Faculty hiring, social class, and epistemic inequality

Allison Morgan
Work w/ Dimitrios Economou, Nick LaBerge, Samuel Way, Daniel Larremore, Mirta Galesic, Aaron Clauset
ETHNIC DIVERSITY AND CREATIVITY IN SMALL GROUPS

POPPY LAURETTA McLEOD
University of Iowa

SHARON ALISA LOBEL
Seattle University

TAYLOR H. COX, JR.
University of Michigan

The Educational Benefits of Diversity: Evidence from Multiple Sectors

by Jeffrey F. Milem
University of Maryland

The Difference

HOW THE POWER OF DIVERSITY
CREATES BETTER GROUPS, FIRMS,
SCHOOLS, AND SOCIETIES

With a new preface by the author

Scott E. Page

Undergraduate Women in Science and Engineering: Effects of Faculty, Fields, and Institutions Over Time*

Gerhard Sonnert, Harvard University
Mary Frank Fox, Georgia Institute of Technology
Kristen Adkins, The University of Texas at Austin

What makes some research more visible?
Who becomes tenure-track faculty?
Outline:

1. Career trajectories and university prestige
2. Institutional prestige shapes scholarship
3. Socioeconomic status shapes academic careers
4. Discuss implications
Career trajectories form networks

BA, Physics
Reed College

BS, Physics
Haverford College

PhD, Computer Science
University of New Mexico

MS, CS
Data Science
@ Twitter

PhD, Computer Science
University of Colorado

Assistant Professor
University of Colorado

Fellow
Santa Fe Institute

Associate Professor
University of Colorado
Career trajectories form networks

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Faculty hiring networks

Each directed edge $u \rightarrow v$
PhD from $u \rightarrow$ faculty at $v$

[US academia: big, mobile, self-contained, competitive]

Dramatic inequality in PhD production
[80/20 rule holds]

Common large-scale structure: influential, well-connected core

Small percentage of edges are self-loops
[8% in CS]

Assumption: reveals collective preferences.
Hiring committees want to hire the best candidates

Computer science faculty hiring network;
http://tuvalu.santafe.edu/~aaronc/facultyhiring/
Features of hierarchy

**systematic**
90% of hiring movement is “down” the hierarchy

**steep**
< 7% of faculty have PhD from lower 75% of universities

**biased**
median change for women
~3 ranks worse than men
Core-periphery position changes with rank

What are the implications?

Mean geodesic distance / diameter

University Prestige ($\pi / n$)

What are the implications?
Shape of the faculty hiring network

- Large inequalities in placement power
- Faculty flow out of core, into periphery
- Modest fraction stays inside core
- Small fraction flows “upstream”
- Prestige describes influence via individuals placement

**Next:** How does prestige affect science as a system? How does SES shape researcher prestige?
Outline:

1. Career trajectories and university prestige
2. Institutional prestige shapes scholarship
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Visibility of research

Prestige drives epistemic inequality in the diffusion of scientific ideas

Visibility of research
Three explanations

(1) genuine differences in merit
(2) non-meritocratic social processes
(3) non-meritocratic structural factors

Three explanations

(1) genuine differences in merit
(2) non-meritocratic social processes
(3) non-meritocratic structural factors

Faculty hiring as a mechanism

**R1:** Are research ideas carried by faculty hiring?
Faculty hiring as a mechanism

R1: Are research ideas carried by faculty hiring?


Earliest published Feynman Diagram
Faculty hiring as a mechanism

**R1:** Are research ideas carried by faculty hiring? (Yes.)

---

Earliest published Feynman Diagram


American Scientist 55, 156-165 (2005)
Proc. 11th Conf. on Web and Social Media (2017)
Faculty hiring as a mechanism

R1: Are research ideas carried by faculty hiring?

R2: Does the structure of the faculty hiring network affect the spread of ideas?
Does the structure of the faculty hiring network affect the spread of ideas?

Seed an epidemic at a university with unique prestige \( \pi \), varying the transmissibility \( p \) (quality of an idea)

Quality of idea relates to how many nodes will adopt an idea (on average)

Measure the fraction of universities which adopted the idea
Does the structure of the faculty hiring network affect the spread of ideas?

Core-periphery position changes with prestige [link to vis]
Average of 10K simulations originating from $u$ with particular quality $p$
Assuming quality of ideas and their origins are independent.
Fraction of Network Infected vs. University Prestige ($\pi$)

Increasing Prestige
Poor quality ideas spread more easily from high-prestige universities.
Great ideas can spread regardless of starting place.
We may lose medium quality research ideas because the system structurally disallows their spread.
Outline:

1. Career trajectories and university prestige
2. Institutional prestige shapes scholarship
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Who becomes tenure-track faculty?
Measuring SES among faculty

**Data:** Survey responses from tenure-track faculty in Anthropology, Biology, Business, CS, History, Physics / Astronomy, Psychology, and Sociology across U.S.

Information about professors’ parents’ education levels (N = 7218; 90.2%), and zip code of where they grew up (N = 4807; 60.0%).

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*Socioeconomic Roots of Academic Faculty*

Allison C. Morgan,1 Nicholas LaBerge,1,4 Daniel B. Larremore,1,2,4 Mirta Galesic,3,4 and Aaron Clauset1,2,3,4

1Department of Computer Science, University of Colorado, Boulder, CO, USA
2BioFrontiers Institute, University of Colorado, Boulder, CO, USA
3Santa Fe Institute, Santa Fe, NM, USA

https://osf.io/preprints/socarxiv/6wjxc
Methods

**Income:** Linked respondent provided ZIP with average AGI from IRS (1998-2018) in the year closest to when they grew up. Adjusted for inflation.

