



# CISE and Quantum

**Margaret Martonosi**

Computer and Information Science and Engineering (CISE)

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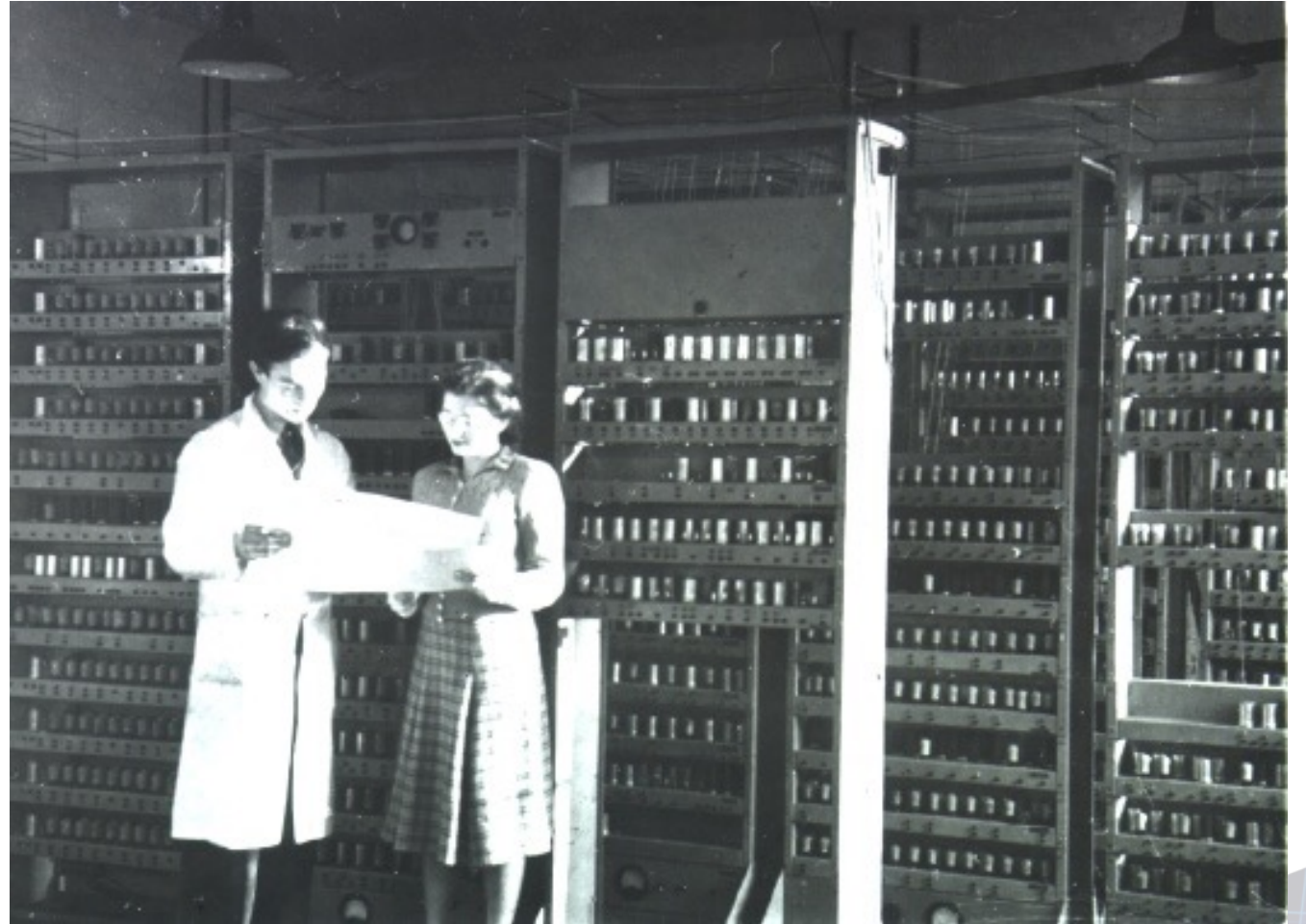
# Quantum Systems Today: An Analogy

