

LETTERS

Edited by Jennifer Sills

Postdocs reimagined

In April, we asked young scientists if the idea of the postdoc position is obsolete. If so, what should replace it, and if not, how can it be improved? We received a record response of more than 300 submissions. About a third of respondents felt that postdocs are indeed

NEXTGEN VOICES

obsolete. The rest deemed them necessary, if imperfect.

Many felt that creating a permanent staff scientist position, with full salary and benefits, would help the plight of postdocs, either by replacing the postdoc entirely or by serving as a long-term option after the completion of a postdoc. Others suggested that a system in which postdocs had dedicated funding and were not beholden to a PI would foster more creativity and minimize exploitation. Tailoring postdocs to a broader array of career paths was another common theme. Many responses reflected the feeling that postdocs deserve more respect and recognition. A sample of the responses describing these and other ideas can be found below. To allow for as many voices as possible, in some cases we have printed excerpts of longer submissions (indicated by ellipses) and lightly copyedited original text for clarity. To read the complete versions, as well as many more, go to <http://scim.ag/NG15R>. Follow *Science's* NextGen VOICES survey on Twitter with the hashtag #NextGenSci.



Postdoctoral scientists are far from being obsolete; rather, they are the drivers of research. They made it through a Kryptonian Ph.D. thesis and emerged ever-more-powerful and fearless

to continue in science. They act as mentors and as students. They constitute the



ILLUSTRATION: ALESSANDRO GOTTARDO; PHOTO: COURTESY OF THE AUTHOR

chain link between the “drowning under grant deadlines, conference talks, endless responsibilities,” stressed-out professor, and the “desperate to finally finish his Ph.D. and get out of here” stressed-out Ph.D. student. They think of projects, perform experiments, analyze data, and write papers. They generate beautiful hypotheses, as well as the ugly data that annihilate these same hypotheses.... They stand in a limbo state: They have already committed themselves to science, but the science world has not committed to them....

Nikolaos Konstantinides

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There should be no postdoc positions. Recent graduates should be able to compete directly for full-time research and faculty positions. It's absurd to expect an individual with a Ph.D. to

work into their mid- to late 30s without full employment benefits at income levels that are often well below the median levels for their area. The current system does not offer fair compensation at precisely the time that one needs to start and support a family. The average number of years spent working as a postdoc is 5; the average number of years spent at any job in the United States is also 5. Why is the postdoc neither fully compensated nor fully employed?

Christina Dinkins

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If anything, the concept of a grad student is obsolete. We do not need Ph.D.s anymore. Once upon a time, pre-Internet age, Ph.D.s were rare and conferred expertise, recognition, and prestige.

This is no longer the case. The Ph.D. system...should be replaced with a system that allows researchers with Bachelor's or Master's degrees to be free agents in host... (academic or corporate) labs until they are ready to apply for faculty positions.... The free-agent system would be more dynamic and eliminate the postdoc problem. It would also force academic research to be more competitive in terms of pay, conditions, and personal development.

Martin P. Stewart

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The goal of any academic career track after the Ph.D. should be to prepare a researcher for a leadership research position.... Currently, postdocs apply for

positions in the labs of tenured PIs, where their primary work includes pursuing research topics assigned to them by their superior, managing students, preparing project proposals, and applying for grants within the PI's field...To facilitate more independence in postdocs,...these postdoc positions should be financed directly from the government or university, and not through PIs....This would allow for the postdocs to (i) at least partially pursue their own scientific questions, (ii) try working under more than a single PI and therefore experience different managerial practices, and (iii) see whether independent research suits them. The last is especially important, because setting your own scientific goals is much more difficult than following someone else's.

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...A 1-year pre-assistant professor position could replace the postdoc position. The postdoc would be offered a small lab area and university funds to lead a small group of

jointly supervised graduate students who are interested in the proposal topic. Applying for external funding and being fully responsible for a small lab model would not only help the postdoc to mature for his next career step as an assistant professor, but would stimulate new avenues of research for graduate students.

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...We need to start funding people, and not only projects. Today, funding agencies are giving money for projects. This creates a situation in which people

continuously have to move to their next

project, putting strain on relationships and families...Is this the system we want to support, where there is only room for those willing to sacrifice everything to keep a low-paying job, without any job security whatsoever and the need to move every 2 to 4 years?

