Who Gets the Credit?

I joined a lab during graduate school and was assigned to a post-doc, who immediately had me working with him to synthesize a key compound for his project. We worked on the compound for a number of months with him directing the effort. However, I was pleased with my own contributions and was delighted to get positive feedback from him. Indeed, the overall experience I was having was very positive, making me work even harder on the project.

That's when things got interesting. Early one evening, when we felt we were very close to success, I decided to stay a bit longer in the lab and try out some hunches. As I systematically tried out each one and tested it to see if it was correct, I FINALLY GOT IT. I verified it over and over to make sure. And I was overjoyed. I wrote it up, and left the lab in the wee hours of the morning elated but exhausted.

So I didn't get to the lab until late the next morning, but I wasn't concerned because I knew my senior partner would be gratified. What do I see, however, but him talking to the PI of the project and taking credit for my discovery of the previous evening. I walked over and was astonished to hear him saying to the PI, "I verified the compound this morning, so we're on our way." Apparently, he saw my lab notes of the evening before, duplicated my test that morning, and now was taking credit for it as his own!

When I got him in private, I was very upset and told him that the last, crucial step in the experiment—the one I did the previous evening—was my idea and my work. He laughed in my face and said that I was only tinkering around with some obvious strategies and that sooner or later one of us would finalize it. In other words, he was entirely dismissing the importance of my work the night before and arguing that the outcome was inevitable no matter which one of us did it. So, he was claiming the work as largely his own because the project was his and he did most of the intellectual work.

How should a lab resolve this problem? In a situation like this, who should get credit and what should the decisional process be?

Expert Opinion

We were surprised to discover that the literature on what Nicholas Rescher has called "credit allocation rules"[1,p.94] in science is rather scant. This is in sharp contrast to the rather large literature on assigning authorship credit, and the scandalous literature on researchers appropriating ideas from one another and then claiming credit for them. Unfortunately, the investigator who is looking for some apriori blueprint or algorithm that spells out who should get credit for what discovery and how much credit will be hard pressed to find that template. But only a little reflection is needed to suggest why that omission exists.

Consider some of the more obvious bases or justifications for allocating credit in scientific research: originality of the research project or experimental idea; ingenuity in developing the research design; persevering through the intellectual and physical rigors of gathering data and conducting analyses; developing critical, perhaps extremely novel experimental materials; providing critical, sometimes ingenious technical support; offering novel or even brilliant insights at any point along the research trajectory; assessing the value of a particular discovery within the overall research project, (e.g., did the discovery play a modest role, or was it momentous in realizing the project's goal?); calculating the value of the discovery's contribution to contemporary scientific knowledge (e.g., is that knowledge expanded, refuted, or better understood in light of the new discovery? Has the discovery enabled new and promising lines of research?); and, of course, deciding the value of the scientific discovery relative to its enhancing human flourishing.[1-3] As such, it isn't difficult to discern why no apriori schema is available for ascribing values to these factors because any research project is

abundantly rich with contextual details like these that would inform and differentiate case-by-case deliberations about assigning credit.

Moreover, the fact that the form of most research is highly collaborative makes for additional problems. If every member of a research team contributed "equally," then, following Aristotle, we would treat equals as equal and give everyone equal credit. Similarly, if the project design was such that each individual's work was equally constitutive of and essential to the end result—or each individual's contribution was so tightly and essentially integrated with all the others' that it would be impossible to isolate one from the other—then we would probably not hesitate to say that the credit must be shared equally.[1]

But much research activity is not nearly so equally distributed. Different tasks are delegated to different people or different groups, each one possibly requiring different levels of expertise or contributional weights—from performing sheer "grunt" work to performing tasks that might require extremely sophisticated knowledge and skill. Thus, while one might greatly value a remarkable insight on solving a complex problem, the experiment might nevertheless be impossible without someone else's contributing a complex reagent or a ninth generation knockout mouse. Not only do all these "contributional interdependencies" exist but as highly interdigitated, they further complicate judgments about a *discrete* contribution's value.

