Refining the Computer Science Postdoc Experience

Panel

Jane Stout (CRA/CERP)

Partha Dasgupta (Arizona State University)

Julia Hirschberg (Columbia University)

Gaetano Borriello (Univ. of Washington)

Brent Hailpern (IBM Research)

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POSTDOC CONCERN?

Substantial increase in CS postdocs

- Four-fold increase since 2000
- Now 592 postdocs out of 5068 faculty in NA CS academia (Taulbee 2012-2013)
- 14.9% of new PhDs take postdocs (includes industrial positions)
- In many cases, entire cohort of new faculty hires interviewed are postdocs

Reasons for concern?

- Postdoc experiences can be extremely valuable, managed well by postdoc and mentor
- Risk of exploitation, stalling career launch

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A FEW PROS AND CONS

Benefits

- Extend intellectual skills with training
  - Collaborate with the best in your field
  - Build interdisciplinary links
- Strengthen research record and publications
- Buffer between supply and demand
  - Explore career options
- Flexibility, especially for families

Risks

- Postdocs become the norm, as in life sciences
- Junior faculty hires are “expected” to have postdoc research record
- Poor postdoc experiences
  - Salary differential
  - Second-class citizens in academia
  - Career diversion (>1 yr?)
- Family disruption, continuing job search

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CRA/CCC POSTDOC ACTIVITES

- Working group in 2010 produced paper outlining concerns
  - Goal to catalyze discussion in CSE community
- CRA best practices memo 12/2012 by Anita Jones and Erwin Gianchandani
  - Practices for postdocs, PhD advisors, mentors, institutions
- CIFellows program during economic downturn 2009-2011
  - Very few new faculty slots, risk of losing a “generation” of researchers
  - NSF support with stimulus money led to 3-year, 127 postdoc program
  - Evaluation of the program recently completed by CRA/CERP
- Post Doc Best Practices program
  - 3 groups (Arizona State, Univ. Washington, ASCENT)
  - Collaborative goal: build unified kit of best practices, innovations
  - NSF support
  - Key challenge: devise mechanisms to gather data to improve practices and inform community choices

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SESSION OUTLINE

CIFellows program evaluation
Jane Stout (CRA/CERP)

PostDoc Best Practices program
Partha Dasgupta (Arizona State University)
Julia Hirschberg (Columbia University)
Gaetano Borriello (Univ. of Washington)

Postdocs in industry
Brent Hailpern (IBM Research)

DISCUSSION

CI FELLOWS EVALUATION

Jane Stout, PhD
Heather Wright
Computing Research Association

Jessica Cundiff, PhD
Colgate University

CERP
Computing Research Association
Evaluation

Methods

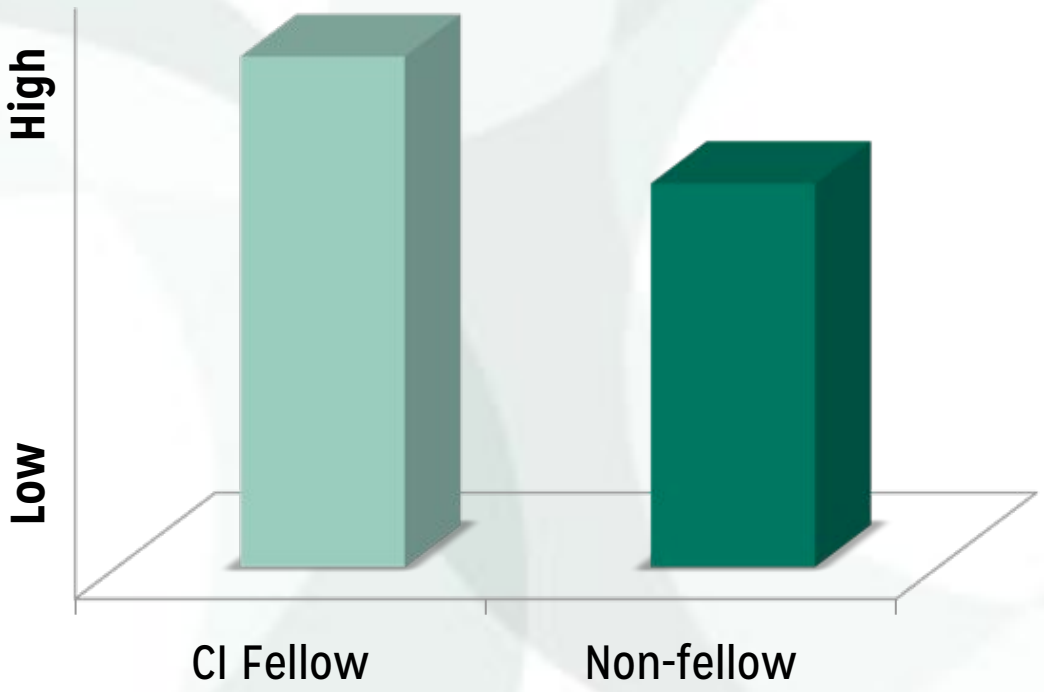
- Follow up survey
  - Three cohorts of applicants (2011, 2012, 2013)
  - Total N = 296
  - Past postdoc N = 182
    - CI Fellows vs. Non-fellow postdocs (Evaluation 1)
    - Industry vs. Academia (Evaluation 2)
- Focus groups
  - Past CI Fellows (N = 9)

Key Findings: Evaluation 1

Compared to Non-fellow Postdocs, CI Fellows:

