



# News Release

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## **The Army's Edgewood Chemical Biological Center develops real 'sci-fi' technologies to counter emerging threats**

***ECBC new hire Dr. Calvin Chue helps advance innovative technologies to protect Armed Forces against chemical and biological threats***

**Aberdeen Proving Ground, Md.** – Focused to strengthen our Joint Force as they face emerging chemical and biological (CB) threats, the U.S. Army Edgewood Chemical Biological Center (ECBC) is developing a highly skilled and adaptable technical workforce that generates and delivers some of the most cutting-edge solutions to our service members.

One of ECBC's most recent additions to its BioSciences Division, Research Biologist Calvin Chue, Ph.D. whose specialization is microbial characterization and detection, previously served in a spectrum of different roles across the CB defense community. Equipped with 16 years of diversified experience as a laboratory technician, principal investigator, manager and science advisor to executive leadership, he is an exceptional fit to communicate across all levels within in the CB defense arena and to achieve high results in his multi-faceted role at ECBC.

Chue is responsible for generating new ideas, pursuing Center-wide and interagency collaboration and integrating workflows to help ensure that service members receive the CB detection equipment they need when in harm's way -- in an efficient, timely and cost-effective manner.

"The main reason why I joined ECBC was because there is such a diversity of skills and capabilities available in one place," Chue said. "Having everything available in one location ensures the integration of a seamless end-to-end research and development (R&D) process for any kind of chemical biological detector."

"Here at ECBC, we have the capability to conduct the research and turn our results into a practical, life-saving tool for the brave men and women that serve our country. There is no other place where this can be done."

Chue reiterates the benefit of being able to take a holistic R&D approach in one place, as there is no value in a device if you cannot get it into the field in a safe way. He uses robots as an example.

“They have to be designed to endure battlefield conditions and survive decontamination cycles,” he said. “We can do the basic and applied research as well as the designing, building and testing. But, we can also help with the packaging and transportation. We can basically do the whole nine yards.”

But he also describes the current environment as one where we can only solve problems by working together –across the government, with academia and private industry and even internationally– and quotes a former colleague from the National Interagency Confederation for Biological Research, retired Colonel Nancy L. Vause .

“If you want to make incremental progress, compete; if you want to make exponential progress, collaborate.”

During the short time Chue has been at ECBC, he has helped to advance several R&D projects that can make all the difference to those facing threats on the front lines.

### **What if we could use artificial organs to test toxicants?**

Taking cell biology into a new direction, Chue is working with ECBC Chief Scientist Harry Salem, Ph.D. to explore a territory that exceeds what has been imaginable only a few years ago. ECBC has partnered with the Wake Forest Institute for Regenerative Medicine, Harvard University, Morgan State University and Johns Hopkins University to propose the development of 3-Dimensional printed artificial human organ analogues. On a micro-fluidic platform, this consortium plans to replicate the human immunological condition artificially to test how four miniaturized organs respond to biological and chemical agents --individually or in combination. This solution could provide answers to questions like ‘What happens when the heart is exposed to chemical agent?’ and ‘What chemical signals does a viral infection send downstream to other organs that affect the overall system?’ This project is still in its proposal phase, but represents a prime example of the break-through research areas that ECBC is pursuing to fuse engineering and biology.

### **Detecting CB threats on the go—ECBC is working on ‘an app’ for that**

Chue has also been involved in the development of Smartphone-based technologies capable of detecting CB threats, an effort that is funded by the Defense Threat and Reduction Agency and led by Tricia Buckley at ECBC. The BioSciences team is conducting the basic and applied research for the first of a suite of Smartphone modules that would allow service members to perform CB testing and on-site diagnostics in the field. Simultaneously, the Center’s Advanced Design and Manufacturing Team is

designing the user interface for the computational platform. When service members are confronted with an unknown or suspicious sample, Smartphone modules could help identify different CB threats. In addition to on-the-spot answers, this technology can send results to a command post or a laboratory for more complex analysis. Chue's future vision is to leverage the research and development of this solution for the potential creation of hand-held Smartphone devices that can conduct genome sequencing in theatre to support public health and environmental biosurveillance missions.

"Our main goal is to provide our men and women in uniform the best tools possible, and using a centralized portable platform for CB detection brings us one step closer to achieving that goal."

### **Educate to Innovate**

Another strategic approach that Chue strongly believes in -- to maintain America's global competitiveness and national security-- is effective outreach that excites future generations about science, technology, engineering and mathematics (STEM) disciplines and career pathways. He has already started to infuse his talent into the Center's educational outreach efforts in support of Joppatowne High School's Homeland Security and Emergency Preparedness Program. According to Chue, it is important that we rekindle the spirit of creative and critical thinking in our education system.

"As scientists we bring those skills to the table, and it is our responsibility to help ensure we grow our ranks of future scientists and engineers to remain technologically superior as a nation."

For more information about ECBC, visit <http://www.ecbc.army.mil/>.

*ECBC is the Army's principal research and development center for chemical and biological defense technology, engineering and field operations. ECBC has achieved major technological advances for the warfighter and for our national defense, with a long and distinguished history of providing the Armed Forces with quality systems and outstanding customer service. ECBC is a U.S. Army Research, Development and Engineering Command laboratory located at the Edgewood Area of Aberdeen Proving Ground, Maryland. For more information about the Edgewood Chemical Biological Center, please visit our website at <http://www.ecbc.army.mil> or call (410) 436-7118.*