We would be remiss, incidentally, if we failed to note that the problem of assigning credit for a scientific discovery is rampant throughout science's history, prompting Stephen Stigler in 1980 to enunciate Stigler's Law of Eponymy: "No scientific discovery is named after its original discoverer."[4] Confirmatory evidence for Stigler's Law abounds. Alfred Russel Wallace had published papers on natural selection prior to Darwin's 1859 masterpiece, *On the Origin of Species*, whose ideas might have more than influenced Darwin's work.[5] Gaussian distributions were not discovered by Gauss, nor was the Pythagorean Theorem discovered by Pythagoras.[3] And to his credit, Stigler admits that Stigler's Law was discovered by the sociologist Robert Merton.[3]

The crux of the contributor's dilemma involves differing interpretations about the originality and significance of the graduate student's efforts. The post-doc understands the graduate student to be performing experiments that are obvious, straightforward and mundane. Although the post-doc would admit that the assistant's experiments are critical to the ultimate research deliverable, i.e., the newly synthesized compound, the post-doc would probably argue that those experiments more require physical and mental stamina than scientific talent or skill. The graduate student, however, understands her experiment's succeeding in synthesizing the compound as a virtual "breakthrough" rather than a predictable, mundane moment in the research project's trajectory. And for that she wants recognition, i.e., credit. She sees her work as unique, skillful, and precious. The post-doc sees her contribution as menial, inevitable, and ordinary, especially in light of the project as a whole, whose creative and professional ownership he believes are his. How, then, does one resolve this problem?

Let us assume that the PI is unable to adjudicate the dispute to the satisfaction of the graduate student and the post-doc. The next step might be to recruit a group of experienced scientists working in a related area of research, presenting them with the issues and disagreements of this dilemma, and requesting their opinion. A preferred, but perhaps less likely, alternative would be if the institution had installed a research ethics ombudsman or consultation group that could be involved in resolving the dispute. This approach is a distinctly Aristotelian one, looking to experienced and presumably virtuous individuals who will analyze the relevant issues and make a fair and just decision. At least two claims whose truth the group will focus on are the post-doc's assertions that the graduate student's experiments were "obvious" and that sooner or later, one of them would synthesize the compound without much difficulty. The committee's considerations will likely focus on whether or not the nature of these synthesizing experiments were developed in advance, whose creative idea they were, how novel that idea was, and how complex it was to implement. Also, to the extent that the post-doc seems

to want the entirety of the credit for himself, his collaboration with the graduate student must be analyzed. Was she, for instance, doing nothing but dutifully carrying out his ideas and orders, or was she contributing her own and how significant and original were they for the realizing the project's objective?

In his famous paper, "The Matthew Effect in Science," Robert Merton—whom Stigler credits with coming up with "Stigler's Law"—notes that the more famous or authoritative one is in the scientific community, the more likely he or she is to get a disproportionate amount of credit for a scientific discovery.[6] Thus, Merton notes how Nobel laureates will not only sometimes refuse to place their names first on an authorship list, but might even remove their names entirely for fear that readers will simply give them all the credit and fail to notice any of the other authors. (The "Matthew Effect" derives from the passage in Matthew, 25:29: "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath.")

We cannot dismiss the idea that the post-doc might be suffering from a Matthew Effect or, better, a "Matthew Syndrome." He understands himself as the authority figure here and perhaps simply assumes that he is entitled to all the credit for the research discovery. If so, then such narcissistic assumptions might need to be checked by something like the institutional procedures we are proposing here.

Of course, there are practical challenges with all our suggestions: How likely are universities to establish a consultative process as described above? Will their faculties endorse, support, and participate in it? How likely is it that most graduate students would even argue the matter beyond the post-doc and take it to the lab's PI (much less to a formal consultation committee)? Yet, to the extent research universities would establish and publicize such measures for resolving disputes among investigators, they might provide something of a remedy for investigators suffering from the "Matthew Syndrome." Failing all these recommendations for resolving this dilemma, perhaps the only words of wisdom left for graduate students such as the one above are: Choose the post-doc(s) with whom you work carefully.

References:

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