Margaret Martonosi

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Major Honors

- Member, National Academy of Engineering
- Member, American Academy of Arts and Sciences
- 2021 IEEE/ACM Eckert-Mauchly Award. "For contributions to the design, modeling, and verification of power-efficient computer architecture". Top award for lifetime research achievement in the field of computer architecture.
- ACM Frances E. Allen Award for Outstanding Mentoring
    - Worldwide computing award offered every two years
- IEEE Fellow. "For power-efficient computer architecture and systems design"
- ACM Fellow. "For contributions in power-aware computing"
- 2016-2022: Andrew Dickson White Visiting Professor-At-Large. Cornell University.
    - Roughly twenty people worldwide are extended this title based on their professional stature and expertise, and are considered full members of the Cornell faculty during their six-year term appointment.
- 2018 IEEE Computer Society Edward J. McCluskey Technical Achievement Award
- 2015-2016: Jefferson Science Fellow, U.S. Department of State.
    - One of 11 tenured STEM professors selected for one-year fellowships on international technology policy.

Leadership Statement

I have demonstrated extensive and successful leadership experience in high-level roles in academia, in government service, and in non-profit organizations. For decades, I have exemplified technical leadership in research communities both through bold visionary leaps into forward-looking topic areas, and through community efforts to make technical communities safer and more welcoming, particularly for early-career researchers.

In government service, while on leave from Princeton, I recently served a 4-year rotation leading the National Science Foundation's Directorate for Computer and Information Science and Engineering. NSF is the primary source of federal research funding for computing, and my role there was to lead budget and operational strategy in stewarding more than $1B of annual research, education, and infrastructure funding for the community.

Leadership and positive influence are context-dependent. Throughout my career, I have numerous examples of nimbly adapting to new contexts and then leading effective and positive change. For example, at CRA-WP, I led a group of ~30 volunteer board members through a strategic repositioning that broadened the organization's mission and vision, and aligned it with research community needs. At the US Department of State, my 1-year fellowship gave me the opportunity to immerse in a new context (intergovernmental technical policy discussions) and then use leadership and coalition-building skills to advance the US position in these venues.

Leadership Experience

2/2020-12/2023: US National Science Foundation Assistant Director for Computer and Information Science and Engineering (CISE)

- I led the CISE Directorate, with a $1B annual budget and ~150 people. I developed the technical and budget strategy, to deliver on our mission of catalyzing computing research, education, and infrastructure across the nation.
- In my role, I led or co-lead NSF's launch of numerous major efforts, including:
    - 25 National AI Research Institutes ($20M investments apiece).
    - To pair with NSF AI Research Institutes, I led the creation of a program, ExpandAI, to foster collaborations between lead AI institutions (typically R1) and additional partners from MSI and R2 institutions.
    - CI Fellows post-doc program to navigate research job market shocks related to the COVID-19 pandemic.
    - CSGrad4US graduate fellowship program to encourage US citizens and permanent residents to pursue doctoral degrees in computing
    - Pathways to Enable Open-Source Ecosystems (POSE) to help innovators cultivate large and vibrant open-source ecosystems around their research results.
    - National AI Research Resource (NAIRR) Pilot: Recognizing the need to democratize access to the compute and data required for AI innovations, the NAIRR pilot was launched as an NSF-led coalition of for-profit, not-for-profit, and government providers of AI infrastructure and educational resources for the research community.
    - Leadership-Class Computing Facility (LCCF) represents the first time that NSF committed MREFC (Major Facilities) funding towards cyberinfrastructure construction for the science and engineering community. LCCF went through its multi-year design phases under my CISE leadership, and entered its construction phase soon after my rotation back to Princeton.
- I prioritized creating an inclusive, diverse, and effective organization. My efforts were recognized in 2023 with the CISE organization being named one the best places to work in the entire US Federal government. In particular, we were ranked 4th out of 432 government subcomponents based on the annual FEVS survey responses. https://www.washingtonpost.com/business/interactive/2023/top-workplaces-federal-government/

7/2017-1/2020: Director, Princeton University Keller Center for Innovation in Engineering Education

- I led this interdisciplinary center with a roughly $10M annual budget and ~20 core faculty and staff, and dozens of additional affiliated faculty.
- A key Keller role is as Princeton's pedagogical home for entrepreneurship and design thinking. In becoming its Director, my goal was to strongly interweave these strengths across the university, by leveraging departmental partnerships, particularly across our School of Engineering and Applied Sciences.
- During my tenure we advocated for the creation of "professor of the practice" career pathways at Princeton to account for the expertise of seasoned entrepreneurs on Keller's teaching faculty. This track is now in place.

