



Impact of Science

14-15 June 2018, Ottawa

MacDonald Room, 11.30-12.45

Research policy & strategy

Toby Smith (Chair)

Kennan Salinero

Christian Kobsda

Research policy & strategy

Toby Smith

*Vice President Policy, American
Association of Universities (AAU)*

HOW CAN (RESEARCH) MANAGEMENT ADJUST POLICY AND STRATEGY TO HELP RESEARCHERS AND STIMULATE IMPACT?

Tobin L. Smith, Association of American Universities

Impact of Science 2018

Ottawa, Canada

15 June 2018



Association
of American
Universities

Post World War II S&T Policy Based Upon the Linear Model

The Linear Model of Research and Innovation



Basic
Research

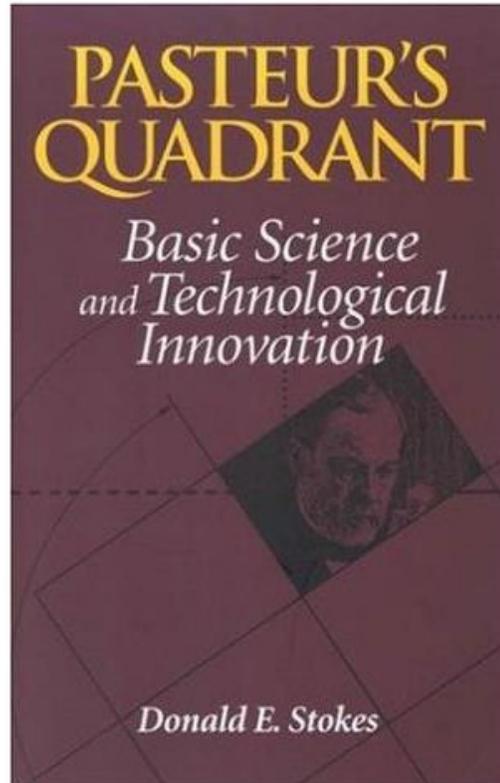


Applied
Research



Development

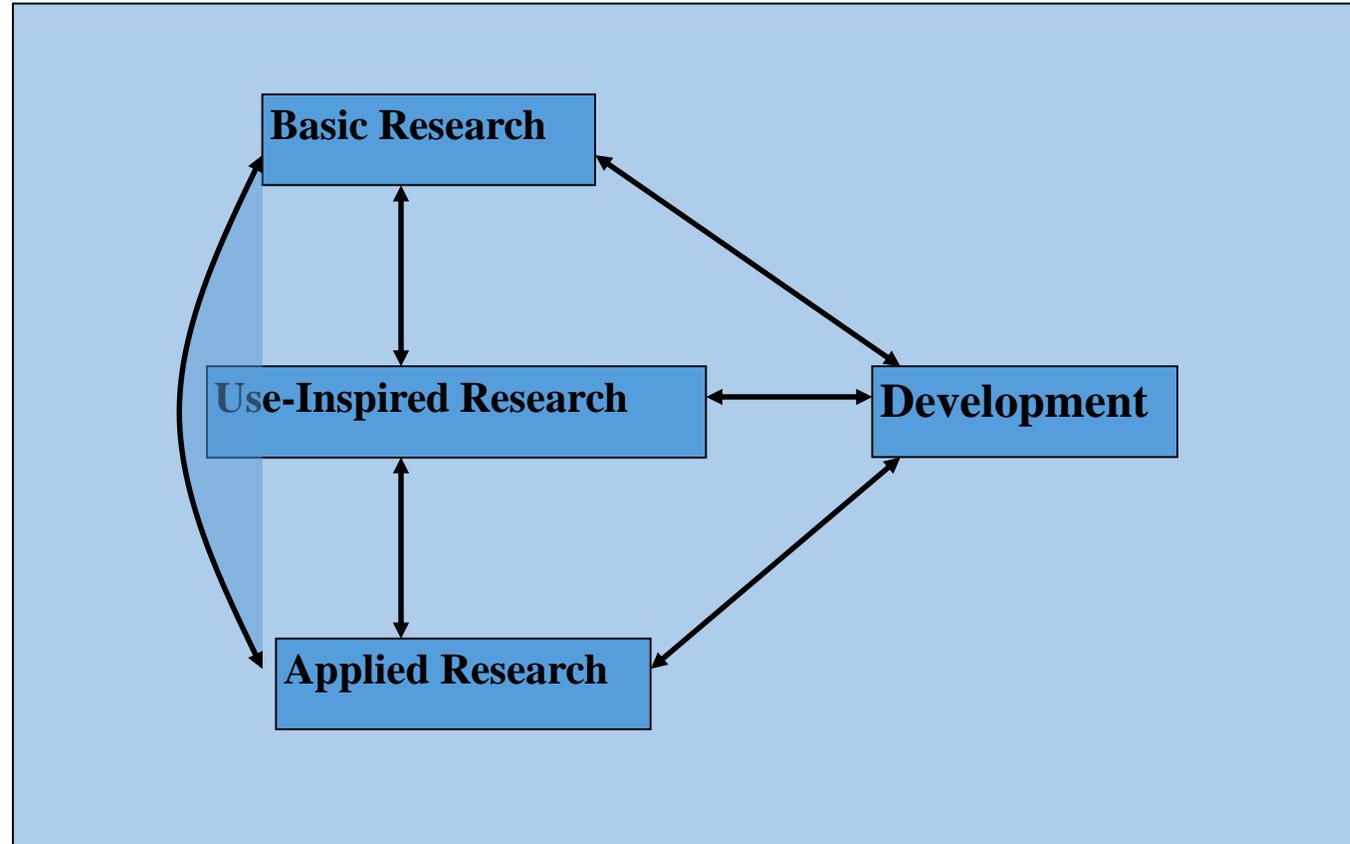
Pasteur's Quadrant



Quest for Fundamental Understanding?	Yes	Pure basic research (Bohr)	Use-inspired basic research (Pasteur)
	No		Pure applied research (Edison)
		No	Yes
		Considerations of Use?	

Adapted from Donald E. Stokes, *Pasteur's Quadrant: Basic Science and Technological Innovation* (Washington, DC: Brookings Institution Press, 1997), figure 3-5.

A Dynamic and Parallel Model of Research and Innovation



Neal, Smith, McCormick, *Beyond Sputnik: National Science Policy in the 21st Century*, (Ann Arbor, Michigan; University of Michigan Press, 2008), figure 1.3.



DEFENSE ADVANCED
RESEARCH PROJECTS AGENCY

Responsive
And
Basic
Integrative
Highly
Research: Engaging Theory with Practice for Transformative Solutions.

OPEN SCIENCE

THINK
GRAND

UCLA Grand Challenges

