Immediate Release:

Monday, February 8, 2016

NATIONAL SCIENCE FOUNDATION AWARD WILL SECURE MICROCHIP DESIGN AND MANUFACTURING

The National Science Foundation (NSF) selected Siddharth Garg, a member of the computer hardware security research team at New York University, to receive a prestigious award for promising young faculty. He plans to use the accompanying grant to develop algorithms that could help secure microchip design and manufacturing.

Garg, an assistant professor of electrical and computer engineering at the NYU Tandon School of Engineering, received the NSF Faculty Early Career Development Award, more widely known as a CAREER Award, which includes mentoring and $500,000 over five years to advance his research.

The design and production of microchips is now a highly decentralized process, with much of the manufacturing outsourced to offshore foundries. While the practice is cost-effective, it challenges the trustworthiness of the finished product by increasing the possibilities of pirating, counterfeiting, and inserting malicious Trojans—adaptations, like the horse of mythology, that are benign-looking but malicious.

Garg explained that security is just as important a metric for chip designers as energy efficiency and performance. “If designers do not include safeguards, their chips can be modified in potentially dangerous ways,” he said. “Chips manufactured by bad actors can enable intellectual property theft and corporate espionage, or even pose national security risks.”

- more -
Among the solutions that Garg and his colleagues are exploring are integrated circuit (IC) logic encryption and split manufacturing. These techniques aim to prevent pirates from reverse engineering and exploiting a design by obfuscating the designer’s intent. Logic encryption locks chips using inputs referred to as keys. The chip functions correctly only with the correct key, which is known only to the designer but not to the untrusted manufacturer. Split manufacturing breaks up a chip into multiple pieces (like those of a jigsaw puzzle) that are separately manufactured and reassembled by the designer after manufacturing.

“We are delighted that Siddharth Garg has joined the growing list of NYU Tandon faculty members who have won NSF CAREER Awards,” said NYU Tandon Dean Katepalli R. Sreenivasan. “He joins a respected core group of researchers who were among the first to address the importance of hardware security to national security, our infrastructure, commerce, and individuals. This award reaffirms our conviction that he has embarked upon research of the utmost importance and that he will be making vital contributions to his field.”

The Faculty Early Career Development (CAREER) Program is a highly competitive activity that offers the NSF’s most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research.

*The NYU Tandon School of Engineering dates to 1854, when the NYU School of Civil Engineering and Architecture as well as the Brooklyn Collegiate and Polytechnic Institute (widely known as Brooklyn Poly) were founded. Their successor institutions merged in January 2014 to create a comprehensive school of education and research in engineering and applied sciences, rooted in a tradition of invention, innovation and entrepreneurship. In addition to programs at its main campus in downtown Brooklyn, it is closely connected to engineering programs in NYU Abu Dhabi and NYU Shanghai, and it operates business incubators in downtown Manhattan and Brooklyn. For more information, visit [http://engineering.nyu.edu](http://engineering.nyu.edu).*

###

*Keywords: Trojans, hardware security, cybersecurity, microchip manufacturing, computer chip design*