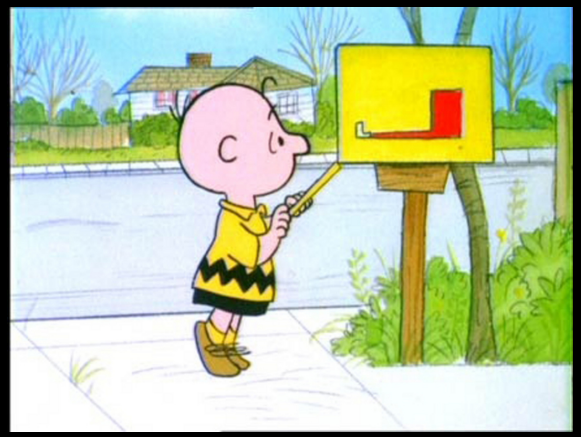
Science and Scandal: Reporting on Biology In An Age of Controversy



Carl Zimmer

Plenary Lecture

Society for Integrative and Comparative Biology

January 3, 2017

Senator Rand Paul (R–KY)

Gage Skidmore/Flickr (CC BY-SA 2.0)

Rand Paul takes a poke at U.S. peer-review panels

By **Jeffrey Mervis** | Oct. 19, 2017 , 10:00 AM

sciencemag.org/news/2017/10/rand-paul-takes-poke-us-peer-review-panels

laboratoryequipment.com/news/2017/10/shrimp-treadmill-us-senate-bill-would-tackle-silly-science

Shrimp on a Treadmill: U.S. Senate Bill Would Tackle 'Silly' Science

Tue, 10/24/2017 - 10:02am 18 Comments by Seth Augenstein - Senior Science Writer - @SethAugenstein

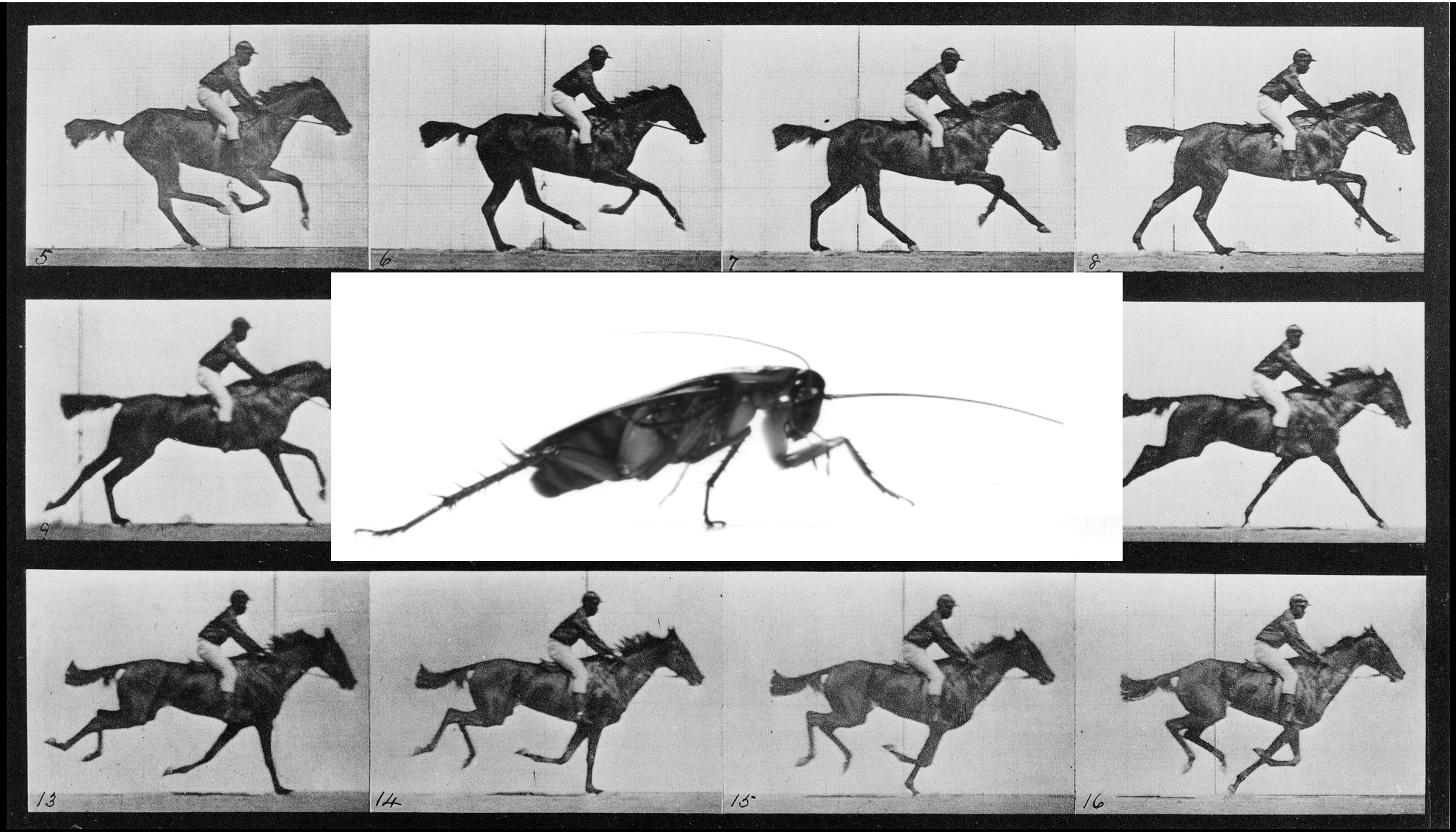
Screenshot from a video demonstrating the "shrimp on a treadmill" research. Credit: College of Charleston Grice Marine Laboratory

The science project became a major emblem of "silly" science: the placement of shrimp on a tiny treadmill. Some laughed, others took it as a call to prioritize federal funding for science research that could produce results for the taxpayer.

Now, a bill proposed by Sen. Rand Paul (R-KY) would upend the way grants are released through the National Science Foundation. The "BASIC Research Act" (S.1973) would transfer the current grant evaluation process in the National Science Foundation to an outside "Officer of the Special Inspector General and Taxpayer Advocate for Research."

Robert Full, UC Berkeley
ctpost.com/science/article/Robotic-cockroach-may-be-a-lifesaver-in-a-big-6815625.php

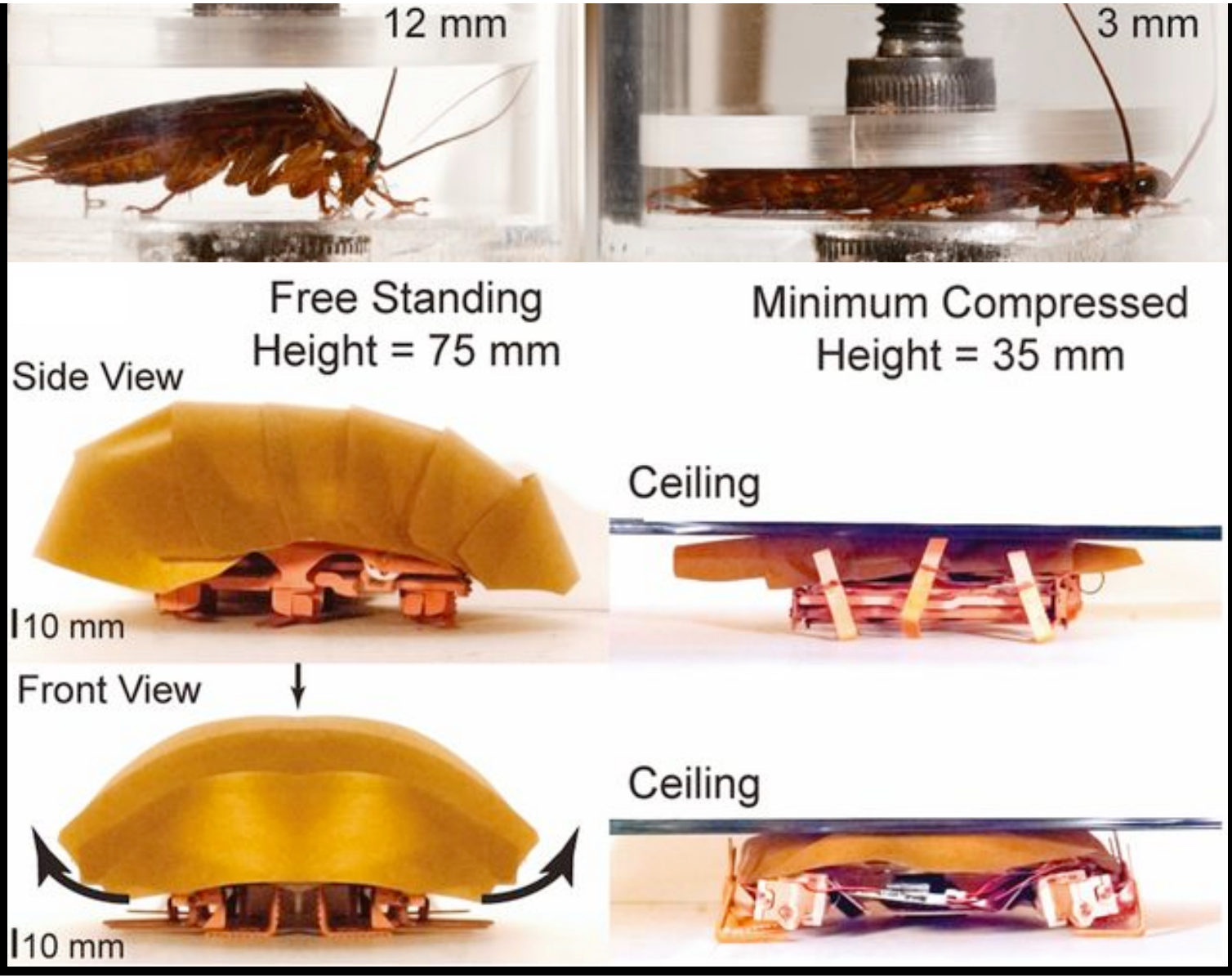
"See How They Run," *Discover*, September 1994
discovermagazine.com/1994/sep/seehowtheyrun418



blogs.loc.gov/teachers/2015/04/eadweard-muybridge-technology-settles-a-debate/

ciber.berkeley.edu/?page_id=6843

Jayaram and Full.
PNAS 113.8 (2016): E950-E957.



Jayaram and Full. *PNAS* 113.8 (2016): E950-E957.

QUANTA MAGAZINE illuminating science

BIOLOGY

Breakthrough DNA Editor Borne of Bacteria

Interest in a powerful DNA editing tool called CRISPR has revealed that bacteria are far more sophisticated than anyone imagined.

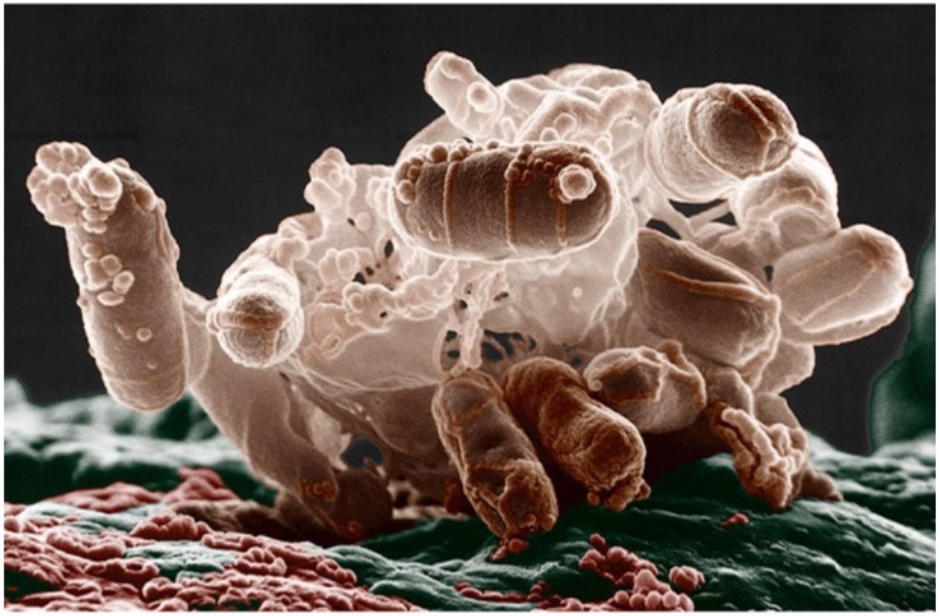


Photo by Eric Erbe, Colorization by Christopher Pooley. USDA.

Microbes such as *E. coli* may use CRISPR as a weapon in their millions-year-old struggle against viruses.

By: Carl Zimmer

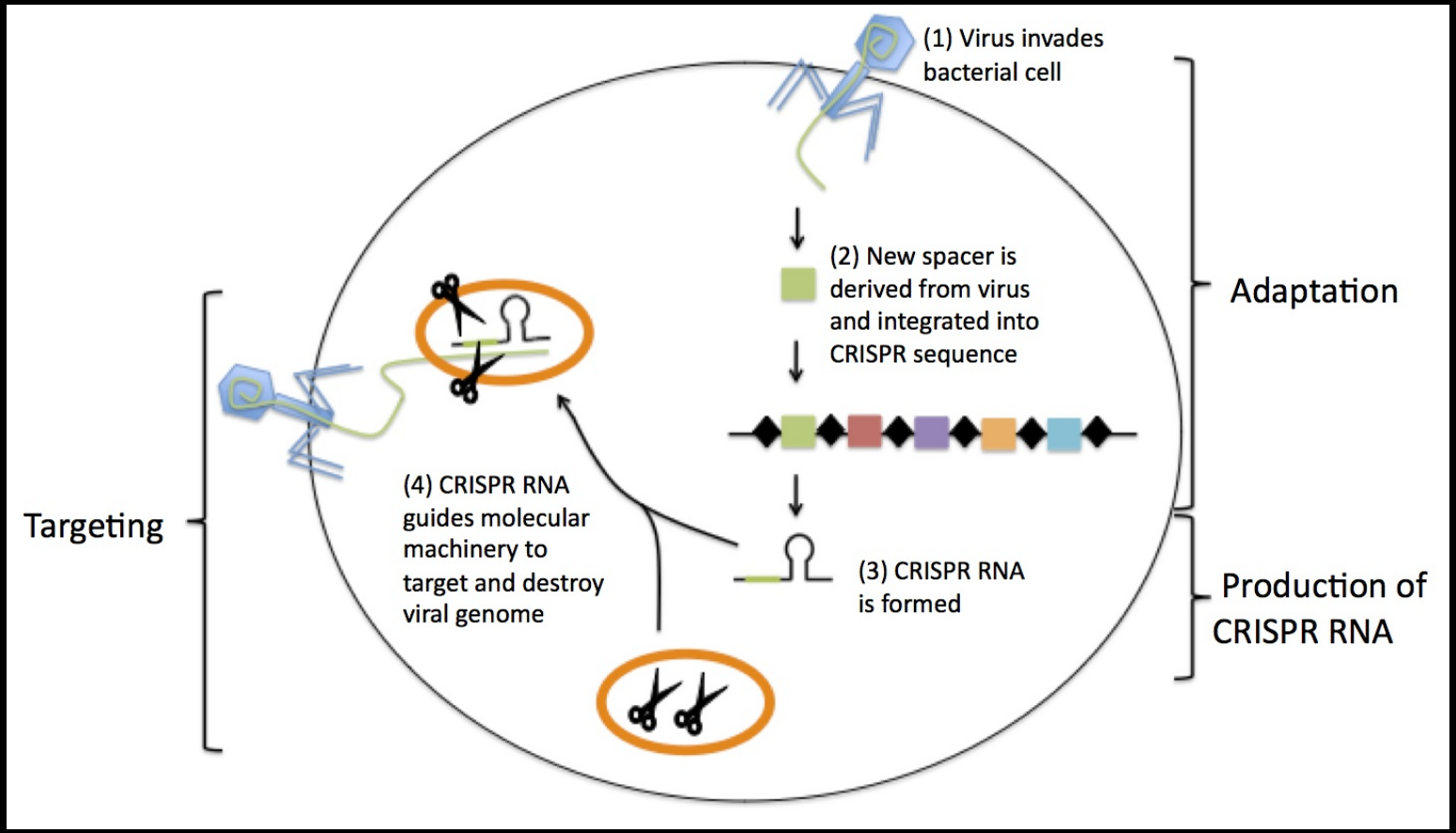
February 6, 2015

Comments (16)

email

quantamagazine.org/20150206-crispr-dna-editor-bacteria/

An Adaptive Immune System for Bacteria



sitn.hms.harvard.edu/flash/2014/crispr-a-game-changing-genetic-engineering-technique/

