

Mentoring & Managing Students

Mark D. Hill

John P. Morgridge & Gene M. Amdahl Professor
University of Wisconsin-Madison

CRA Mentoring Workshop, February 2020



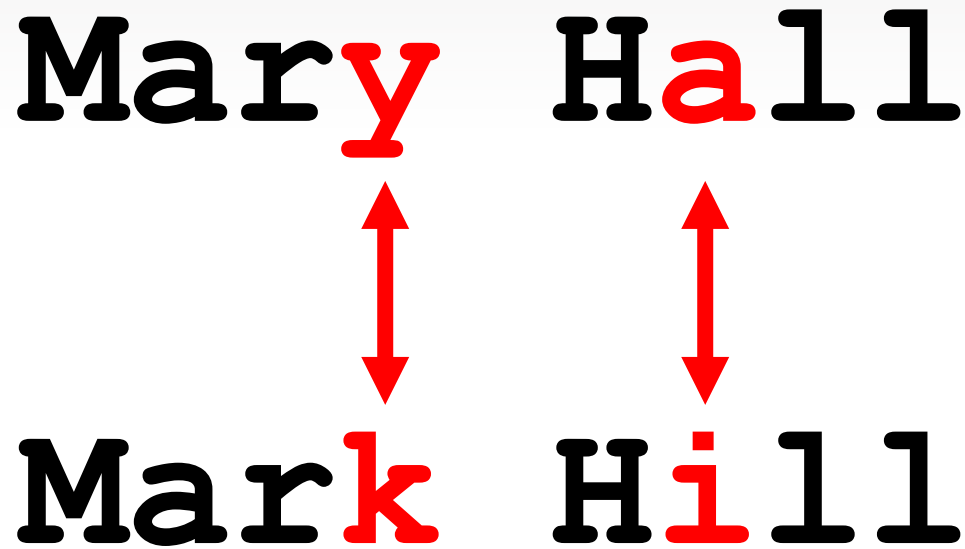
CRA
Computing Research
Association



CCC
Computing Community Consortium
Catalyst

Hamming Distance Two!

Mary Hall
Mark Hill



Mark D. Hill, Univ. of Wisconsin-Madison

Research in Computer Architecture

- Memory & Parallel Systems
- 3C cache misses & Data Race Free
- 160+ Collaborators
- Eckert-Mauchly Award

Industrial Sabbaticals & Consulting

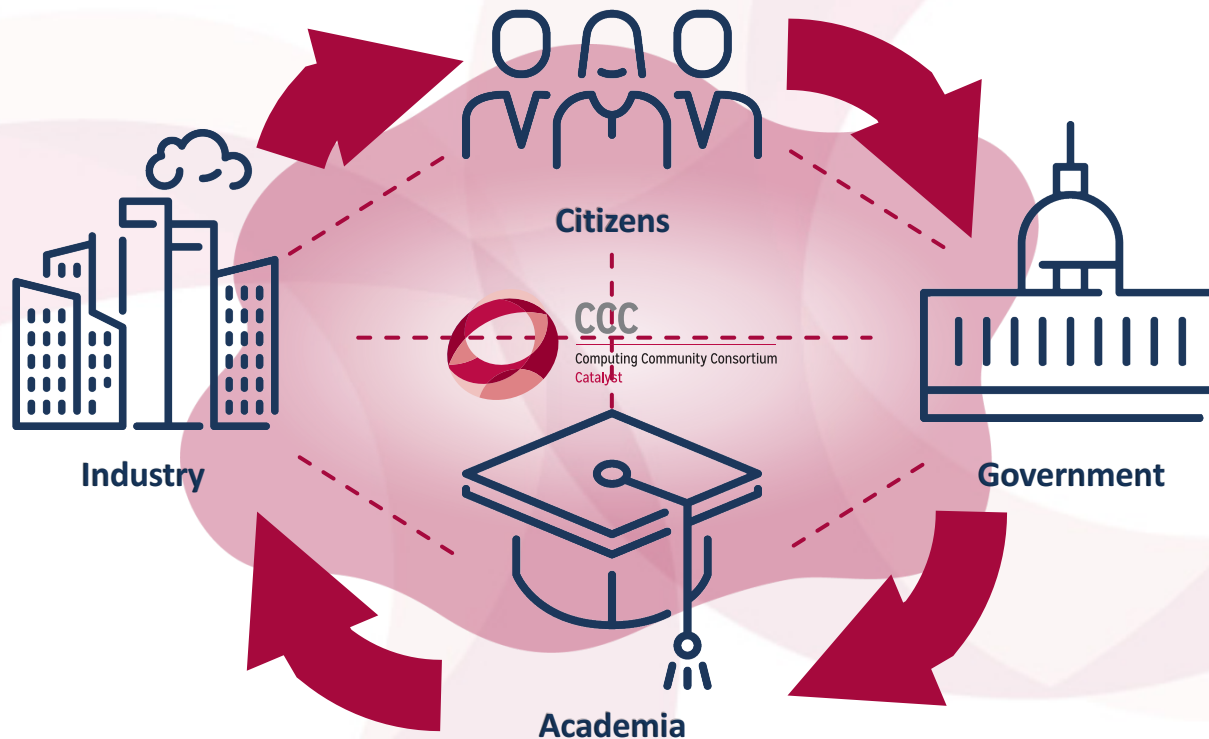
- Sun Micro, AMD, Google, etc.