MULTIDISCIPLINARY
RESEARCH BUILDING 1
AT UC RIVERSIDE



Organizing Research to Increase Impact

- DARPA Model
- HIBAR
- Grand Challenges
- Multidisciplinary Research Centers
- Open Science



How Can Scientists Increase Impact

- Improved Science Communications
- Increased Engagement
- Community Outreach and Extension Programs
- Broader Impacts of Science

WHY SOCIAL SCIENCE ?

STRATEGIES FOR KNOWLEDGE TRANSFER



Leveraging Knowledge

- Tech Transfer
- Knowledge Transfer
- Value of Social Science



TECHNOLOGY TRANSFER EVOLUTION: DRIVING ECONOMIC PROSPERITY

Report of the Technology Transfer Evolution Working
Group of APLU's Commission on Innovation,
Competitiveness & Economic Prosperity (CICEP)

NOVEMBER 2017



CONSENSUS STUDY REPORT

F W L P M I A H K R S F A C U L T Y N D
K R E U Q I T Z P X O 7 S D M A K Q I Y
G M I **GRADUATE** X E T Z L R N L 3
K T N Y M A **STEM** K U P W I W G K B R
E C Q F O **EDUCATION** R S E J T N
N 5 L G B X P A **FOR THE** H P X L I
T W H A D S **21ST CENTURY** O H
B A 4 P X I A E X T M O J Y F X I U N X
I S C A R E E R A B T F R P R A H O T 6
B J A T W M I P M A E 4 S T U D E N T S
K C X H D O K 5 X Z 1 O X 7 S D M A K P
S L I W I R 8 E R N J M E R N 7 O J Y M
N S T A O Z X Q 6 H R E S E A R C H M 3
E R 8 Y L F N U S W S N U I X F M L E J
Y O B S U Z X I A M S T U I X F M L A I
C G 2 J A S B T O L U O Y M S A O T G A
P X B M I 4 D Y X E B R H R B W F M E M
I H X S L E O L 2 M X P E L I 9 Z A X T
E O Y M C U L T U R E 8 C H A N G E T N
A O E I U B S C Y T X H U I X E M I A 4 O