- Despite its relatively small faculty headcount, Keller had one of the heaviest teaching headcounts at Princeton. I advocated for and achieved FTE increases to support outstanding classroom experiences and faculty retention in the center.

2017-2020: Co-Chaired CRA-WP, the Computing Research Association's Committee for Widening Participation in Computing Research.
- Led a 35-person action-oriented board of US and Canada-based researchers spearheading activities to broaden participation in computing.
- Served as funding PI and coordinated an annual budget over $10M per year for programs aimed at undergraduate and graduate students, as well as researchers in both academia, industry, and government pathways.
- Executed a shift in organizational mission and board composition to transition from women-focused to broader efforts across a wide range of groups historically underrepresented in computing.

2015-2016: Foreign Affairs Officer (Jefferson Science Fellow). U.S. Department of State.
- I represented US government and commercial interests and offered technical expertise in intergovernmental discussions convened by the International Telecommunications Union. Topics included cybersecurity, Internet of Things, Artificial Intelligence, and Semiconductors.
- I demonstrated leadership through strategic awareness and coalition-building in order to advance US government positions in international and intergovernmental technical policy discussions.

2005-2007: Associate Dean for Academic Affairs, School of Engineering and Applied Science.
- Coordinate SEAS FTE counts, and allocation to service courses and other uses
- Pioneered a Dean's Commendation List for Teaching Excellence to honor successful classroom teaching.

Global Leadership and Service

Non-Profit and Governmental Boards
- Co-Chair, Science Advisory Board for Elevate Quantum.
  - 2024-present
  - Elevate Quantum is a multi-state regional organization with the mission to secure the Mountain West's position as the global epicenter for Quantum development. https://www.elevatequantum.org/
  - EQ leads the recently awarded >$100M Department of Commerce Tech Hubs.
  - EQ selected me for this co-chair role in order to lead scientific aspects of its Tech Hubs activity, by leveraging and fusing my unique expertise across i) quantum technologies, ii) workforce and diversity, and iii) federal funding scenarios.
- Board of Directors, National Center for Women and Information Technology (NCWIT)
  - 2024-present
  - NCWIT selected me for a board position based on my experience (gained through Keller, CRA-WP, and other roles) with academic research career pipelines and their interactions with tech company hiring and career flows.
- DARPA Information Science & Technology (ISAT) Study Group Steering Committee.
  - 2024-present

    - The ISAT Study Group was established by DARPA in 1987 to support its technology offices and provide continuing and independent assessment of the state of advanced Information Science technology as it relates to the U.S. Department of Defense. ISAT's role is to help the DOD "avoid technical surprise".
    - 2024-Present: Steering Committee Member. My SC role is to guide ISAT Study Group in bold, forward-looking strategic visioning for identifying important technical threats and opportunities.
    - I took on this role to bring broad federal and academic perspectives to DARPA I2O's strategic visioning.
    - 2013-2015: Member of ISAT Study Group
- Member, Center for Strategic and International Studies (CSIS) Commission on U.S. Quantum Leadership.
    - 2024-present
    - I am one of 25 quantum experts preparing a report calling for future action and investment in quantum technologies, to protect US leadership in the field.
    - I bring unique perspectives both as a computer scientist and as someone with deep federal policy expertise.
- Founding Co-chair of ACM SIGARCH/SIGMICRO CARES.
    - 2018-2020
    - We established CARES with the mission to serve as a resource comprising of senior trusted researchers in the architecture community, willing to listen as sounding-boards and to help people who experience or witness discrimination, harassment, or other ethics policy violations, either at ACM events or related to ACM publications.
    - My leadership on CARES exemplifies change-making through coalition-building, in a technical research community.
    - For our work and its broad impact across ACM as a whole, the CARES movement received the 2020 Computing Research Association Distinguished Service Award
- NSF Computer and Information Science and Engineering (CISE) Directorate Advisory Committee.
    - Member: 2015-2016. Co-Chair 2016-2019.
- CRA Board of Directors, Computing Research Association.
    - Elected Member: 6/09-2018.
    - 2010-11: Chair, Election Committee.
    - Executive committee 2011-2014.