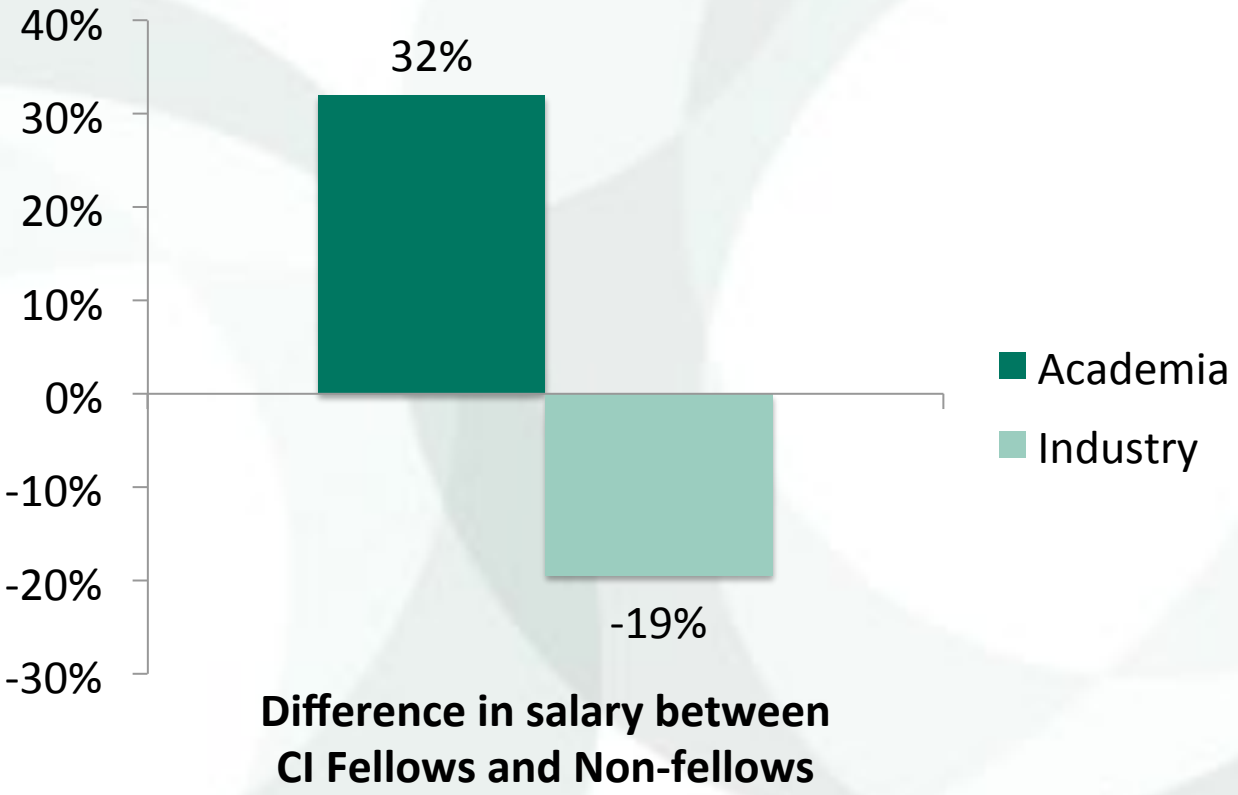
- Experienced greater independence
- Benefitted from more resources
- Earn higher salary at current position

CI Fellowship promotes independence



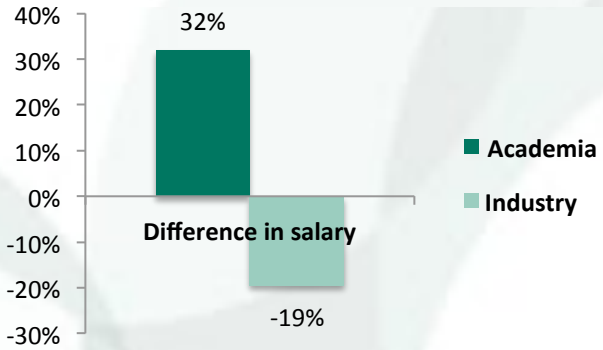
- Choosing your mentor, research topic, methods
- Choosing what to present at conferences
- Deciding on authorship when publishing
- Deciding where to submit manuscripts for review

CI Fellows were paid more (in academia)

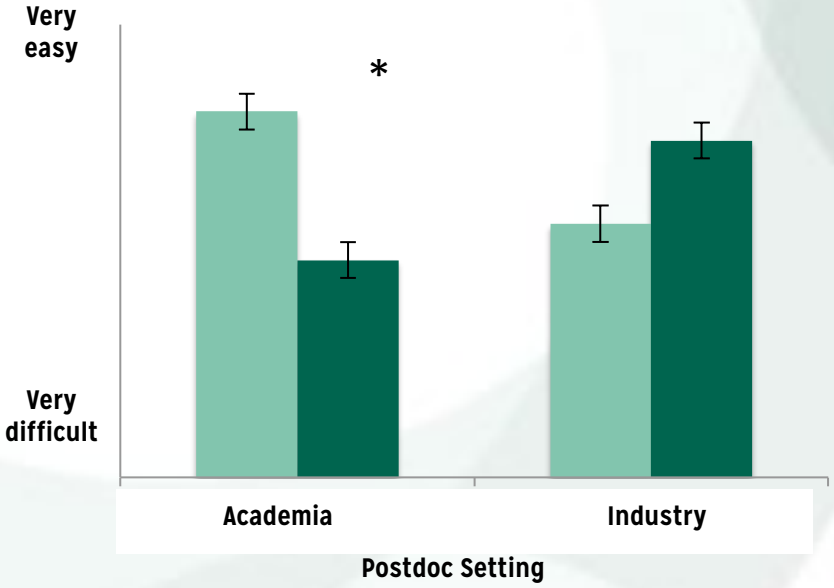


CI Fellows

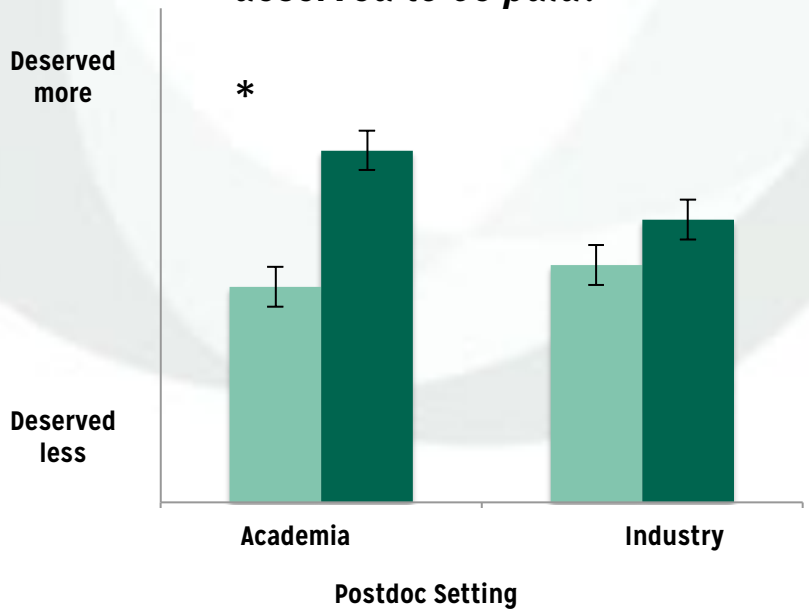
Non-fellow Postdocs



How difficult was it to live off your salary?