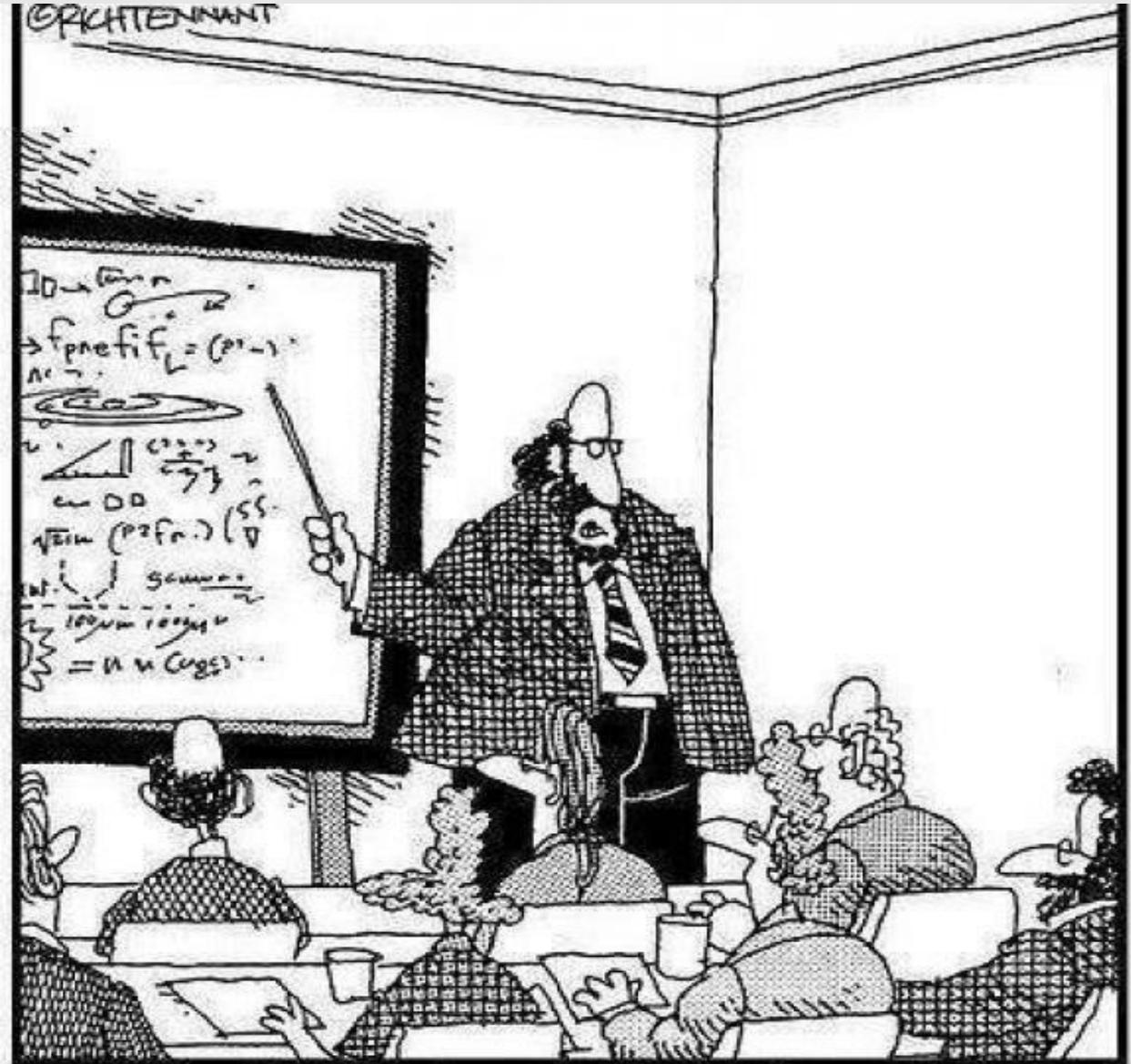
Changing How We Train Scientists Can Increase Impact

- Graduate training needs to become more student centered
- Faculty need to move beyond trying to replicate themselves
- Need more training in communication, management, leadership, etc.
- Career outcome data needs to be transparent

HOW WE COMMUNICATE IMPACT MATTERS



Association
of American
Universities



“Along with ‘Antimatter,’ and ‘Dark Matter,’ we’ve recently discovered the existence of ‘Doesn’t Matter,’ which appears to have no effect on the universe whatsoever.”



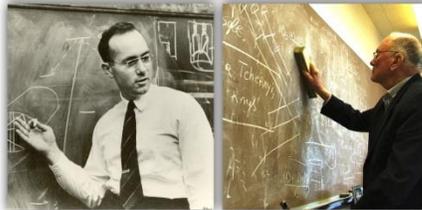
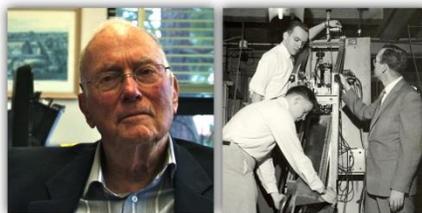
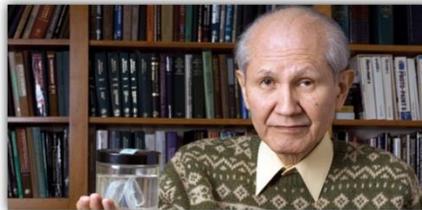
Tell Better Stories

Tell me a fact, and I'll learn. Tell me a truth, and I'll believe, but tell me a story and it will live in my heart forever.

--Indian Proverb



THE
GOLDEN
GOOSE
AWARD





They made **1,911** submissions including:

- **52,061** academic staff
- **191,150** research outputs
- **6,975** impact case studies

The **overall quality** of submissions was judged, on average to be:

★★★★ **30%** world-leading (4*)

