

New algorithm gives credit where credit is due

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Albert-László Barabási, the Robert Gray Dodge Professor of Network Science and a Distinguished University Professor at Northeastern, co-authored a paper with visiting scholar Hua-Wei Shen that presented a new algorithm to determine how credit should be allocated among multiple authors of one research paper. Credit: Brooks Canaday

It makes sense that the credit for science papers with multiple authors should go to the authors who perform the bulk of the research, yet that's not always the case.

Now a new algorithm developed at Northeastern's Center for Complex Network Research helps sheds light on how to properly allocate [credit](#).

The research was published this month in *Proceedings of the National Academy of Sciences* in a paper co-authored by Hua-Wei Shen, a visiting scholar at Northeastern and associate professor at the Institute of Computing Technology at the Chinese Academy of Sciences, and Albert-László Barabási, the Robert Gray Dodge Professor of Network Science and a Distinguished University Professor at Northeastern.

Using the algorithm, which Shen developed, the team revealed a new credit allocation system based on how often the paper is co-cited with the other papers published by the paper's co-authors, capturing the authors' additional contributions to the field.

"The idea behind this is that based on an author's previous line of work, people have a perception of where the credit lies," explained Barabási, the director of the Center for Complex Network Research. "And the algorithm's goal is simply to extract that perception."

To test its hypothesis, the team looked at Nobel prize-winning papers in which the Nobel committee and the science community decided to whom the primary credit for a discovery should go. In 81 percent of the papers related to physics, chemistry, and medicine that they looked at, the credit allocation algorithm found that the authors deserving of the most credit corresponded to the Nobel laureate.

In all, the team looked at 63 prize-winning papers using the algorithm. In another finding, the algorithm showed physicist Tom Kibble, who in 1964 wrote a [research paper](#) on the Higgs boson theory, should receive the same amount of credit as Nobel prize winners Peter Higgs and François Englert.

A world-renowned network scientist, Barabási has joint appointments in the College of Science and the College of Computer and Information Science at Northeastern. The paper builds upon his research in the science of success, which uses a mathematical model for quantifying the long-term success of individual researchers.

Barabási explained that the traditional system of credit allocation varies depending on the field of research, and being the first author listed on a paper does not mean that person would receive the most credit. In biology, for example, the authors listed first and last on a paper are generally the one's who receive credit while in physics the author list is often alphabetical.

"If you are not an insider in the field, you have absolutely no idea who should get the credit for the paper," Barabási said.

While the [science](#) community is usually correct when allocating credit to [authors](#), sometimes credit can go to the wrong person. In their paper, the researchers wrote that "the ability to accurately measure the relative credit of researchers could potentially impact hiring, funding, and promotions."

Barabási also noted this new algorithm could help professors from different disciplines who collaborate on a research paper determine to whom the community would credit the [paper](#).

Provided by Northeastern University

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