

Grants boost national security research



CHUCKSCHER

Psychology professor Charles Honts, who is heading the Credibility Assessment Research Initiative, conducts a polygraph test on a subject.

BY JANELLE BROWN
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Consider the following two hypothetical scenarios:

- A man is charged with a felony after DNA tests confirm that his blood was found at the crime scene. The man insists he's never even been to the crime scene and that he's innocent.

- At a national border crossing, immigration officials fail to detect that a well-dressed woman is entering the country illegally. She doesn't arouse suspicion, even though she has a fake passport.

No, these aren't scenes from the hit TV series *CSI*. They are actual research questions that Boise State scientists are pursuing as part of new projects funded by the U.S. Department of Defense.

The university recently received nearly \$4 million in funds aimed at national security as part of the Fiscal Year 2006 Defense Appropriations Bill. The

funds will support three research projects at Boise State, including two that will boost forensic science research at the university. A third project involves innovations in microchips that could be used as part of sensors to detect bioterrorism threats (opposite page).

Boise State biology professor Greg Hampikian heads the DNA Safeguard Project, a research effort that will ensure that reference DNA samples collected as part of routine sampling could never be mixed up with forensic DNA samples collected from crime scenes. The innovation would prevent accidental contamination of evidence that might occur at labs that handle both types of samples. It would also prevent evidence such as blood from being "planted" at a crime scene.

Hampikian, working with Boise State colleagues in computer science,

chemistry and biology, has developed a novel approach to labeling blood or saliva samples by adding an artificial DNA code called a "marker" to the sample. The marker, made up of the same chemicals as DNA, would consist of a gene sequence not found in nature. The marker's presence in the sample would immediately identify it as coming from a voluntary or reference standard, such as might be given as part of a hospital test, investigation or military registration.

Hampikian is working with co-principal investigators Tim Andersen, computer science, Ken Cornell, chemistry, and Jim Smith, biology, on a computational-based approach developing artificial DNA codes for the marker. Computer science professor Amit Jain and his students are also involved with the project.



Biology professor Greg Hampikian heads the DNA Safeguard Project, which could prevent illegal evidence from being “planted” at crime scenes.

“This really is an important protection for the public, the accused, and the hard-working police and forensic scientists who protect us,” says Hampikian, who is acting director of the Boise State office of the Idaho Innocence Project.

“On Sept. 11, there were 19 people on those planes that went down and every one of them lied to an official at least twice ... Not one of them was caught.”

“Just last month in New Jersey, a judge had to free a convicted rapist because of concerns over possible DNA contamination at the crime lab,” Hampikian adds. “Since there was no safeguard marker in his reference sample, we will never know if it was his DNA found on the victim. Either he was accused of a horrible crime that he did not commit, or a guilty man is going free. In either case, it is tragic

and could have been prevented with DNA Safeguard.”

Psychology professor Charles Honts is the principal investigator on a second project, the Credibility Assessment Research Initiative, which is designed to enhance national security through efficient and accurate credibility assessment, including improvements in polygraph testing.

“We’re not very good at telling when people are being truthful or when they are lying,” Honts says. “That becomes critical at places like our portals where passports and visas can be faked pretty easily.” Because most border workers don’t have specialized training in credibility assessment, the issue becomes even more critical.

“To put it into perspective,” Honts continued, “on Sept. 11, there were 19 people on those planes that went down and every one of them lied to an official at least twice — once when they came into the United States and once before they got onto an airplane that morning. Not one of them was caught.”

CARI researchers will work to create a fully computerized polygraph test as well as a non-computerized assessment tool that border workers can use to determine whether or not a person attempting to enter the United States is telling the truth. Researchers will also work on an automated portal credibility assessment test suitable for use at transportation and immigration portals.

Researchers at Boise State will develop infrastructure for the

project, which will begin with the development and field-testing of a standardized state-of-the-art automated test of credibility. Based on current polygraph technology, the new test will also address the National Research Council’s concerns about examiner bias and the lack of standardized testing techniques.

The new grants position Boise State to become a leader in forensic science research and education, Hampikian adds.

“Our thriving research programs in forensics, bioterror detection, and credibility assessment form the nucleus of a regional center in forensic technology development,” he says. “This is a very exciting time to be at Boise State University.”

PROJECT COULD ASSIST SENSOR DEVELOPMENT

Inside Amy Moll’s laboratory, researchers and students work to develop and test microchips that can be stacked vertically in what might be termed a “skyscraper model,” instead of spread out in a single layer. The innovation would increase functionality and reduce size, and has many applications for the microelectronics industry, including the development of sensors for detecting bioterrorism threats.

Moll, chair of the BSU Department of Materials Science and Engineering, received \$1.8 million as part of the Fiscal Year 2006 Defense Appropriations Bill for Characterization, Reliability and Applications of 3-D Microstructures.

The research Moll is conducting could be used as part of sensors that would detect bioterrorism threats such as anthrax. Her innovations would allow the silicon-based circuitry and sensors to be housed separately in a small package, thus protecting the circuitry from exposure and possible damage by the biological agents.

Several other faculty and more than a dozen graduate and undergraduate engineering students work with Moll on the project.

— Janelle Brown