The Big Picture
"Also sprach CRA…"

"**Relying on journal publications** as the sole demonstration of scholarly achievement, especially counting such publications to determine whether they exceed a prescribed threshold, **ignores significant evidence of accomplishment** in computer science and engineering. For example, **conference publication is preferred in the field**, and computational artifacts — software, chips, etc. — are a tangible means of conveying ideas and insight. **Obligating faculty to be evaluated by this traditional standard** handicaps their careers, and indirectly **harms the field**."

-- D. Patterson, L. Snyder, and J. Ullman
Evaluating Computer Scientists and Engineers for Promotion and Tenure
Best Practices Memo
Approved by CRA Board of Directors, August 1999

What Changed in 10+ Years?

- Field encompasses more topics
- Literature and knowledge base has grown
- Research community is larger

… Problems with scaling!!!!

What Changed in 10+ Years?

- Competition for resources
  - Presentation slots at conferences
  - Audiences for conferences
  - Funding
  - Program committee members
  - Program committee time for reviews
  - Space in journals
  - Great papers and great ideas

- Traditional labels have taken new meanings and describe broader set of practices

Today's Culture

Increasing community discussion:

- Deadline-driven, incremental research
  - Certain problems cannot be addressed at this scale
  - Papers tend to omit descriptions of methods, supporting data, proofs, generalizations, context (e.g., related work)
- Large numbers of publications required of new hires and for promotion

An **elephant** in the room: Criteria for hiring, promotion, and tenure.
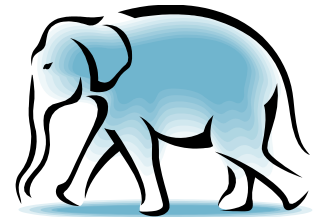
The Big Picture
Addressing the Problem

- Situating the solution
  - Complex ecosystem
  - Many things are working well
- How to fix it
  - Small, targeted change that will reset expectations and re-shift the balance
  - Thoughtful systemic change
  - Manage the transition

…Committee to write a "Best Practices" memo

Statement of Work

- Draft a CRA Best Practices memo giving guidelines for North American institutions
  - scholarly practices in computing and information science and engineering
  - scholarship and professional service for new hires and promotion
- Cultivate widespread adoption
  - some departments make changes, according to culture and local constraints

CRA Scholarship Committee
Plan of Action

- Interview a broad spectrum of North American academic departments and labs to understand current practices for hiring and promotion
  - Open ended questions, by phone

- Committee has representation from major research areas

- Be mindful of scholarly practices in other scientific disciplines

- Engage broader community in the evolving discussion
  - Phone interviews at start
  - Snowbird at mid-point

- Draft the Best Practices memo

- Submit Best Practices memo to CRA Board of Directors

CRA Scholarship Committee
Committee Members

- Fred Schneider [c] (Chair) (Cornell)   security
- Batya Friedman (Co-chair) (UW)   human-computer interaction
- Lorenzo Alvisi (UT Austin)   distributed computing
- David Culler [pc] (UC Berkeley)   systems
- Eric Grimson [pc]* (MIT)   vision
- Mark Hill [c] (U Wisconsin)   hardware architecture
- Julia Hirschberg [c]* (Columbia)   computational linguistics
- Benjamin Kuipers [pc] (U Michigan)   artificial intelligence
- Keith Marzullo [pc] (NSF and UC San Diego)   systems
- Tamer Ozsu [pc]** (U Waterloo)   databases
- Frank Pfenning [c] (CMU)   programming languages
- Jennifer Preece [d] (U Maryland)   digital social media
- Eva Tardos [pc] (Cornell)   theory
- Jennifer Widom [c] (Stanford)   databases
- Jeannette Wing [pc]** (Microsoft Research)   formal methods
- Ellen Zegura [pc]* (Georgia Tech)   networking

*=CRA Board Member; **=Past CRA Board Member
[c]=Dept Chair; [pc]=past Dept Chair; [d]=Dean

Committee Composition

- 7 women + 9 men
- 15 academic + 1 industry
- 14 Dean/Chair/past Chair
- 14 CS; 2 iSchool
- Areas:
  - artificial intelligence, computational linguistics, computer architecture, databases, formal methods, human-computer interaction, programming languages, networking, theory, systems, vision

CRA Scholarship Committee
Schedule

- Fall 2013: Full committee meeting (Washington, DC)
  - Discuss areas for focus in memo
  - Develop interview questions
- Fall 2013: Conduct interviews (Phone)
- Spring 2014: Full committee meeting (Bay Area, CA)
  - Discuss results of interviews
  - Discuss elements of a Best Practices memo
- July 2014: Dept heads and CRA Deans meeting (Snowbird)
  - Status report to community
  - Solicit feedback and insight

  ==

- Fall 2014: Full committee drafts Best Practices memo
- Feb 2015: Best Practices memo discussed by CRA Board

Respondents and Data

Committee interviewed representatives from CS and Information units and from Industry about current practices and concerns.

- 77 total respondents
  - 65 CS depts, 6 iSchools, 6 industry research groups
  - Typically spoke with department chair or dean
  - Interview took 45 min. to 1 hr. 45 min. by phone
  - 203 pages total of responses (aggregated)

Areas Explored

- Current criteria for hiring and promotion
  - Campus invitation
  - Job offer after visit
  - Promotion to tenure
- What's working?
- What's not working? (*our focus here...*)
  - How might this be repaired?

