

How ideas go viral in academia

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Students attend a computer science class at CU Boulder. Credit: Glenn Asakawa/CU Boulder

How ideas move through academia may depend on where those ideas come from—whether from big-name universities or less prestigious institutions—as much as their quality, a recent study from the University of Colorado Boulder suggests.

The new research borrows a page from epidemiology, exploring how ideas might flow from university to university, almost like a disease. The findings from CU Boulder's Allison Morgan and her colleagues suggest that the way that universities hire new [faculty members](#) may give elite schools an edge in spreading their research to others.

In particular, the team simulated how ideas might spread out faster from highly-ranked schools than from those at the bottom of the pile—even when the ideas weren't that good. The results suggest that academia may not function like the meritocracy that some claim, said Morgan, a graduate student in the Department of Computer Science.

She and her colleagues began by drawing on a dataset, originally published in 2015, that described the hiring histories of more than 5,000 faculty members in 205 computer science programs in the U.S. and Canada.

That dataset revealed what might be a major power imbalance in the field—with a small number of universities training the majority of tenure track faculty across both countries.

"This paper was really about investigating the implications of the imbalance," Morgan said. "What does it mean if the elite institutions are producing the majority of the faculty who are, in turn, training the future teachers in the field?"

Academic roadmap

To answer that question, the researchers turned the 2015 dataset into a network of connected universities. If a university placed one of its Ph.D. students in a job at another school, then those two schools were linked. The resulting "roadmap" showed how faculty might carry ideas from their graduate schools to the universities that hired them.

The researchers then ran thousands of simulations on that network, allowing ideas that began at one school to percolate down to others. The team adjusted for the quality of ideas by making some more likely to shift between nodes than others.

The findings, published in October in the journal *EPJ Data Science*, show that it matters where an idea gets started. When mid-level ideas began at less prestigious schools, they tended to stall, not reaching the full network. The same wasn't true for so-so thinking from major universities.

"If you start a medium- or low-quality idea at a prestigious university, it goes much farther in the network and can infect more nodes than an idea starting at a less prestigious university," Morgan said.

That pattern held up even when the researchers introduced a bit of randomness to the mix—allowing ideas to pop from one end of the network to another by chance. That simulated how university departments might learn about an idea through factors other than hiring, such as journals, conferences or word of mouth.

The results seem to paint a dim picture of academia, said study coauthor Samuel Way, a postdoctoral research associate in computer science. He explained that recent sociological research demonstrates that workplaces benefit by having a lot of diversity—whether in gender, race or in how employees are trained.

"If you have five people who all have the exact same training and look at the world through the same lens, and you give them a problem that stumps one of them, it might stump all of them," Way said.

He added that it may be possible for the academic world to blunt the impact of the sorts of biases the team revealed, including by adopting practices like double-blind peer review—in which the reviewers of a study can't see the names or affiliations of the authors.

"In a setting like science where it's incredibly difficult to come up with an objective measure of the quality of an idea, double-blind peer review

may be the best you can do," Way said.

The study did, however, contain a bit of good news: The bias toward big-name universities mattered a lot less for high-quality ideas. In other words, great thinking can still catch fire in academia, no matter where it comes from.

"I think it's heartwarming in a way," Morgan said. "We see that if you have a high-quality idea, and you're from the bottom of the hierarchy, you have as good a chance of sending that [idea](#) across the network, as if it came from the top."

More information: Allison C. Morgan et al, Prestige drives epistemic inequality in the diffusion of scientific ideas, *EPJ Data Science* (2018). [DOI: 10.1140/epjds/s13688-018-0166-4](https://doi.org/10.1140/epjds/s13688-018-0166-4)

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