A BRIEF GUIDE TO GENOMICS

NHGRI FACT SHEETS

genome.gov

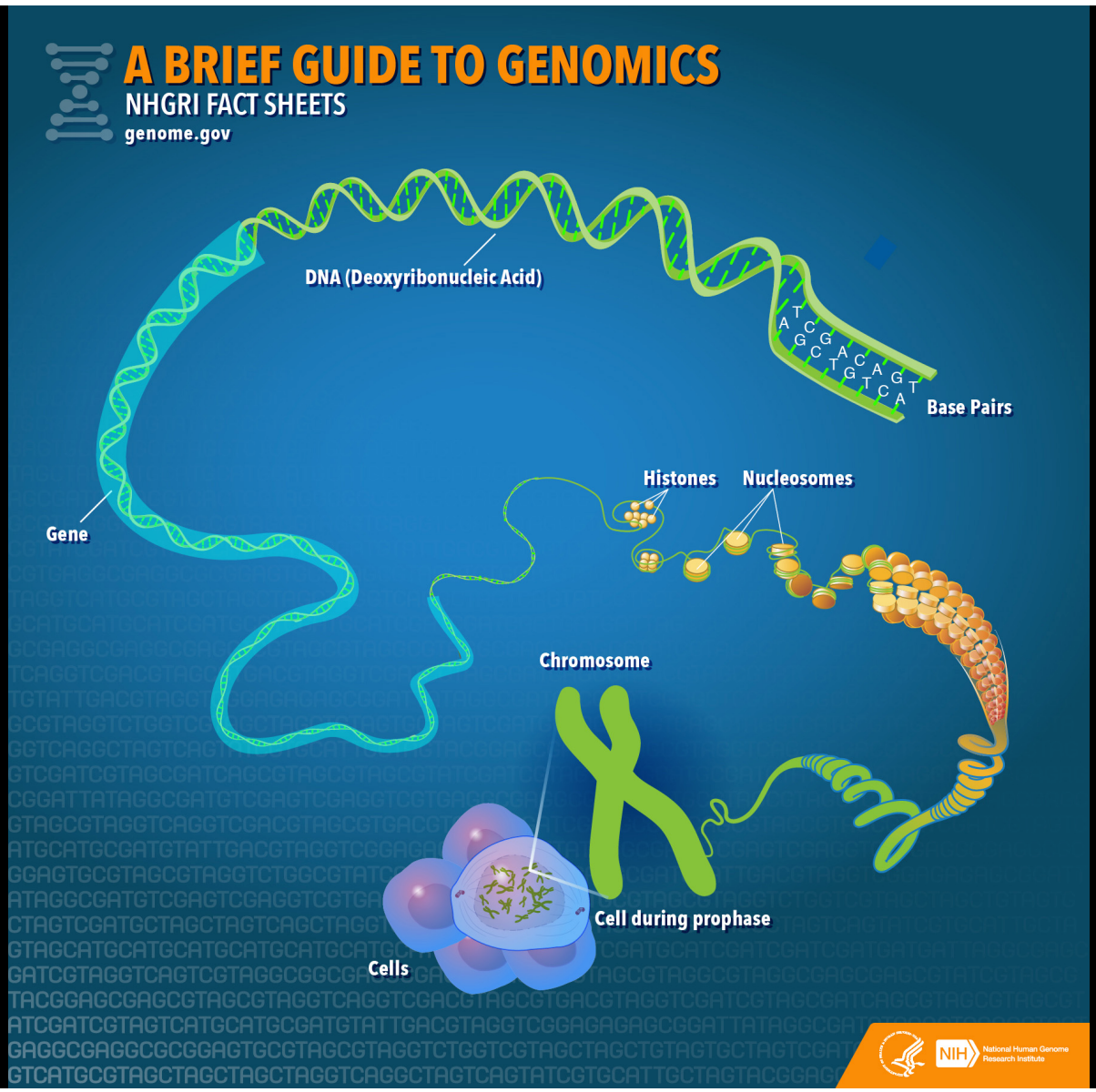
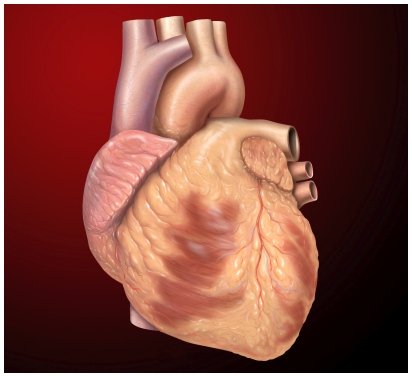
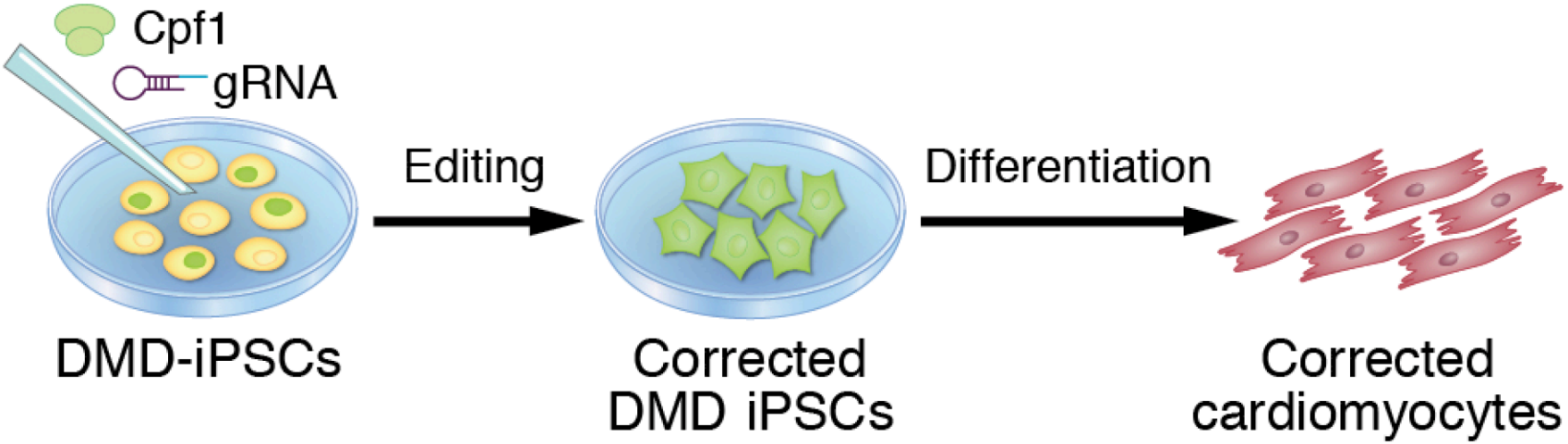


Image: statnews.com/2016/04/20/clever-crispr-advance-unveiled/



Healing Hearts With CRISPR

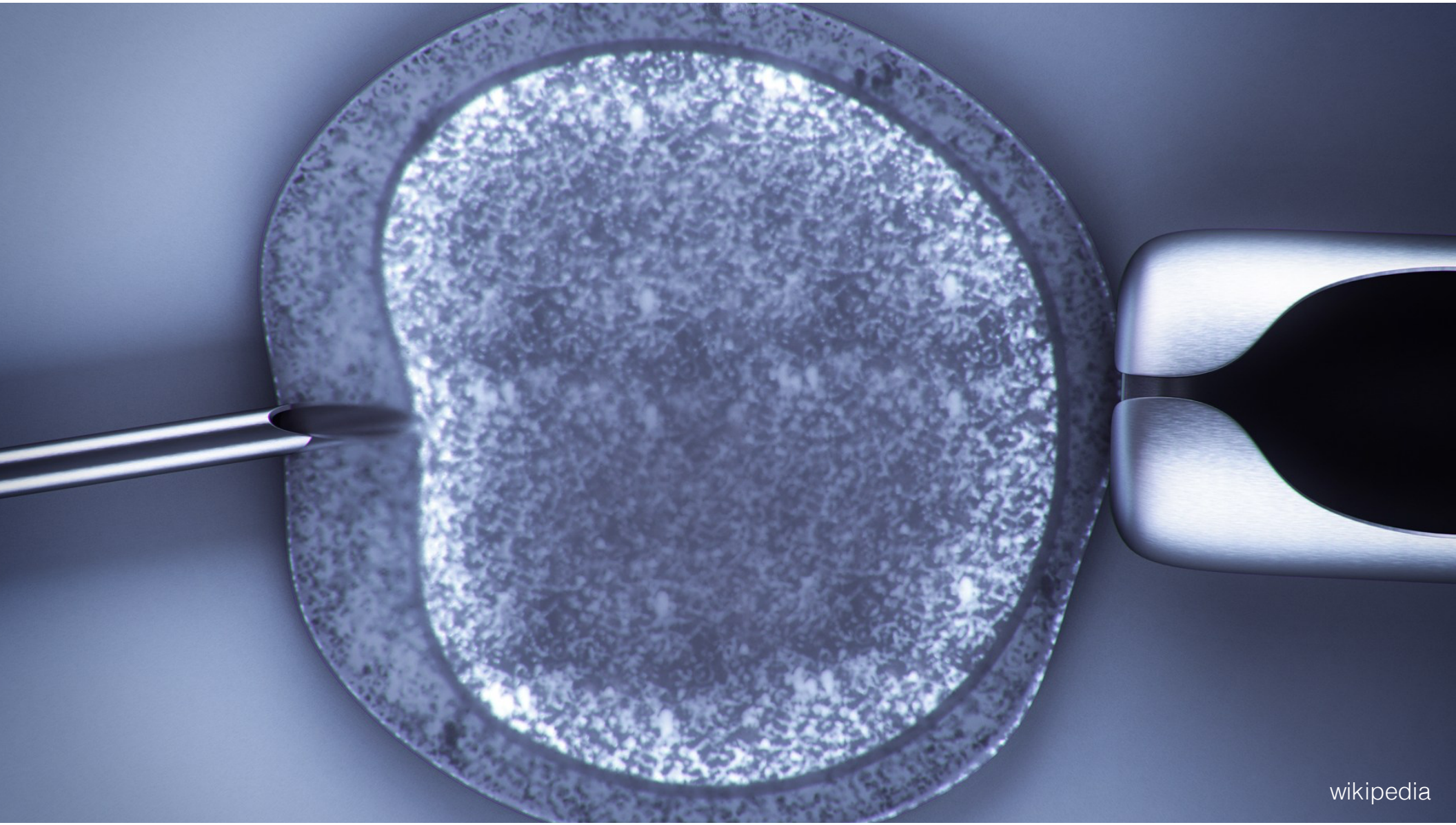


Zhang et al, *Science Advances* 12 Apr 2017: 3:e1602814

CARL ZIMMER

The Powers, Perversions,
and Potential *of* Heredity

To be published
May 2018


wikipedia

The New York Times

SCIENCE

Scientists Unveil New 'Tree of Life'

By CARL ZIMMER APRIL 11, 2016

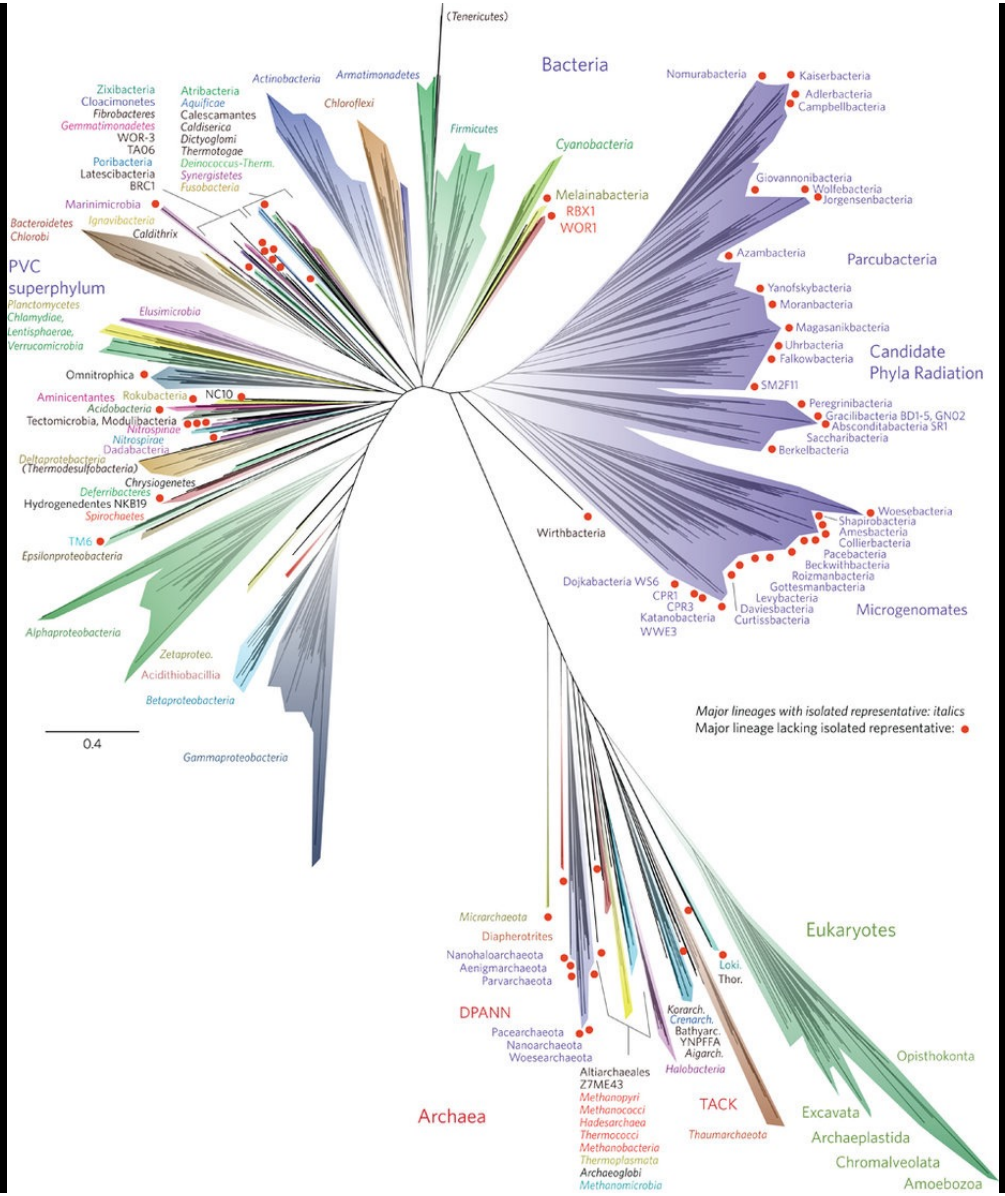
A team of scientists unveiled a new tree of life on Monday, a diagram outlining the evolution of all living things. The researchers found that bacteria make up most of life's branches. And they found that much of that diversity has been waiting in plain sight to be discovered, dwelling in river mud and meadow soils.

"It is a momentous discovery — an entire continent of life-forms," said Eugene V. Koonin of the National Center for Biotechnology Information, who was not involved in the study.

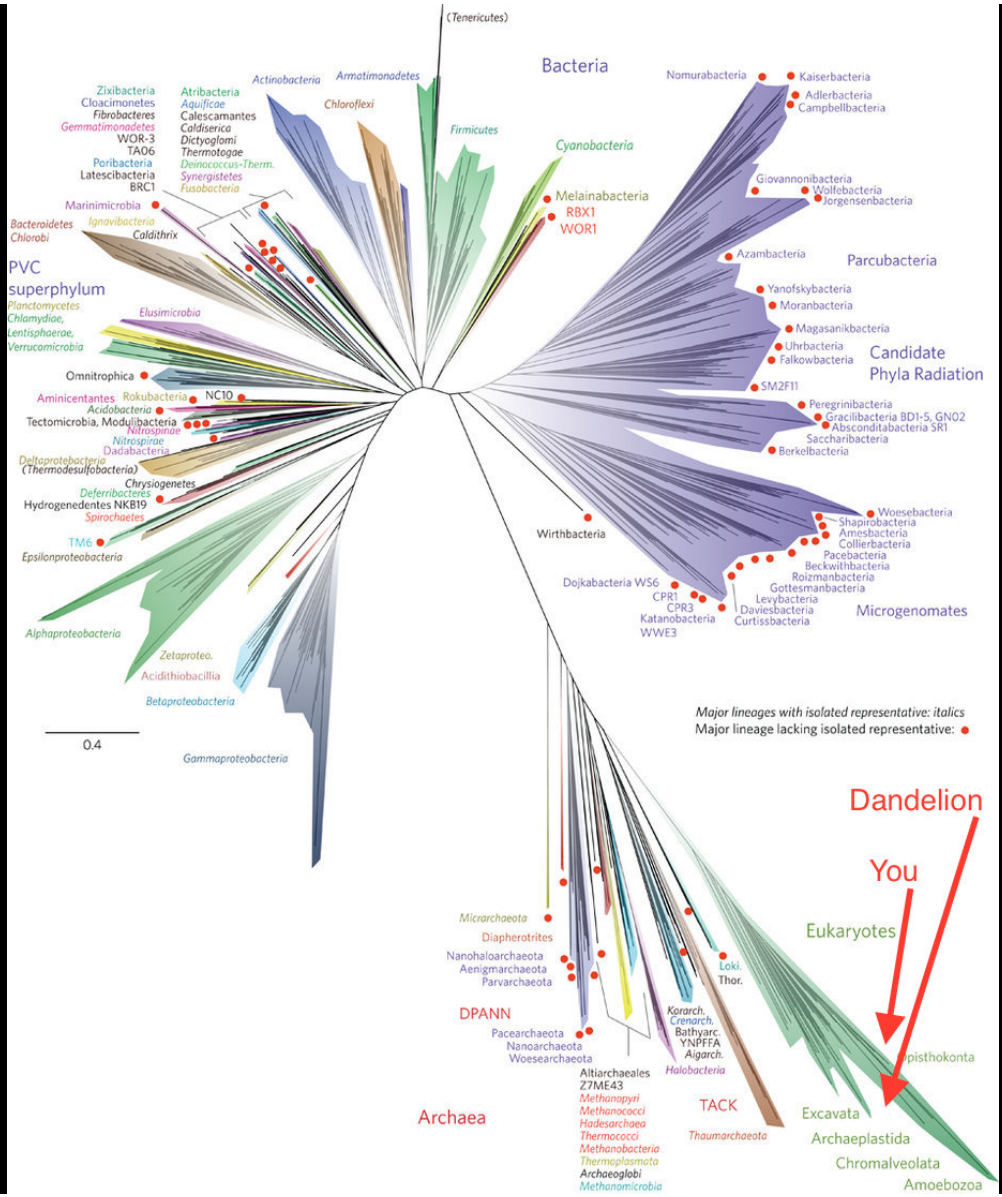
The study was published in the journal Nature Microbiology.

