PRESS KIT

Ground-breaking Discoveries in Science and Technology showcased at the 21st Annual Coalition for National Science Funding (CNSF) Exhibition and Reception

WHEN: Wednesday, April 29, 2015, 5:30-7:30 p.m.
WHERE: B338-340 Rayburn House Office Building, Washington, D.C.
@CoalitionNSF
#CNSFExpo15

The 37 presentations by universities and scientific institutions reveal discoveries in an array of fields, from a potentially revolutionary way to gauge voter sentiment to algorithms for predicting space weather and the physics of how cells move.

The CNSF Exhibition and Reception annually draws more than 300 attendees, including members of Congress and their staff, congressional committee staff, the leadership of NSF, and representatives from the White House and other policymaking and research agencies.

Highlights:
- Improved Collaboration with Industrial Robots
- Stopping the Next Amphibian Apocalypse
- American National Election Studies: Understanding the Changing American Electorate

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Improved Collaboration with Industrial Robots

Researchers

Gregory Hager is the Chair of the Department of Computer Science at Johns Hopkins University and the head of the Computational Interaction and Robotics Laboratory.

Kelleher Guerin is a PhD candidate at Johns Hopkins University in Computer Science who focuses on human-robot interaction and robots for manufacturing.

Colin Lea is a PhD candidate at Johns Hopkins University in Computer Science who focuses on modeling how humans interact with complex environments.

Quote

"Current methods for large scale industrial automation are insufficient for meeting the challenging requirements of small manufacturing entities. We overcome these challenges with technology that enables users to more quickly program robotic systems that deal with the high variability of these environments."
- Kelleher Guerin
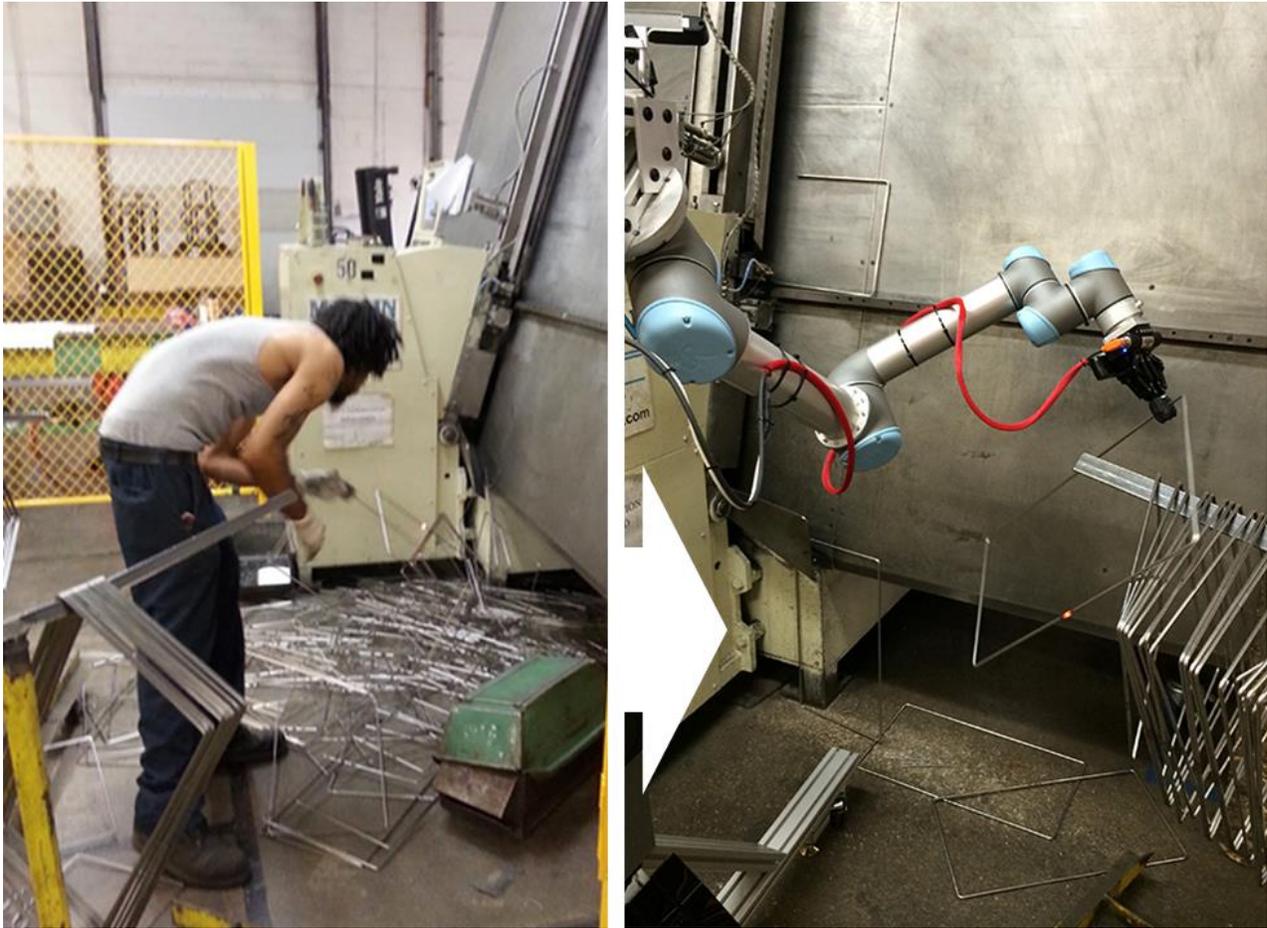
Graphics and Videos

Photo: The CoSTAR system enables robots to be quickly and easily instructed to perform tasks that were previously difficult or impossible for industrial robots. The robot has to be agile and highly dynamic in unstructured environments that require a robot to be able to sense changes and adapt.