How much do you feel you deserved to be paid?

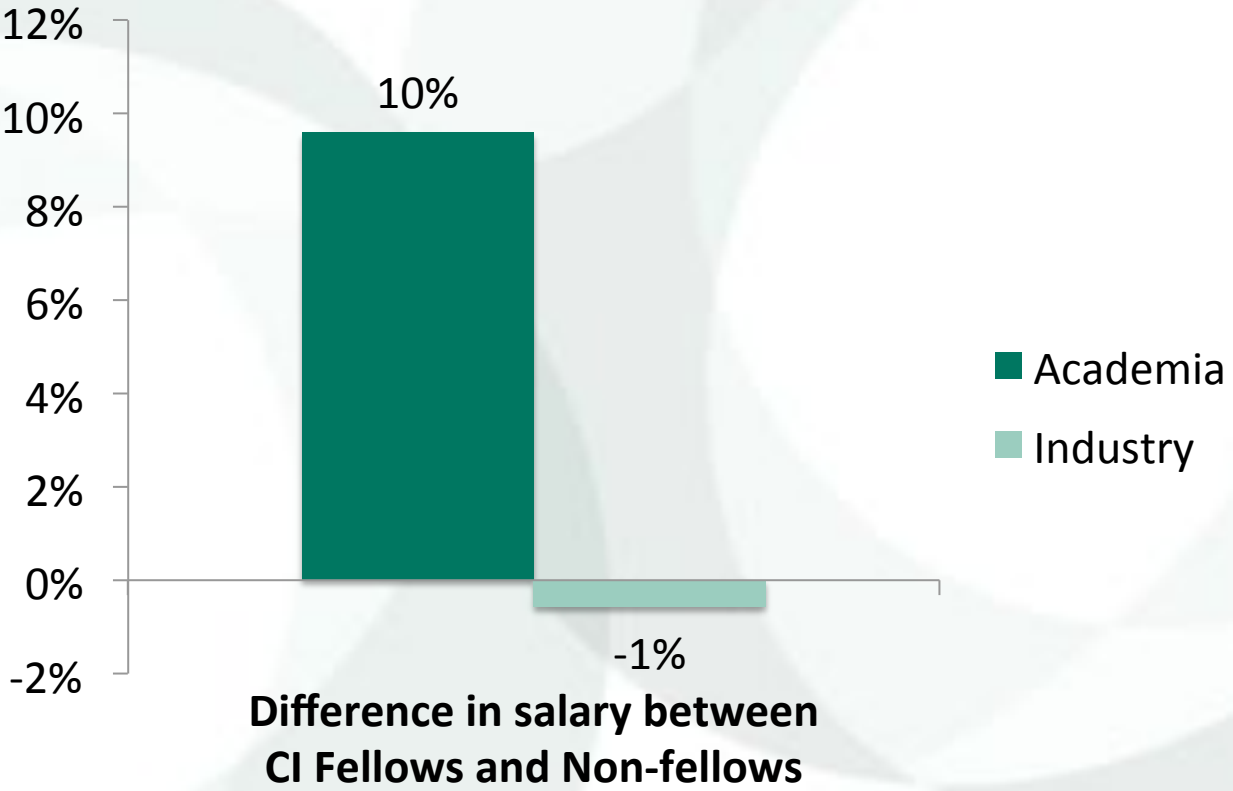


CI Fellows had more independence and resources

- “Having the CRA CI Fellowship gave me financial independence, which allowed me to work on my own projects, and seek out collaborations outside of the specific lab that I was in.”- CI Fellow

- “The research funds from the CI Fellows award let me decide how to pursue my research, what workshops/conferences I needed to attend, and to purchase supplies that I thought I needed. This independence was invaluable.” - CI Fellow

CI Fellows currently earn a higher salary (in academia)

