army Research Office (ARO), were among the recipients of the 2009 Army Research and Development Achievement (RDA) awards. Gardner and Becker were recognized for their outstanding leadership and scientific contributions towards the development of end-of-service-life indicator technology for Chemical, Biological, Radiological, and Nuclear (CBRN) mask filters. The technology consists of an array of passive colorimetric sensors that are designed to signal the end-of-service life condition for CBRN mask filters following exposure to chemical agents and/or toxic industrial chemicals.

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# Success of TGER Project Earns Valdes a 2009 Army Presidential Rank Award *(continued from page 1)*

system that combines two complementary technologies – advanced fermentation and thermal decomposition – to convert a broader range of waste products such as plastic, paper, food scraps and styrofoam into synthetic gas or hydrous ethanol.

The TGER can consume about a ton of waste per day and was designed to produce electricity for the local power grid or heat for showers while disposing of waste generated by more than 600 people with a 60 kilowatt generator.

"The TGER is best suited for a post-Katrina, post-combat or expeditionary military operation situation. One where there is a lot of garbage, but no power," Valdes said.

***"ECBC leadership has allowed me the freedom to take technical risks which would not be possible in many organizations."***

The only technology of its kind to be fielded, two, four-ton TGER prototypes were shipped out to Victory Base Camp in Baghdad in standard ISO containers for a 90-day test of the systems under extreme working conditions in the summer of 2008. Valdes and his team – comprised of experts from ECBC, the U.S. Army Rapid Equipping Force, Defense Life Sciences, LLC, and Purdue University – wanted to discover all possible vulnerabilities of the TGER.

"The prototypes were put through the ringer out there. It was windy and 130 degrees every afternoon, so we were able to see how the TGER would really work for the warfighter," said Valdes. "If we can reduce the number of fuel convoys, which act as insurgent targets, then we can reduce casualties from improvised explosive devices and solve a real Army problem."

Valdes is grateful he had the opportunity to realize the hypothesis he laid out to the Small Business Technology Transfer Research program on the topic of tactical energy.

"This award reflects the fact that ECBC leadership has allowed me the freedom to take technical risks which would not be possible in many organizations," said Valdes, when asked how he feels about winning the prestigious award.

The Presidential Rank Awards program is administered annually by the federal government and recognizes high-performing career members of the senior executive service, senior leader and scientific and professional government employees for sustained extraordinary accomplishment. The senior career employees are nominated by their agency heads, evaluated by citizen panels and designated by the president. The meritorious-level rank award, which may be presented to no more than five percent of the entire senior-level population, is one of the most prestigious recognitions afforded to executive and senior professionals.

Valdes was previously recognized with the "Meritorious Senior Professional Rank Award" in 2003. At that time, he was honored for his conceptual and technical breakthroughs in the field of "biosensors," a discipline which he helped to establish, as well as his leadership in defining a strategic direction in biodefense research at ECBC and throughout the Joint Services.

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# R&T Employees Receive Awards at DTRA Science and Technology Conference

Members of the U.S. Army Edgewood Chemical Biological Center's (ECBC) Research & Technology Directorate were recognized during the 2009 Chemical and Biological Defense Science and Technology Conference in Dallas on Nov. 19 for their research in the field of decontamination science.

Brent Mantooth, Ph.D., received an Outstanding Platform award and Abe Greenstein, Ph.D. (OptiMetrics Inc. contractor), received an Outstanding Poster award for their CREATIVE decontamination system performance evaluation model presentations.

*Brent Mantooth, Ph.D., receives his Outstanding Platform award at the 2009 Chemical and Biological Defense Science and Technology Conference.*

The acronym "CREATIVE" is shorthand for the "Contact hazard Residual hazard Efficacy Agent T&E Integrated Variable Environment decontamination system performance evaluation model."

Decontamination is a complex system involving various forms and mechanisms of mass transport, chemistry and physics. The CREATIVE Decontamination System Performance Model predicts decontaminant performance and post-decontamination hazards for a variety of surfaces, over a range of environmental conditions and realistic scenarios. These capabilities can benefit all levels of testing from laboratory-scale research and development to full-scale developmental and operational testing. Mantooth's podium presentation covered a demonstration of the model graphical user interface and the capabilities it provides to the community.

Greenstein's poster on "The Model of Simultaneous Evaporation and Absorption of a Droplet of Chemical Warfare Agent on a Solid Non-Porous Substrate," part of the larger CREATIVE model, focuses on chemical warfare agents. However, it is valid for many chemical/substrate combinations, and could be used to study many chemical and industrial processes where simultaneous sorption and evaporation of droplets occur.

"The ability to predict the hazard posed to soldiers resulting from an object contaminated with chemical warfare agent, both before and after decontamination, would be of great utility to the armed forces," said Greenstein.

