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USC Awarded Two Department of Defense Grants

By Eric Mankin on May 19, 2011 7:33 AM

Two USC Viterbi School of Engineering professors have received highly competitive and sought-after five-year grants for interdisciplinary basic research.

Daniel Lidar and Milind Tambe won Department of Defense Multidisciplinary Research Initiative (MURI) support to lead multi-institutional efforts in their respective fields. The Department of Defense awarded \$191 million in grants through the MURI program this year. USC joined the Massachusetts Institute of Technology and Stanford University in the elite lineup of institutions receiving two 2011 MURI grants.

"I don't think we've ever had two MURI awards at once. That's a great accomplishment," said Randolph Hall, USC vice president for research.

Both award-winning projects were seeded and received prior support from the USC Office of Research. Lidar is a recipient of a Zumberge Research and Innovation Fund award that promotes the initiation of research at USC. Tambe is the recipient of an award from the USC Research Collaboration Fund that encourages interdisciplinary collaboration among USC scholars.

"This award spotlights two important and long-standing achievements within USC Viterbi - our transformative faculty and our interdisciplinary mission," said Yannis C. Yortsos, dean of USC Viterbi. "Professors Tambe and Lidar epitomize transformative faculty, and the awarding of the MURIs, with focus across the university and across the nation, is a demonstrative endorsement."

"Both [professors Tambe and Lidar] have been working on their collaborative, interdisciplinary efforts for some time, bringing relevant faculty investigators together across USC," said Maja Mataric, USC Viterbi senior associate dean. "We look forward to their progress on the two innovative research projects."

After discussions with the Department of Defense and analysis of funding areas, the USC Office of Research Advancement was instrumental in identifying and guiding the principal investigators through the application process, including careful review of grants by editors trained in the sciences.

"In this increasingly competitive funding environment, it's clear that universities need to have a strategic approach to large initiatives such as this one," said Steven Moldin, executive director of the USC Washington, D.C., Office of Research Advancement. "That's the approach we took here, and we are really pleased with our success."

Lidar, a professor in the Ming Hsieh Department of Electrical Engineering and the Department of Chemistry, will be the leader of an advanced effort to realize the promise of direct quantum control for quantum systems.

Quantum physics research has revealed a rich universe of interactions between subatomic particles. This quantum world is very different from the ordinary classical world to which people have access through their senses.

For decades, physicists have proposed - and, increasingly, have demonstrated - that quantum systems have the potential to process information quickly and efficiently. However, quantum systems also are extremely fragile. The slightest stray interaction completely could derail a quantum control process.

The problem, Lidar explained, is all about control. Numerous physical processes can create or break quantum interactions, but inserting traditional intermediaries slows and complicates the system. The ideal is to have the quantum systems control themselves through feedback, an idea known as "coherent feedback control."

"Coherent feedback control" has been in circulation for a few years, but the Lidar effort, conducted with seven USC specialists, in addition to faculty at four other universities, will make a multi-pronged attack on the problems involving some critical new insights.

"One of the goals will be ... an experiment clearly demonstrating quantum feedback even if imperfect," Lidar said. Another will be "semiconductor systems ... showing elements of continuous quantum monitoring, as a first step toward full quantum feedback." These would be the first implementations of quantum feedback in solid-state systems, he said.

Lidar will lead a team comprised of USC faculty and researchers Todd Brun, Edmond Jonckheere and Anthony Levi of USC Viterbi; Stephen Haas and Paolo Zanardi of the Department of Physics at the USC Dornsife College of Letters, Arts and Sciences; Federico Spedalieri from the USC Information Sciences Institute; and faculty from Iowa State University, the University of Massachusetts Boston, the University of California, Riverside and Princeton University.

Tambe, a professor in the Department of Computer Science, will direct a six-university initiative building on his successful efforts to make airport operations more secure by making them more unpredictable.

Among the agencies that employ projects developed by Tambe-led research teams are Los Angeles International Airport, the Transportation Safety Administration and, most recently, the U.S. Coast Guard.



USC professors Daniel Lidar, left, and Milind Tambe

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Los Angeles Times reported that the NCAA denied USC's appeal of sanctions against the university's football program. "We respectfully, but vehemently, disagree with the findings of the NCAA's Infractions Appeals Committee," a USC statement said. "Our position was that the Committee on Infractions abused its discretion and imposed penalties last June that were excessive and inconsistent with established case precedent." The news was also covered by three more **Los Angeles Times** stories (additional links [here](#) and [here](#)), **CBS Sports**, **NBC News** Los Angeles affiliate KNBC-TV, **The Sports Network** and **SportsDirect**.

The New York Times ran an op-ed by Dan Schnur of the USC Dornsife College about the possibility that former Gov. Sarah Palin might run for president in 2012. "The prospect of a Palin presidential candidacy is as tantalizing to liberals as conservatives, and there's no question that Ms. Palin's fervent support base would allow her to enter the primary field at a much later date than any other potential contender," Schnur wrote. "But even the Lady Gaga of Republican politics will soon be forced to tell her most fervent supporters that she can best serve their dreams and her cause by commenting on political news rather than making it."

United Press International featured analysis of new census data by Dowell Myers of the USC School of Policy, Planning, and Development, which found that California's child population declined, as families moved out of state due to unemployment and high housing costs during the Great Recession. As a result, L.A. County workers may be in short supply in the future, Myers said. "The implications are that we really need to think about building a more supportive environment for families and kids," he added. **Univision** interviewed Edward Flores, project manager of USC's Population Dynamics Research Group, about the research. The study was also covered by **Fox News** Los Angeles affiliate KTTV-TV and **KFWB-AM**.

Gizmag featured work by Gerard Medioni of the USC Viterbi School and colleagues, who are

The focus of the new five-year effort, "Scalable, Stochastic and Spatiotemporal Game Theory for Real-World Human Adversarial Behavior," will advance the field through basic research in the relevant areas of game theory.

The key, Tambe said, is robust mathematics that analyzes not only threats from rational, cooperating, coordinated adversaries, but also threats from scattered hostile groups of competitive rivals with differing agendas.

"In Star Trek parlance," wrote the scientist, "we are not facing a Vulcan adversary, but instead a Klingon-Romulan horde."

Rajiv Maheswaran of the USC Information Sciences Institute will work on the project, along with colleagues from UCLA, the University of California, Irvine, Stanford University, Duke University and California State University, Northridge.

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developing a "guide vest" that could help the visually impaired navigate without a cane. The vest works in conjunction with a helmet-mounted camera and special software that allows wearers to perceive the world through tactile feedback. "There are many limitations to canes for the visually impaired, from low hanging branches to large objects," Medioni said. "We wanted to build an effective system that would provide new opportunities for the visually impaired." [Asian News International](#) also featured the research.

[Forbes](#) ran a column Edward Lawler and Christopher Worley of the USC Marshall School on the future of tech company Cisco, which recently shuttered its Flip video unit. "Is getting out of a business that has no future the sign of an aging CEO and wrong-thinking organization? I don't think so," Worley wrote. "Cisco's withdrawal from the Flip business is a smart move by an agile firm simply withdrawing from an unprofitable business." Lawler and Worley are the authors of "Management Reset: Organizing for Sustainable Effectiveness," the story noted.

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