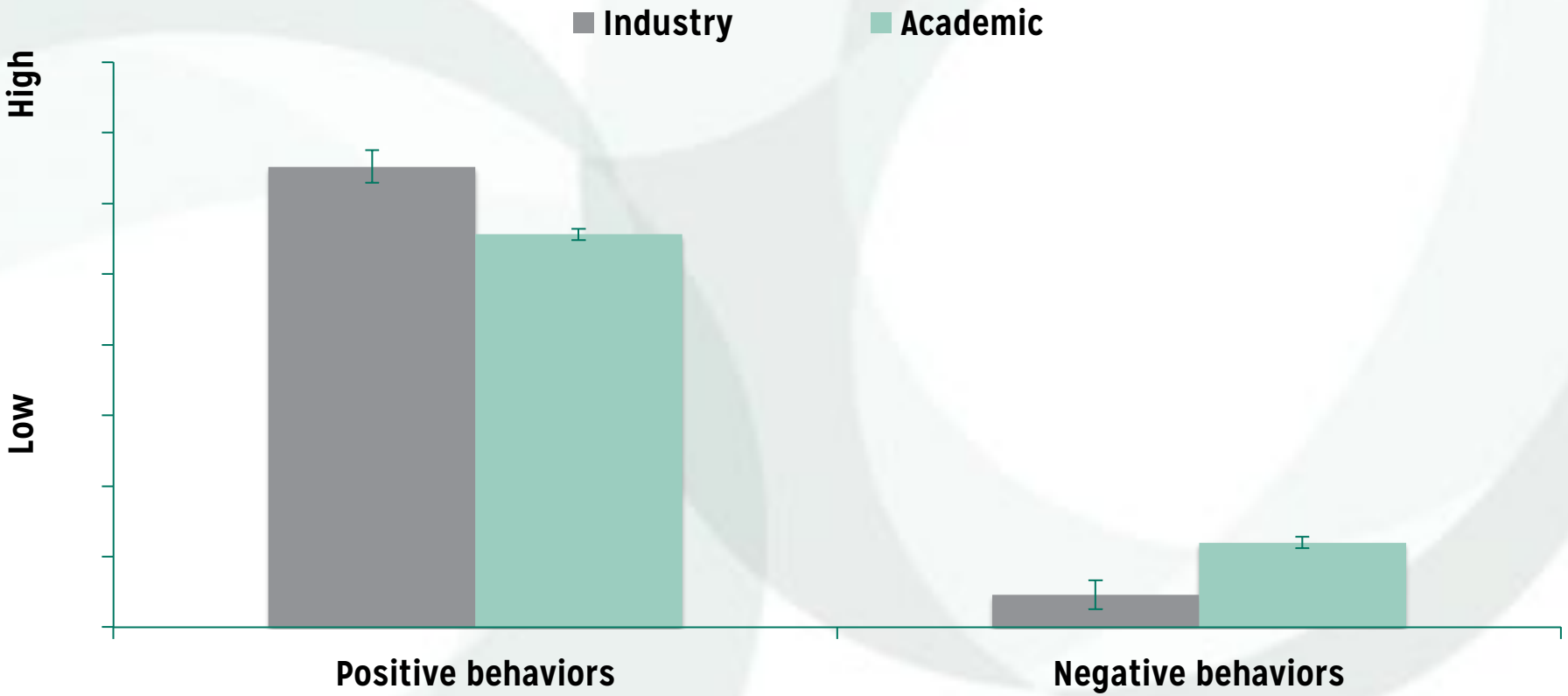


Key Findings: Evaluation 2

Industry versus Academia postdocs:

- Better relationship with advisor
- Juggle professional and personal responsibilities better
- Perceive a more supportive work environment

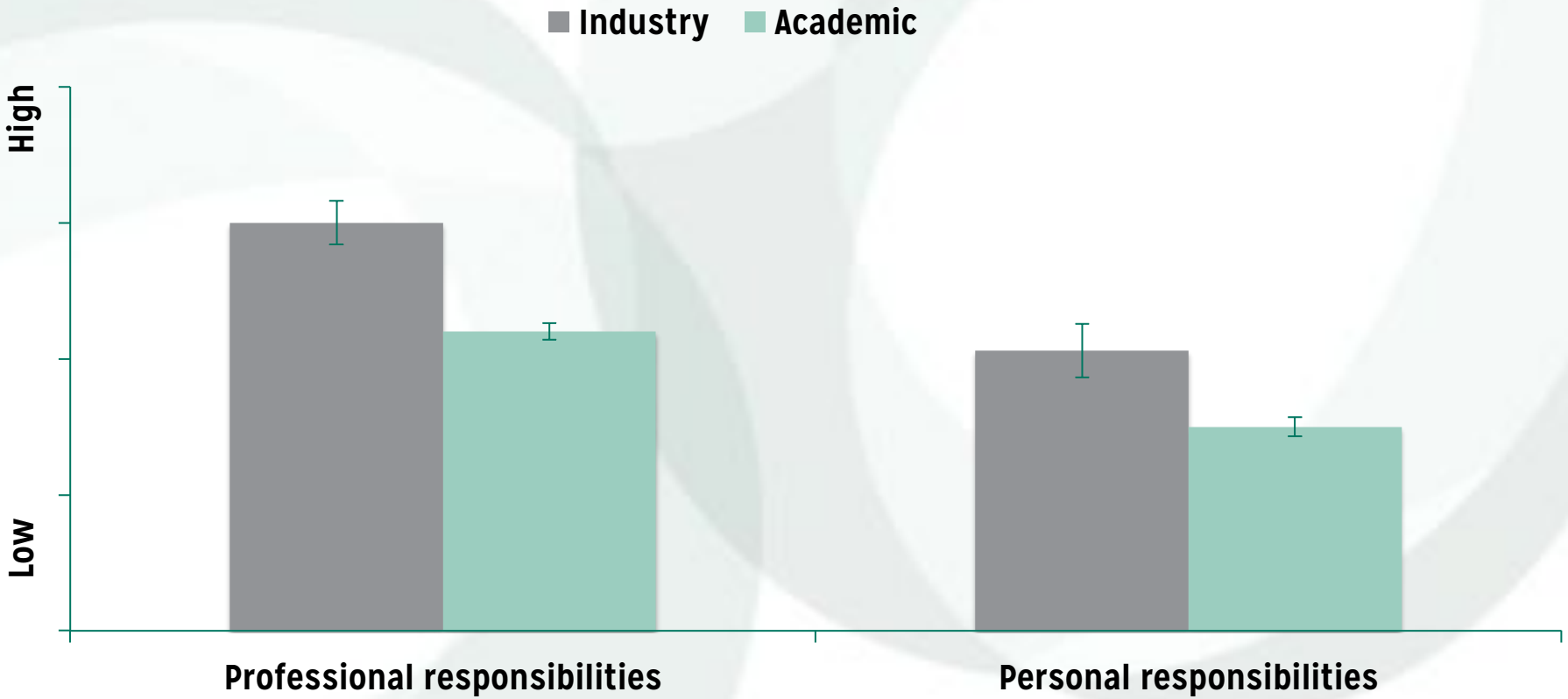
Interaction with Postdoc Advisor



- Was respectful
- Helped guide your research
- Took note of your strengths
- Helped you work on your weaknesses

- Micromanaged your work
- Asked to you do administrative work unrelated to your postdoc research

Management of Professional and Personal Responsibilities



- Lab responsibilities
- Research responsibilities
- Career development
- Relationship with your advisor
- Relationships with co-workers/colleagues

- Activities outside of work
- Relationships with friends
- Relationships with family

What makes an industry postdoc so manageable?

"I think I enjoy the stuff that I can do in an industry lab -- sort of being flexible, if I need to take a break to just build something out. I don't want to have to stress out about students or funding or things like that."