The conference, hosted by the Defense Threat Reduction Agency, connects individuals working within the chemical and biological defense landscape to help them identify and examine interrelated areas of basic and applied research in fields such as nanotechnology, bioinformatics, systems biology, and omics.

Mantooth's and Greenstein's presentations were recognized out of a total of 500 posters and more than 200 speeches. "This award reflects the hard work, dedication, and vision of the CREATIVE team. The successful development of the model required a tight collaboration between testing and modeling," said Mantooth, principle investigator for the CREATIVE model.

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## R&T Employees Receive Awards at DTRA Science and Technology Conference *(continued from page 6)*

"Their efforts have significantly impacted the field of decontamination science, resulting in a paradigm shift of how to think about the systems, decontamination performance, and risk assessment," said Teri Lalain, Ph.D., chief of the Decontamination Sciences Branch.

The CREATIVE model was developed by a team of employees at ECBC with contractor support, including OptiMetrics and SAIC. The team includes Mantooth, Lalain, Michelle Hover, Zach Zander, Matt Shue, Dave Gehring, Dave Sorrick, Zoe Hess, Tom Lynn, Mike Kierzewski, and Erin Shelly from ECBC; Greenstein, Roger Davis, Matt Willis, and Mike Dunkle from OptiMetrics; and Pam Humphreys, Michelle Sheahy, and Joe Myers from SAIC.

The awards include:

Outstanding Platform - The CREATIVE Decontamination System Performance Model: Demonstration of the Generation 1 Capabilities Presented by Brent Mantooth, Ph.D.

Outstanding Poster - Model of Simultaneous Evaporation and Absorption of a Droplet of Chemical Warfare Agent on a Solid Non-Porous Substrate Presented by Abe Greenstein, Ph.D.

## Research & Technology Leadership Speaks at OnSite 2010

Joseph L. Corriveau, Ph.D., director of the U.S. Army Edgewood Chemical Biological Center's (ECBC) Research and Technology (R&T) Directorate, and Harry Salem, Ph.D., R&T's chief scientist for life sciences, recently spoke at a leading technology conference in Baltimore.

The 18th International Conference for OnSite Analysis for Homeland Security, Forensics and Environmental Remediation is the premier conference promoting communication and collaboration across industry, government and academia for emerging field analytical technology. Session topics during the five-day conference included pharmacology and toxicology, chemical and biological agent detection, field methods for disasters/forensics, and standards for CBRNE field applications.


*Joseph L. Corriveau, Ph.D., presents ECBC's mission and vision during the OnSite 2010 conference.*

Corriveau delivered the plenary talk for the OnSite conference. A theme of his talk was the continued national priority of biological defense preparedness, as evidence by the recently released "National Strategy for Countering the Biological Threat."

"The release of the strategy demonstrates the U.S. commitment to global health security," said Corriveau. "Much of the work of the conference participants is relevant to the objectives of the strategy."

Salem chaired the Pharmacology and Toxicology session, and presented "Toxidromes: The Answer to Toxic Agents of Concern, Classification and Medical Mitigation" as well as "Chemical and Biological Threats to Drinking Water."

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# R&T Biologist Travels to India to Support Collaboration

Vipin Rastogi, Ph.D., of the U.S. Army Edgewood Chemical Biological Center's (ECBC) Research and Technology Directorate, recently traveled 7,500 miles to participate in the first Indo-U.S. Workshop on Chemical and Biological Defense.

Held in Gwalior, India, the workshop provided an opportunity to explore collaboration opportunities between the Center, the U.S. Defense Threat Reduction Agency (DTRA) and India's Defence Research and Development Establishment (DRDE).

Rastogi, a senior research biologist, acknowledged several potential areas of research cooperation between DTRA, ECBC and DRDE that were identified during the workshop. The areas include detection, decontamination of military assets and infrastructure, molecular diagnostics of viral and bacterial agents, disease surveillance and monitoring of emerging biological agents and epidemiology and public health issues related to communicable diseases.

*Vipin Rastogi, Ph.D., poses in front of the Taj Mahal with other members of the U.S. delegation to the Indo-U.S. Workshop on Chemical and Biological Defense.*

Noting that both DTRA and DRDE were enthusiastic workshop participants, Rastogi said, "In my opinion, this workshop has laid the foundation for a long-term and fruitful partnership between the U.S. and India in the endeavor of finding solutions to chemical biological (CB) threats."

S.J.S. Flora, Ph.D., a DRDE Joint Director, thanked Rastogi for his participation, saying, "The workshop has at last opened the door for a future opportunity to work and interact together."

Following ECBC's participation in the workshop, Rastogi provided input to DTRA for drafting an international exchange agreement, which is in the final stages of approval within the Pentagon. According to the agreement, ECBC as Army representative will play a pivotal role in chemical-biological defense research projects of common interests with the DRDE. Joseph Corriveau, Ph.D., ECBC director of Research and Technology, has nominated Rastogi to serve as an associate technical project officer.