~1950's Classical Computing

Algorithms

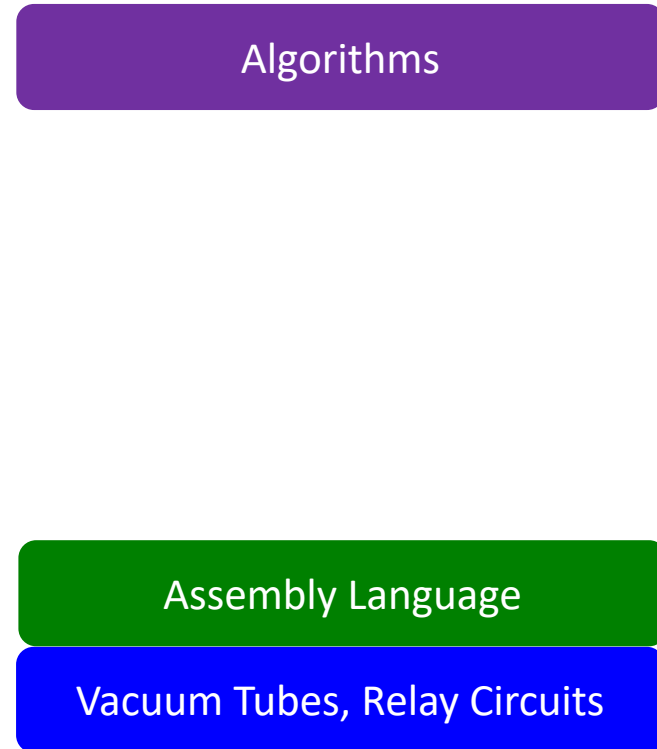
Assembly Language

Vacuum Tubes, Relay Circuits

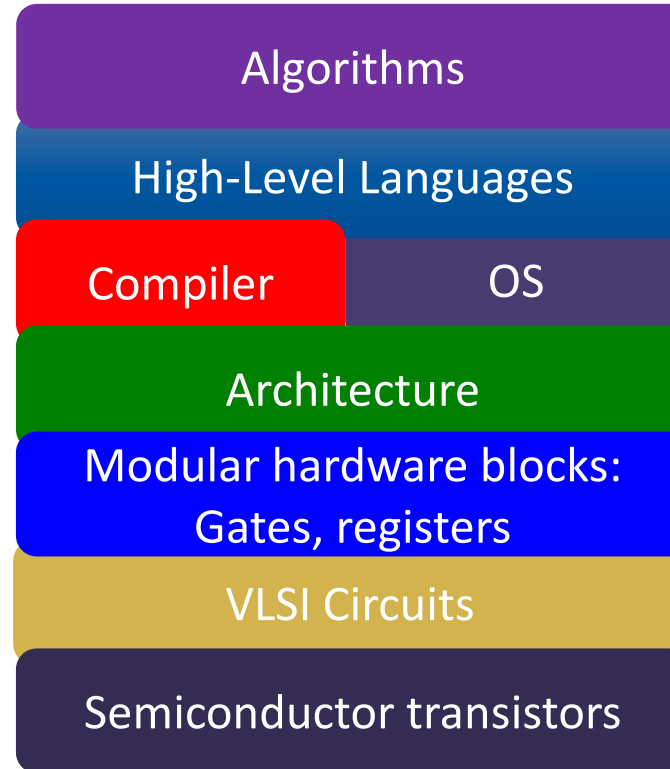


# Quantum Systems Today

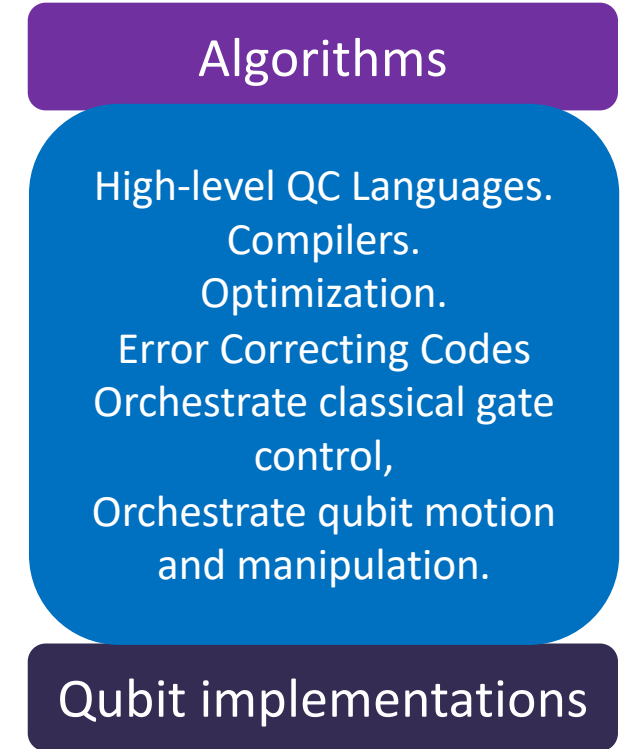
## ~1950's Classical Computing



## Today's Classical Computing



## Quantum Toolflows





# CISE Organization and Core Programs

## Office of Advanced Cyberinfrastructure (OAC)

- Data/Software
- Leadership and Advanced Computing
- Networking/Cybersecurity
- Learning and Workforce

