Ant-sized Robots with Big Applications

Sarah Bergbreiter

Associate Professor, Mechanical Engineering and Institute for Systems Research

CURRENT RESEARCH

How Dr. Sarah Bergbreiter's microrobotics work can transform medical interventions, disaster relief, and civil infrastructure monitoring

As ubiquitous as they may be, ants are one of the most amazing creatures on the planet. An individual ant is capable of carrying objects 50 times its own weight. Amazonian ants are able to sacrifice their own bodies as lifeboats for other ants to travel through floods, and fire ants can band together to form bridges to carry others across. It is no wonder then that ants, and other insects like them, are being used as models to design microrobots with similar properties and capabilities. Imagine if after a natural disaster devastated the lives of thousands and demolished structures, we were able to release buckets full of microrobotic "ants" that could survey the area quickly, find victims beneath the rubble, assess whether buildings were structurally sound enough for rescues, and all the while send feedback to search and rescue teams.

Dr. Sarah Bergbreiter of the University of Maryland imagines the applications of such microrobots each day in her lab where she uses her expertise in microfabrication along with inspiration from biology to create mobile microrobots and improve existing robot performance. Her research is focused on the challenges of engineering robotic systems down to sub-millimeter size scales. Applications for such research are widespread and have the potential to affect medical care, disaster relief, and civil infrastructure monitoring. In addition to working with small mobile robots, Dr. Bergbreiter and her team use microfabrication in support of larger robotic systems. The resulting research supports work in soft robotics to better interface with humans and small actuators to enable better manipulation and movement in larger robots.

Dr. Bergbreiter's current research includes:...

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AFFILIATION

University of Maryland College Park Campus

EDUCATION

- Ph.D., in Electrical Engineering and Computer Science, 2007 ,University of California, Berkeley
- M.S., in Electrical Engineering and Computer Science, 2004 ,University of California, Berkeley
- B.S.E., in Electrical Engineering,1999 ,Princeton University

AWARDS

- PECAE (Presidential Early Career Award for Scientists and Engineers), 2013
- NSF Career for "Microrobot Legs for Fast Locomotion over Rough Terrain", 2011
- DARPA Young Faculty Award, 2008
- Best Conference Paper Award IEEE International Conference on Robotics and Automation, 2010
- NTF Award IEEE International Conference on Intelligent Robots and Systems, 2011

RESEARCH AREAS

Technology, Robotics, IOT, Devices, Data, Natural Disasters / Emergency

FUNDING REQUEST

Your contributions will support research into the microfabrication processes and design required to create ant-sized robots that can move through real-world environments at insect-like speed. These robots have tremendous potential for society including disaster relief services, civil infrastructure monitoring, medical interventions, and assembly tasks. Donations will cover the costs of graduate student stipends, undergraduate student research projects, microfabrication time, supplies, test equipment costs.