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# Senior Technologist Awarded for Superior Civilian Service

The Department of the Army presented Augustus Way Fountain III, Ph.D., R&T senior technologist, with the Superior Civilian Service Award. It is the third highest Department of the Army honorary award reflecting superior service or achievement, and consists of a medal, lapel button and citation certificate.

Former ECBC Technical Director Rick Decker opened the Center's fiscal year 2010 mid-year review April 20 thanking Fountain for his outstanding commitment and dedication to the protection of the warfighter and homeland, and handed him this honorable certificate of appreciation.

*Photo credit Conrad Johnson U.S. Army RDECOM Rick Decker, ECBC technical director, presents the U.S. Army Superior Civilian Service Award to Way Fountain, Ph.D., senior technologist at ECBC R&T Directorate.*

"I am honored to present the Superior Civilian Service Award to Dr. Way Fountain and sincerely thank him for his scientific contributions to ECBC, RDECOM and the U.S. Army," Decker said.

As an internationally recognized expert in electro-optics, Fountain provides cutting-edge research in chemical defense and leads scientific efforts to counter improvised explosive device (IED) threats for U.S. troops in Afghanistan and Iraq. Additionally, he provides advice to the Army and other government agencies for developing schedules and milestones for analytical chemistry and nanoscience projects to ensure appropriate emphasis on emerging technologies.

"My continuous contact with the soldiers in the field drives my motivation to help them and conduct research on defeating IED threats," Fountain explained as he accepted his award at the Center-wide event. "It's about the warfighter, not about us."

Entering the Army through its Reserve Officer Training Corps program as a lieutenant, Fountain served in mechanized, airborne and Ranger units, obtained a doctorate in analytical chemistry from Florida State University and taught at West Point's Department of Chemistry and Life Science. After retiring from 22 years of active-duty service, he accepted an appointment in the Senior Executive Service of the federal government as Senior Research Scientist for Chemistry within the R&T Directorate at ECBC.

"Serving the U.S. Army for well over 30 years, I have developed a closer bond to the Army than to some of my blood-related family members," Fountain said. "I simply love the Army too much."

Under Fountain's leadership, the Center's In-House Laboratories Independent Research (ILIR) program rank has risen from 14th to fifth out of 14 over the past two years. As an integral part of the Army's in-house basic research program, ILIR funds are allocated to the directors of selected Army research organizations to support in-house research projects of exceptional scientific quality with high risk and very high potential payoff to the Army's science and technology programs.

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# Senior Technologist Awarded for Superior Civilian Service

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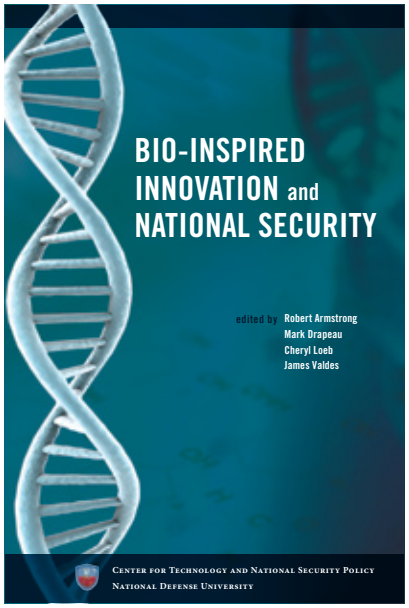
One of Fountain's highest goals is to help increase ECBC's and ultimately the U.S. Army's capabilities by leveraging existing chemical detection technologies and incorporating home-made explosive detection.

To effectively address and overcome the threat of explosives, he reaches out to the chemical biological radioactive nuclear and explosive (CBRNE) community and collaborates with leading interagency scientists. These agencies include the Navy Explosive Ordnance Disposal; Research, Development and Engineering Centers; the Transportation Security Administration; and the Intelligence Community.

"Dr. Fountain has mastered the art of building relationships with key stakeholders in his area of expertise, which substantially contributes to successful mission accomplishments for ECBC, RDECOM, and the U.S. Army," said Joseph L. Corriveau, Ph.D., director of the R&T Directorate.




*Bio-Inspired Innovation and National Security*, co-edited by R&T's James Valdes, Ph.D., was recently published by the National Defense University Press's Center for Technology and National Security Policy. The book focuses on strategic applications of the biological sciences in defense planning and policymaking. "Rather than reacting to the biological sciences as a series of threats to be dealt with, this book approaches the subject as a set of opportunities with the potential to confer strategic advantage to our nation," Valdes noted. For additional information, visit http://ndupress.blogspot.com/2010/05/bio-inspired-innovation-and-national.html.