Service

- ISCA PC Chair, DARPA ISAT, Dept. Chair
- Chair Computer Community Consortium



COMPUTING COMMUNITY CONSORTIUM (CCC): CATALYZING I.T.'S VIRTUOUS CYCLE



Get involved w/ white papers, workshops, & advocating I.T. research
(to do good & make your research better)



CCC

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Catalyst

Selecting Students



MYTH: Look for the highest intelligence

REALITY: Look for “fire in the belly” & work ethic

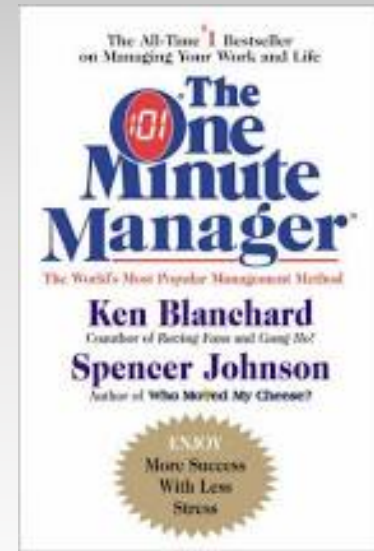
- As these can be channeled, not created by you
- Want creativity, but takes time to spot
- Hone other domain & communication skills

Creative work req's breaks: daily, weekly, quarterly



Managing New Students

MYTH: Give new students
Ph.D.-sized challenges



REALITY: Your job is to grow student capabilities

- Assign problem/tasks: smaller vs. too big
- You set initial & next directions
- Have them write, throw away, & you write
- Gradually hand over responsibilities
- Why? Ph.D. \leftrightarrow Do Independent Work



Managing Senior Students



MYTH: Closely manage even finishing Ph.D.s

REALITY: Ph.D. \leftrightarrow Do Independent Work

- Students must define their (later) Ph.D. topics
- Student must learn to self manage
- *“If you need to talk to me, do so.”*
- Co-authored papers: don't write, just read
- Don't be a helicopter or **snowplow** advisor!



The Role of Criticism



MYTH: Never criticize: Medal even for last place

MYTH: Criticize the person strongly: You idiot!

REALITY: Criticism is necessary for growth

- Criticize actions & compliment the person
- All should seek criticism from friends first
- Referees not wrong: Authors failed to convey



When Ph.D. Students Shouldn't Finish



MYTH: As on *“The Apprentice”*: You’re fired

REALITY: Need a fair process

- *“Your work is not sufficiently progressing toward a Ph.D. This needs to happen to make a Ph.D. worth the many years ”*
- *“This semester we will do work that results in a manuscript to submit to a conference.”*
- The several students I have had “failed this test,” but understood it was time get a pay raise & flourish in industry