No Surprises in Evaluation Criteria

- 49 24 47   Letters of recommendation
- 47 31 42   Venue/types of pubs
- 38 19 33   Number of pubs on CV
- 6 6 32   Funding history
- 12 13 29   Teaching experience
- 13 12 19   Number/types of awards
- 3 6 14   Professional service
- 26 16 13   Read candidate's papers
- 24 17 13   Research statement
- 26 18 7   Diversity
- 7 3 5   Outreach activities
- 17 51 2   Previous technical lecture
- 0 51 2   Job/promotion talk

- 29 27 0   Area of research
- 24 11 0   PhD institution fame
- 16 10 0   Thesis advisor fame
- 11 10 0   Postdoc experience
- 5 7 0   Industrial experience
- 11 4 0   Personal connection

x y z:
- x = campus invitation
- y = job offer after visit
- z = promotion to tenure

Number of total responses for CS departments and Information Schools (N=71).

Interview Findings
What's not Working (I)

- "Concerned that researchers are too focused on conferences: work is usually not fully assessed, but rather just a proof of concept. **Field is losing standard of scholarship** in which work is thoughtfully and carefully assessed and evaluated to demonstrate validity and identify weaknesses. **Conference publications don't position work relative to field** – too often someone just "borrows" someone else's citation list and uses; don't spend the time to frame the context for the work. **Field is too incremental** – too many small improvements, not enough bold and big ideas being published (or accepted for publication)."

- "Nonetheless, I am worried about the **increasingly incremental nature of contributions** that appear at conferences—we seem to be playing the game of slicing what used to be one paper into a group of papers."

Interview Findings
What's not Working (II)

- "I must say that I am concerned somewhat about the **inflation in publications**, and in the number of publication venues. We seem to be just **moving from one conference deadline to the next**."

- "In many cases, the **10-page limit may be limiting**."

- "Too much damn publishing. **Publishing is out of control**. 3-4x as many publications expected as before."

- "Also, **conference paper page limits** lead authors to leave out proofs or say 'it is easy to generalize our results to…' "

- "There is perhaps too much publication pressure. **Making numbers is seen as important**. Focus should be more on impact."

- "Race to the bottom. On the job market and tenure circuit, **the number of papers expected grows monotonically with time**. The maximum that anyone achieves becomes the expectation."

Interview Findings
What's not Working – Ph.D. Students

- "I am also concerned by the expectation that graduating Ph.D. today will have a long publication record. It seems to me that, when it comes to publications before one's Ph.D., **we may be trading quantity with quality**, encouraging students to submit a paper before it is truly ready."

- "**The number papers** that a graduating Ph.D. student has to publish to get a tenure-track position **is crazy**."

- "I am concerned that there is **too much pressure to publish too many papers**. I see new Ph.D.'s with nearly as many papers as I had at tenure time twenty years ago."

Interview Findings
What's not Working – Junior Faculty

- "On the downside, there is thrashing as junior faculty and grad students feels **they must hit every key conference deadline**. Incremental work never gets extended to the length of journal papers."

- "A lot of it is tenure driven and the fact that **huge numbers of papers on the CV** seems to be becoming the norm."

Addressing the Problems

- Need to reverse an over-emphasis on **quantity**
- Need an environment that better supports **scholarly practices**
  - *Viz* methods, supporting data, proofs, generalizations, context, related work

… Must reset community's expectations!   This requires change.

Desirable Characteristics of Change

- Interventions: Must be small in number, focused, and have widespread impact.

- Interventions that can be operationalized.

- Implications (including perceptions) that can be managed, with respect to:
  - Research community
    - graduate students, young faculty, senior faculty
  - Deans and other administrators
  - Other fields

- Forward looking about role of CS and Information.

A Modest Proposal I
Hiring and Promotion

Key idea: For publications, focus on only a few.

- For new hires:
  - Candidate identifies 1-2 publications to which significant contributions were made
  - These 1-2 publications are read and evaluated for decision about interview invitation
- For tenure promotions:
  - Candidate identifies 3-5 publications to which significant contributions were made
  - Outside reviewers invited to comment specifically on impact, depth, and scholarship for those 3-5 selected publications

A Modest Proposal II
Publication Mechanisms

Key idea: Publication venues should enable good scholarly practices.

- Remove page limits for:
  - References
  - Appendices for data, methods, and proofs
  - Journals should consider longer-papers but make clear to authors that a longer review turnaround is likely
- Nurture venues for presenting work-in-progress
  - to facilitate discussion
  - but do not have archival proceedings

Fine Print I
Publications Scholarship

Publications should:

- Address problems with interesting and useful scope
- Give in-depth review of related work
- Use/develop robust methods
- Obtain results of consequence
- Make a novel and innovative contribution
- Provide sufficient detail to use and/or reproduce results

Other Artifacts Matter Too

- Tools
- Software
  - The system itself
  - User community
- Patents and commercialization
- Science policy and regulation

Your Thoughts?

A Best Practices memo which recommends a new world in which:

- For hiring, promotion, tenure focus on only a few of the candidate's publications
  - For hiring: 1-2 publications
  - For tenure: 3-5 publications
- Publication venues should enable good scholarly practices

Be mindful of the transition.

Thank You!