Other Academic and Technical Advisory Boards

- 2024-present: SPHERE Advisory Board. Provide advisory input for large-scale cyberinfrastructure funded by NSF Mid-Scale Research Infrastructure program.
- Member, Singapore National Research Foundation (NRF) Fellowship Evaluation Panel (FEP) (2018-2020)
- 2018: Committee of external scholars to review Brown University's Department of Computer Science
- 2017-2018: National Academies of Science, Engineering & Medicine Committee on Technical Assessment of the Feasibility and Implications of Quantum Computing.
- 2012-2015: Member, Advisory Board for the Department of Computer and Information Science at University of Pennsylvania.

- External Advisory Committee Member. Computer Engineering Program. University of California, Santa Barbara. 1/2010-2014. Chair of committee: 2012-2014.
- Member of Board of Directors, ACM SIGMETRICS (ACM's Special Interest Group on Performance Measurement and Modeling). 7/01-7/05.
- Vice-Chair, ACM SIGARCH (ACM's Special Interest Group on Computer Architecture). 7/03-7/07 (two terms).

Editorships and Award Review Committees

- Series Editor, Morgan-Claypool Synthesis Lectures in Computer Architecture.
- Technical program chair for numerous highly-selective and high-impact publication venues
- 2012-2015: ACM Doctoral Dissertation Award Committee
- New York Academy of Sciences Blavatnik Award Review Committee. 2010 selection process.
- IEEE Fellows Committee. Class of 2011 Fellows. Class of 2012 Fellows.
- Member, Anita Borg Institute Award Committee. 2009-2010.
- Member, Eckert-Mauchly Award Committee. ACM Representative to joint IEEE/ACM committee selecting most prestigious career award in Computer Architecture. 2/2007-2010.
- Member of Interview Committee. Vietnam Education Foundation. September, 2006; August, 2010. VEF is a US Government agency offering graduate science and engineering fellowships to Vietnamese undergraduates. I was part of an interview trip coordinated by NAE/NAS and VEF that traveled to Hanoi and Ho Chi Minh City to conduct selection interviews.

Educational Background and Research Highlights

Education

- Stanford University. Ph.D. in Electrical Engineering. Completed December, 1993. Conferred 1994.
  - Dissertation: Analyzing and Tuning Memory Performance in Sequential and Parallel Programs.
  - Advisors: Professors Anoop Gupta and Thomas E. Anderson
- Stanford University. Master of Science in Electrical Engineering, September, 1987.
- Cornell University. Bachelor of Science in Electrical Engineering with Distinction, June, 1986.

Graduate Advising:

- Have advised over 35 PhD dissertations
- Alumni of my group are now on the faculty at Stanford, Harvard, and other universities, and leaders in industry R&D
- Two of my PhD students have earned the ACM SIGARCH Dissertation Award and one has received an honorable mention. *More than any other thesis adviser in the field.*
- Three of my former PhD students have received the ACM SIGARCH Maurice Wilkes Award for impactful research in the first 20 years of their career. *More than any other thesis adviser in the field.*

"Test of Time" research paper awards, recognizing sustaining influential research contributions::