Magnus V. Persson

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...Under the current system, if a postdoc substantially contributes with experiments and grant writing for a grant that is awarded to the PI, he/she benefits from the experience (especially if

the postdoc is pursuing an academic position) and in securing funds for the lab. Beyond that, the postdoc should receive credit, via CV or Biosketch, for contributions made to the grant. It would also be beneficial for a postdoc who is transitioning to be able to take a portion of funds from grants to which he/she contributed substantially.

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...Creativity is crucial in science; therefore, young scientists should be exposed to an open arena, where their ideas are not constrained, guided, or limited by the structure of well-established research groups...Research

institutions should create positions for young scientists without expecting them to join a given research group. This would create new research areas for the institution, and push new scientists to be more effective while fighting to get their own funding for research and equipment....

Nicolas Bambach

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...PIs have been able to build their reputations purely on the achievements of postdocs, because they represent the most skilled, cheap labor force. From the point of view of a postdoc, it's the most challenging time in trying to build a base for one's interests, publish, and most important, be able to walk that tightrope of what can be taken with them and what the PI would like



to retain in the lab... To give the postdoc more autonomy, I would strongly recommend that there be more funding opportunities that allow for postdocs to be more in charge of their projects

and what they would like to pursue. This also serves as training to be able to manage money and plan experiments according to a fixed budget.

Suchitra D. Gopinath

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...There should be different kinds of postdocs available for each career track. We need more postdoc positions to help recent graduates transition into industry research,

teaching, or administrative positions.

Kierstyn Schwartz

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The postdoc employment should have a very concrete purpose, agreed upon before the start. For example: "I want to be ready to join a certain branch of industry," "I want to be able to lead a

team and raise funds," or "I want to become a great tutor/teacher." A grant-giving institution would then limit the number of postdocs with each goal according to market demand (for example, 50% for the industry goal, 30% for the team lead goal, and 20% for the teacher goal). At the end of the postdoc period, the success should be evaluated and if the goal was not reached, consequences should follow; the university should have to pay the past postdoc salary from its own money, or future grant money should be reduced.

Michael Böttger

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With an increasing number of Ph.D. graduates aiming to pursue nonacademic career tracks, there is an urgent need to revamp the traditional postdoc position, the majority of which do not prepare graduates for jobs outside academia. A systemic integration of career support into Ph.D. programs in all universities is critical to ensure that

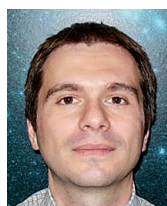


maximum returns are channeled from the national investment in graduate education. An experiential 1-year career-rotation program (not unlike first-year lab rotations) should

follow graduation. Ph.D. graduates would have the opportunity to pursue three to four internships in different settings that value a terminal degree in their field of study. Examples of organizations for which the graduates might intern include science societies, policy think-tanks, law firms, regulatory affairs teams, nonprofit organizations, government agencies, and biotech start-ups. The graduates could be placed in these internships through a matching process facilitated by the university and funded by stakeholders in the process. Such a transition program would be transformative for the educational ecosystem because it would help students identify and gain a foothold in the career track of their choice, allow employers access to a pool of highly qualified job candidates, and help participating universities bolster their student success metrics.

Meera Govindaraghavan

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No more than two postdocs for a given person, up to 3 years each, should be allowed. This would force universities to hire people more permanently after this maximum 6-year period,

rather than exploiting them with numerous postdocs.

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If by "postdoc," we mean a 2- to 3-year research position meant exclusively as a bridge between the Ph.D. program and a professorship, then I think the postdoc is obsolete. I

would make two changes to improve it: (i) Make postdocs into permanent, non-faculty positions. Both individuals and institutions would benefit. A scientist who has to reapply for his/her job every 2 to 3 years—especially if that means moving to a new institution—has much less time to

develop expertise....(ii) Remove the stigma associated with the postdoc—i.e., the idea that if you postdoc for more than 3 years, you must not be faculty material.... Why treat postdocs like lepers if they take more than 3 years to discover something exciting enough to rocket them into a faculty position?

Lisa Neef

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...The problem is that the postdoc is currently an open-ended and unregulated career stage. This situation leaves young scientists exposed, because investigators at all levels

need lots of active postdocs for their labs to be competitive. Academic science has accidentally evolved into a pyramid structure, where the vast majority of postdocs cannot expect to find long-term sustainable careers.... A pragmatic solution would be to limit laboratory size to 10 or fewer individuals, and to create sustainable and independent staff scientist positions....

