UCF DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCEINCE

# Spring 2015 Seminar Series

Presented by the CS Division

## TOWARDS WEARABLE INTERACTIONS THAT GO BEYOND THE TOUCHSCREEN

TUESDAY APRIL 7, 2015

10:00 AM – HEC 450

The ubiquitous touchscreen has become the primary mechanism with which users interact with small personal computing devices. While there is a trend showing that personal computing devices may become smaller and smaller, a primary constraint on device miniaturization is the user interface (e.g. touchscreen). Screens need to be large enough to be seen, and keyboards need enough physical space to facilitate typing. Arbitrary hardware miniaturization may lead to devices that are not usable. In this talk, I present my work in extending the input space of personal computing devices from on-the-display to off-the-device through three proof-of-concept prototypes. My first approach includes the use of a device's rear surface as an input medium to allow for fine grained and pixel level control on mobile devices. This can be particularly useful for scenarios requiring using a mobile device with one-hand. My second approach extends the input space to the peripheral region, and to a device's vicinity. By means of this method, I introduce my vision for the personal computing device of the future which can 'see' its environment, in a self-contained prototype called Surround-See. I describe Surround-See's design, architecture, and demonstrate novel applications that exploit peripheral 'seeing' capabilities during active use of a mobile device. My third approach is to extend the input space to any surface available to the user. I present Magic Finger, a small device worn on the fingertip, which supports always-available input. Magic Finger inverts the typical relationship between the finger and an interactive surface: with Magic Finger, I instrument the user's finger itself, rather than the surface it is touching. Magic Finger senses touch through an optical mouse sensor, enabling any surface to act as a touch screen. Magic Finger also senses texture through a micro RGB camera, allowing contextual actions to be carried out based on the particular surface being touched. I present a number of novel interaction techniques that leverage its unique capabilities and show how it can be exploited for use with wearable technologies. At the end of my talk, I present my plan for future research that is driven by my vision of how future wearable devices can be developed to improve people's daily activities.

## DR. XING-DONG YANG

University of Calgary, Canada

Xing-Dong Yang completed his Bachelor of Computer Science in 2005 from the University of Manitoba, Canada. He earned his Master of Computing Science with a specialization in Haptic Interfaces in 2008 from the University of Alberta, Canada under the supervision of Dr. Pierre Boulanger and Dr. Walter F. Bischof, and his Doctorate in Computing Science with a specialization in Human-Computer Interaction in 2013 from the same university where he worked under the supervision of Dr. Pourang Irani and Dr. Pierre Boulanger. During his graduate work he was a research intern at Autodesk Research in Toronto and Microsoft Research Asia in Beijing. He has generated a number of publications, with many in top-tier venues in HCI which include the ACM Conference on Human Factors and Systems (ACM CHI) and the ACM Conference on User Interfaces and Technology (ACM UIST). He has over twenty publications in fields of HCI, mobile computing, wearable technology and haptic interfaces. His work has also been recognized through best paper nominations at ACM CHI and ACM MobileHCI, as well as featured in public press through Discovery News, NBC, and New Scientist. This work also led to four US patent applications filed between 2010 and 2015. His dissertation work was awarded the 2013 Bill Buxton Best Canadian HCI Dissertation Award, given annually for the best doctoral dissertation completed at a Canadian university in the field of human-computer interaction. He is currently a Postdoctoral Fellow in the iLab, at the University of Calgary, Canada.

*Hosted by: Dr. Joseph LaViola*

UCF

4328 Scorpius Street Room 346 Orlando, FL 32816

WWW.EECS.UCF.EDU