Job Title: Master’s Student Position: Graduate Research Assistant in Quantified Hardware Assurance

Location: ElectroScience Laboratory, The Ohio State University, Columbus, OH

Supervisor: Dr. Waleed Khalil, Professor, Electrical and Computer Engineering

Job Description:

This role involves testing and analysis of custom ASICs, hands-on laboratory experiments, and data analysis to classify parts. The successful candidate will be a motivated individual with a background in data analysis, classification learning, and statistics.

The Circuit Laboratory for Advanced Sensors and Systems (CLASS) at The Ohio State University is seeking a Master’s Student Graduate Research Assistant. The selected candidate will work in Quantified Assurance of semiconductor hardware as part of the Center for Enabling Cyber Defense in Analog and Mixed-Signal Domain (CYAN). The role is focused on testing and analyzing the performance of custom Application Specific Integrated Circuits (ASICs) to determine their provenance. Work will involve hands-on laboratory experimenting at both the ElectroScience Lab (ESL) and the Air Force Research Lab (AFRL) as well as offline data analysis to classify parts into their respective categories.

This offline data analysis will comprise the bulk of the research with the student learning and employing classification algorithms such as machine learning, graph theory, neural networks, or similar. The ultimate objective is to categorize ASIC parts into categories based on their origin of manufacture, fabrication lot, and wafer number.

The successful candidate will be an incoming Master’s student in Electrical Engineering, Computer Engineering, Computer Science, Mathematics, Physics, Statistics, or similar major with a strong background in data analysis, classification learning, and statistics. Research will be largely self-guided so the candidate should be a self-starter with a strong sense of personal initiative and a track record of effectively managing their own workload while driving towards a successful outcome with minimal supervision.

Key Responsibilities:

- Perform in-lab testing and analysis of ASICs using equipment such as oscilloscopes, FPGAs, multimeters, and power supplies.

- Apply mathematical techniques such as machine learning, graph theory, neural networks, or similar to categorize different parts.

- Collaborate with a team of researchers, graduate students, and visiting scholars including close partnership with the Air Force Research Lab (AFRL).
Qualifications:

*Required*

- Incoming Master’s student in Electrical Engineering, Computer Engineering, Computer Science, Mathematics, Physics, Statistics, or similar major.
- Strong background in data analysis, classification learning, and statistics.
- Self-motivation and strong drive along with the ability to self-manage.

*Preferred*

- Background in simple analog circuit design or relevant coursework.
- GPA > 3.5.

About CLASS:

The Circuit Laboratory for Advanced Sensors and Systems (CLASS) was established by Dr. Waleed Khalil in 2009 and is part of The Ohio State University’s Department of Electrical and Computer Engineering. Housed in the ESL complex, CLASS is a major center of excellence in Electromagnetic (EM) and Radio Frequency (RF) circuits and systems. The lab is sponsored by research contracts and collaborations with commercial and government organizations, and it is equipped with state-of-the-art infrastructure including CAD tools, wafer/package test facilities, and access to in-house and external foundries. Since its inception, CLASS has made significant contributions to RF and mm-wave circuits and systems, with a research focus on high-speed wireline and wireless systems and mixed-signal circuits.

https://electroscience.osu.edu/class

About CYAN:

The CYAN Research Program, a joint initiative by The University of Florida and The Ohio State University, focuses on multidisciplinary research in hardware-enabled cybersecurity. Its mission is to innovate and develop new security in the Analog and Mixed Signal (AMS) domain, addressing a significant gap in hardware security’s digital research focus. The program prides itself on a strong partnership with government and industry, an outstanding research team, and a commitment to education and capacity building. The program’s research is divided into two main thrusts: securing AMS devices and systems and exploiting analog emanations for cyber defense. The team at CYAN is dedicated to advancing the science of analog security, analog emissions, and analog and radio frequency (RF) forensics.

https://cyan.engineering.osu.edu/

How to Apply:

If you’re interested in applying, please contact Dr. Waleed Khalil by email at Khalil.18@osu.edu with a copy of your CV, transcripts, and a list of publications. We appreciate your interest and assure you that all applications will be thoroughly reviewed.