Recap



Apprentice & Master

Selecting: “Fire in the belly” & work ethic

New Students: Grow student capabilities

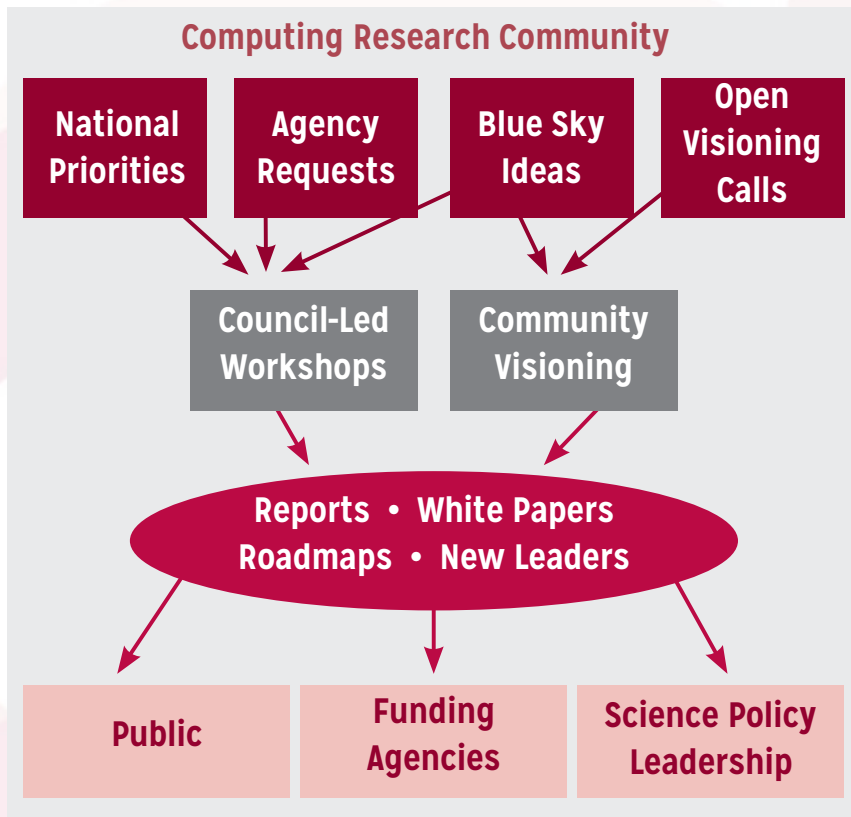
Senior Students: Ph.D. \leftrightarrow Do independent work

Criticism: Criticism is necessary for growth

Pre-Ph.D. Exit: Semester-long test

COMPUTING COMMUNITY CONSORTIUM

The **mission** of Computing Research Association's Computing Community Consortium (CCC) is to **catalyze** the computing research community and **enable** the pursuit of innovative, high-impact research.



Who

- Council ~24 members
- CCC/CRA Staff
- Chair, VC, & Director

Inputs: Bottom-up, Internal, & Top-Down

What:

- Workshops & Conf. Blue Sky Tracks
- Whitepapers & Social Media
- Reports Out (esp. to government)
- Biannual Symposium to DCers

Human Development

- Early Career Workshops & Participation
- Council Membership
- Leadership w/ Gov't (LISPI)

Mentoring & Managing Students

Mary Hall

Professor

University of Utah

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Mary Hall, University of Utah

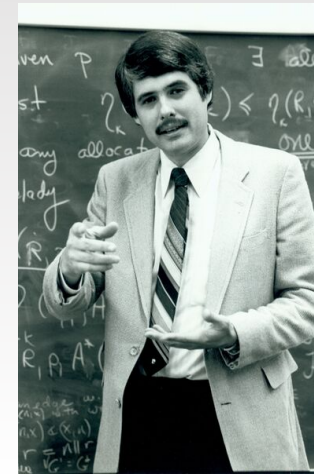
Early History

Mother: math and computer literacy teacher

Father: Journalist, writer

Surrounded by: Books, news, puzzles, TRS-80

Mentors



Ken Kennedy
PhD Advisor



Keith Cooper,
Linda Torczon
PhD Committee

PhD CS, Rice University, 1991



John Hennessy
Research Scientist,
Stanford University,
1992-1995



Monica Lam



Career Timeline

University of Utah (Tenured): 2008-present

USC & USC/ISI (Research Faculty/Project Lead): 1996-2008

Caltech (Visiting Professor): 1995-1996



Jamie, 23, BA CS 2018, Rice
Software developer, Clover



Jackie, 19, USC Astro Eng
Class of 2023

Recruiting Students (Outside the Top 10)

MYTH: Rely on department admissions and look for good candidates.

REALITY: Actively work to get good students.

- Reach out to students before application deadline: own university, neighboring institutions, collaborators' institutions
- Call prospective students, get your students to call them.
- Participate fully in recruiting events.

Undergraduate and Masters Students

MYTH: Research is only possible with PhD students.

REALITY: Variety contributes to research portfolio.

- Masters students: Technical but short term.
- Undergraduates: Small projects, results quickly.
- Why?
 - Mentoring critical to student success, particularly from underrepresented groups.
 - Sometimes capable of outstanding work.
- How to manage: work with senior students.



Teaching Students to Write Research Papers

MYTH: A student's writing skills are set when they start with you.

REALITY: Writing skills can be learned just like technical skills.

- One thing at a time: Story → organizational structure → paragraphs and sentences in right order with right content → sentences and words.
- Figures can drive the rest of content.
- Point out recurring problems.
- Poor writers improve with practice.

Personal Side

MYTH: You can apply a formula to working with each student and turn the crank.

REALITY: Each student is unique, and research is a creative process.

- Ultimately, the work must be a good fit for their interests and skills, and inspire their passion.
- Personal/medical/life issues will arise. Support inspires loyalty, but maintain boundaries.
- Serious issues, get help (e.g., counseling center).

Topic

MYTH: qqqqq

- qq
- qqqq

REALITY: qqqq

- Qqqq
- qqqqq