In his 1859 book "On the Origin of Species," Charles Darwin envisioned evolution like a branching tree. The "great Tree of Life," he said, "fills with its dead and broken branches the crust of the earth, and covers the surface with its ever branching and beautiful ramifications."

nytimes.com/2016/04/12/science/scientists-unveil-new-tree-of-life.html



Hug et al. *Nature Microbiology* 1 (2016): 16048.


(Tenericutes)
Bacteria
Actinobacteria
Armatimonadetes
Chloroflexi
Firmicutes
Cyanobacteria
Melainabacteria
RBX1
WOR1
Zixibacteria
Cloacimonetes
Fibrobacteres
Gemmatimonadetes
WOR-3
TA06
Poribacteria
Latescibacteria
BRC1
Atribacteria
Aquificae
Calescamantes
Caldiserica
Dictyoglomi
Thermotogae
Deinococcus-Therm.
Synergistetes
Fusobacteria
Marinimicrobia
Ignavibacteria
Calditrix
Bacteroidetes
Chlorobi
PVC
superphylum
Planctomycetes
Chlamydiae,
Lentisphaerae,
Verrucomicrobia
Elusimicrobia
Omnitrophica
Aminicentantes
Rokubacteria
NC10
Acidobacteria
Tectomicrobia, Modulibacteria
Nitrospinae
Nitrospirae
Dadabacteria
Deltaproteobacteria
(Thermodesulfobacteria)
Chrysiogenetes
Deferribacteres
Hydrogenedentes NKB19
Spirochaetes
TM6
Epsilonproteobacteria
Alphaproteobacteria
Zetaproteo.
Acidithiobacillia
Betaproteobacteria
Gammaproteobacteria
0.4
Nomurabacteria
Kaiserbacteria
Adlerbacteria
Campbellbacteria
Giovannonibacteria
Wolfebacteria
Jorgensenbacteria
Azambacteria
Parcubacteria
Yanofskybacteria
Moranbacteria
Magasanikbacteria
Uhrbacteria
Falkowbacteria
Candidate
Phyla Radiation
SM2F11
Peregrinibacteria
Gracilibacteria BD1-5, GN02
Absconditabacteria SR1
Saccharibacteria
Berkelbacteria
Woesebacteria
Shapirobacteria
Amesbacteria
Collierbacteria
Pacebacteria
Beckwithbacteria
Roizmanbacteria
Gottesmanbacteria
Levybacteria
Daviesbacteria
Curtissbacteria
Microgenomates
Wirthbacteria
Dojkabacteria WS6
CPR1
CPR3
Katanobacteria
WWE3
Major lineages with isolated representative: italics
Major lineage lacking isolated representative:
Dandelion
You
Eukaryotes
Micrarchaeota
Diapherotrites
Nanohaloarchaeota
Aenigmarchaeota
Parvarchaeota
DPANN
Pacearchaeota
Nanoarchaeota
Woesearchaeota
Loki.
Thor.
Korarch.
Crenarch.
Bathyarc.
YNPFFA
Aigarch.
Halobacteria
Altiarchaeales
Z7ME43
Methanopyri
Methanococci
Hadesarchaea
Thermococci
Methanobacteria
Thermoplasmata
Archaeoglobi
Methanomicrobia
Archaea
TACK
Thaumarchaeota
Opisthokonta
Excavata
Archaeplastida
Chromalveolata
Amoebozoa

Nathan Ainslie shared Oliver Sacks Foundation's post.
April 14 at 10:40am ·

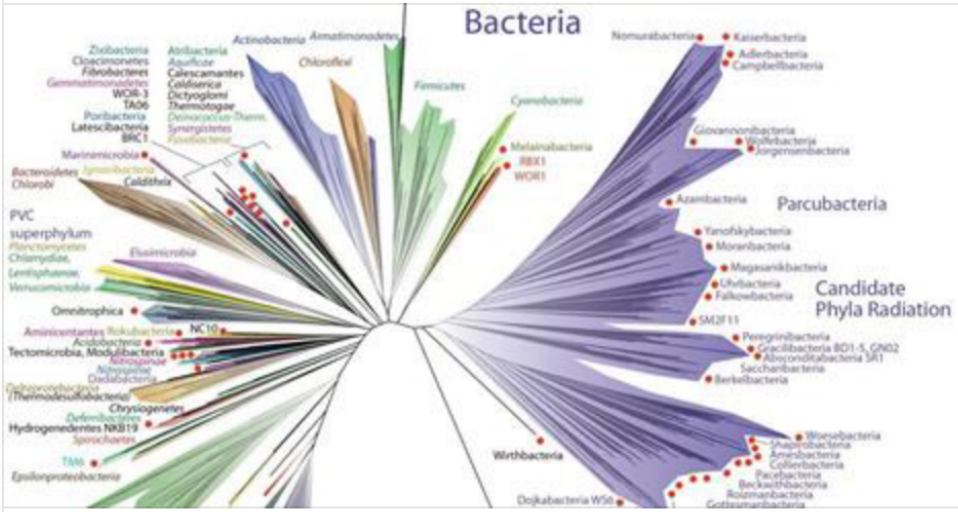
I feel insignificant.

Oliver Sacks Foundation
April 14 at 8:46am ·

Like Page

"It's a humbling thing to behold. All the eukaryotes, from humans to flowers to amoebae, fit on a slender twig."

And so much more to be discovered! Carl Zimmer wrote about the new tree of life for The New York Times - Science today.



Scientists Unveil New 'Tree of Life'

Most of the diversity outlined on the new tree has been hiding in plain sight.

NYTIMES.COM | BY CARL ZIMMER

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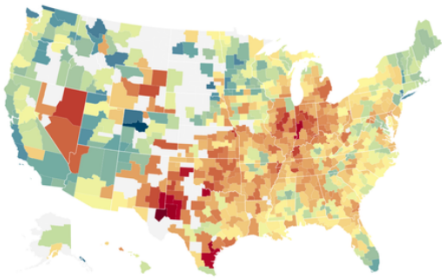
Most emailed articles today



The Rich Live Longer Everywhere. For the Poor, Geography Matters.

Chinese Scions' Song: My Daddy's Rich and My Lamborghini's Good-Looking

Where the Poor Live Longer: How Your Area Compares

In California, Marijuana Is Smelling More Like Big Business

How to Fix Politics

Scientists Unveil New 'Tree of Life'

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Racially Charged Joke by Hillary Clinton and Bill de Blasio Leaves Some Cringing

2. VANCOUVER JOURNAL
Chinese Scions' Song: My Daddy's Rich and My Lamborghini's Good-Looking

3. Reaching for the Stars, Across 4.37 Light-Years

4. 'Deadpool' Isn't the Only Solution. But 'Batman v Superman' Is the Problem.

5. Scientists Unveil New 'Tree of Life'

6. New Evidence on When Bible Was Written: Ancient Shopping Lists

7. OP-ED CONTRIBUTOR
Why I'm Supporting Bernie Sanders

8. Barrage of Attack Ads Threatens to Undermine Donald Trump

9. 2016 Delegate Count and Primary Results

10. Deutsche Bank Freezes North Carolina Expansion, in Protest of Bias Law

The concatenated ribosomal protein alignment was constructed as described previously[16]. In brief, the 16 ribosomal protein data sets (ribosomal proteins L2, L3, L4, L5, L6, L14, L16, L18, L22, L24, S3, S8, S10, S17 and S19) were aligned independently using MUSCLE v. 3.8.31 (ref. 34). Alignments were trimmed to remove ambiguously aligned C and N termini as well as columns composed of more than 95% gaps. Taxa were removed if their available sequence data represented less than 50% of the expected alignment columns (90% of taxa had more than 80% of the expected alignment columns). The 16 alignments were concatenated, forming a final alignment comprising 3,083 genomes and 2,596 amino-acid positions. A maximum likelihood tree was constructed using RAxML v. 8.1.24 (ref. 35), as implemented on the CIPRES web server[36], under the LG plus gamma model of evolution (PROTGAMMALG in the RAxML model section), and with the number of bootstraps automatically determined (MRE-based bootstopping criterion). A total of 156 bootstrap replicates were conducted under the rapid bootstrapping algorithm, with 100 sampled to generate proportional support values. The full tree inference required 3,840 computational hours on the CIPRES supercomputer.

Hug et al. *Nature Microbiology* 1 (2016): 16048.

Choose Your Words

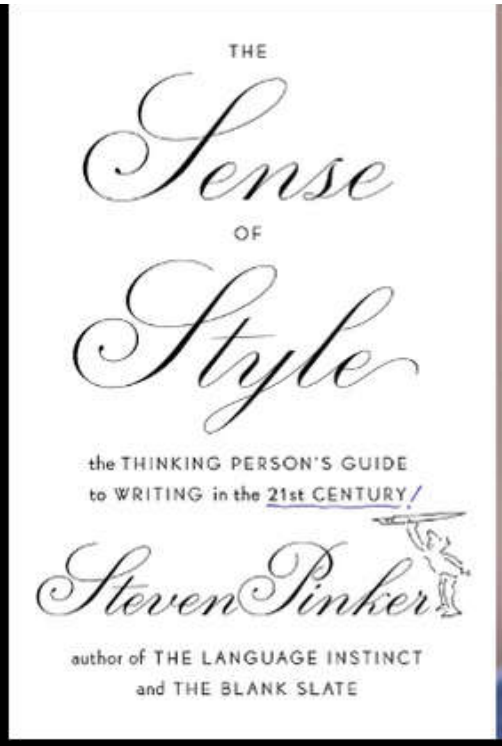
Tritrophic is not a real word. Your reader does not know the words *tritrophic, ecological assemblage, genomics* or *parthenogenesis*.

That is not because your reader is dumb. It is because scientists made up those words and never told anyone but other scientists.

Don't underestimate the intelligence of your readers. Readers can be very clever, but it is not their job to know all of the words that you and the twelve people you call colleagues made up.

"Advice for Scientists Who Want to Write" by Rob Dunn (NCSU)

yourwildlife.org/2013/06/advice-for-scientists-who-want-to-write-for-the-public/



The curse of knowledge:

"The main cause of incomprehensible prose is the difficulty of imagining what it's like for someone else not to know something that you know."

Terms that have different meanings for scientists and the public

Scientific term	Public meaning	Better choice
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from exact true number
bias	distortion, political motive	offset from an observation
sign	indication, astrological sign	plus or minus sign
values	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long-term average

"Communicating the Science of Climate Change,"
Richard C. J. Somerville and Susan Joy Hassol, *Physics Today*, October 2011

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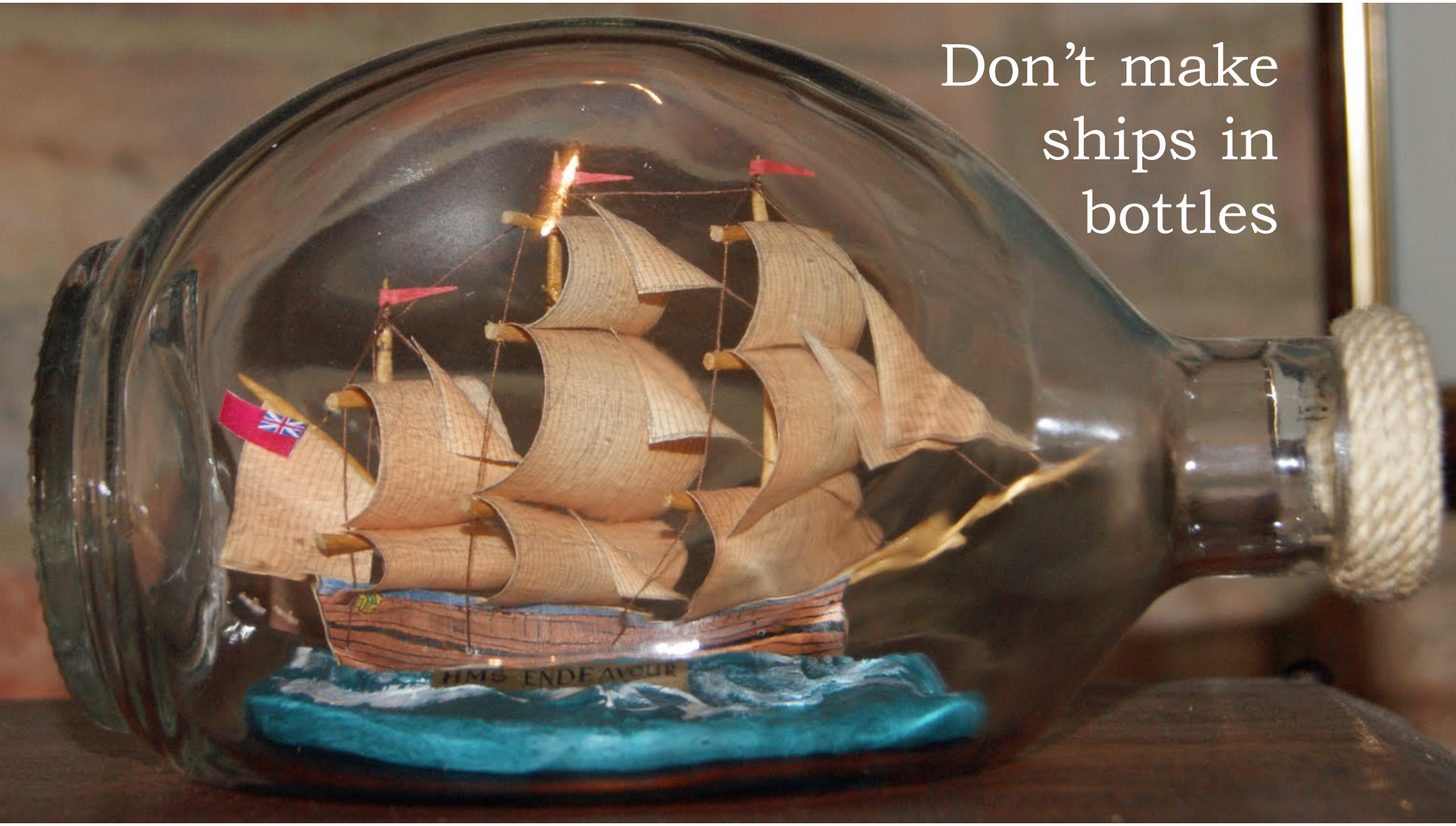

Don’t make
ships in
bottles
HMS ENDEAVOUR

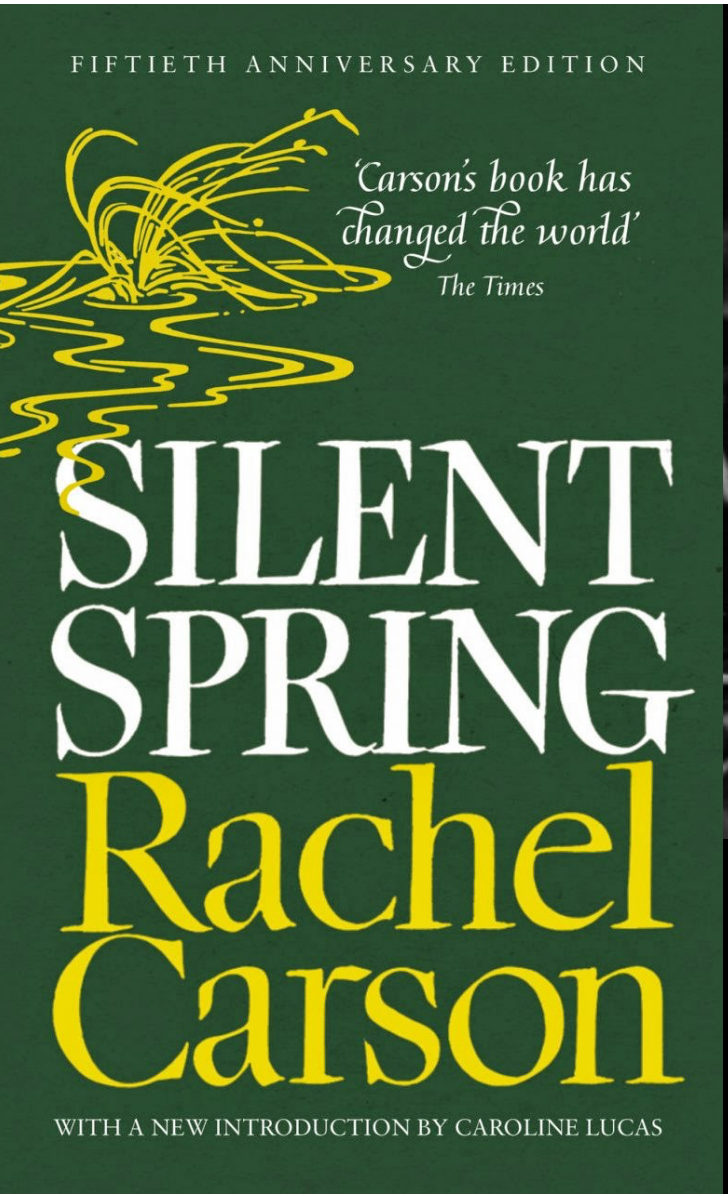
ARTICLE

DOI: 10.1057/s41599-017-0047-7 OPEN

How can we use the 'science of stories' to produce persuasive scientific stories?