–CI Fellow, Industry Postdoc

Perceived Supportive Work Environment

- Feeling welcome
- Feeling encouraged

Lessons learned from different types of postdocs

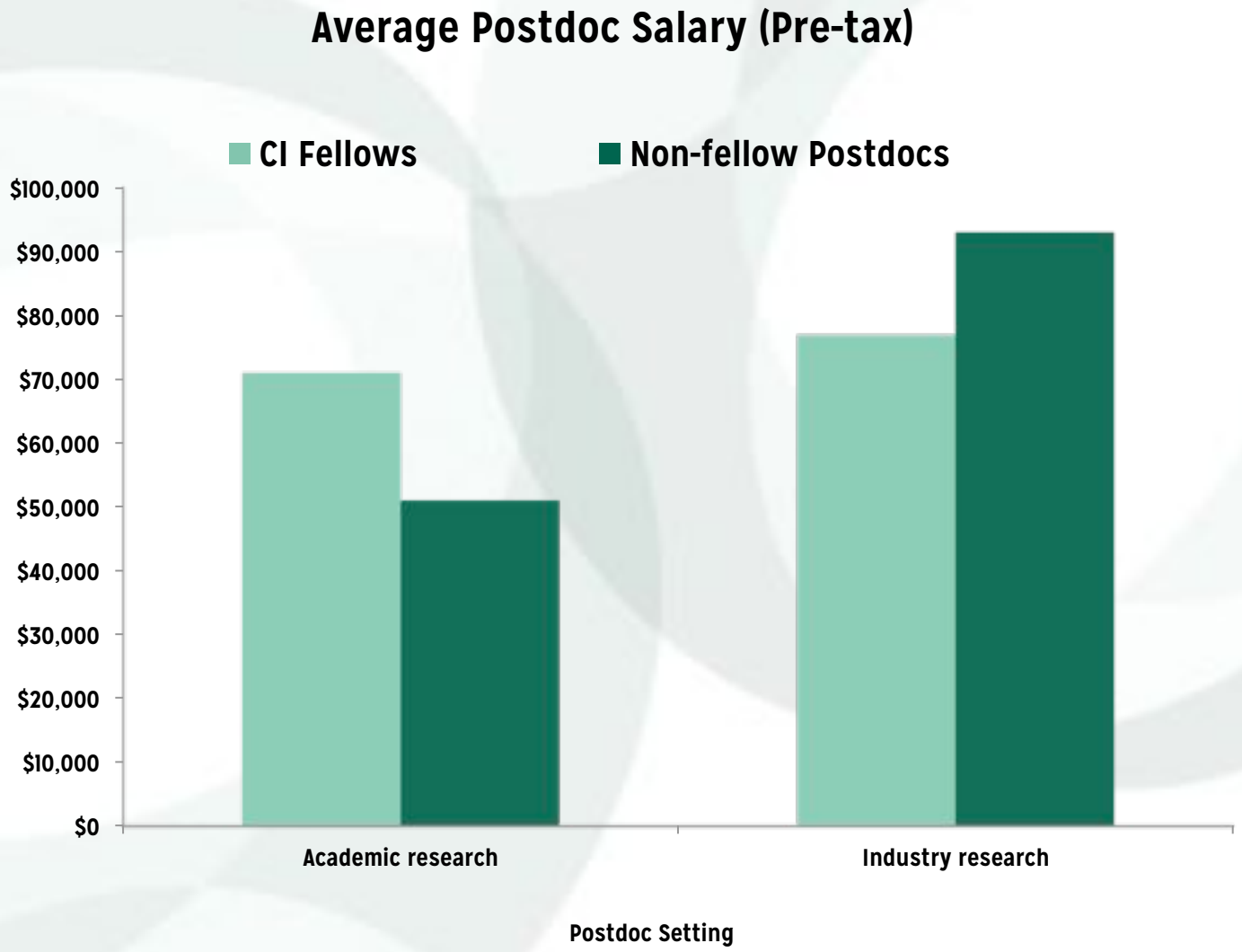
- CI Fellows postdoc
  - Independence
  - Associated with higher salary after postdoc
- Industry postdoc
  - Better relationship with advisor
  - Juggle responsibilities
  - Supportive environment

Relationship with Postdoc Mentor is Important

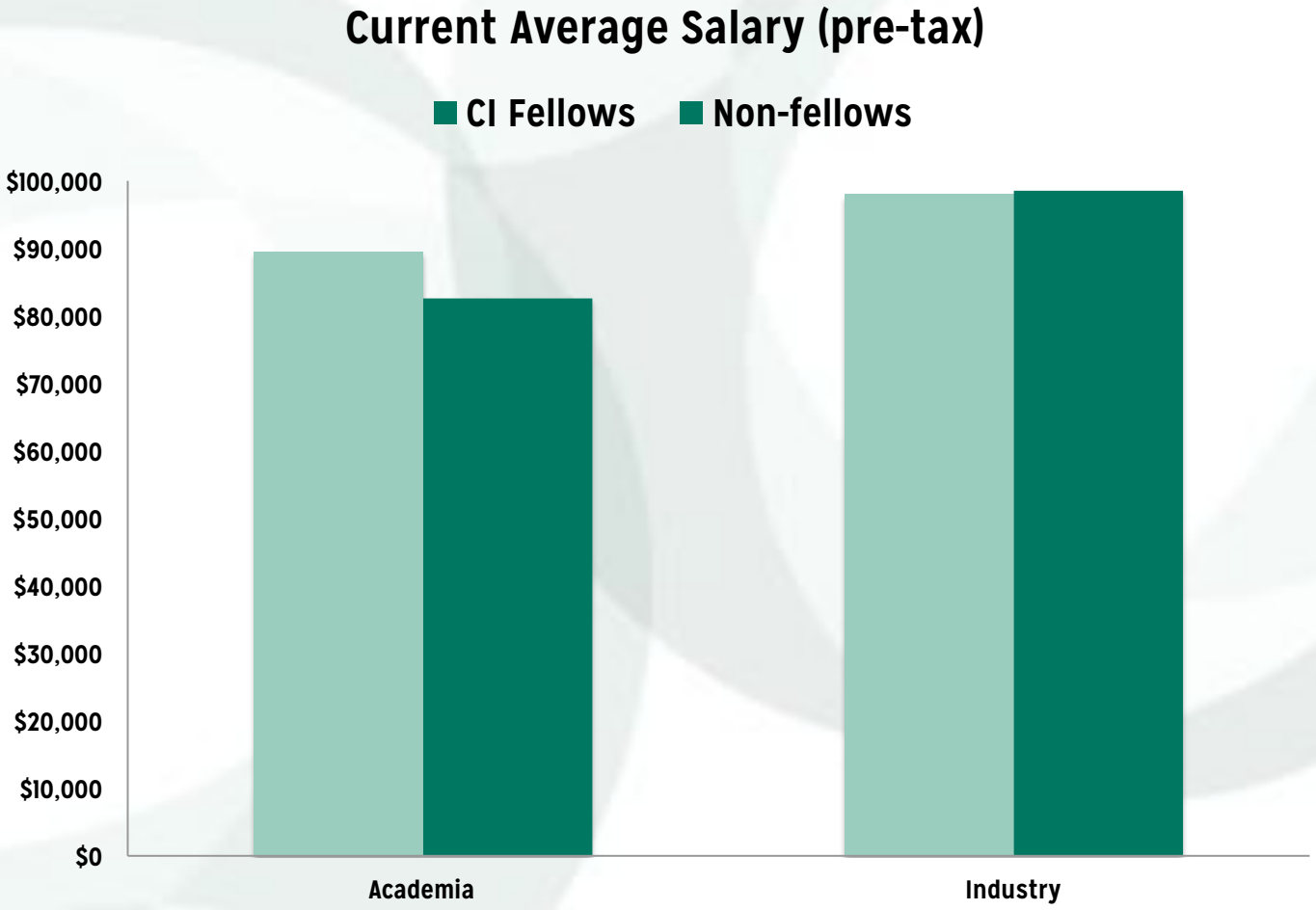
"I think having mentors in the postdoc situation really push[es] you to independently think beyond what your PhD was." **–CI Fellow**

