Leonardo da Vinci
500 y
Isaac Newton
300 y
Albert Einstein
100 y
Death of Renaissance Scientists
Human Genome Project
10 y
Lingfei Wu
Is research style a personal trait or an evolving strategy?
Hiring foxes or hedgehogs in your interdisciplinary center?
Edmund Rolls

specialization (S) score = 0.71

- Neuroscience: 71%
- Cognitive Psychology: 8%
- Pattern Recognition: 4%
- Computer Vision: 3%

Herbert Simon

S-score = 0.12

- Cognitive Psychology: 12%
- Mathematical Economics: 12%
- Epistemology: 11%
- Cognitive Science: 10%
Research style is more a personal trait than an evolving strategy.

APS data, 24,304 scientists, 84% unchanged.

MAG data, 454,737 scientists, 77% unchanged.
Death of Renaissance Scientists?

Fox-like scientists are declining by -13% and -10%.
Comparing the effect of research styles while accounting for knowledge diversity

Atypicality index (Uzzi et al., 2013) measures (surprising) idea complementary

e.g., GPS, microwave TV
Disruption index (Wu et al., 2019) measures idea substitution.

For example, light bulb vs candle.

Knowledge diversity becomes a burden, e.g., microwave TV.
Ideas are getting harder to displace in science

The principle of functional equivalence: ideas or technologies of the same function substitute for one another, while those with different functions may complement each other.
Death of Renaissance Scientists

1. Research style is more a personal trait (~80%) than an evolving strategy (~20%);
2. Fox-like scientists declined by 13% (49% to 36%) over the past six decades;
3. Fox teams consistently outperform hedgehog teams in scientific innovation.

Zak Risha
Pitt

Yiling Lin
Pitt

Erin Leahey
U of Arizona
How can science and technology advance?

Measure innovation (metrics) and study its cognitive, organizational, and social foundations (mechanisms). Teams are the testbed for all three.

Small teams disrupt

Flat teams innovate

2019 size

2022 shape

Onsite teams conceive

2023 location

How scientists innovate in teams?

1. Author rank;
2. Author contribution disclosure;
3. Author Latex Macro

liw105@pitt.edu

@LingfeiWu

“Team Science & Innovation”

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