Michael D. Jones[1] & Deserai Anderson Crow[2]

Palgrave Communications 3.1 (2017): 53. Published December 22, 2017



Rachel Carson testifying before U.S. Senate, 1963

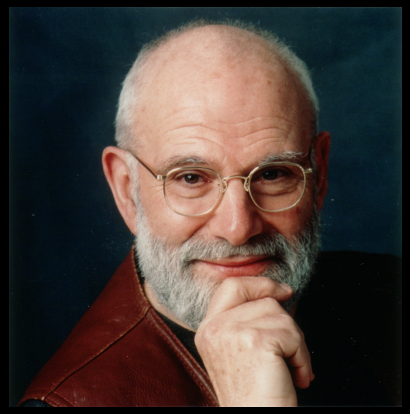
Chapter One: A Fable For Tomorrow

There once was a town in the heart of America where all life seemed to live in harmony with its surroundings. The town lay in the midst of a checkerboard of prosperous farms, with fields of grain and hillsides of orchards where, in spring, white clouds of bloom drifted above the green fields. In autumn, oak and maple and birch set up a blaze of color that flamed and flickered across a backdrop of pines. Then foxes barked in the hills and deer silently crossed the fields, half hidden in the mists of the fall mornings. So it had been from the days many years ago when the first settlers raised their houses, sank their wells, and built their barns....

Scientists Who Know Their Way Around The English Language

Hope Jahren

Siddhartha Mukherjee



Oliver Sacks

Lewis Thomas

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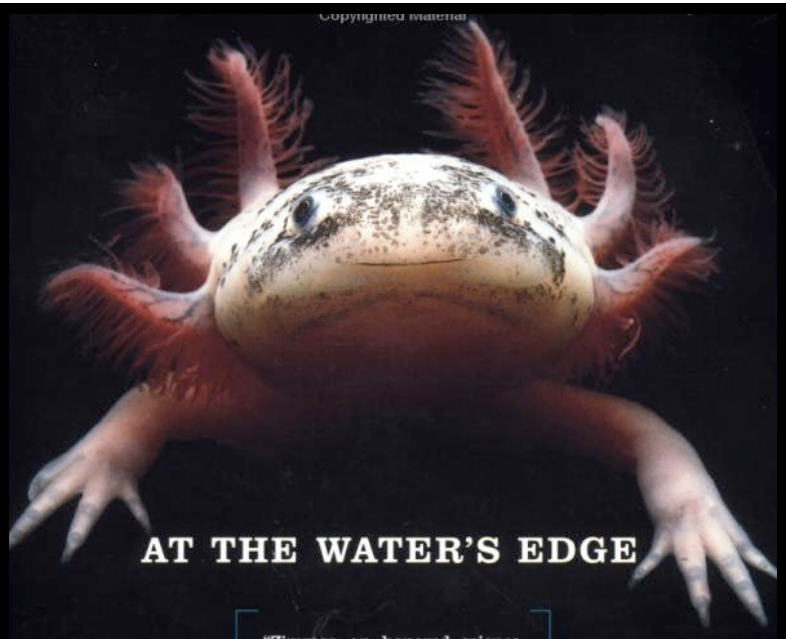


AT THE WATER'S EDGE

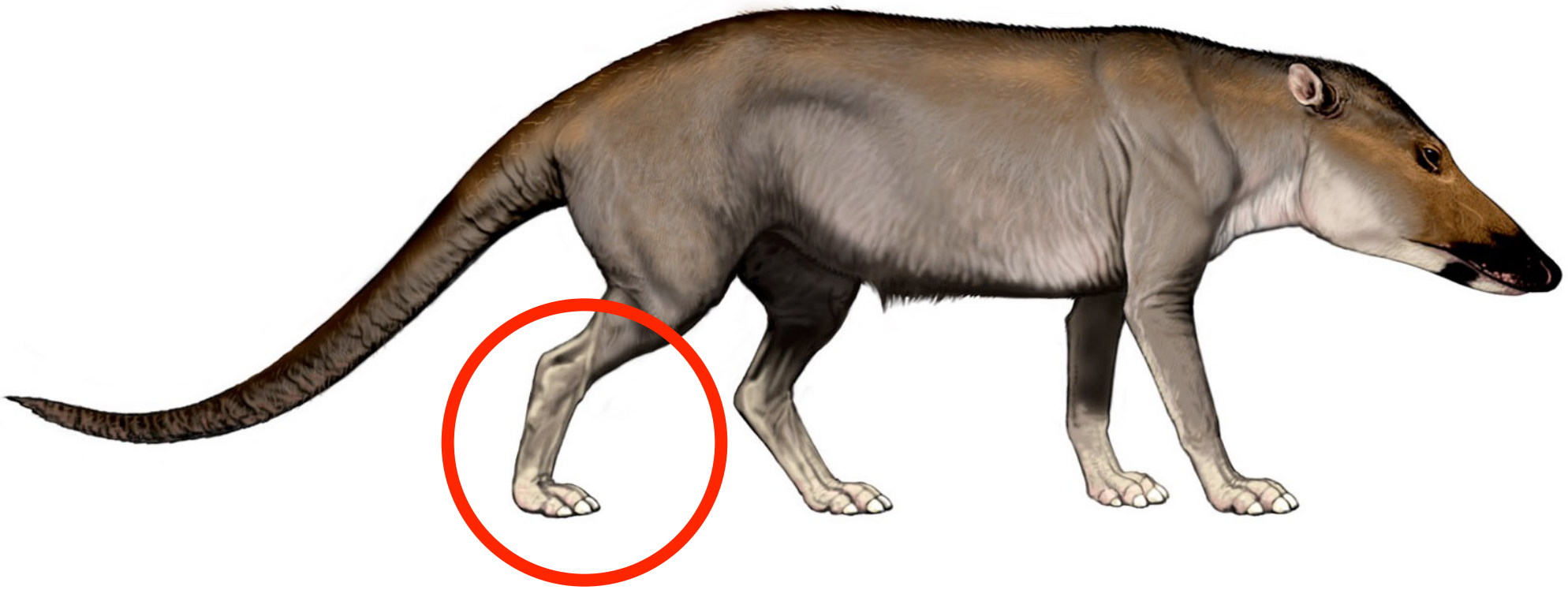
"Zimmer, an honored science journalist . . . leaves life among the fossils agreeably bright."
ATLANTIC MONTHLY

FISH WITH FINGERS, WHALES WITH LEGS,

and How Life Came Ashore but Then Went Back to Sea

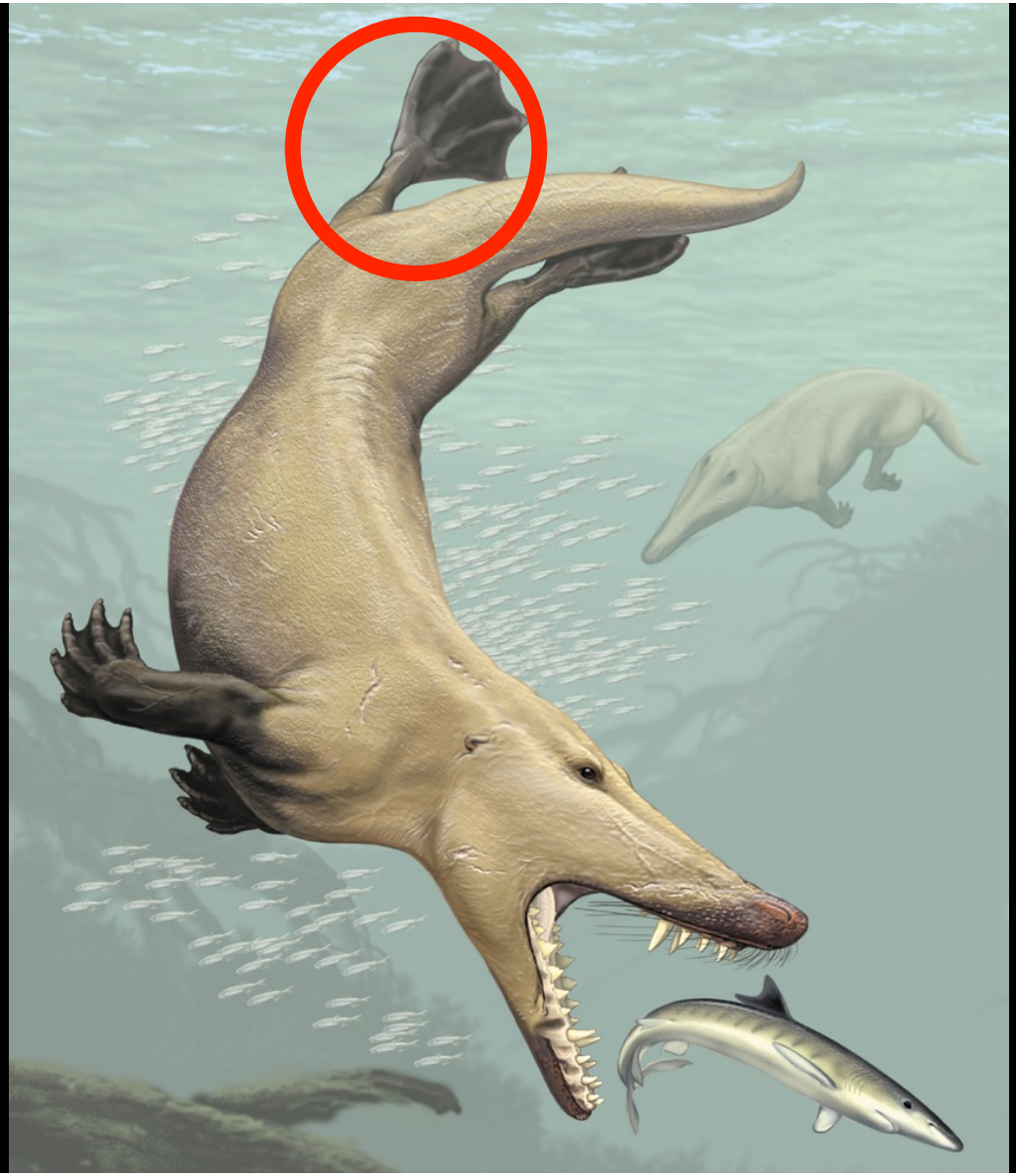
CARL ZIMMER

Artwork by
Carl Buell



Pakicetus (50 million years ago)

Artwork by
Carl Buell



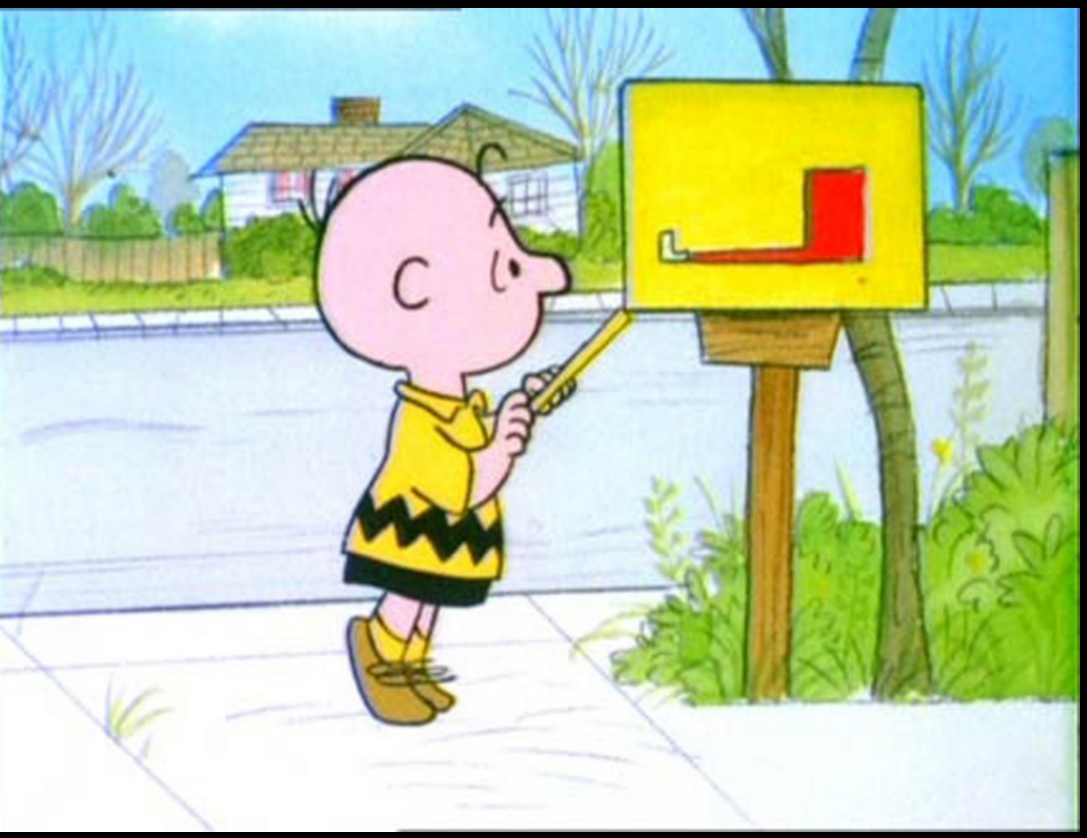
Ambulocetus
(47 million years ago)

Artwork by
Carl Buell

Basilosaurus (40 million years ago)

