**COLLOQUIUM**

Department of Computer Science and Engineering

University of South Carolina

### **Design of Secure and Anti-Counterfeit Integrated Circuits**

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Place: **Swearingen 1A03 (Faculty Lounge)**

# Abstract

As electronic devices become increasingly interconnected and pervasive in people's lives, security, trustworthy computing, and privacy protection have notably emerged as important challenges for the next decade. The assumption that hardware is trustworthy and that security effort should only be focused on networks and software is no longer valid given globalization of integrated circuits (ICs) and systems design and fabrication. The design of secure hardware ICs requires novel approaches for authentication that are based on multiple factors that is difficult to compromise. Equally important is the need for protecting intellectual property and design of integrated circuits that are harder to reverse engineer. In this talk, I will explore both of the authentication-based and obfuscation-based hardware protection approaches. One popular technique of authentication-based protection is Physical Unclonable Functions (PUFs) which provide a hardware specific unique signature or identification. I will provide an overview of the reconfigurable PUF structures and circuits that could achieve higher security. Next, I will present a novel low-overhead solution to design Digital Signal Processing (DSP) circuits that are obfuscated both structurally and functionally by utilizing high-level transformation techniques. Finally, I will describe the theme of my future research: security, randomness, and computing.

**Yingjie Lao** is a PhD candidate in the Department of Electrical and Computer Engineering at the University of Minnesota-Twin Cities.