

Postdoctoral Fellows in Computing
An Emerging Consensus of the Computing Community
March 2012

The field of computing is maturing. As it does, the field is experiencing changes in career trajectories (such as the percentage of new doctoral graduates pursuing industrial research and development careers compared to those following academic careers), changes in expectations of accomplishment at time of hiring, and changes in the demographics of the field. As the field of computing evolves, it is important for the community to address key issues that affect its health. The Computing Research Association has served as a mechanism for articulating consensus views of the broader community on such issues in the past – for example, the importance of different publishing venues in promotion and evaluation and the special considerations for evaluation and promotion of interdisciplinary researchers.

One emerging issue is the role of the postdoctoral position in computing research. This document proposes a consensus statement that the Computing Research Association supports. This consensus was reached after considerable and open community discussion, based on a discussion document (see <http://cra.org/postdocs>) prepared by a committee chaired by Anita Jones (University of Virginia). It is a statement of the opinion of the majority of members of the Board of Directors of the CRA.

This consensus is a statement by the community to all concerned with the issue of postdoctoral positions in computing. It is not a statement of policy; indeed the CRA certainly cannot (nor does it wish to) require individual departments to act in specific ways, nor can it set limits to funding agencies on numbers of postdoctoral positions to support. Instead, this paper provides information to graduating doctoral students, to mentors, to hiring departments, and to funding agencies, by articulating guidelines on when a postdoctoral position is a positive experience, and by articulating expectations of postdoctoral fellows, their mentors and their supporting departments that will foster a positive experience for the individual and for the field as a whole.

It is the consensus of the community that unfettered growth in the number of postdoctoral fellow positions in computer science is not healthy for the field. The community notes that the Taulbee Survey since 2006 indicates 740 tenure-track academic positions taken, 886 postdoctoral fellowship positions

taken, and 3567 industrial positions taken. The number of postdoctoral positions in 2010 was almost triple the number in 2006, and was roughly 2.5 times the number of academic positions taken in 2010.

A rapid growth in positions may lead to scenarios in which postdoctoral fellows are used as a holding pattern in career development, while waiting for a permanent position to appear. This holding pattern is particularly troubling if it leads to an expectation that most doctoral graduates will undertake one or more postdoctoral positions before accepting a permanent position, as has happened in some science fields. The computing community is concerned that if multi-year postdoctoral positions become the norm, this will have a negative impact on demographics of the field, as it will make early family years much more difficult for candidates. Moreover, the funding of postdoctoral positions may come at the expense of funding for other aspects of the research endeavor, such as graduate students, and the community is concerned that unfettered growth in postdoctoral fellows, while potentially satisfying short term research contract needs, will reduce support for earlier stages of the research pipeline. Furthermore if postdoctoral positions become viewed as a necessary stepping-stone on the way to a faculty position, the people who are already at the peak of their intellectual powers are delayed in attaining a position where they can independently pursue research and teaching.

For potential postdoctoral scholars, the consensus of the CS community is that such an experience is of value when:

- It is being used to expand the scholar's experience base, such as entering a new research discipline, or gaining a distinctly different perspective on the scholar's current research base;
- There is a specific and relevant opportunity for intellectual growth, such as working with a particular mentor or on a particular project; and
- The cumulative term of the position is, except in rare, extenuating circumstances, no more than two years in duration.

We note that a postdoctoral fellow position may be useful, but not optimal, for individuals who take the position for other than a main objective of training, such as synching two body situations. It is important to stress that a postdoctoral fellow position is not a career, but has value when it directly enhances career development.

In light of these guidelines, a candidate for a postdoctoral position should expect:

- To receive mentoring and guidance that directly supports professional development, and not simply serve as a contract researcher;
- To have significant opportunities to explore independent research topics, in addition to supporting existing research efforts of the mentor's group – ideally this would include an opportunity to manage operational aspects of a research project under the supervision of the mentor; and
- To enhance the breadth of their research experience by exploring new fields or new perspectives on their base area, and not simply refine material from their doctoral studies.

For mentors, and for computing departments in academia and industry, it is important to understand expectations on their responsibilities to postdoctoral scholars, and to maintain clear perspectives on the impact of postdoctoral fellows on their system. In particular, a mentor and/or a department should:

- Hire a postdoctoral scholar only if they have a strong commitment to providing professional development to that scholar;
- Not view a postdoctoral position as an inexpensive way to meet contract requirements; such needs should be satisfied through research scientist positions with appropriate expectations and benefits; and
- Take an active role in advising their own students about post-doctoral opportunities and alternative career paths. Given the realities of the job market, most students will not obtain tenure-track positions in academia so they should be made aware of the very many alternative and rewarding possibilities.

In addition, departments should be proactive in managing the impact of postdoctoral growth on hiring and search processes. The consensus of the community is that it is not healthy to allow postdoctoral growth to change expectations on search, i.e., that a candidate is expected to have two (or even more years) of postdoctoral experience. While some candidates will use a postdoctoral position to write papers that simply extend their thesis work but do not break independent ground, or to publish papers that are derivative of the supervised project in which they are working, many Ph.D. graduates already have full credentials and are ready to transition immediately into a tenure track position. It is important that search committees maintain a clear perspective – a candidate should not be viewed as less accomplished simply

on the basis of number of publications, rather quality should dominate evaluation and in many cases that quality is very clear even at the completion of a doctoral thesis.

In summary, the consensus of the computing research community is that postdoctoral positions can, under some circumstances, serve a valuable role both to the scholar and to the community. Those circumstances, outlined above, may vary across subfields (some areas such as theory and numerical analysis have traditionally had a higher percentage of postdoctoral fellows); however, the basic principles of the expectations on postdoctoral opportunities and on the responsibilities of mentors and departments remain. The CRA believes that a broad community consensus on this topic, and thus careful attention by the community as the postdoctoral experience evolves, will ensure a healthy and productive growth for the entire community.