Artwork by
Carl Buell

From a Journalist's Mailbox

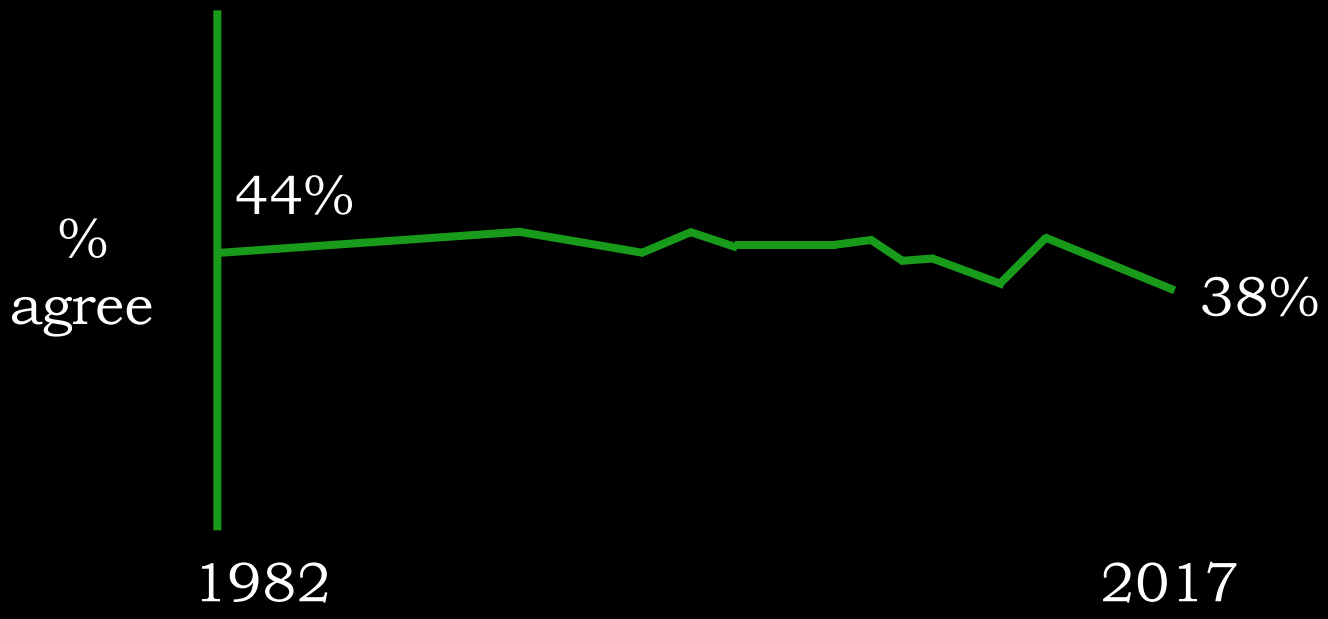


….you can be sure of this Carl, the reason you cannot see how wrong you are is that the god of this world, Satan, has blinded your eyes to the truth. May God have mercy on your soul

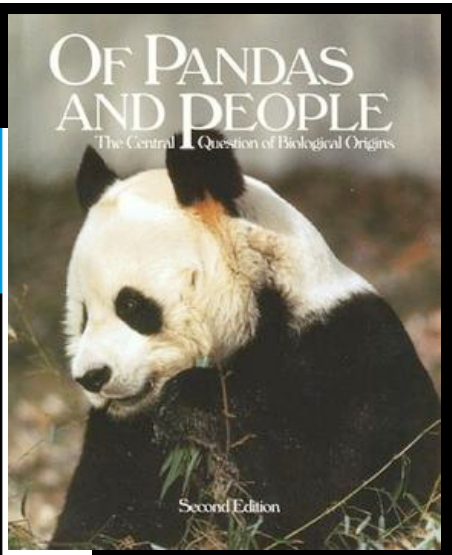
In Christ, Bill

phenomena.nationalgeographic.com/2005/12/21/the-big-fact-check-thoughts-on-the-day-after-dover/

"God created human beings pretty much in their present form at one time within the last 10,000 years or so"



news.gallup.com/poll/21814/evolution-creationism-intelligent-design.aspx



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Chewed Dinosaur Bones Fit Flood

by Brian Thomas, M.S. *

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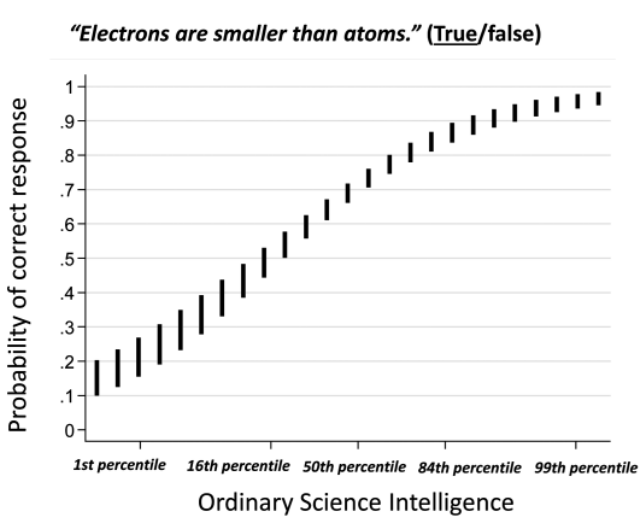
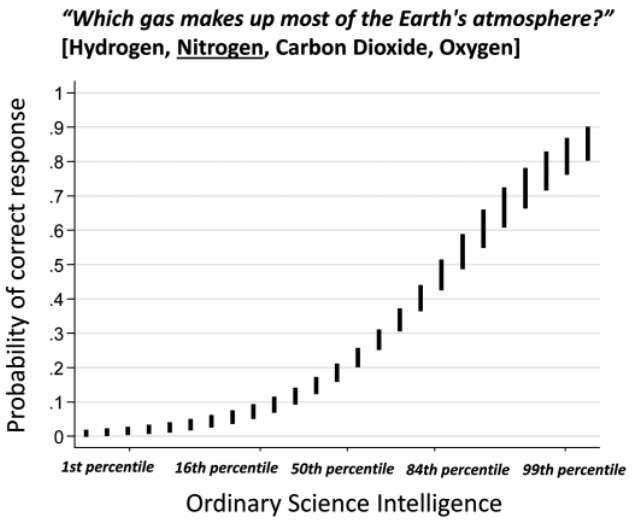
A new cache of fossils found in Arlington, Texas, contains plenty of clues that are best explained by Noah's Flood.

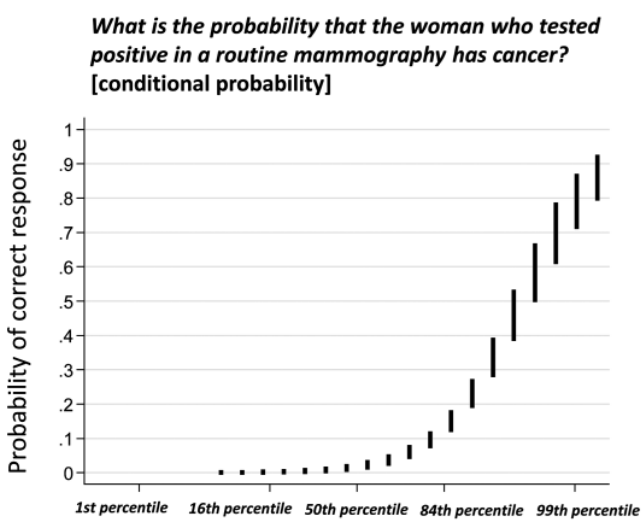
icr.org/article/6765/

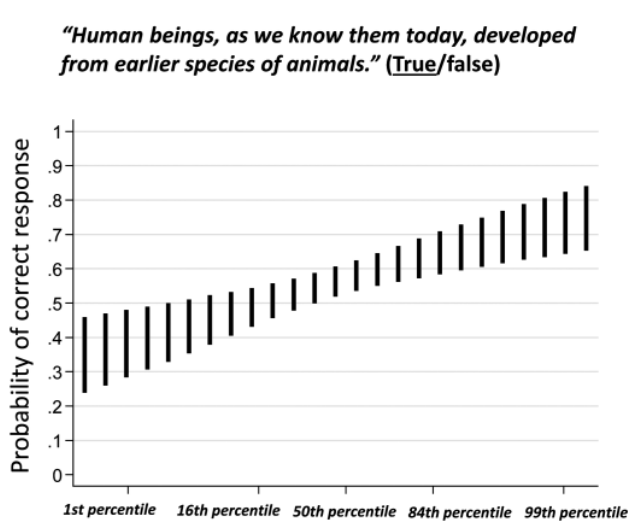
A New Theory of the Science Audience

Dan Kahan
Yale Law School
culturalcognition.net

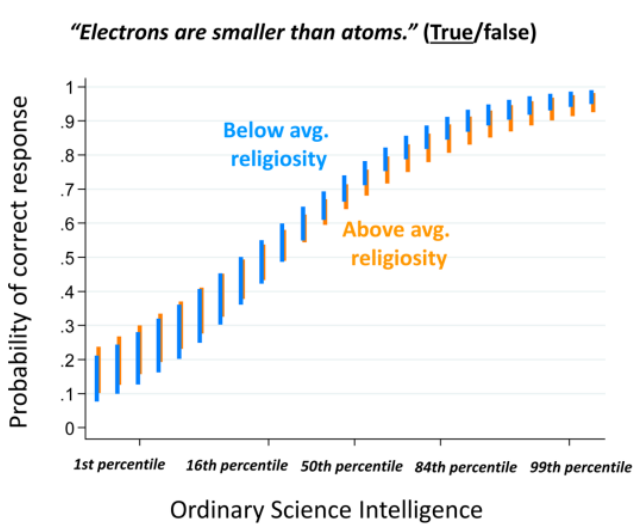


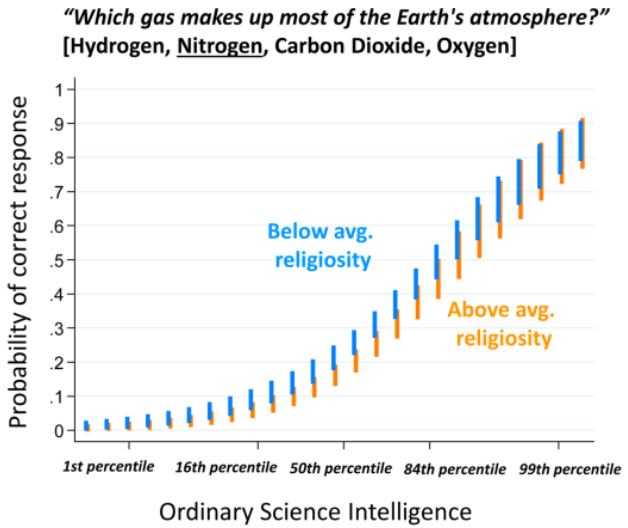


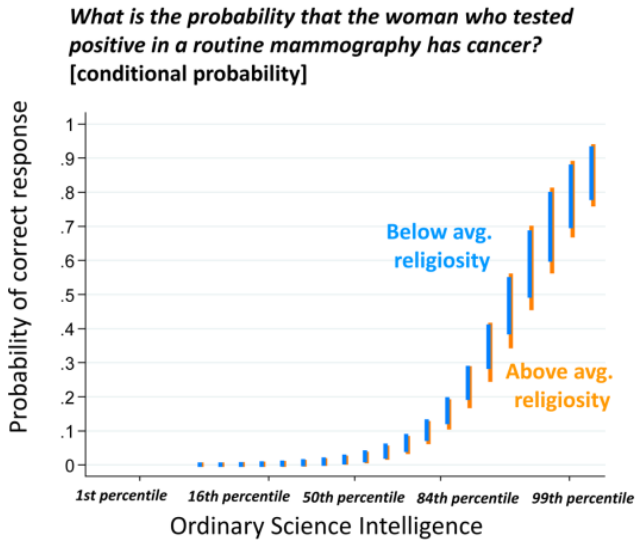


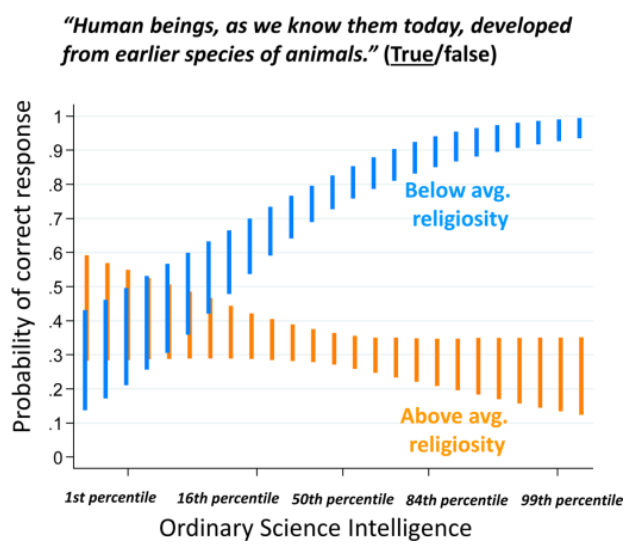


Kahan, *Journal of Risk Research* 20.8 (2017): 995-1016.









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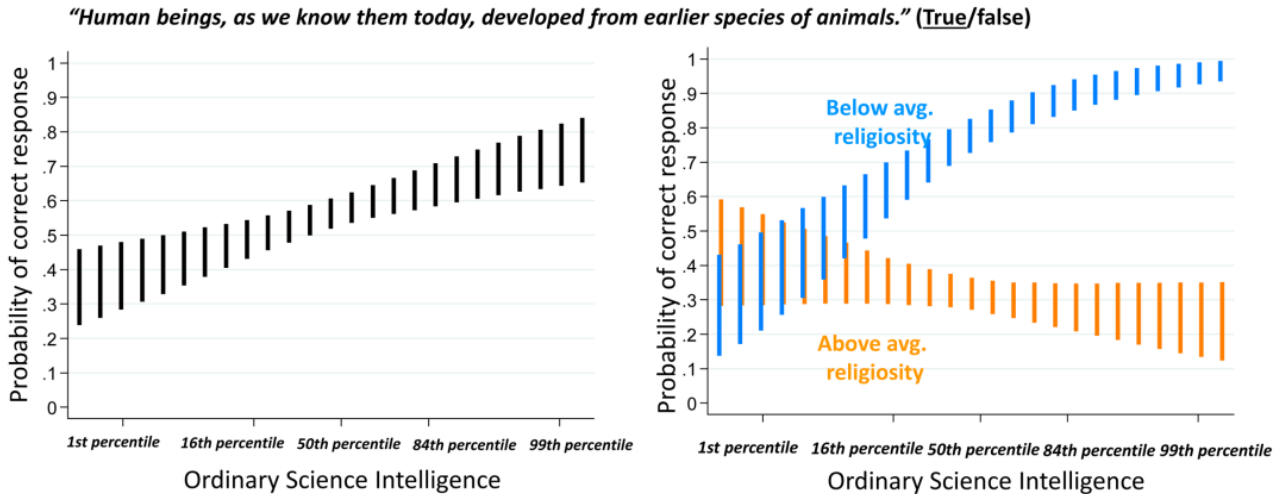

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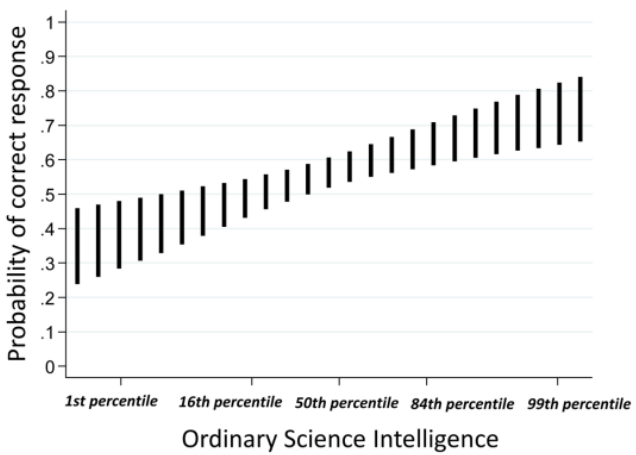
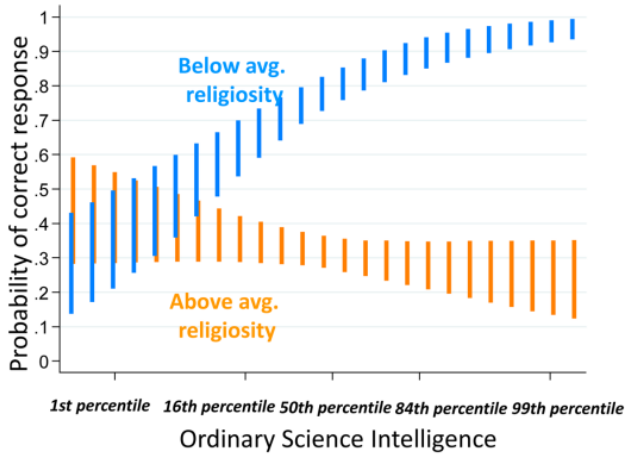
"Human beings, as we know them today, developed from earlier species of animals." (True/false)





"According to the theory of evolution, human beings, as we know them today, developed from earlier species of animals." (True/false)

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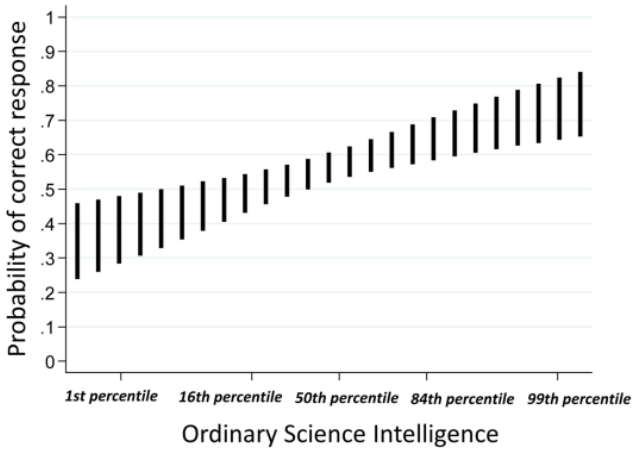