"I think mentors and role models make a big difference. I mean, that's why I got into computing. I thought it was sitting in a cubicle all day." **–CI Fellow**

CI Fellows were paid more (in academia)



CI Fellows currently earn a higher salary



PostDoc BP - Arizona
(Best Practices for Post-Docs)

Chitta Baral, SCIDSE, ASU

Partha Dasgupta, SCIDSE, ASU

Pamela Garrett, Office of Graduate Education, ASU

Len Fine, Science Foundation of Arizona

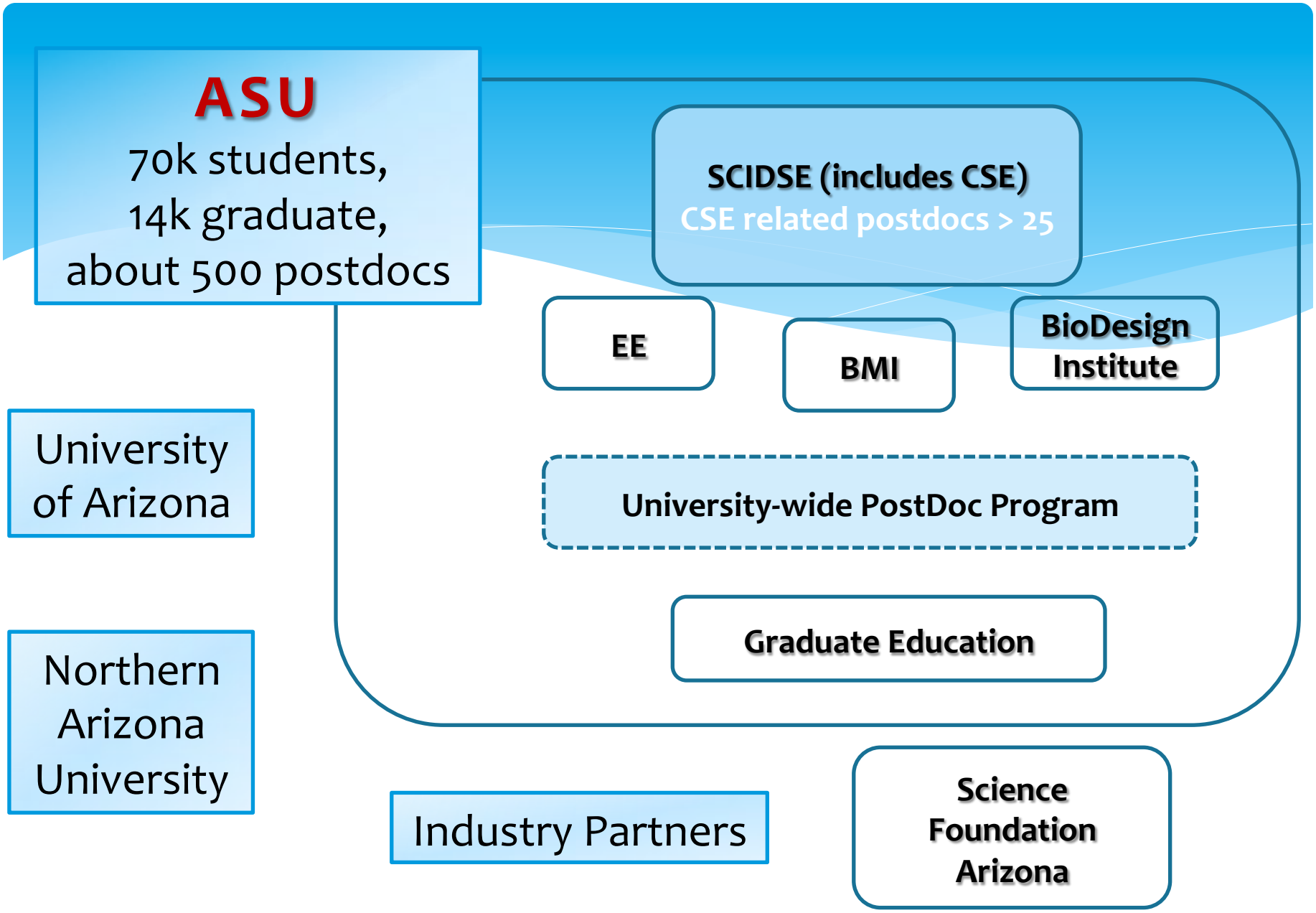
Premises

* Post-doc in Computing relatively new in many Universities, growing rapidly
* Post-doc researchers “too tied” advisors
* Not exposed to the bigger picture
* Advisors may not be able to provide exemplar mentorship
* Need postdoc programs to expand to all levels:

  Advisor ⇒ Department ⇒ college ⇒ university

Overall Vision

* Champions
* Peer Mentoring + social networking
  (online + physical)
* Synthesis Center (accessible meeting location)
* Broadening of Visions and Perspectives
  * Grand challenges and innovations
  * Career Development skills
  * Ethics, Diversity, Cultural and gender issues
  * Social and life skills (non US scholars with limited ties to PhD students)
* Pilot project for entire University
  * With University buy-in (OGE, OKED, President's office)


ASU
70k students,
14k graduate,
about 500 postdocs
SCIDSE (includes CSE)
CSE related postdocs > 25
EE
BMI
BioDesign Institute
University of Arizona
University-wide PostDoc Program
Graduate Education
Northern Arizona University
Industry Partners
Science Foundation Arizona

Local Advantages

* *Bisgrove* Postdoc scholars program funded by SFAZ
* Office of Graduate Education (Dr. Garrett is a Co-PI)
* FURI – undergrad research with postdoc mentorship
* OKED (Office of Knowledge Enterprise Development) – to provide seed grants to postdocs
* ASU President has expressed support
* ASU commitment to expand across the university
* SFAz – Multi University and Industry tie-ups
* ASU's Office of Evaluation to evaluate effectiveness

Current Status

* Advisory board
* Have buy-in from initial set of Champions
* Have preliminary space for Synthesis center
* Univ. of Arizona on board,
  Northern Arizona visit in a week:
  [Post-docs: 20@ASU, 7 @UA, 7@NAU]
* Post-doc mentor lunch at ASU in April
* Two Post Doc + PhD student mixers held in April and May

Plans – short term

* NAU tie up very soon (Aug)
* Program Wide Orientation (Sept)
* Postdoc Workshop for ASU, UA and NAU (Oct)
  * Keynote speakers
  * Speakers from ASU, UA, NAU
  * Invited Guests
* Mixers and invited talks (Sept – Dec)
* Regular formal and informal mixers, invited speakers, exchange of ideas, mentorship meetings and so on

Conclusion

* Mentor postdocs into wholesome individuals with good career prospects
* Evaluate effectiveness
* Allow plenty of opportunities for human development
* Create a model postdoctoral program for
  * College-wide deployment and expansion to the University
  * A pilot plan for large state universities

NYC ASCENT

Advancing Computer **S**cience **C**areers through **E**nhanced **N**etworking and **T**raining:

Implementing Best Practices in the Computer Science and Engineering Postdoc in New York City

Julia Hirschberg, Co-PI
Columbia University
Snowbird 2014

ASCENT Collaboration

- Lead: Columbia University
- Partner Schools:
  - City University of New York
  - Cornell and Cornell NYC –Technion
  - NYU and NYU Polytechnic School of Engineering
- Coordinator: Kate Mazal

ASCENT Program

- Enhance the postdoc experience by providing ASCENT Fellows with
  - Training in technical writing and presentations, proposal preparation, leadership and collaboration skills, interview skills
  - Networking opportunities with other postdocs, faculty, industrial researchers and practitioners
  - Career services and job search support
- Goal: Make fellows more competitive for academic tenure-track positions and for leadership positions within industry, government, and non-profit sectors.

ASCENT Participants

- Fellows: Computer Science and Computer Engineering postdocs at Columbia, Cornell, CUNY, and NYU
- Affiliates: CS and CE postdocs from other local institutions
- Mentors: Faculty at Columbia, Cornell, CUNY and NYU – with or without postdocs of their own – as well as industry affiliates

ASCENT Programming & Curriculum

- Individual Development Plan (IDP)
- Monthly professional development workshops that rotate between campuses (leadership skills, academic writing, communication and conflict resolution, grantsmanship and obtaining funding, job search, interviewing, resume and CV writing)
- Quarterly orientations (one hosted at each school)
- Networking events with industry and ASCENT schools
- Annual Career Symposium and Employer Fair
- Online/Virtual Resources

Sample NYC ASCENT Curriculum

The 21st Century Postdoc "Curriculum"

Curricular Theme	*Sample Seminars & Subject Matter*
NYC Orientation: IDP and Making the Most of the Postdoc	Offered in both Spring and Fall of each year.
Communication skills: Writing	*Writing for Scholarly Research Publications, Technical Writing for Grant Proposals, Writing for the Lay Audience*
Communication skills: Public Speaking	*The Talk Talk*: chalk talk, elevator talk, public speaking; *Framing Your Research for Diverse Audiences*
Grantsmanship Workshop	*Finding Funding, the Submission Process*
Ethics	*Responsive Conduct of Research*
Management skills	*Managing People*: staffing, mentoring, and conflict resolution; *Managing Projects*: budgeting, purchasing, time management
Job search	*The Academic Job Search* and *Understanding the Tenure System*, *Careers beyond Academia, CV to Resume, Interviewing and Negotiating*
Teaching	*Developing First Year Courses* and *STEM Pedagogy*, *Teaching through an Online Platform(e.g. MOOCs)*
Leadership Workshop	Adapted from the Cornell course and Postdoc Program
Product Development & Commercialization Workshop/ Entrepreneurship Bootcamp	*Design Thinking*, *Defining Your Market*, and *Managing Intellectual Property*, *Commercialization*, and *Entrepreneurship*; in collaboration with NSF iCorps (NYCRIN), or modeled off the Lean Launchpad approach

Proposed Curricular Calendar & Locations

- September: Launch/Kickoff Event @ Microsoft Tech Center
- October: Orientation – IDP and Planning the Postdoc @ NYU
- November: Entrepreneurship – LEAN Launchpad Training @ CUNY
- November: Academic Writing Workshop @ Columbia
- December: Orientation – IDP and Planning the Postdoc @ Cornell
- December: Networking Holiday Event @ TBD (Google)
- January: Communication & Conflict Resolution Workshop @ NYU
- February: Orientation – IDP and Planning the Postdoc @ CUNY
- March: Networking Event @ TBD (IBM)
- March: Leadership Skills 2-Day Weekend Workshop @ Cornell
- April: Finding Funding and Writing Proposals Workshop @ Columbia
- April: Job Search Prep Workshop @ NYU
- May: Orientation – IDP and Planning the Postdoc @ Columbia
- May: Employer Fair and Career Symposium @ CUNY
- June: Networking Event @ TBD
- July – August: Free NYC calendar of events

