“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
The Big Picture

What Changed in 10+ Years?

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

... Problems with scaling!!!!
The Big Picture
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
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
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 O兹su [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
CRA Scholarship Committee

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
Interview Methods

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)
Interview Methods

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?
## Interview Findings

### No Surprises in Evaluation Criteria

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$x, y, z$:  
$x = \text{campus invitation}$  
$y = \text{job offer after visit}$  
$z = \text{promotion to tenure}$

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 feel 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.”
Envisioning a Solution

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
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
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
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!