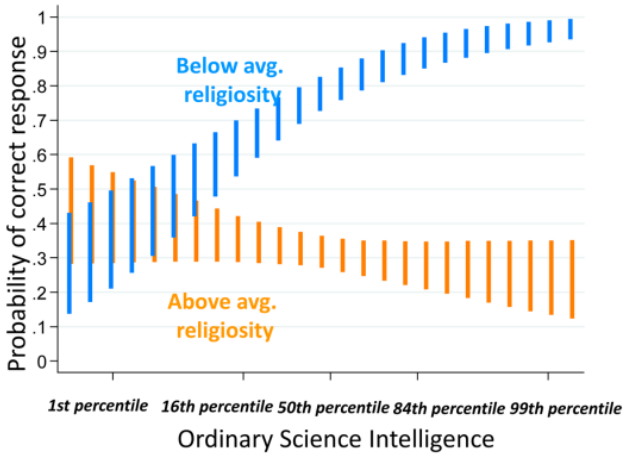

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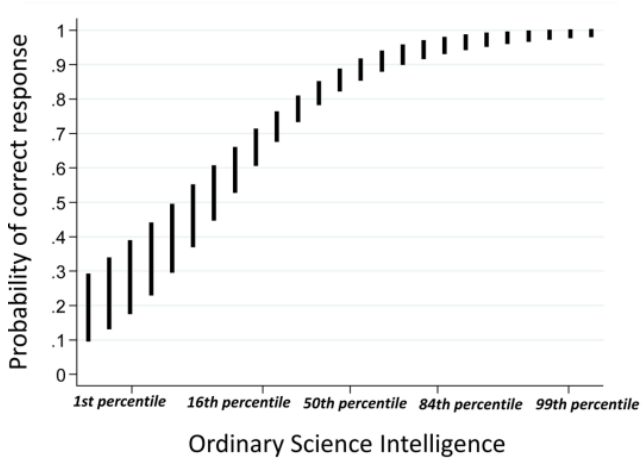
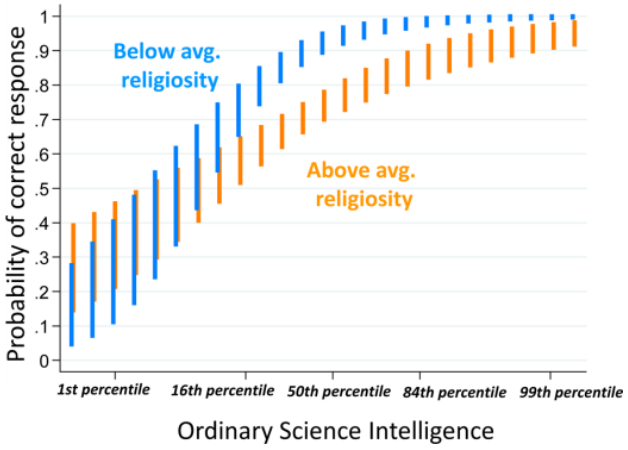




Kahan, *Journal of Risk Research* 20.8 (2017): 995-1016.

Weaponizing cultural self-identification

"You've heard about some of these pet projects, they really don't make a whole lot of sense and sometimes these dollars go to projects that have little or nothing to do with the public good. Things like fruit fly research in Paris, France. I kid you not."

—Sarah Palin, 2008

Donald J. Trump
@realDonaldTrump

Follow

Ice storm rolls from Texas to Tennessee - I'm in Los Angeles and it's freezing. Global warming is a total, and very expensive, hoax!

10:13 AM - 6 Dec 2013

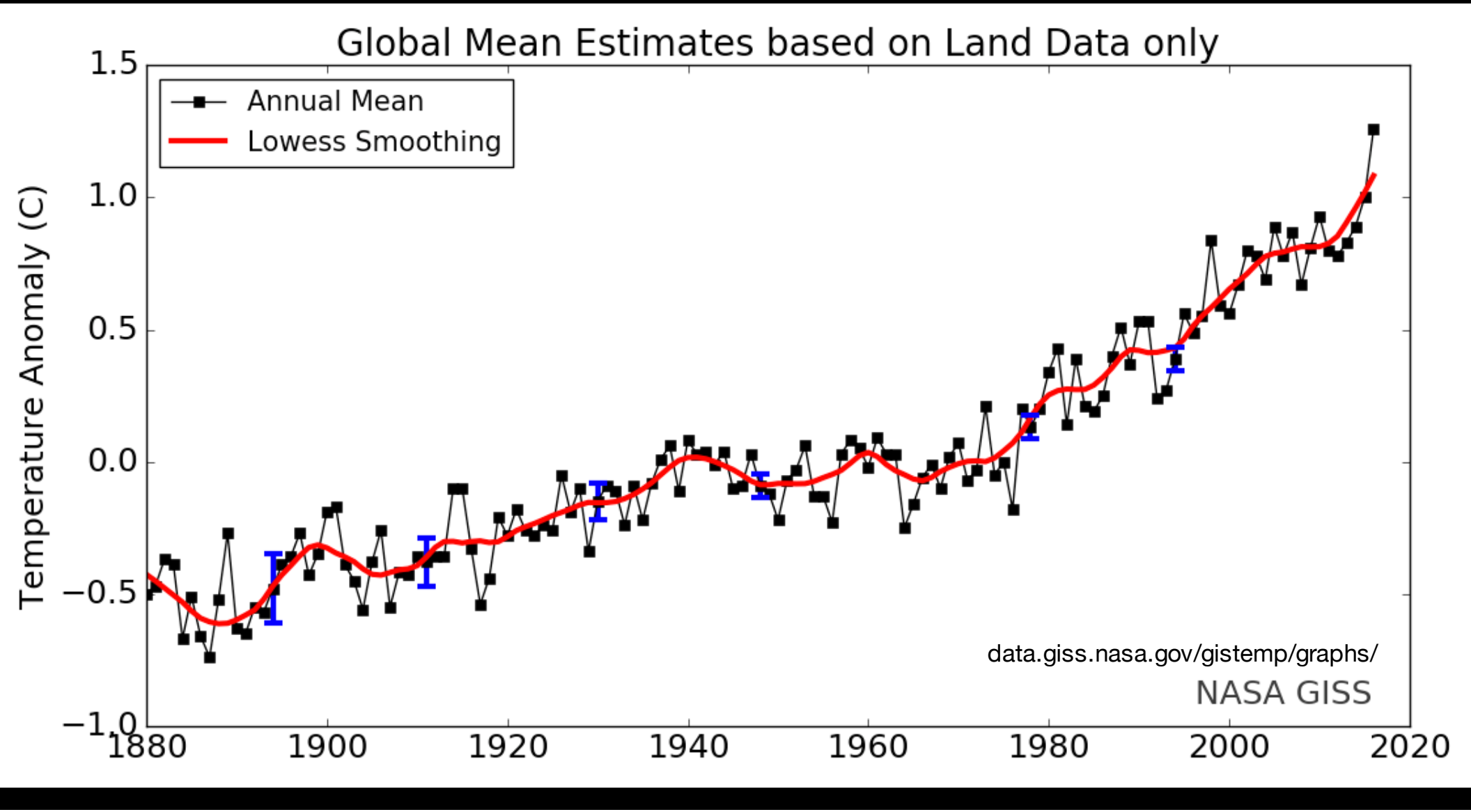
402 343

Donald J. Trump
@realDonaldTrump

If I were President I would push for proper vaccinations but would not allow one time massive shots that a small child cannot take - AUTISM.

Climate Change
Evidence & Causes

An overview from the Royal Society and the US National Academy of Sciences


Global Mean Estimates based on Land Data only
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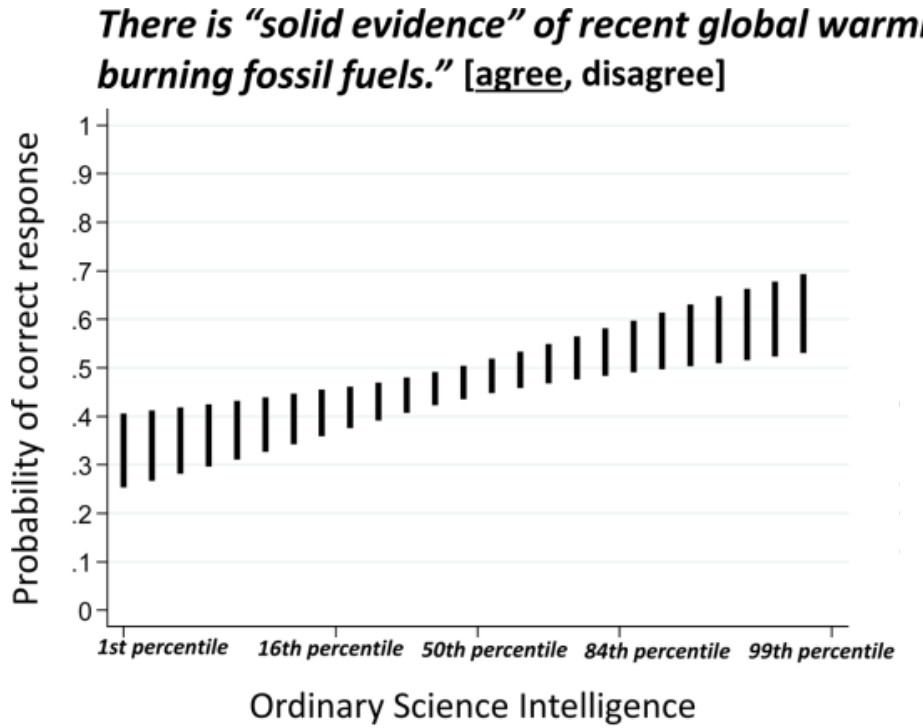
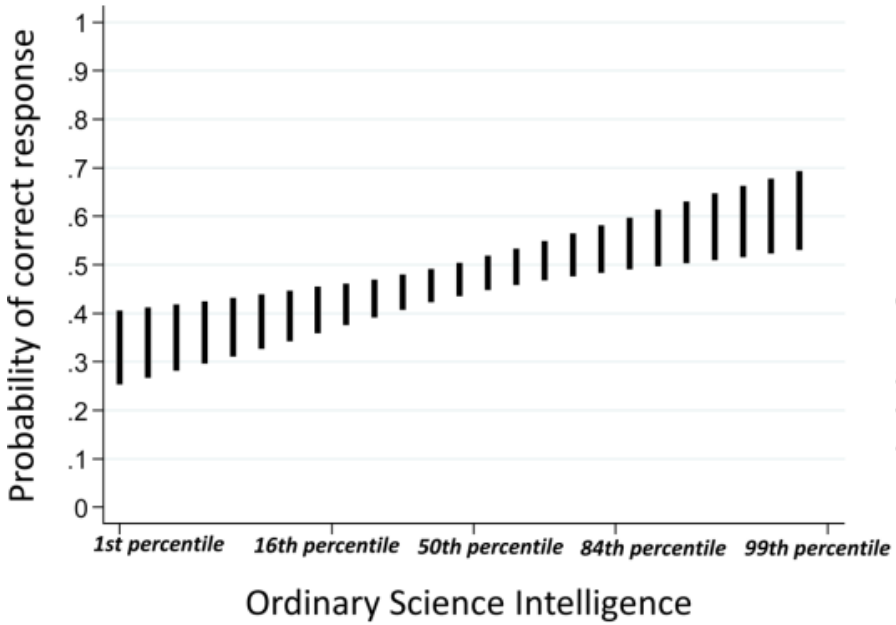
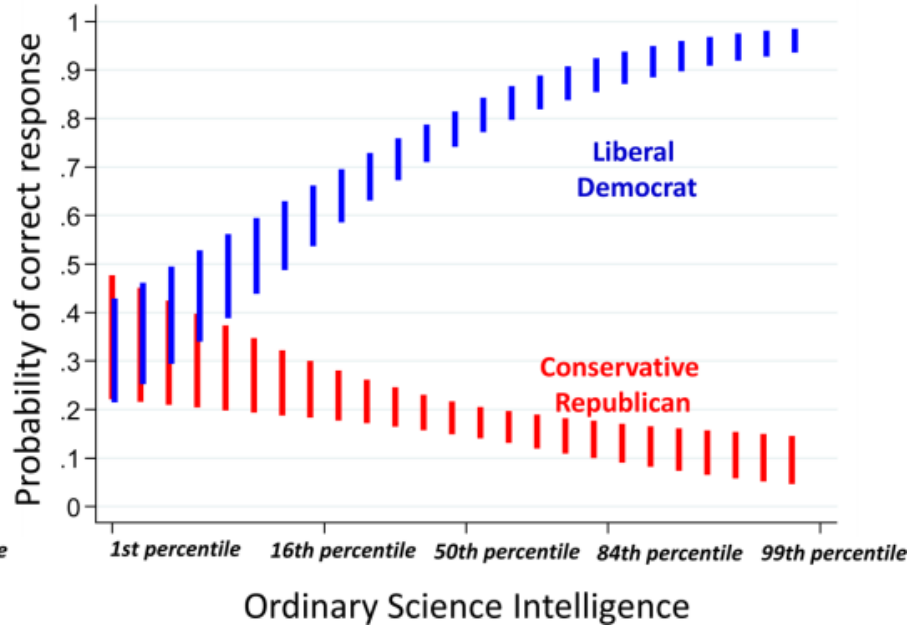


Kahan, D. M. (2015), Climate-Science Communication and the Measurement Problem. *Political Psychology*, 36: 1–43.

There is "solid evidence" of recent global warming due "mostly" to "human activity such as burning fossil fuels." [agree, disagree]





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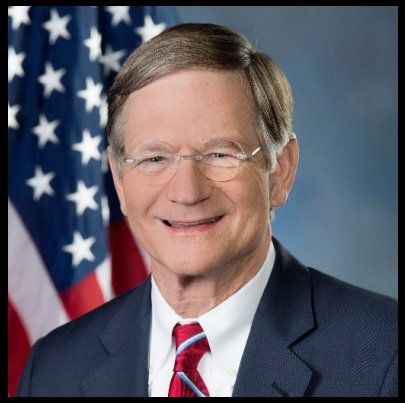
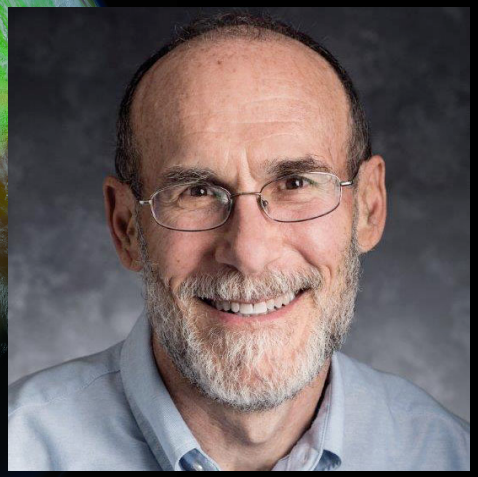
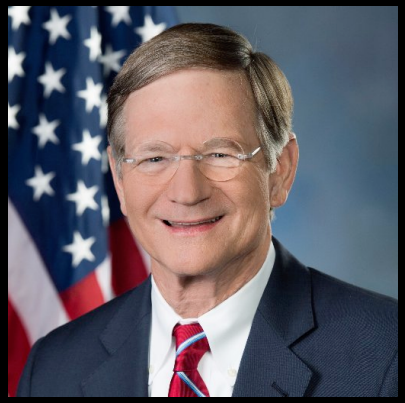


Lamar Smith
Chairman of House Committee on Science, Space and Technology



Jeff Mervis



Lamar Smith
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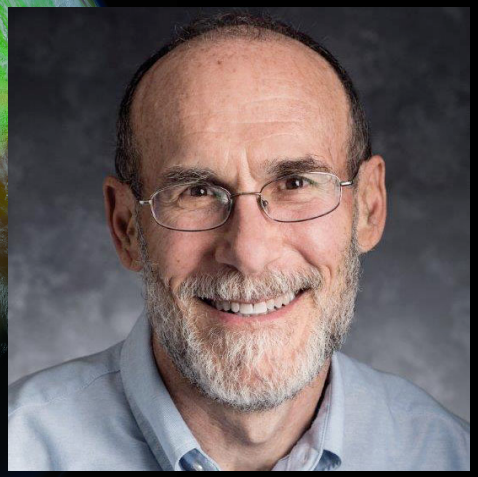
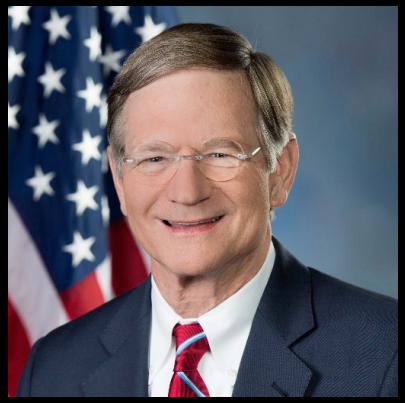


Jeff Mervis

"That is not known as an objective writer or magazine"
Congressional hearing,
March 29, 2017



Lamar Smith
Chairman of House Committee on Science, Space and Technology

ars TECHNICA BIZ & IT TECH SCIENCE POLICY CARS GAMING & CULTURE FO

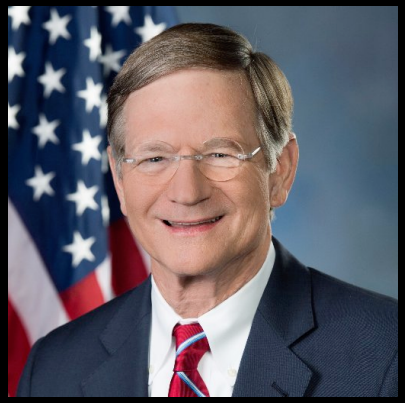
SCIENCE SCHMIENCE —

US House Science Committee tweets Breitbart climate misinformation

"Global temperatures plunge," the article falsely exclaims.

