RUTGERS DISCOVERY INFORMATICS INSTITUTE RDI²

RDI² Distinguished Seminar

What is the Role of Architecture and Software Researchers in Making Quantum Computing Practical?

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ABOUT THE SPEAKER: Margaret Martonosi is the Hugh Trumbull Adams '35 Professor of Computer Science at Princeton University, where she has been on the faculty since 1994. She is also Director of Princeton University's Keller Center for Innovation in Engineering Education. Martonosi's research interests are in computer architecture and mobile computing. Her work has included the development of the Wattch power modeling tool and the Princeton ZebraNet mobile sensor network project for the design and real-world deployment of zebra tracking collars in Kenya. Her current research focuses on hardware-software interface approaches in both classical and quantum computing systems. Martonosi is a Fellow of both IEEE and ACM. Notable awards include the 2018 IEEE Technical Achievement Award, the 2010 Princeton University Graduate Mentoring Award, and the 2013 Anita Borg Institute Technical Leadership Award. Her research has earned four recent Test-of-Time Paper Awards: the 2015 ISCA Long-Term Influential Paper Award, 2017 ACM SIGMOBILE Test-of-Time Award, 2017 ACM SenSys Test-of-Time Paper award, and 2018 (Inaugural) HPCA Test-of-Time Paper award.

Friday, March 1, 2019

10:30 am—12:00 pm

Busch Campus Student Center, Center Hall

604 Bartholomew Road, Piscataway, NJ

Parking is available in lots 51, 59, 60B & 67

Refreshments will be provided

Free Registration:
rdi2_spring2019seminar.eventbrite.com

ABSTRACT: In the past 3-5 years, Quantum Computing (QC) has reached an interesting and important inflection point. For decades, quantum computing research was comprised of very abstract mathematical algorithms development "up high" that demonstrated some potential for future impact, and physics device demonstrations "down low" that were modest in size but that offered some hope for eventual implementations. However, with prominent QC algorithms like Shor's factoring algorithm needing roughly a million times more physical quantum bits (qubits) than successful implementations currently provide, there has been a cavernous gap between algorithm and implementation. What is needed now are computer scientists to develop the crucial intermediate tool flows, abstraction layers, and programming languages that will help quantum computing scale through the current so-called NISQ (noisy, intermediate-scale quantum) era. My talk will both (i) give details about our new approaches for optimal and near-optimal spatial-temporal placement of QC algorithms onto real systems, and (ii) more broadly advocate for the role that computer architecture, compiler and programming languages researchers must play in order for QC to reach its full potential.