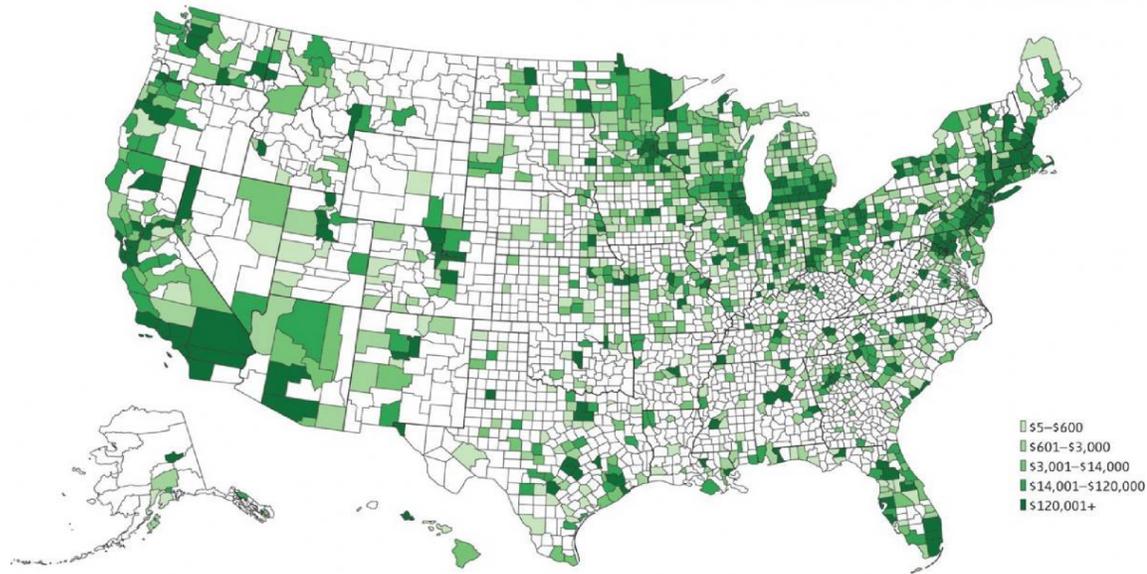
★★★ **46%** internationally excellent (3*)

★★ **20%** recognised internationally (2*)

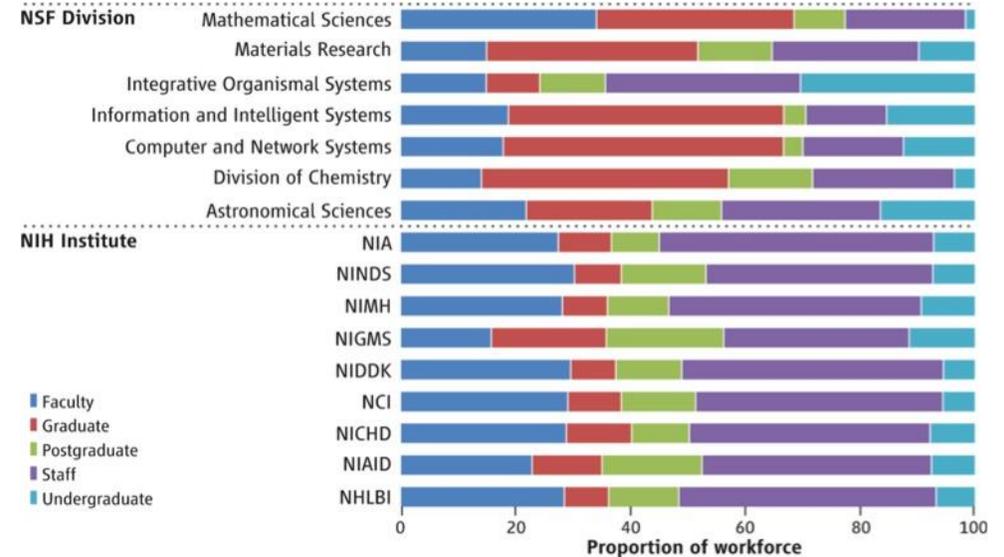
★ **3%** recognised nationally (1*)

Better Data – UMETRICS

The geographic distribution of vendor and subaward expenditures.



Weinbert, B., J. Owen-Smith, R. Rosen, L. Schwarz, B. McFadden Allen, R. Weiss & J. Lane. *Science* 344, 41-43 (2014).



Comment: Watching the players, not the scoreboard

[Julia Lane, Nature, November 2017](#)

National initiatives that track people, rather than papers, will lead to better science...

All Politics is Local... ...*Impact is Local Too*



UNIVERSITY OF MISSOURI
IMPACT

A graphic for Michigan State University's 'The Great State Road Trip' campaign. The top half features a white background with the text 'THE GREAT STATE ROAD TRIP' and a sub-headline: 'See how Spartans are working to make a better tomorrow for Michigan.' Below this is a 'MORE →' button. The right side of the graphic shows a top-down view of a person's hands holding a coffee cup, a laptop displaying a website, a map of Michigan, a camera, and other travel-related items. The bottom half of the graphic is a dark green banner with the Michigan State University logo in white.

· THE ·
GREAT STATE
ROAD TRIP

See how Spartans are working to make a better tomorrow for Michigan.

MORE →

MICHIGAN STATE UNIVERSITY

IOWA STATE UNIVERSITY
Extension and Outreach
Healthy People. Environments. Economies.