SCOTT K. JOHNSON - 12/2/2016, 1:37 PM

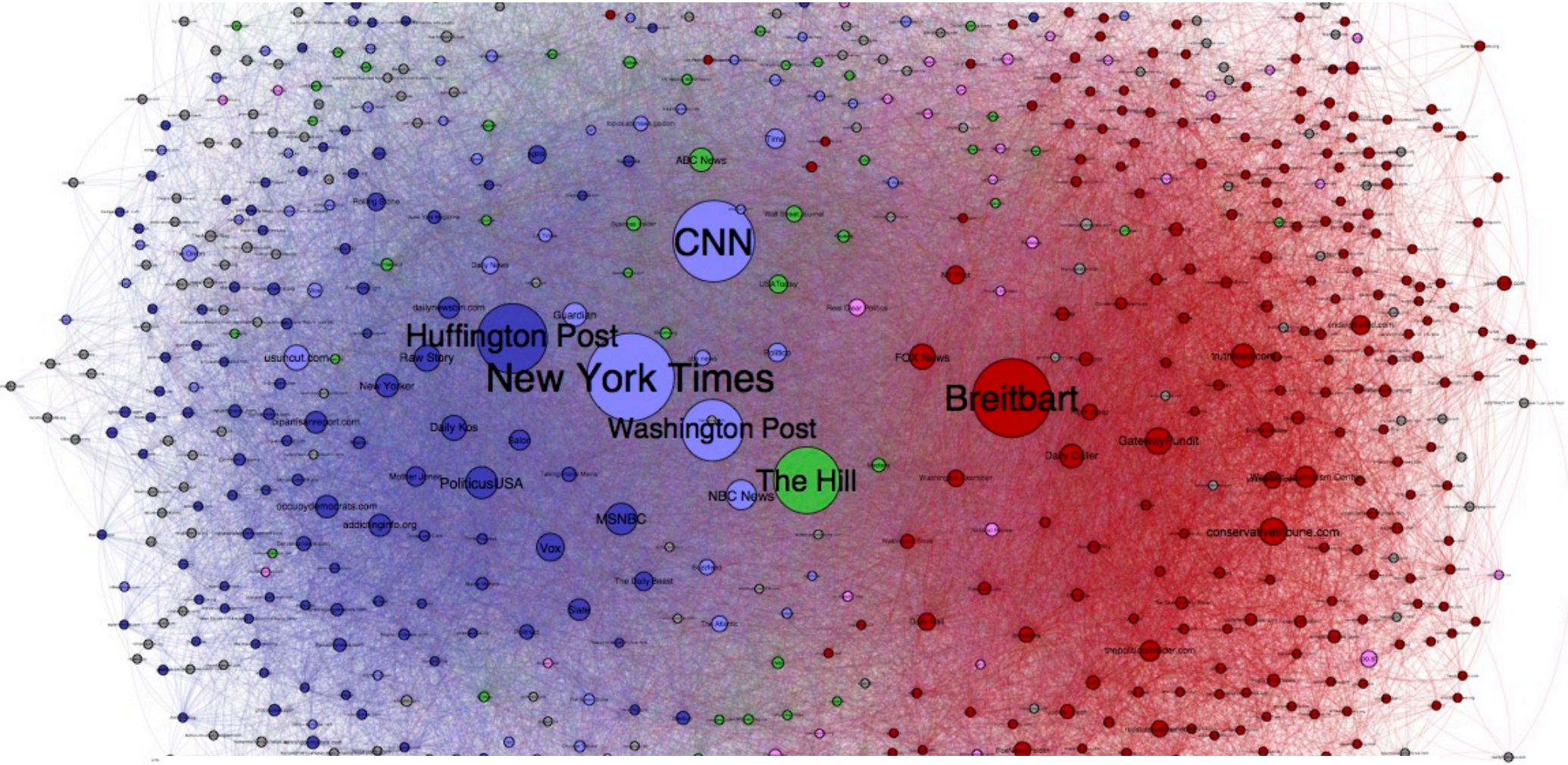
arstechnica.com/science/2016/12/us-house-science-committee-tweets-breitbart-climate-misinformation/



Lamar Smith
Chairman of House Committee on Science, Space and Technology

"The article was written by James Delingpole, a columnist who has made a career out of insult-laden polemics against climate science. (In an episode of BBC's Horizon, Delingpole famously admitted that he never reads scientific papers and called himself "an interpreter of interpretations.") In this case, Delingpole mostly tacked a few put-downs onto quotes from a *Daily Mail* story written by David Rose—who also has a long history of writing deeply misleading stories about climate science."

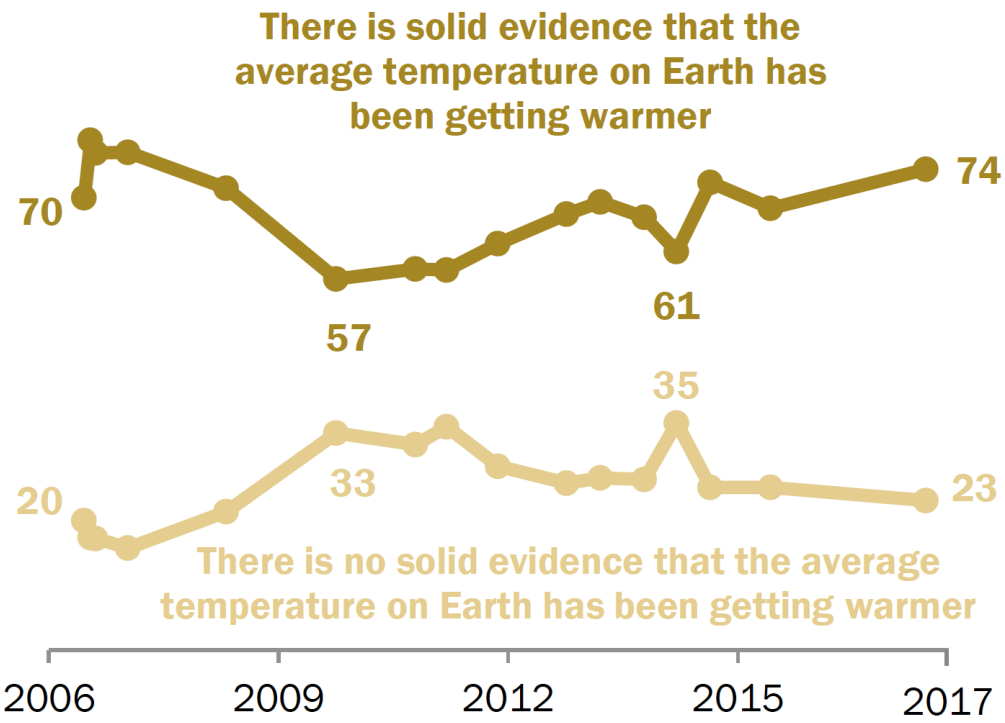
arstechnica.com/science/2016/12/us-house-science-committee-tweets-breitbart-climate-misinformation/



Faris, Robert, et al. "Partisanship, Propaganda, and Disinformation: Online Media and the 2016 US Presidential Election." nrs.harvard.edu/urn-3:HUL.InstRepos:33759251

Large majority says there is ‘solid evidence’ the Earth is warming

% who say …



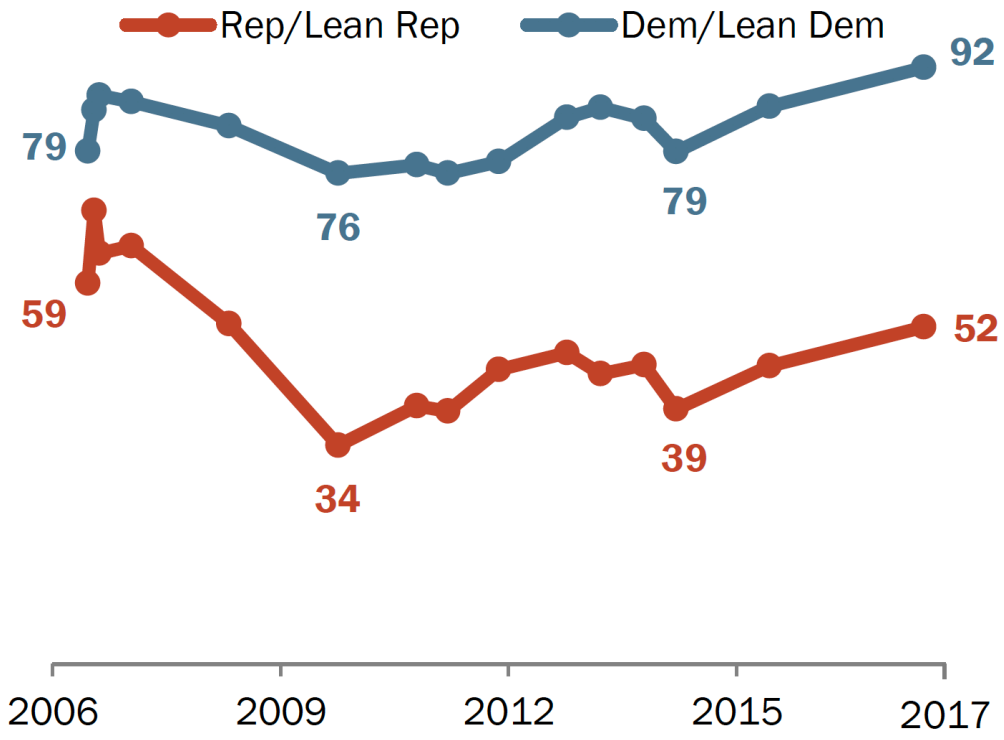
Note: Don’t know responses not shown. QA77.
Source: Survey conducted June 8-18, 2017.

PEW RESEARCH CENTER

goo.gl/e6pS3T

In both parties, more say solid evidence of global warming, but wide gap persists

% who say there is solid evidence that the average temperature on Earth has been getting warmer



Source: Survey conducted June 8-18, 2017. QA77.

PEW RESEARCH CENTER

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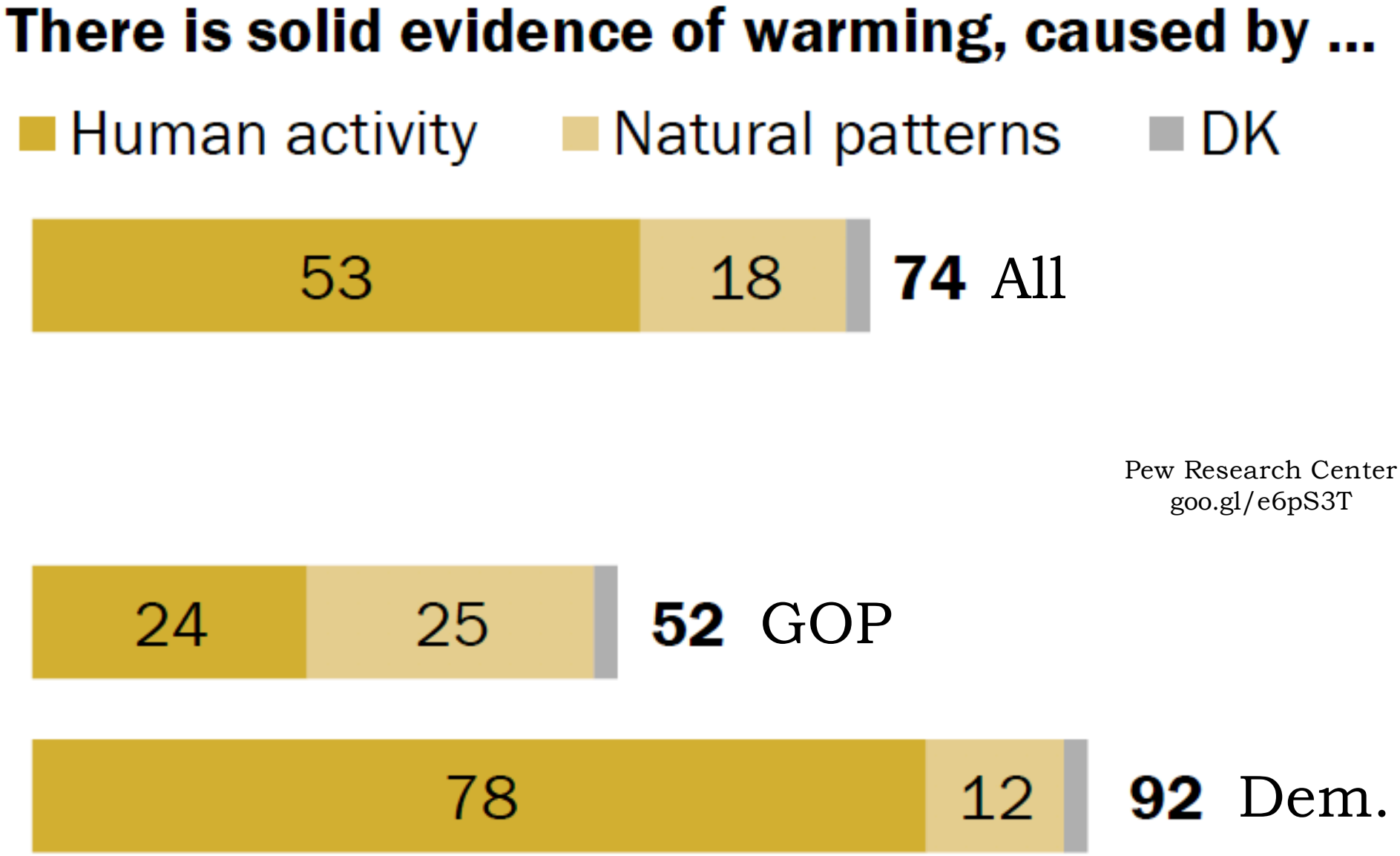


Pew Research Center
goo.gl/e6pS3T

Shrimp on a Treadmill: U.S. Senate Bill Would Tackle 'Silly' Science

Tue, 10/24/2017 - 10:02am 18 Comments by Seth Augenstein - Senior Science Writer - @SethAugenstein

laboratoryequipment.com/news/2017/10/shrimp-treadmill-us-senate-bill-would-tackle-silly-science

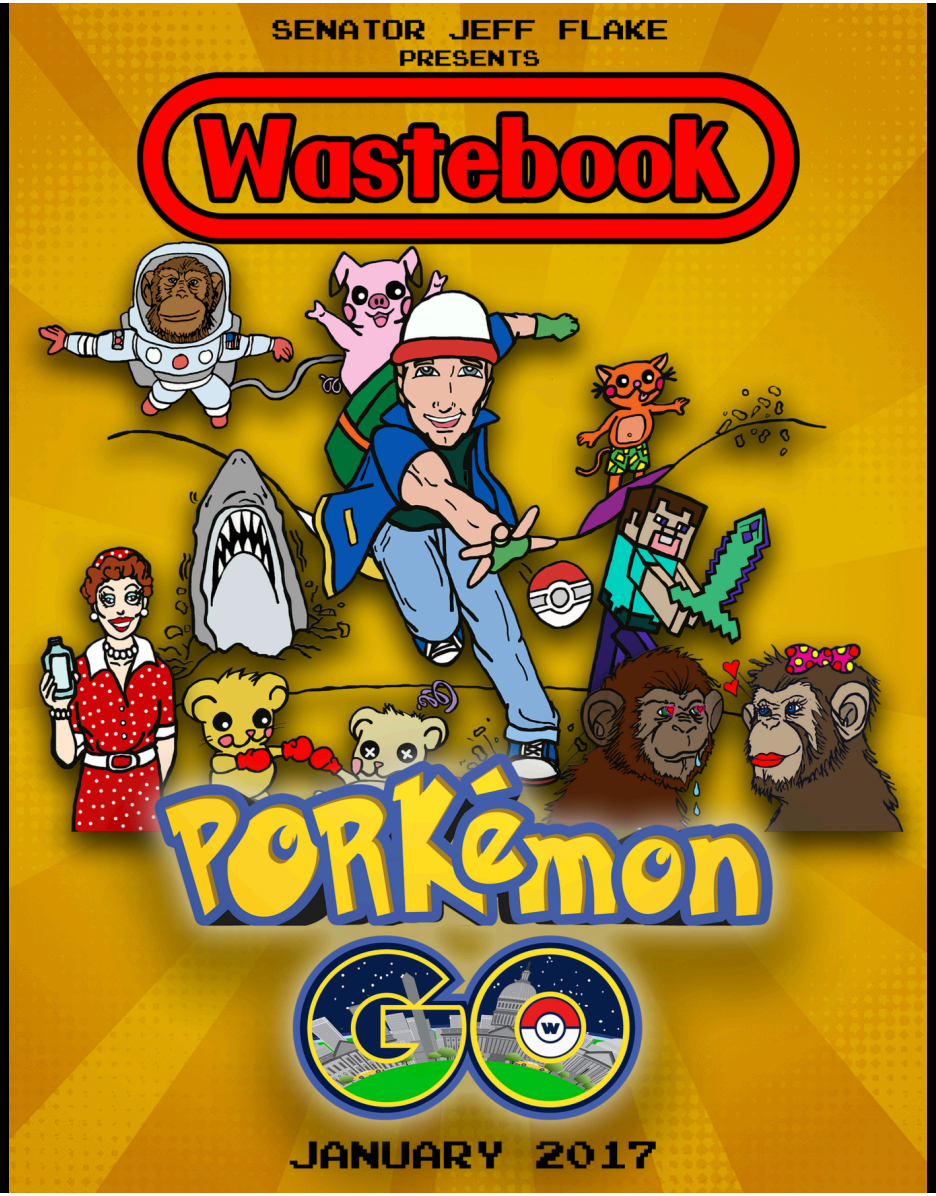
Senator Jeff Flake
Arizona

Sheila Patek,
Duke University

pbs.org/newshour/show/why-knowledge-for-the-pure-sake-of-knowing-is-good-enough-to-justify-scientific-research
PBS NEWS HOUR

