



**Central Coast Section
Joint CSS/EMBS Chapter**
In conjunction with the
Computer Society Chapter



PRESENTS

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Professor Emeritus of Computer Science
University of Southern California

Robots That Walk and Run: A Status Report

Many robots, from military vehicles to the "Roomba" vacuum cleaner, move on wheels. In this talk we concentrate on mobile robots designed to imitate animals, so they walk or run on legs. We will begin with the history of walking machines, including the "Phony Pony", a quadruped robot built in the speaker's laboratory some 40 years ago. We present some of the design issues of legged robots, including joints and number of degrees of freedom, static vs dynamic stability, actuators and sensors. The principles will be illustrated with numerous examples, from the early machines designed to carry a person to contemporary machines like the Aibo entertainment robot and the four-legged cargo-carrying "Big Dog" developed for the Army. Gait patterns will be illustrated with a USC example, a six-legged robot named "Rodney" which learned to walk using genetic algorithms. We then describe recent research emphasizing the role of passive compliance in the legs, as contrasted with complex control algorithms, and show some current examples of very fast legged robots based on this principle. Finally, we provide an introduction to biped robots, including humanoids which are very popular in Japan and Korea.



George A. Bekey is an Emeritus Professor of Computer Science and founder of the Robotics Research Laboratory at the University of Southern California. His research interests include autonomous robotic systems, multi-robot cooperation and human-robot interaction. He received his Ph.D. in Engineering from UCLA. During his USC career he was Chairman of the Electrical Engineering Department and later of the Computer Science Department. In the late 1990s he served as Associate Dean for Research of the School of Engineering. He has published over 200 papers and several books in robotics, biomedical engineering, computer simulation, control systems, and human-machine systems. His latest book entitled "Autonomous Robots" was published by MIT Press in May 2005.

Dr. Bekey is a Member of the National Academy of Engineering and a Fellow of the IEEE, the AAI, and the AAAS. He has received a number of awards from professional societies and from USC.

George officially retired from USC in 2002, but continues to be active on a part-time basis at the University, as well as in consulting and service on the advisory boards of several high technology companies. He recently led a major program funded by NSF and NASA to ascertain the status of robotics R&D worldwide. He is Editor in Chief of the journal "Autonomous Robots" and a member of the Administrative Committee of the IEEE Robotics and Automation Society. He is affiliated with a medical devices startup company in San Luis Obispo and a robotics startup in Los Angeles. He also teaches part-time in the Biomedical Engineering program at California Polytechnic University in San Luis Obispo.

November 9, 2006, Thursday 6:30pm

light refreshments will be served, presentation starts at 7pm

Engineering Science Building, Room 1001

University of California Santa Barbara

For more information and directions: http://ewh.ieee.org/r6/central_coast/css-embs/