## Computing & Communication Foundations (CCF)

- Algorithmic Foundations
- Communications and Information Foundations
- Software and Hardware Foundations
- Foundations of Emerging Technologies

## CISE Leadership



Margaret Martonosi,  
Assistant Director



Joydip Kundu,  
Deputy Assistant Director

- Computer Systems Research
- Networking Technology and Systems
- Education and Workforce Development

## Computer & Network Systems (CNS)

- Human-Centered Computing
- Information Integration and Informatics
- Robust Intelligence

## Information & Intelligent Systems (IIS)

Manish Parashar  
Office Director



Amy Walton  
Deputy Office Director



Behrooz Shirazi,  
Acting Division Director



Ann Von Lehman,  
Acting Deputy Division Director



Dilma Da Silva  
Division Director



Irina Dolinskaya,  
Deputy Division Director



Michael Littman,  
Division Director



Wendy Nilsen,  
Deputy Division Director



# CISE Core Solicitation: 2 per year - Any CISE Topic!

**Office of Advanced Cyberinfrastructure  
(OAC)**

**Computing & Communication  
Foundations (CCF)**

**Small Core Proposals: <\$600K**

No Deadlines in CCF, CNS, IIS

OAC Deadline: Oct 23, 2023

**Medium Core Proposals: \$600K-1.2M**

Deadline: October 23, 2023

**Large Core Proposals: \$3-5M**

Next Deadline: Sept 30, 2024

<https://www.nsf.gov/pubs/2023/nsf23561/nsf23561.htm>

<https://www.nsf.gov/pubs/2023/nsf23524/nsf23524.htm>

**Computer & Network Systems  
(CNS)**

**Information & Intelligent Systems  
(IIS)**



# Quantum Platforms

Home

Email Print Share

NSF 22-092

## Dear Colleague Letter: Enabling Quantum Computing Platform Access for National Science Foundation Researchers with Amazon Web Services, IBM, and Microsoft Quantum

June 3, 2022

Dear Colleagues:

The field of quantum computing has witnessed substantial progress in recent years, with the development of next-generation quantum processors in the 50- to 100-qubit range and beyond. Realizing the promise of such processors requires significant capacity-building to prepare the next generation of quantum researchers and users. In light of the quantum-computing developments in the private sector as well as the opportunity for further innovation in the academic setting, the National Science Foundation, in conjunction with Amazon Web Services (AWS), IBM, and Microsoft, is coordinating the availability of cloud-based access to quantum-computing platforms in order to advance research and build capacity in the academic setting. More information about the platforms is available at the following company websites.

- Amazon Braket: <https://aws.amazon.com/braket/>
- IBM Quantum: <https://www.ibm.com/quantum-computing/>
- Microsoft Quantum: <https://azure.microsoft.com/en-us/services/quantum/>





# CISE MSI Research Expansion Program

- Goal: Expand the number and diversity of schools and faculty represented in CISE Core research investments
- Faculty: Capacity Building and Proposal-writing workshops ("Mini-Labs")
- Infrastructure: Collaborative Multi-MSI opportunities
- Undergrad Students: Enhanced undergraduate research opportunities
  - Fellowships to encourage transition to grad programs
- **Next deadline: Feb 9, 2024**

<https://beta.nsf.gov/funding/opportunities/computer-information-science-engineering-minority>





# CISE Research Initiation Initiative (CRII) Program

- Aims to level the playing field by offering “startup package” opportunities to new Early-Career faculty in CISE-relevant topics at non-R1 institutions
- **Next Deadline: September 18, 2023**
- **(Third Monday in September)**
- <https://beta.nsf.gov/funding/opportunities/computer-and-information-science-and-engineering-research-initiation>



# My Story:

## How I got started in QC

- 2006: I started QC research ~17 years ago when a device physicist at the department coffee machine started talking about his idea for a new qubit....
- 2023: Many pots of coffee later... Still doing QC & still collaborating!

