Growing Your Research Program

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> CRA-W.org @CRAWomen







Carol Frieze

2017 Recipient of A. Nico Habermann Award

Carol Frieze is the Director of SCS4ALL and Women@SCS, Carnegie Mellon University (CMU).

She was selected as the recipient of the 2017 A. Nico Habermann Award for devoting nearly two decades to promoting diversity and inclusiveness in computing. She has worked with and supported a wide variety of students including women, people with disabilities, and various age groups ranging from K-12 to graduate students.

Carol has contributed valuable research towards understanding the challenges diverse populations face, and in many ways, her research has challenged the existing narrative in the field. And it's had impact: 48% of computer science majors in the 2016 incoming freshman class at CMU are women, far above the national average.



What does CRA-W do? Individual & Group Research Mentoring

Undergrads: Undergraduate Research Experiences Undergrads: Distinguished Lecture series/role models Grad Cohort: Group mentoring of graduate students Grad Students: Discipline Specific Research workshops Academics/PhD Researchers: Group mentoring for early and mid career @ CMW, Grace Hopper, and Tapia



CRA-W Events at Grace Hopper

Visit the CRA-W Booth in the EXPO to learn more (#2050)

Attend another CRA-W Session Wednesday (3): Thursday (3) or Friday (1)

Visit a CRA-W Table at the Student Opportunity Lab on Friday (Undergrads)

Stay in touch: CRA-W.org, @CRAWomen, Facebook: CRA-W, Linked-in: CRA-Women









a bit about Nancy...

Accidental Computer Scientist – thanks to Bellcore!

- BS Math & Econ, then MS & PhD in CS
- Texas A&M Faculty 1995-present <u>Research: Applied Algorithms</u>
- PhD in parallel computing & computational geometry; added robotics and (accidentally) computational biology
- Group: 3 postdocs, 12 PhDs, 3 MSs, 5+ BS /HS
 - 23 PhD graduates (10 profs, 8 research labs)
- External Activities & Major Awards
- IEEE Robotics & Automation Society, CRA, CRA-W Co-Chair, NCWIT, Program Chair flagship robotics conference
- ACM, AAAS, IEEE Fellow; CRA Haberman Award; NCWIT Harold/Notkin Award

Other interesting facts about Nancy

- Husband Lawrence is also a CSE prof at Texas A&M
- Bernese Mountain Dogs currently Fred & Wilma
- Recent Highlights: Bucket trip to Machu Picchu & Diving!



a bit about Sarita ...

Research area: Computer architecture + systems 1987: B. Tech from IIT-B 1993: PhD from Wisconsin 1993-99: Assistant Prof, Rice 2000-now: Associate, Full, Endowed Prof, Illinois Married with two-body solution; two kids Research group: 7 PhD students ACM fellow, Maurice Wilkes, ABI Woman of Vision SIGARCH chair, CRA board, DARPA ISAT

> CRA-W Computing Research Association Women

Perspective (for Academics)

Tenure is not a destination or a goal Purpose is not job security, but the freedom that results from it

Orchestrating your life only for tenure defeats its purpose Most of your career post-tenure, but defined by pre-tenure habits Pre-tenure = Preparing good habits for rest of your career

Almost all in your school will want you to get tenure, use help

There is life after being denied tenure (and often a pay raise!)



Top Five Things to Avoid

5. Poor (unhappy) personal life: I'll work 24/7 until tenure

4. Blow off service - It is all about research

3. Blow off teaching – It is all about research

2. No work w/ students, collaborators, no talks, nobody knows you – work 24/7

1. A gazillion publications, but no impact



Top Things to Consider

Most schools care most about what other successful people think of you

Reference letters

Most people will write letters only if they know you/your work

Research impact

Not just from papers, but from conversations, talks, students, ...

Personal impressions

Service on PCs, leadership, ...

