Sarah Bergbreiter

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Education

University of California, Berkeley, May 2007 (Expected)
Ph.D. Electrical Engineering and Computer Science
Dissertation: Autonomous Jumping Microrobots

University of California, Berkeley, May 2004
M.S. Electrical Engineering and Computer Science
Thesis: CotsBots: An Off-the-Shelf Platform for Distributed Robotics
GE Fund Fellowship for Graduate Study 2000-2001

Princeton University, May 1999
B.S.E. Electrical Engineering, Graduated with High Honors
John Ogden Bigelow, Jr. Prize in Electrical Engineering

Research Experience

UC Berkeley, Electrical Engineering and Computer Science Dept.
Advisor: Kris Pister, http://bsac.eecs.berkeley.edu/~sbergbre/microrobots/
Designed and currently fabricating an autonomous jumping microrobot. This project involves the development of several key technologies including an elastomer-based micromechanical energy storage system that can store tens of μJ for quick release (equivalent to tens of cm jump height for 10mg robot). Also designed high force, large displacement, and low power silicon inchworm motors which are currently being fabricated to provide over an order of magnitude increase in both force (5mN) and displacement (5mm) from previously designed motors. (Sept 2004 – present)

UC Berkeley, Electrical Engineering and Computer Science Dept.
Advisor: Kris Pister, http://bsac.eecs.berkeley.edu/projects/cotsbots/
Designed and built the CotsBots, a small, inexpensive, and modular mobile robot platform with off-the-shelf hardware and open-source software using TinyOS, an operating system designed for low-power sensor nodes. In addition, an optical triangulation localization system for use on such a robot platform was designed and built, including a custom fabricated CMOS IC. (June 2001 – June 2004)

Princeton University, Mechanical and Aerospace Engineering Dept.
Advisor: Naomi Leonard
Modified a remotely-controlled underwater glider for autonomous operation to explore new control strategies and programmed an image processing system to locate the glider within a tank. (Sept 1998 – May 1999)

Teaching Experience

CalView/UC Berkeley in partnership with National Technical University
Introduction to MEMS Design, Course Consultant
Currently organizing and acting as a teaching assistant for a distance education course around a pre-recorded set of lectures. Responsibilities

include writing/grading homework, project, and exams. (Fall 2006 – present)

UC Berkeley, Electrical Engineering and Computer Science Dept.
Feedback Control, Teaching Assistant
Wrote a new lab to introduce microcontrollers for use in feedback control systems. Wrote homework solutions and assisted students during laboratory assignments and with homework questions. (Fall 2003)

Princeton University, Electrical Engineering Dept.
System Design and Analysis, Undergraduate Teaching Assistant
Assisted students with the design and implementation of an autonomous vehicle. (Spring 1999)

Princeton University, Computer Science Dept.
Computers and Computing, Undergraduate Teaching Assisstant
Assisted non-CS majors with web design and basic Java programming. (Fall 1998)

Student Mentoring Experience

Jonathan Li, “Infrared-based Obstacle Avoidance for CotsBots”

Jonathan Novak, “CotsSim Robot Simulator”

Thomas Cheng, “Low Cost Inertial Navigation”

Marga Chiri, “Joystick Control for TinyOS Robot”

Stephanie Leung, “CotsBots MotorBoard Design and Speed Calibration”

Xiafan (Fred) Jiang, “Ultrasound Localization”

William Goldshlag, “LabView Interface for Optical Localization Sensor”

Leo Choi, “Matlab-based Inchworm Motor Controller”

Stratos Christianakis, “Solar-Powered Inchworm Motor Controller”

Jameson Lee, “CotsBots Simulator with Player/Stage”

Journal Articles

S. Hollar, A. Flynn, S. Bergbreiter, and K. S. J. Pister, "Robot Leg Motion in a Planarized-SOI, Two-Layer Poly-Si Process," *Journal of Microelectromechanical Systems*, vol. 14, pp. 725-740, 2005.

Refereed Conference Proceedings

Bergbreiter, S.; Pister, K.S.J. "Design of an Autonomous Jumping Microrobot," accepted to ICRA 2007, Rome, April 10-14, 2007.

Bergbreiter, S.; Pister, K.S.J. “An Elastomer-Based Micromechanical Energy Storage System,” ASME 2006, Chicago, IL, November 5-9, 2006.

Bergbreiter, S.; Pister, K.S.J. "CotsBots: An Off-the-Shelf Platform for Distributed Robotics," IROS 2003, Las Vegas, NV, October 27-31, 2003.

Hollar, S; Bergbreiter, S.; Pister, K.S.J. "Bidirectional Inchworm Motors and Two-DOF Robot Leg Operation," Transducers 2003, Boston, MA, June 8-12, 2003.

Hollar, S; Flynn, A; Bergbreiter, S.; Pister, K.S.J. "Robot Leg Motion in a Planarized-SOI, 2 Poly Process," Hilton Head 2002 Workshop, Hilton Head Island, S.C., June 2-6, 2002.

Presentations

Bergbreiter, S.; Pister, K.S.J. "Autonomous Silicon Microrobots," ICAT Symposium on Smart Actuators, State College, PA, October 2-4, 2006.

Bergbreiter, S.; Pister, K.S.J. "Towards Autonomous Jumping Microrobots," Berkeley Sensor and Actuator Center Industrial Advisory Board Meeting, Berkeley, CA, September 19, 2006.

Bergbreiter, S.; Pister, K.S.J. "Grand Challenges in Autonomous Mobile Microrobots," Robotics 2006: Workshop on Micro and Nano Robotics, Philadelphia, PA, August 18, 2006.

Bergbreiter, S.; Pister, K.S.J. "CotsBots: An Off-the-Shelf Platform for Distributed Robotics," Berkeley Sensor and Actuator Center Industrial Advisory Board Meeting, Berkeley, CA, September 9, 2003.

Related Professional Experience

Dust Networks, Consultant
Designed, laid out, and tested an IC in 0.18μm CMOS for determining relative angle of incoming optical transmissions to within 1° and minimum signal power of -60dBm. In addition, designed and programmed PCB-level system with TI MSP430 around IC to provide UART interface for mobile robot localization, tracking, and 1kbps optical communication. (Fall 2003 – Fall 2005)

Arial Systems, Development Engineer
Wrote specifications for and coded a multi-threaded, reusable component in C++ for the server side of a house-wide digital audio system and programmed client side in VB. Designed and prototyped hardware for a home automation system. (Aug 1999 – Aug 2000)

Other

Student Member, IEEE
Cycling and Triathlons
Princeton Varsity Women's Water Polo

- 1997 Defensive Player of the Year
- 1998 Academic All-American

References upon request