Videos:
https://www.dropbox.com/s/z8c3grg2pk5qzx4/CoSTAR_ICRA_2015_720p.mp4?dl=0
https://www.dropbox.com/s/77wymltg1efn3pu/AAAI%20Video_final.mp4?dl=0

Description and Broader Impact

We present CoSTAR, a system for human instruction and collaboration with robotic systems. CoSTAR has been developed to enable experts skilled at a task, but not skilled with programming, to instruct the robot as an apprentice. Our system also allows for the robot to collaborate with humans, and respond to dynamic events just as a human would. In addition we use advances in virtual reality to provide an environment for intuitive robot interaction and teaching. This research improves the ability of robots to interact with humans and operate in dynamic environments, with a much lower training cost and programming time than traditional robots. This means we can leverage techniques in large scale automation as more flexible

solutions for small manufacturing, as well as other domains such as in-home care and medical intervention.

This research is motivated by the dramatic impact industrial robots have had on efficiency and productivity in large scale manufacturing enterprises. ***Despite this success, Small Manufacturing Entities (SMEs) have yet to reap similar benefits from the robotic revolution due to a set of unique challenges.*** First, SMEs typically process small lots sizes and require rapid change-over, hence, a robotic system must be very agile and fast to program. This requirement is not satisfied by typical industrial robots that may take hours or days to program. Additionally, SMEs have highly dynamic and unstructured environments that require a robot to be able to sense and handle large changes in part configurations, drop off locations, and factory layouts. Using a traditional robot, an SME would be required to spend a significant amount of time and money to account for these variations in their own factory. Finally, many SMEs consist entirely of human workers with very little automation, and therefore a robotic system must not only be easy and fast to program, but also be able to work alongside human workers and respond to their actions as a co-worker would. Most industrial robots are not capable of this type of interaction.

Further Inquires

Gregory Hager, hager@cs.jhu.edu

Dr. Hager is sponsored by the [Computing Research Association (CRA)](#). Founded in 1972, CRA's membership includes more than 200 North American organizations active in computing research: academic departments of computer science and computer engineering, laboratories and centers (industry, government, and academia), and affiliated professional societies. CRA's mission is to enhance innovation by joining with industry, government and academia to strengthen research and advanced education in computing.

Stopping the Next Amphibian Apocalypse

Researcher

Dr. Karen R. Lips is a Professor of Biology at the University of Maryland where she studies amphibian-disease ecology.

Quote

"Invasive diseases are a great threat to the species diversity and abundance of our native wildlife."
-Karen Lipps

Graphics and Videos

Photo: Plethodon jordani, a species endemic to Great Smoky Mountain National Park
photo credit: Nick Caruso (carusonm@gmail.com)

Videos about Dr. Lips lab and research can be found at : http://lipslab.weebly.com/
credit of all to: Grace Direnzo grace.direnzo@gmail.com

Description and Broader Impact
Amphibians are important components of many types of ecosystems, so we are concerned about the global loss of salamanders and frogs from invasive diseases. A group of pathogenic chytrid fungi have caused amphibian die-offs and population declines around the world, and we have not been able to eliminate the fungus from wild areas nor recover those populations. We are faced with a new fungus that is not present in the US but which is in the live animal trade and could be imported. Regulations are needed to prevent escapes of infected animals into the US.

Further Inquires
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Dr. Lips is sponsored by the [Ecological Society of America](#) (ESA) for the exhibition. ESA's 10,000 members comprise the largest group of ecologist in the world, is 100 years old, and a highly trusted source of ecological science.

American National Election Studies: Understanding the Changing American Electorate

Researcher
Simon Jackman, Stanford University

Broader Impact
Since 1948, the American National Election Study data has been the mainstay of rigorous non-partisan studies of American politics over the long haul; without exaggeration, every textbook on American politics makes use of ANES, along with thousands of articles and books. To the extent there is a genuinely scientific account of change in the American electorate — and American society more generally — it comes from ANES, with data on the opinions of ordinary citizens as the raw materials. ANES provides data on a vast inventory of measures of public opinion and behaviors, including voter registration and turnout, civic engagement, awareness of and interest in politics and campaigns, sources of political news, evaluations of parties, candidates and issues of the day. In our presentation we highlight a number of intriguing findings from the data, including the ebbs and flows in Americans' trust in the Federal government between the years 1958-2012; trust in the Federal government now stands at historic lows, with large differences between Republicans and Democrats. We also examine how measures of political polarization, interest in politics, and civic engagement have changed over the years, highlighting how different segments of the electorate have been more or less energized at different moments in American political history (e.g., younger voters in the 2008 and 2012 elections).

Sponsored by the American Political Science Association.

Other Highlights

Disruptive Technology & Cosmology at 17,000 Feet
American Astronomical Society
Suzanne Staggs and Sara Simon

Princeton University

American Psychological Association
Videotaping Interviews: Effects on Police, Suspects and Juries
Saul Kassin, PhD
Williams College and John Jay College of Criminal Justice

Michigan State University
Wearable, self-powered biosensors for disease detection and
health monitoring
Peter B. Lillehoj and Xiyuan Liu

Society for Research in Child Development
Supporting Science and Math Learning of Pre-K and
Dual Language Learners
Dr. Kimberly Brenneman and Dr. Alissa Lange
National Institute for Early Education Research, Rutgers University

University of Illinois
National Center for Supercomputing Applications
NSF Blue Waters
John Melchi and Brett Bode