Culture Change Will Not Come Easily

- Policies alone will not be enough
- Practices will have to change
- New incentives will have to be developed
- Top down, bottom up, and middle out
- Funding opportunities can have an impact

Contact Me



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Research policy & strategy

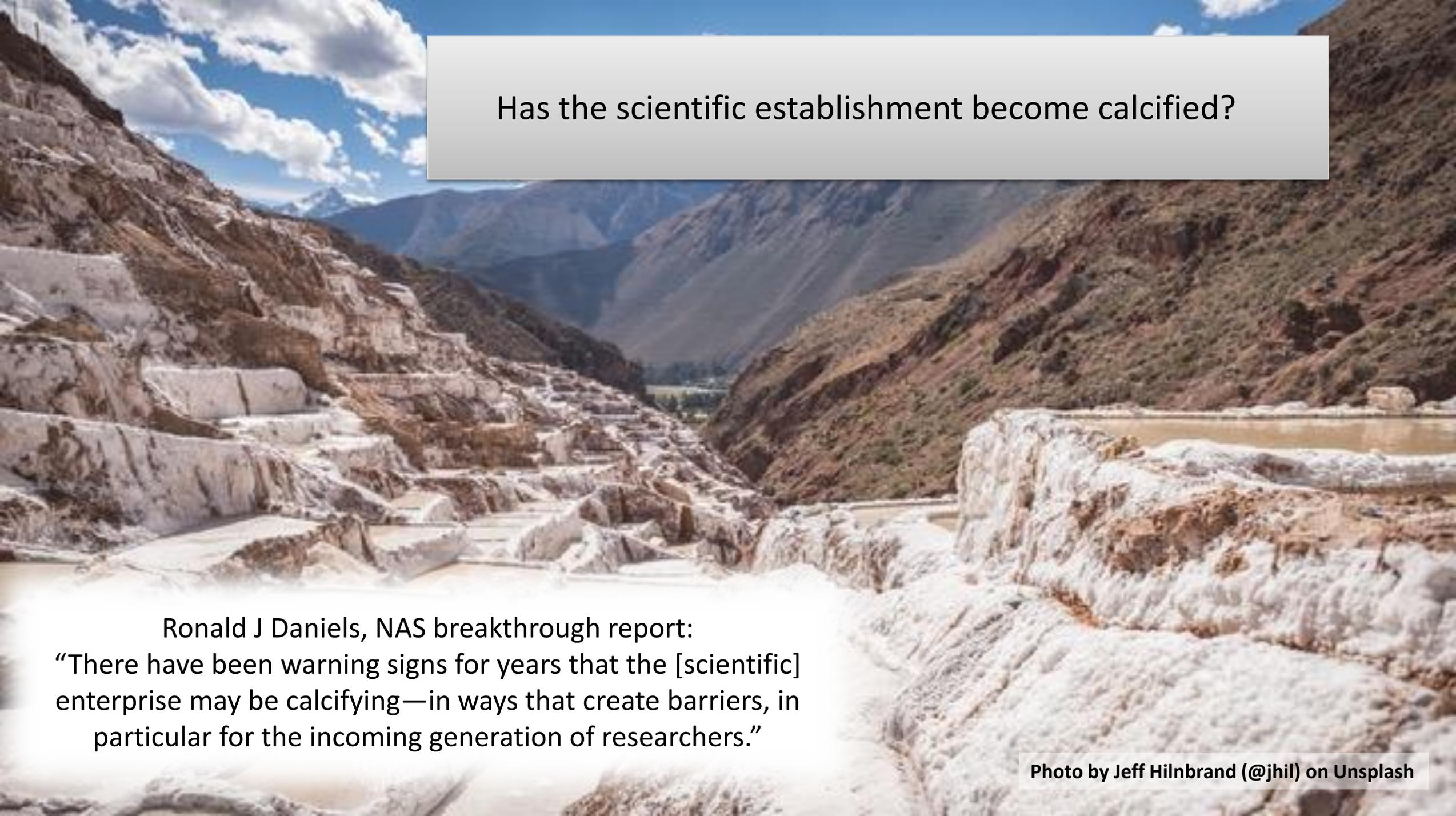
Christian Kobsda

*Political Consultant to the President,
Leibniz Association, Germany*

Research policy & strategy

Kennan Salinero

*Executive Director,
ReImagine Science, USA*

A wide-angle photograph of a mountain valley. In the foreground, a river flows through a series of terraced fields. The middle ground shows a valley floor with more terraced fields and a small town. In the background, there are large, rugged mountains under a blue sky with scattered white clouds.

Has the scientific establishment become calcified?

Ronald J Daniels, NAS breakthrough report:
“There have been warning signs for years that the [scientific] enterprise may be calcifying—in ways that create barriers, in particular for the incoming generation of researchers.”

Photo by Jeff Hilnbrand (@jhil) on Unsplash

Science | Future

AESIS: Impact of Science 2018
Research & Policy Strategy Session

June 15th 2018

Kennan Kellaris Salinero

<http://reimaginescience.org>

Kennan@reimaginescience.org



Science Policy Recommendations in the USA

two key reports have just come out:

THE NEXT GENERATION OF BIOMEDICAL AND BEHAVIORAL SCIENCE RESEARCHERS: BREAKING THROUGH

Committee on the Next Generation Initiative
Board on Higher Education and Workforce
Policy and Global Affairs

A Consensus Study Report of
The National Academies of
SCIENCES · ENGINEERING · MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, DC
www.nap.edu