Creating a Virtual Community

- Develop online infrastructure to connect remote postdocs at Cornell/Ithaca, NYU Abu Dhabi to events and resources
- Blended-learning to connect online and in-person components (much like the “flipped classroom” approach)
- Streaming for Ithaca and international participants
- Announcements, job postings, calendar information and registration, curricular offerings (modules), and additional postdoc resources featured
- LinkedIn and Facebook communities to connect ASCENT postdocs
- All virtual resources will be available through www.nycascent.org

Evaluation

- Baseline survey as part of ASCENT Fellow application
- Exit surveys and career path data collection
- Network growth analysis (LinkedIn)
- Event attendance records
- Programming and annual satisfaction surveys
- IDP as artifact: “journey mapping”
- Short annual mentor surveys
- Evaluation will examine the success of each intervention individually and the program as a whole by collecting metrics on the postdocs who participate in the program and events and comparing to baseline data

Questions to be Addressed

- How to effectively incentivize faculty and their postdocs to enroll and stay in the program
- How to properly and effectively coordinate with all partner institutions/sites
- How to manage interaction with remote participants
- How to keep track of postdocs and their career paths once they leave the program
- How to generalize results

Taking Collective Responsibility

University of Washington, Computer Science & Engineering

Aruna Balasubramanian, new faculty at Stony Brook, networking
Gaetano Borriello, faculty, computing for development (ICTD)
Ed Lazowska, faculty, systems and eScience
Ben Ransford, post-doc, sensor systems
Simon Peter, post-doc, systems and networking
Dan Ports, post-doc, distributed systems and languages
Sudeepa Roy, post-doc, databases

Major trends for CSE post-docs

- More post-doc positions
  - UW had 2 in 2003, now we are at 27
  - growth in dept including 50% more ugrads pales in comparison
- More competitive hiring
  - More graduating grads feel a need for a "finishing school"
  - Increase visibility within appropriate research community
  - Begin to assert more independence in choice of research topics
- Inconsistency in experiences
  - Post-docs often viewed as "super-grad" or "staff who write papers"
  - Rarely is there collective department responsibility, left to PI

Part I: Visibility

- Increase visibility with department faculty
- Seminars
- Discussion of exiting post-docs
- Exposure to graduate students
- Networking among post-docs
- Social events
- Span across departments that include CSE post-docs

Part II: Independence

- Support fast-tracked REU-like proposals
  - Fund undergrads to work on post-doc-initiated investigation
  - Topics independent of post-doc's PI
- Workshops on grant writing
- Discussion of publication process tradeoffs
- Workshops on advising and mentoring

Part III: Department Investment

- Staff post-doc coordinator and faculty ombudsman
- Post-docs viewed as much department products as grads
  - Web presence
  - Job placement
  - Touting achievements
- Periodic progress check towards goals set out initially in post-doc plan with PI

Part IV: Evaluation

- Recruit a set of universities to implement UW-developed policies
- Measure differences against control group w/ no intervention
  - Post-doc satisfaction
  - Publications
  - Job placement
  - Advising/mentoring

Part V: National coordination

- Disseminate practices through conferences/workshops
- Develop checklist for post-docs as well as mentors
  - How to develop post-doc plan
  - How to evaluate progress
  - Important experiences during post-doc period

First steps

- Survey of chairs of Taulbee departments (summer)
- Implement department practices for post-docs at UW (fall)
- REU-like small grants for independent research (summer)
- Checklists for post-doc process (fall)
- Decide on metrics and start collecting data (fall)

Thank you!

- Gaetano Borriello, gaetano@cse.uw.edu
- David Rispoli, rispoli@cse.uw.edu

BEST PRACTICES: POSTDOCS IN INDUSTRY

Brent Hailpern

Director of Computer Science

IBM Research

DISCLAIMER

- These are guidelines we use at IBM Research – Almaden
- They are NOT official IBM HR policies or practices

WHO / WHAT IS A POSTDOC

- Recent recipient of a PhD – usually no more than 2 years ago
- Officially treated as “Long Term Supplemental” employee – max 3 years
  - Key item – plan for what comes next – Academia? Industry?
- Full-time engagement in research
  - Postdoc is expected to publish results of research during period of appointment
- Project participation under guidance of group manager or other senior leader
- Comply with all company policies regarding IP, ethics, conduct, etc.

COACHING, MENTORSHIP, PLACEMENT

- Department should have an overall postdoc “advisor” – single point of contact for postdocs and their managers
- Member of research group, other than manager, assigned as mentor
  - Guidance in research and environment to facilitate success
  - Professional development, written/oral skills
  - Expose to other groups within organization
  - Career advice
- New Postdocs encouraged to give seminar on their work within first 3 months

EVALUATION

- Regular feedback from manager – i.e., every 6 months
- Document accomplishments in short “brag sheet” at end of each year of appointment

NON-PROBLEMS (HOPEFULLY)

- As “Supplemental Employees”, Postdocs have access to
  - Standard salary scales
  - Benefits (including health care)
  - Grievance and dispute mechanisms

RESOURCES

- PostDoc Best Practices program (current CRA/CCC focus)
  - http://postdocbp.org/programs
  - Site will contain pointers to other CRA/CCC resources

- "The Explosive Growth of Postdocs in Computer Science," Anita Jones, CACM 56(2) 37-39, February 2013
- CRA working paper, Jan. 2011
  - http://cra.org/postdocs/Issues-PostDoc-1-28-2011.pdf
- CRA Best Practices memo
  - http://cra.org/resources/bp-view/best_practices_memo_computer_science_postdocs_best_practices/
- CIFellows project
  - http://cra.org/ccc/leadership/cifellows-project
  - Evaluation: http://cra.org/cerp/wp-content/uploads/2014/05/CI-Fellows-Evaluation-Report1.pdf

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