UCF DEPARTMENT OF COMPUTER SCIENCE

# Distinguished Speaker Series

## PHYSICAL COMPUTING FOR EVERYONE

Thursday February 16, 2017 • 10:30 AM– 11:30AM • CREOL Rm 103

Thanks to Moore's Law, embeddable microcontroller-based devices continue to get cheaper, faster, and include more integrated sensors and networking options. In 2016, the BBC and a host of technical partners, including Microsoft, delivered such a physical computing device, the micro:bit, to every 5th grader in the UK. Microsoft Research helped to make the micro:bit easy to program for novices. The non-profit Micro:bit Education Foundation (microbit.org), of which Microsoft is a founding partner, was recently created to take the micro:bit global. Over the last year, Microsoft has invested in a new web-based programming platform for physical computing, called PXT, with the micro:bit being the first target (pxt.microbit.org).

In this talk, I'll describe the design and implementation of PXT, focusing specifically on its web-based approach to physical computing. PXT supports rapid script development and testing within the confines of a modern web browser, via a novel combination of Blockly, TypeScript and hardware simulation. A browser-based compilation toolchain targets both the Thumb and AVR instruction sets and links against pre-compiled C++ code. PXT uses a bespoke C++ runtime from Lancaster University that provides a set of useful abstractions, including events, a message bus, and fibers. ).

**Thomas Ball**

Principal Researcher and Research Manager, Microsoft Research

Thomas (Tom) Ball is a principal researcher and manager at Microsoft Research. In 1999, Tom initiated the SLAM software model-checking project with Sriram Rajamani. This led to the creation of the Static Driver Verifier tool for finding defects in Windows device drivers. Tom is a 2011 ACM Fellow for "contributions to software analysis and defect detection." As a manager, he has nurtured research areas such as automated theorem proving, program testing/verification, and empirical software engineering. His current focus is CS education and the PXT platform for physical computing.

*Hosted by: Dr. Gary T. Leavens*

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4328 Scorpius Street Room 346 Orlando, FL 32816

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