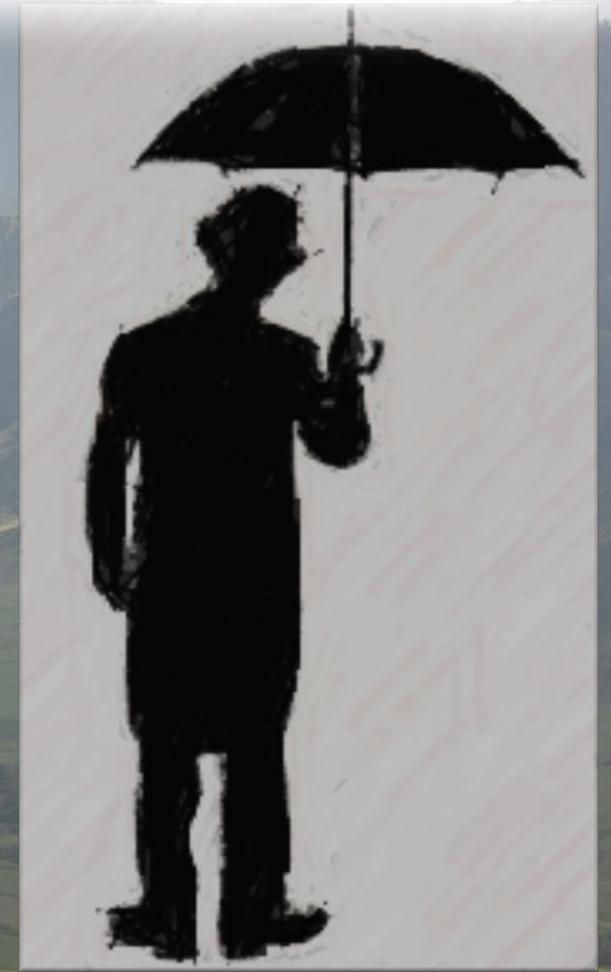
Graduate STEM Education for the 21st Century

Alan Leshner and Layne Scherer, Editors
Committee on Revitalizing Graduate STEM Education for the 21st Century
Board on Higher Education and Workforce
Policy and Global Affairs

A Consensus Study Report of
The National Academies of
SCIENCES · ENGINEERING · MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, DC
www.nap.edu

We need a farther horizon and a
bigger umbrella

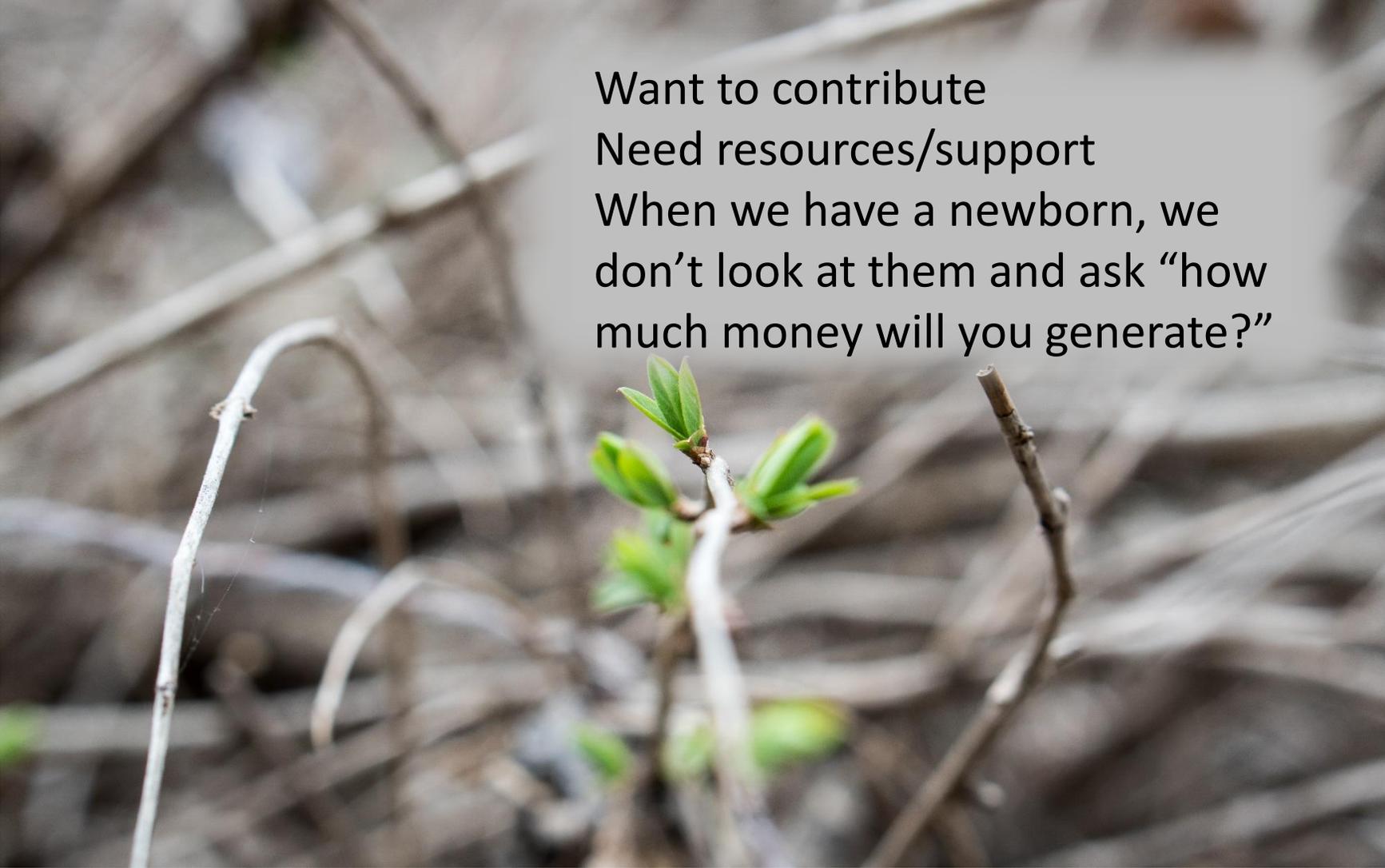


Post-docs and the alternative career landscape

Casting post-docs out to the void



The next generation



Want to contribute
Need resources/support
When we have a newborn, we
don't look at them and ask "how
much money will you generate?"