**Education:** Respondent provided: What was your parents’ highest levels of education? Benchmarks come from the Census Bureau and NSF SED.
Parental education

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Percentages of faculty by their parents’ highest held degree, compared to the closest available data on educational attainment of the U.S. adult population when faculty were born and the education levels of the parents of doctoral recipients when faculty started their tenure-track job.
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- **39% first-gen**
- **12% PhD parents**

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Parental education and career support

Parents’ Highest Level of Education

Amount of support parents provided for academic careers on a scale of 1 (None at all) to 5 (A lot), stratified by faculty members’ parents’ highest education levels.
Estimated income

Average income distribution estimated using faculty members’ childhood ZIP codes (green), compared with the income distribution across the 1998 U.S. population (black).
Aside: Isn’t this to be expected?

Medical school admission test: advantages for students whose parents are medical doctors?

Anne Simmenroth-Nayda & Yvonne Görlich

BMC Medical Education 15, Article number: 81 (2015) | Cite this article

7771 Accesses | 7 Citations | 11 Altmetric | Metrics

“IN MY FATHER’S FOOTSTEPS: CAREER PATTERNS OF LAWYERS”

by

STEPHEN L. WASBY & SUSAN S. DALY

57 Celebrities with Famous Parents

These stars practically stole the spotlight from their parents.

by CARINE LAVACHE and RENEE KONNER | JAN 27, 2021

The 25 Most Important Families in Hollywood History

From the Coppolas to the Barrymores to, yes, the Kardashians.

Kennedy family

The Kennedy family is an American political family that has long been prominent in American politics, public service, entertainment, and business. The first Kennedy elected to public office was Patrick Joseph "P. J." Kennedy in 1884, 35 years after the family's arrival from Ireland. Wikipedia

Parent family: O'Kennedy
Place of origin: Dunganstown
Current region: New England
Founder: Patrick Kennedy (1823–1858)

Probably.
Aside: Isn’t this to be expected?

It might be tempting to take the position that the extreme microclass inequalities uncovered here are not all that objectionable. Should we really care, for example, that the child of the truck driver has a special propensity to become a truck driver while the child of a gardener has a special propensity to become a gardener? Must we truly commit ourselves to equal access to truck driving and gardening? If pressed, we would argue that all ascriptive constraints on choice, even those pertaining to purely horizontal inequalities, are inconsistent with a commitment to an open society. By this logic, all types of origin-by-destination association are problematic because they imply that human choice has been circumscribed, a circumscription that is wholly determined by the accident of birth. We care, in other words, that the truck driver is fated to become a truck driver at birth because that amounts to a stripping away of choice, and most of us would embrace an open society in which choices are expanded, not stripped away. Although our illustrative nonchoice (i.e., being a truck driver versus being a gardener) may not have implications for total rewards (of the sort that are consensually valued), it is nonetheless a fateful nonchoice that determines the texture and content of a human life. It is this commitment to an open society, sometimes left quite implicit, that underlies the discipline’s long-standing interest in monitoring marital homogamy, occupational sex segregation, and many other forms of ascription that are hybrids of vertical and horizontal processes.

“It’s a Decent Bet That Our Children Will Be Professors Too” Jonsson, Grusky, Di Carlo, Pollak (2009)
Relationship between prestige and SES
Relationship between prestige and SES

![Graph showing the relationship between current institutional prestige and the percentage of faculty with PhD parents. The x-axis represents current institutional prestige ranging from 0 to 100, and the y-axis represents the percentage of faculty with PhD parents ranging from 0 to 40. The graph indicates a lack of significant difference in the percentage of faculty with PhD parents between more prestigious and less prestigious institutions.]
The relationship between the current institutional ranking of faculty and whether they have a parent with a PhD. Lines show the relationship for faculty born in different time periods.
Relationship between prestige and SES

Percentage of faculty with at least one parent holding a PhD, stratified by prestige of the faculty’s current institution. Green upward arrows describe faculty at top 20% of institutions by USNWR or NRC ranking, and downward arrows the bottom 20% of ranked institutions. The black line describes the average proportion of faculty with PhD parents.
Relationship between prestige and SES

Linear regression of current institutional prestige as a function of neighborhood, estimated income, and parents’ highest education.

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<td>Average income</td>
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4. Discuss implications
Academic workforce

Who becomes faculty?

What influences their visibility?
Ideas spread in academia via faculty hiring. The structure of this network can privilege elite institutions.

**Caveats:** Model assumes quality is independent of institution and hiring decisions.
Implications

Faculty are 2X more likely to have a PhD parent than PhD recipients.

Current placement correlates with having PhD parents.

Caveats: This study doesn’t speak to barriers once individuals become faculty.

What should we do?

The Facade of Fit in Faculty Search Processes
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Roles for Computing in Social Change

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Conf. on Fairness, Accountability, Transparency (2020)
Thanks!

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Systematic inequality and hierarchy in faculty hiring networks
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Prestige drives epistemic inequality in the diffusion of scientific ideas
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EPJ Data Science 7:40 (2018)

Socioeconomic Roots of Academic Faculty
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https://osf.io/preprints/socarxiv/6wjxc

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