Most universities increasingly care about teaching



Defining a Research Program

What is the overall theme of your work? What do you LOVE to do? What are your short, medium, long-term goals? What steps do you need to take now and in the

future to meet those goals?

Defining a Research Theme: An Exercise

Get out a piece of paper

Come up with 1-2 sentences describing your research theme

Spend 1 – 2 minutes

How?

Pick your favorite papers and think about what they have in common

Look for ways your students' projects connect

Use this theme as a way to prioritize

Some General Advice....

- Aim for impact & technical recognition
- Develop your reputation
- Invest in students
- Build collaborations with colleagues
- Collect the resources you need to do your work

Goal: Impact & Recognition

- Do top quality work that is central to its area
 - Not tons of papers, just a few strong ones
- Your papers should be considered required reading and papers in the field should cite/compare with your work
- You want to be the authority in your specialty

Develop Your Reputation

Identify a strong research problem with clear short-term, medium-term, and long-term goals

- Publish steadily in high impact venues
- Amplify through students
- Amplify through mentors
- Distinguish yourself from advisor, senior collaborators
 - Selectively do service that enhances your reputation

Reputation = Work + Networking

Network

Attend *important* conferences

Volunteer selectively in conferences and professional associations

Help others

Self-promote

Give talks

Maintain your online presence

- Your organization's website
- Your own website
- Google Scholar/Microsoft Academic/Research Gate
- Social media

Invest in Students

- Students multiply your impact
 - Good students can be exhilarating
 - Bad students can be draining (not just on funding)
 - Choose carefully
- Advisor-advisee is a highly symbiotic relationship
 - Usually student's success is advisor's and vice versa
 - Every investment in your student is worth it (and your job!)
- Many schools require evidence of grad student advising one or more PhD graduates and several in the pipeline



Build Collaborations

- Collaborations expand your mind and your reputation
- Choose people you enjoy and can work with
- Compatible or complementary skill set
- Senior collaborators open doors/get grants; junior collaborators present new directions and do more work
- Be generous with co-authorship on publications and giving credit in talks
- Explore broadly, including interdisciplinary work

Build Collaborations

Do

Communicate effectively and be responsible Make sure you have an impactful part of the project Have a contingency plan

Don't

Be a "student" for someone else Take it personally if a collaboration does not work Expect collaborators to change Be the programmer or tech support for another discipline

Relationship Between Academia and Industry/Labs

- Working across academia industry labs = win-win
 - Research impact
 - Students
 - Funding
 - Cultivating relationships Publishing



Funding

- Look for new proposal opportunities
 - Early career proposal calls (DOE, DOD + NSF)
 - Opportunities to collaborate
 - Internal funding grants and travel grants
 - Faculty Fellowships: NASA, Microsoft etc.
- Learn the ropes by teaming with senior colleagues
- Review some proposals (but not too many)

Top 10: How to Write a Bad Proposal

- 1. Submit a research paper as a proposal
- 2. Make the scope too large
- 3. Make the scope too small
- 4. Ignore agency's mission / history
- 5. Keep your best ideas for later
- 6. Ignore RFP details and use rudimentary tools
- 7. Wait until the last minute
- 8. Don't get feedback on drafts
- Grab as much budget for yourself as possible
 Give up after first rejection

Be Your Own Advocate

Present and showcase your work regularly and broadly (not just in a narrow area/field)

- **Elevator speeches**
- Blogging, microblogging, social media Departmental seminars, symposia, manager meetings
- **Outreach venues**

Meet program managers and organizational leaders who can have influence on your funding

Go to visioning/leadership meetings Network your best students, reflected glory

Be Your Own Advocate

Take credit for **your** work Avoid people who do not give you credit Find advocates and nurture them Own your success, brag appropriately Believe in your agenda; don't give up, don't take "no" personally

In closing

Enjoy what you do... it's a great career Feel and share the passion in research

Remember to take time for yourself and don't forget to indulge yourself – it will keep you healthy and more effective overall!

Don't pull the ladder up!



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