Purpose of Science

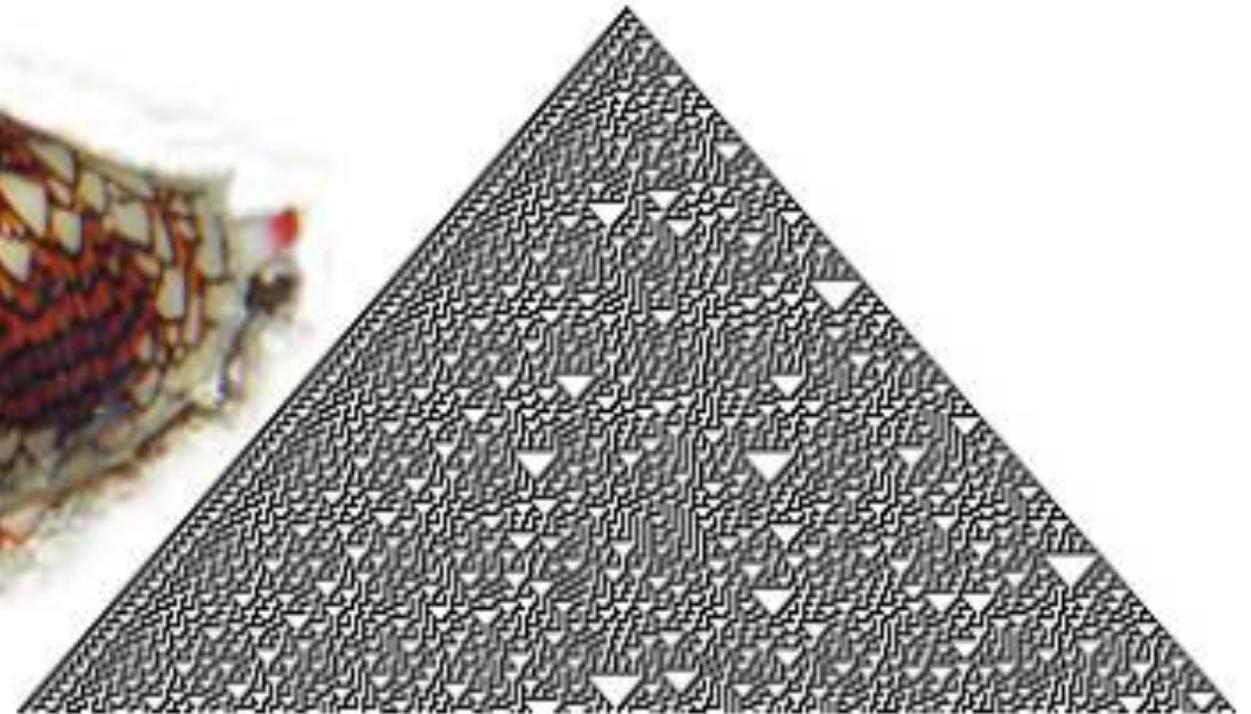
First Principles: what is our 'rule set?'
What are we here for?



Nature & Simple Rule Sets



Cone Snail, Photographer: Richard Ling



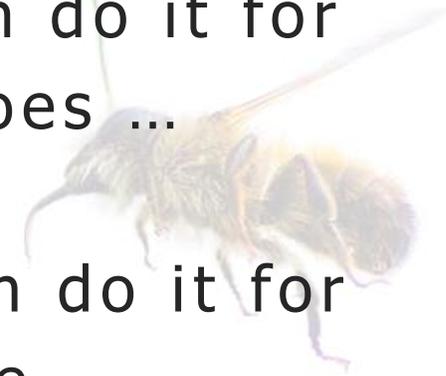
Cellular Automata Rule 30



MORNING STAR SELF-MANAGEMENT INSTITUTE



Self-organizing – if
we can do it for
tomatoes ...



We can do it for
science

Culture of Science



Policy is from the post-WWII era

Shame/Grief



What's lost? To
them? To society?



