

USC News

Professors Win Okawa Research Awards

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Laurent Itti and Shrikanth Narayanan will use their \$10,000 grants for research in speech processing and robotic systems.

By Diane Ainsworth

Two USC Viterbi School of Engineering faculty – Laurent Itti of the computer science department and Shrikanth Narayanan of the Ming Hsieh Department of Electrical Engineering – have won 2008 Okawa Foundation grants to support their research in human-machine speech processing and neuroscience-inspired robotic vision systems, respectively.

Itti specializes in biologically inspired computational vision, with an emphasis on visual attention, scene understanding, control of eye movements and the neurological basis of surprise. His basic research has technological applications to video compression, target detection and robotics as well as other fields.



Laurent Itti, above, and Shrikanth Narayanan

An associate professor of computer science, psychology and neuroscience, Itti will use his research grant to support a project titled “Towards Neuroscience-Enabled Machines: Taking Computational Neuroscience From the Laboratory to the Real World.” The research involves developing algorithms for a new visual system that will allow an autonomous robot to navigate in an unconstrained outdoor environment.

“Using computational neuroscience algorithms developed in our lab and other labs for visual attention, object recognition, scene understanding and robot navigation, we will demonstrate how these algorithms can be used in the real world by endowing an autonomous robot with such a system, then asking it to return our loaned books to the Seaver Science Library, located several blocks away from our laboratory,” Itti said.

The broader goals of the project are to show the potential of computational neuroscience to advance the field of artificial machine intelligence.

“This research at the intersection of computer science, neuroscience and psychology may give rise to the next generation of machines, which could effectively interact with the natural world and its human and other inhabitants,” Itti said.

Itti earned his M.S. degree in image processing from the Ecole Nationale Supérieure des Télécommunications in Paris in 1994 and his Ph.D. in computation and neural systems from the California Institute of Technology in 2000.

He has co-authored more than 90 publications in peer-reviewed journals and conferences, two patents, an open-source neuromorphic vision software toolkit used by more than 3,000 research groups and individuals worldwide, and he has led the development of the first encyclopedia of attention research.

“Laurent has conducted some truly seminal work in one of the most exciting areas of computer science and machine vision today,” said Ellis Horowitz, interim chair of the computer science department.



Narayanan, professor of electrical engineering, computer science, linguistics and psychology and the Andrew J. Viterbi Professor of Engineering, will use his research award to fund “Emotionally Intelligent Human-Machine Communication for Virtual Humans and Robots.”

The research will probe current understanding and modeling of verbal and nonverbal human behavior to develop emotionally intelligent robot and computer systems. Key challenges will be to gather details of emotive vocal, spoken language and gestural productions in order to create robust machine learning and pattern recognition algorithms for automated emotion processing.

Narayanan earned his M.S., Engineer and Ph.D. degrees in electrical engineering from UCLA in 1990, 1992 and 1995, respectively. From 1995-2000, he was with AT&T Labs-Research, Florham Park (formerly AT&T Bell Labs, Murray Hill), first as a senior member and later as a principal member of the technical staff.

Currently he is the director of the Speech Analysis and Interpretation Lab and a professor in the Signal and Image Processing Institute in the Ming Hsieh Department of Electrical Engineering.

He was a research area director in the Integrated Media Systems Center, an National Science Foundation Engineering Research Center that was phased out at the end of a 10-year contract, and he was the research principal for the USC Pratt and Whitney Institute for Collaborative Engineering, a partnership between academia and industry, from 2003 until 2007.

He is known for many outstanding accomplishments in speech processing, spoken language science and technology, human-machine interaction and in multimedia integration of these research results.

“Shri has received many professional and technical awards and honors for his work and is a prolific, highly cited author who has greatly influenced the research of others,” said Alexander “Sandy” Sawchuk, co-chair of the Ming Hsieh Department of Electrical Engineering. “His latest award will help to advance our understanding of human-robot intelligence.”

The Okawa Foundation was established in Japan in 1986 to provide funding for and give recognition to new studies in the fields of information technology and telecommunications. Each year, the foundation awards \$10,000 grants to individual researchers whose work shows promise of advancing the field.

The awards will be formally presented at a ceremony to be held Oct. 8 in San Francisco.