- 2023 International Symposium on Computer Architecture 50th Anniversary Retrospective Volume. Four papers from my research group are included in this volume recognizing sustaining influential research contributions.
    - ISCA 2000 paper: Wattch: A Framework for Architectural-Level Power Analysis and Optimizations
    - ISCA 2001 paper: Cache decay: Exploiting generational behavior to reduce cache leakage power
    - ISCA 2006 paper: Techniques for Multicore Thermal Management: Classification and New Exploration
    - ISCA 2009 paper: Thread criticality predictors for dynamic performance, power, and resource management in chip multiprocessors
- 2022 ACM SIGMICRO Test of Time award. For 2003 paper entitled "Runtime Power Monitoring in High-End Processors: Methodology and Empirical Data" by Isci and Martonosi
- 2021 International Symposium on Computer Architecture Long-term Influential Paper Award honoring 2006 paper entitled "Techniques for Multicore Thermal Management" by Donald and Martonosi.
- 2021 IEEE International Symposium on High-Performance Computer Architecture Test of Time award, honoring the long-term impact of our HPCA 2001 paper entitled "Dynamic Thermal Management for High-Performance Microprocessors". This highly cited paper opened the field of thermal-aware architecture research and was the first to make the distinction between power-aware and thermal-aware architecture. Dynamic thermal management, inspired by this paper, is now essentially universal in computer systems today, proliferating from server processors to mobile SoCs.
- 2020 ACM International Conference on Architecture Support for Programming Languages and Operating Systems (ASPLOS) Long-term Influential Paper award, honoring the long-term impact of our ASPLOS 2002 paper entitled "Energy-Efficient Computing for Wildlife Tracking: Design Tradeoffs and Early Experiences with ZebraNet".
- 2018 IEEE International Conference on High-Performance Computer Architecture Test-of-Time Paper award, honoring the long-term impact of our HPCA-5 (1999) paper entitled "Dynamically Exploiting Narrow Width Operands to Improve Processor Power and Performance"
- 2017 ACM SenSys Test-of-Time Paper award, honoring the long-term impact of our SenSys 2004 paper entitled "Hardware Design Experiences in ZebraNet".
- 2017 ACM SIGMOBILE Test-of-Time Paper Award, honoring the long-term impact of our ASPLOS 2002 paper entitled "Energy-Efficient Computing for Wildlife Tracking: Design Tradeoffs and Early Experiences with ZebraNet".
- 2015 ACM IEEE International Symposium on Computer Architecture Long-term Influential Paper Award, honoring the long-term impact of our ISCA 2000 paper entitled "Wattch: A Framework for Architectural-Level Power Analysis and Optimizations".
- One of the 25 Most Significant Papers from the first 20 years of FCCM. "Accelerating Boolean Satisfiability with Configurable Hardware.", by Peixin Zhong, Margaret Martonosi, Pranav Ashar, and Sharad Malik. FCCM 1998. (Recognized at FCCM 2013).

Best Paper awards:

- Quantum Computing Track for the 2020 IEEE International Conference on Quantum Computing and Engineering (QCE).
- 49th Annual International Symposium on Microarchitecture. Taipei, Taiwan. November, 2016.

- Ninth International Conference on Mobile Systems, Applications, and Services (MobiSys). Washington, DC. June, 2011.
- First International Green Computing Conference (IGCC'10) (IEEE). Chicago, IL. August, 2010.
- 38th Annual International Symposium on Microarchitecture. Barcelona, Spain. November, 2005.
- Multiple papers selected for inclusion in "Top Picks in Computer Architecture." IEEE Micro. 2006-present.
- ZebraNet II hardware chosen as Design Contest winner at 2003 Intl. Symposium on Low-Power Electronics and Design (ISLPED). August, 2003.

Other Awards:

- 2020 Computing Research Association Distinguished Service Award given to ACM SIGARCH/SIGMICRO CARES, of which I was a founding co-chair in 2018.
- 2019 ACM SIGARCH Alan D. Berenbaum Distinguished Service Award. For "outstanding leadership in recruiting, retaining, and advancing women and under-represented minorities and raising awareness of the importance of diversity to the computer architecture community."
- 2019 Semiconductor Research Consortium (SRC) Aristotle Award. National award for graduate mentoring.
- 2015 Marie R. Pistilli Women in EDA Achievement Award
- 2013 Anita Borg Institute ABIE Technical Leadership Award
- National Council of Women in Technology (NCWIT) & AT&T Undergraduate Research Mentoring Award. 2013
- Princeton University Graduate Mentoring Award. May, 2010.