Policy suggestions from Breakthrough report

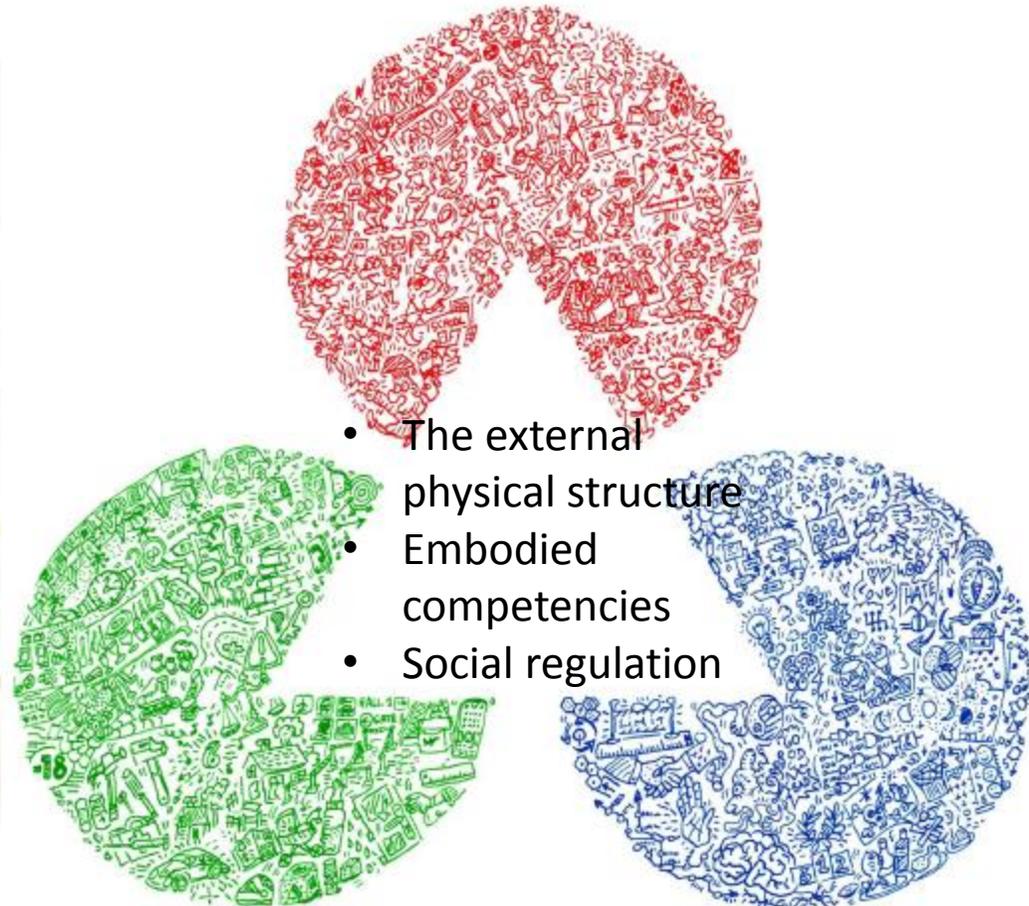
- Shared oversight, responsibility from all levels/institutions involved
- Transparency and data regarding outcomes
- Don't train only for academic careers
- Experiment

Three components that form behavior & outcome



Saadi Lahlou, Installation Theory

The Societal Construction and Regulation of Behaviour



The world is awaiting with awe



Photo credit: Greg Rakozy (@grakozy) Unsplash

Some of these thoughts written up recently – article available

at <http://bit.ly/ScienceandIvoryTowers>

REIMAGINING SCIENCE

and the IVORY TOWER

By Kennan Kellaris Salinero

I had my big aha moment about the future of science and the supposed influence of “market forces” during a conversation with a first-year graduate student in molecular and biochemical nutrition at Berkeley. A brighter future for science will not be shaped by market forces or academia, at least not as they are currently organized. Rather, it will be shaped by the human desire for contribution.

Alexandra was disillusioned. She had left a biotech company in Boston where she had been doing research that purportedly furthered modern medicine’s contribution to improve the human condition. However, without a PhD she would not be making decisions or driving the direction of research, so she had left her position in Boston to pursue the basic research path that a PhD at Berkeley could provide.

She had come to Berkeley to make a difference for humanity. She had presumed that Berkeley, one of the world’s top research institutions, would be the ideal place to study the role of nutrition at the molecular level, within the cellular structures of the human body. What she found instead was a role in looking for drug candidates to chemically

block, modify, or activate those cellular components. There was righteous indignation in her voice when we met at a coffee shop near the Berkeley campus: “Can you believe they want me to look for another druggable target for diabetes? Why aren’t they looking at why diabetes is increasing so much in the first place?”

Further, she knew full well that a PhD is no longer sufficient, and that she would likely follow her PhD with a low-paid postdoctoral scholar position. Only those would she be eligible to try for entry into a hypercompetitive job market, currently saturated with five PhDs for every faculty position and 60 percent of recent PhD graduates leaving science altogether.

While research at Berkeley seemed focused on developing more, better, newer drugs, Alexandra was decidedly not. Alexandra was driven, instead, by a strong belief in the foundational importance of the foods we eat and the value of understanding as much about this complex human/nutrition interaction as possible. Many young scientists share this willingness to subject themselves to demanding coursework, long hours, and challenges based on altruism rather than

Kennan Kellaris Salinero is the Executive Director of ReImagine Science, a nonprofit based out of Washington, DC. She has held positions in numerous institutions within the basic sciences, including as a faculty member in Georgetown University’s Department of Chemistry, at Celera Genomics, University of California, Berkeley, and several national laboratories. Her most recent research position, at Abo Akademi, Turku, Finland, was studying microbial genomics and inheritance patterns.