Tomás Ryan

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The postdoc position should be replaced by an academic research scientist position that is treated as a career.... Although research scientists should be held accountable

for the progress of their research, the labs in which they work should be run with more oversight. Lead investigators should receive managerial training, and an overarching university body should evaluate the management of labs to ensure that research scientists receive appropriate guidance and regular feedback. Within labs, a substructure of collaborative research groups could provide new hires with direct supervision and would also provide senior lab members with the opportunity to develop managerial skills needed for their future success as lead investigators. However, each research scientist need not aim to run an independent lab, as one could rise to a senior research scientist or director level position within a lab, so long as he/she continues to be productive in his/her own research and contributes to the development of others in the lab. A key strength of this structure

is that it values contribution to the overall success of the group rather than solely rewarding individual accomplishments.

Nidhi Rug

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...After completing my Ph.D. in Canada, I started a postdoc in Australia. The contrast in postdocs between these two countries is appreciable. In Australia, I am treated as a full and equal staff member and colleague. I can co-supervise graduate students and apply for grants as a chief/principal investigator, and I am paid a salary that allows me to adequately support my family. Postdoc positions are very different in Canada, where postdocs are often lumped in with graduate students, are not recognized for graduate student supervision, cannot apply for many of the grants full faculty can, and usually earn much lower salaries. Failing to treat postdocs as colleagues and provide them with reasonable funding opportunities and salaries risks losing their energy and expertise....

Matthew Mitchell

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In China, obtaining a postdoc after getting a Ph.D. used to be regarded highly, but this is no longer the case because postdocs in Chinese universities do not receive enough

recognition. Recruitment advertisements often emphasize "overseas research experience preferred." A potential solution would be to strengthen global collaboration, which would help domestic postdocs improve their competitiveness by proposing original ideas, designing innovative experiments, and achieving leading results together with international colleagues....

Bo Cao

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People usually know what is valuable after they lose it. If postdocs vanish, scientific advancement would inevitably suffer... The postdoc position is an indispensable bridge between beginners and experienced mentors... I suggest that scientific journals

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To submit, go to http://scim.ag/NG_16

Deadline for submissions is 14 August. A selection of the best responses will be published in the 2 October issue of *Science*. Submissions should be 200 words or less. Anonymous submissions will not be considered.



include in the contents a special section that exclusively publishes research articles on studies conducted by postdocs in the capacity of leading investigators, thereby highlighting the

contribution of postdocs. Such a simple change not only encourages postdocs to immerse themselves more into research, but also instantly eliminates the unrealistic impression that they do the same work as what students do....

Chun-Wai Ma

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Postdocs who are raising a family while training for a scientific career need more support.... Postdocs pay serious penalties in dollars and, for mothers, in professional reputation when

they have a child, which are exacerbated for underrepresented minorities. Increasing support for postdoc parents would increase diversity at the postdoc and faculty stages, especially in fields where postdocs are longer and more common.... Child care financial aid, eligibility for pre-tax dependent care payment plans, and backup care programs are needed to support postdoc parents. Postdoc fellowship policies should also be adjusted to support new parents. Postdocs on fellowships are often ineligible for maternity leave. And parenting a newborn does not stop when postdocs

return to work; a 1-year extension on the "postdoc clock" of eligibility for NIH's Pathway to Independence award, akin to the 1-year extension faculty get on their "tenure clock," is necessary.

Katherine L. Thompson-Peer, on behalf of P-Value* at UCSF

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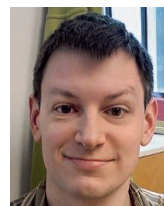


Postdocs should be treated like actual employees. ... We don't get the benefits of employees with less education, less training, and less experience. When you have been in higher education for more than

10 years, it would seem reasonable to get employee health (not student health or no health) insurance and retirement benefits. When a research technician straight out of college gets 6 to 12% retirement benefits, and a postdoc gets zilch, there seems to be a problem....

Jared M. Fischer

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I think the problems facing research make the postdoc position more important, not obsolete.... I suspect that a good number of fresh ideas in research would not have come about if there

were one less step between the lab bench and grant writing... Perhaps there should be grant mechanisms for grad students funding a short postdoc, with the stipulation that it must be a complete departure from what the student worked on in grad school.

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...The increasing rarity of tenure-track positions means that postdocs need to be prepared for jobs that are significantly less attractive. One must honestly answer the question "What am I willing to give up for a career in academia?" before proceeding toward a postdoc.

Kriti Charan

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