



## No more first authors, no more last authors

If we really want transdisciplinary research, we must ditch the ordered listing of authors that stalls collaborative science, says Gretchen L. Kiser.

Every academic scientist has heard a tale of someone being shafted on an authorship list, or had it happen to them. Less appreciated is how much the attribution of credit impedes cross-disciplinary approaches to difficult questions. It creates a negative feedback loop that hinders research.

Most scientists agree that research questions and approaches have become more complex, so the need to engage in expanded team science has increased. I've found, however, that there is great reluctance among faculty members to join such efforts. I find myself asking, 'What if we completely blow up the way in which we attribute authorship?' I suspect that if we got rid of first authors, last authors and the fight for asterisks, we might interrupt the negative feedback loop and see more innovation.

Since 2012, I've led the Research Development Office at the University of California, San Francisco (UCSF). One of our goals is to bring together researchers of varying backgrounds to encourage innovative thinking and new approaches. My team identifies and cajoles 'champions' to invite colleagues to participate in team-building events. We offer financial and logistical support; we bring in interesting speakers; we provide drinks and food (and not just pizza!) — all to get scientists to talk to each other about their research, needs and ambitions. But the resource that really matters is not mine to dispense: credit for scientific contributions.

There are real successes: one of our 'speed-networking' events at UCSF introduced neurologist Dena Dubal, who investigates the molecular mechanisms of longevity and neurodegenerative disease, to psychologist Aric Prather, who researches the effects of stress on health. That led to a project that revealed an association between chronic psychological stress and lower levels of a longevity hormone. They published that work and continue to collaborate (A. A. Prather *et al.* *Transl. Psychiatr.* **5**, e585; 2015).

Other teams we've helped have received follow-on support from external funders such as the US National Institutes of Health. Surveys tell me that faculty members enjoy our team-building events, even when they did not expect to, and that they would recommend them to others.

Nevertheless, there seems to be an undeclared disincentive for researchers to build unconventional collaborations. I get frustrated with the disconnect between what we say about the need for transdisciplinary teams to solve complex problems and the reluctance to try something new to build those teams.

The assessment of publications during promotion and tenure decisions is a big part of the problem. Although these processes often have some mechanism to recognize a researcher's team contributions, the culture remains largely unchanged from 50 years ago. The gravitas associated with 'first' and 'senior' authorship is entrenched. What about the middle author who might have significantly altered the

approach? Or the fourth-place author who linked different disciplines? Often these researchers are left to find only self-satisfaction.

Many journals now allow, and even require, statements that explain contributors' roles in their publications. Taxonomies and standardized vocabularies for describing authors' roles have been developed. Similarly, promotion and tenure committees are using contribution narratives in their assessments. These changes are helping. They capture a fuller spectrum of a researcher's productivity so that evaluators can consider more than where someone sits in an author list.

Still, I've had senior faculty members tell me that, even though they look at the contribution narratives, they still expect to see first-author and then senior-author papers when assessing candidates.

Meanwhile, research projects are starting to incorporate data that no one on the immediate team collected, and there are no settled conventions for crediting outside researchers or incentivizing that valuable work.

We need a cultural shift to recognize and reward scientists who make their work useful to others, including researchers who might never meet but whose data are used. One way to make this happen is to get rid of ordered author lists. By developing author contribution taxonomies and narratives, we have already acknowledged the need to reflect the multifaceted nature of authorship. Large consortia and organizations are adopting contribution frameworks to reflect author roles and participation more accurately. We are also moving to use repository tools that assign authorship to

different types of research output, such as data sets. More effort, creativity and diversity of thought are needed. We should stop trying to apply old attribution models to the innovative ways we now generate data.

If we can reveal the shape of proteins at atomic resolutions, tweak genes to order and detect cosmic signals from the beginning of time, then surely we can work out better ways to represent author contributions. We already send complex basic research and clinical data into 'information commons' and build computational 'knowledge network' tools to inform patient diagnostics and therapeutics. A well-annotated data set might be combined with other data to expand its impact synergistically. Can we imagine an author attribution method that would use cutting-edge computational tools similar to those being applied to scientific research itself? A tool that gives credit where credit is due?

If we acknowledge the products of research in more-innovative ways, the value of 'team-ness' might grow in academic culture and the cutting edge will get sharper. Perhaps, then, I won't have to cajole anyone to participate in team-building activities. ■

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