

# Regaining Trust in Electronic Chips

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**POSITION TITLE:** VLSI DESIGN-FOR-TRUST RESEARCHER

**RESEARCH PROJECT TITLE:** REGAINING TRUST IN ELECTRONIC CHIPS

**FACULTY NAME & TITLE:** OZGUR SINANOGLU, ASSISTANT PROFESSOR OF ELECTRICAL AND COMPUTER ENGINEERING

## RESEARCH PROJECT DESCRIPTION

Support for multiple capabilities and mixed technologies has increased the cost of ownership of advanced electronics chip manufacturing foundries. For instance, the cost of owning a chip foundry will be \$5 billion in 2015. As a result, many of the chip design companies cannot afford owning and acquiring expensive foundries and hence, outsource their design fabrication to offshore foundries. This globalization of Integrated Circuit (IC) design flow has introduced security vulnerabilities. If a design is fabricated in a foundry that is outside the direct control of the (fabless) design house, reverse engineering, malicious circuit modification, and Intellectual Property (IP) piracy are possible. An attacker, anywhere in this design flow, can reverse engineer the functionality of design, and steal and claim ownership of the IP. An untrusted IC foundry may overbuild ICs and sell the excess parts in the gray market. Rogue elements in the foundry may insert malicious circuits (hardware Trojans) into the design without the designer's knowledge. Because of these and similar hardware-based attacks, the semiconductor industry loses \$4 billion annually.

This project aims at understanding the aforementioned hardware security and trust issues, surveying the existing solutions, and proposing and implementing new ones.

## RESPONSIBILITIES OF THE POSITION

- Literature survey for chip design flow and latest hardware security and trust solutions
- Devising and implementing new design-for-trust techniques
- Simulations and experimentation to perform security/cost assessment

## ESSENTIAL QUALIFICATIONS:

- At least a BS degree in Electrical and Computer Engineering with a good background in data structures and algorithms, logic design and programming.

## PREFERRED EXPERIENCE / SKILLS:

- Coding experience in major software projects (C/C++ programming language)
- Familiarity with the IC design flow and use of electronic design automation (EDA) tools
- Background in VLSI design and CAD

**APPLICANTS TO PROVIDE:**

1. Statement of interest in the position
2. Transcript of degree(s)
3. CV
4. Two letters of recommendation