Sheila Patek talks with Senator Jeff Flake, April 2016

dukechronicle.com/article/2016/04/duke-scientist-sheila-patek-defends-shrimp-research-on-capitol-hill



flake.senate.gov/public/index.cfm/press-releases?ID=03100833-ECA9-459F-A100-03FA9419007F

Lap Dogs

$1.3 million
Virginia
National Science Foundation

The way cats and dogs drink is as different as, well, cats and dogs, according to researcl supported by the National Science Foundation (NSF). The project was partially funded out of three separate NSF grants that total more than $1.3 million.[1027]

"Little is known about the actual physical mechanisms that dogs use to transport fluids when lapping," according to researchers at the Virginia Tech College of Engineering.[1028]

"Before we did fundamental studies of how these animals drink fluids, our guess was dogs and cats drink about the same way," says Sunghwan "Sunny" Jung, an associate professor of biomedical engineering and mechanics. "Instead we found out that dogs drink quite differently than cats."[1029]

"Comparing lapping in dogs and cats reveals that, despite similar morphology, these carnivores lap in different physical regimes: an unsteady inertial regime for dogs and steady inertial regime for cats," the researchers say.[1030] In other words, dogs are sloppy when they drink.

Nineteen dogs "of various sizes and breeds were observed drinking water "using photography and laboratory simulations."[1031]

"The researchers measured tongue motion, recorded water volumes, and generally measured lapping in the dogs. They used the results to generate a physical model in the laboratory of the tongue's interaction with the air-fluid interface, according to Jake Socha, an associate professor of biomedical engineering and mechanics at Virginia Tech."[1032] Physical experiments were also conducted "to mimic the motion of a dog's tongue as it exits the water."[1033]

The difference between how dogs and cats drink was discovered.

"Dogs accelerate the tongue upward more quickly than do cats, and then time their bit to coincide with the pinch-off of the column. The everyday experience of dogs as messy drinkers results from the backward curl of the tongue, which increases the size of the water column and thus enables dogs to drink more per lap than with a straight tongue," the researchers explain.[1034]

Wastebook PORKémon GO

LAP DOG: A dog drinking water as part of the study.[1035]

"Dogs lap because they have incomplete cheeks and cannot suck. When lapping, a dog's tongue pulls a liquid column from the bath," the researchers observed.[1036] "We measured lapping in 19 dogs and used the results to generate a physical model of the tongue's interaction with the air–fluid interface. These experiments help to explain how dogs exploit the fluid dynamics of the generated column. The results demonstrate that effects of acceleration govern lapping frequency, which suggests that dogs curl the tongue to create a larger liquid column."[1037]

So what do these findings mean? "This was a basic science study to answer a question very little was known about — what are the fundamental mechanics of how dogs drink?" explains Sean Gart, the graduate student who filmed the dogs.[1038]

These types of projects are lapping up public resources that could be put to much better use.

Flobots, Robot Flowers

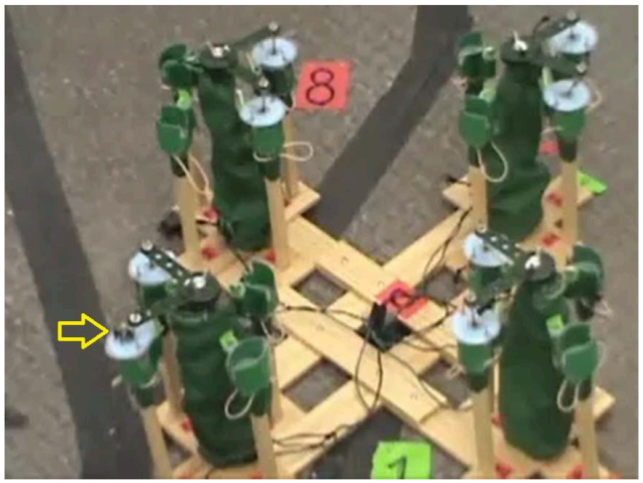
$1.3 million
Arizona
National Institutes of Health

Flobots aren't your garden variety flowers. In fact, they aren't flowers at all but rather robots in disguise.

The flobots were created with funding from a $1.3 million grant from the National Institutes of Health to the University of Arizona.[542]

Each of the robotic flowers is made up of a brass rod dipped into a reservoir containing a liquid sugar solution.[543] They are designed to refill themselves with nectar sugar.[544]

The flobots were developed for use in studies into the foraging behaviors of bees and other pollinators when it may be "impractical" to use real flowers.[545] Bees can reach the flobot's sugar solution through a hole in the brass rod "using relatively natural behavior, similar to probing the area around the base of a flower's style."[546]



A bee foraging on flobots.[548]

While robotic flowers may sound like a futuristic idea, the concept is not new. "A variety of self-refilling artificial flowers" have been utilized and studied by researchers for more than four decades.[547]

When compared to ten "artificial flower designs developed by other researchers," the flobots were found to have "two important disadvantages over most" of the others. "Namely the lack of control over nectar volume and the possibility that refilling flowers will startle nearby bees," according to the study "Flobots: Robotic Flowers For Bee Behavior Experiments."[549]

A flobot compared to a real flower.

Despite these downsides, the creator of the flobots claims the robotic flowers "have a number of compensating advantages. The flowers can be set up, disassembled, and cleaned quickly enough to make the use of a large array feasible, and the components are inexpensive enough to allow construction of such an array on a small budget."[550]

She also claims that by "using flobots, researchers can provide bees with a large number of flowers, allowing more natural foraging behavior."[551] The appearance and make-up of the flobots, however, is far from natural, so she recommends painting the flobots "to give them a more natural appearance."[552]

When the researched "trained bees" to visit the robotic flowers, most of the "bees readily learned to forage from the flobots," but some still avoided the fake flowers.[553]

Taxpayers aren't fooled either and want unnecessary projects like this nipped it in the bud.

Wastebook PORKémon GO

Fish On A Treadmill

$1.5 million
California
National Science Foundation

A fish needs a treadmill like a fish needs a bicycle. But if a fish finds itself on a treadmill, what it really does need is an abundance of oxygen— to both exercise longer and recover faster.

That was the finding of a study measuring the endurance of mudskipper fish (Periophthalmus modestus) on a treadmill. The experiment was conducted at the University of California-San Diego Scripps Institution of Oceanography with funding from a $560,000 stimulus grant from the National Science Foundation (NSF).[128]

Overhead view of a fish on treadmill, funded with a National Science Foundation grant.

How does a fish even use a treadmill? Mudskippers possess remarkable abilities both to live out of water for long periods of time and use their fins like legs.

In this study, mudskippers were placed on a miniature "terrestrial treadmill enclosed in an atmospheric chamber." The fish were given one minute "to acclimate to the treadmill environment," the treadmill was set to a speed of 5.5 centimeters per second, or about 2 inches per second.[129] [130] The mudskippers were then "encouraged to 'skip' and 'crutch' forward by shading the front of the treadmill with black plastic (to simulate a refuge) and by prodding them with a plastic-bristled brush from behind."[131] The treadmill "was kept moist by a drip tube in the roof of the enclosure."[132]

Wastebook PORKémon GO

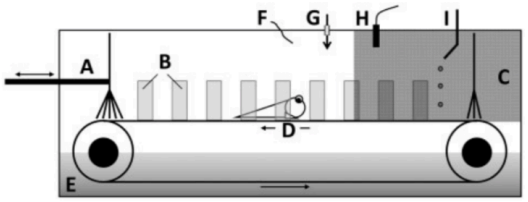


Fig. 1 Enclosed terrestrial treadmill used to exercise mudskippers. (**A**) Moveable plastic bristle brush used to prod mudskippers forward, (**B**) vertical bars painted on the side of the enclosure to help mudskippers visually maintain their position on the treadmill, (**C**) shaded "refuge" created by black plastic, (**D**) tread surface (arrows indicate direction of tread rotation), (**E**) warm water reservoir at 25°C, (**F**) thermocouple to monitor atmospheric temperature, (**G**) gas input valve to adjust atmospheric concentration of oxygen, (**H**) clark-type electrode used to monitor atmospheric concentration of oxygen, (**I**) drip tube to keep tread moist.

Diagram of a mudskipper fish on a treadmill.[133]

The mudskippers "were exercised to exhaustion, defined by when a fish would fall against the brush at the back of the treadmill and no longer respond to prodding, or for a maximum of 15 min. Each fish was exercised three or more times at each oxygen concentration in random order to determine mean individual endurance under each condition."[134] The fish were given at least 48 hours to recover "between trials."[135]

The study found mudskippers "can exercise longer and recover quicker under higher oxygen concentrations." The researchers say these findings "support the hypothesis that the rise in atmospheric oxygen" hundreds of millions of years ago hastened the emergence of animal life from water onto land.[136]

While mudskippers may provide able test subjects for such studies, exercising on a treadmill for most fish is literally like being a fish out of water. But another project funded with a $650,000 NSF grant is "placing bluegill fish in tanks of water with treadmill-like swim tunnels to observe how they swim under various conditions. The scientists will ultimately collect about 100 fish from different environments for various analyses."[137]

The NSF funds will be spent to purchase what one of the researcher jokingly refers to as "all the toys" as well as travel costs for junkets to conferences.[138]

Senator Rand Paul (R–KY)

Gage Skidmore/Flickr (CC BY-SA 2.0)

Rand Paul takes a poke at U.S. peer-review panels

By **Jeffrey Mervis** | Oct. 19, 2017 , 10:00 AM

sciencemag.org/news/2017/10/rand-paul-takes-poke-us-peer-review-panels

laboratoryequipment.com/news/2017/10/shrimp-treadmill-us-senate-bill-would-tackle-silly-science

Shrimp on a Treadmill: U.S. Senate Bill Would Tackle 'Silly' Science

Tue, 10/24/2017 - 10:02am 18 Comments by Seth Augenstein - Senior Science Writer - @SethAugenstein

Screenshot from a video demonstrating the "shrimp on a treadmill" research. Credit: College of Charleston Grice Marine Laboratory

The science project became a major emblem of "silly" science: the placement of shrimp on a tiny treadmill. Some laughed, others took it as a call to prioritize federal funding for science research that could produce results for the taxpayer.

Now, a bill proposed by Sen. Rand Paul (R-KY) would upend the way grants are released through the National Science Foundation. The "BASIC Research Act" (S.1973) would transfer the current grant evaluation process in the National Science Foundation to an outside "Officer of the Special Inspector General and Taxpayer Advocate for Research."

Camille Parmesan, formerly of the University of Texas

The impact of Trump on climate science has been far greater than what the public believes it has. He has not only slashed funding, but he's gone on the attack in any way he can with his powers as the president. University researchers are buffered from this, but scientists working at government agencies have really felt the blow.

They have been muffled and not allowed to speak freely with the press, they have had their reports altered to remove "climate change" from the text, and are being told to leave climate change out of future reports and funding proposals.

This degrades the entire climate science community. Scientists are fighting back, but Congress needs to exercise its constitutional powers and keep the executive branch in check. This is not a partisan issue – this is about the future of America.

theguardian.com/science/2017/dec/31/camille-parmesan-trump-extremism-climate-change-interview

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By **LISA FRIEDMAN**, **MARINA AFFO** and **DEREK KRAVITZ** DEC. 22, 2017

Ronnie B. Levin spent 37 years at the E.P.A. working on lead exposure. She retired in November after what she described as months of low morale at the agency. Kavana Szymczak for The New York Times

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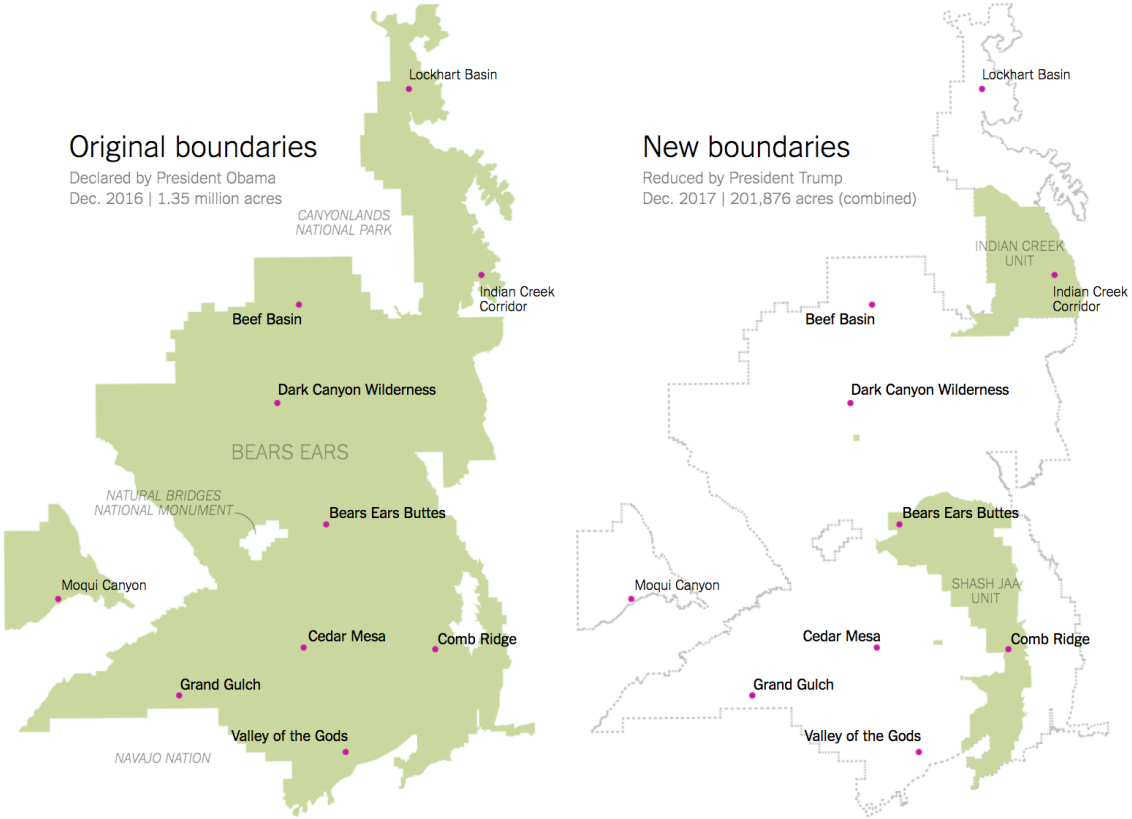

THE SPOKESMAN-REVIEW

Thu., Sept. 28, 2017, 5:19 p.m.

Zinke aims for new low: rolling back collaborative Sage Grouse Plan

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By Rich Landers
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Rich Landers joined The Spokesman-Review in 1977. He is the Outdoors editor for the Sports Department writing and photographing stories about hiking, hunting, fishing, boating, conservation, nature and wildlife and related topics.

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In this 2008 file photo, a male sage grouse performs his "strut" near Rawlins, Wyo. (Jerret Raffety / Associated Press)

PUBLIC LANDS -- In an apparent effort to open more federal public lands to oil and gas development, mining and grazing, Interior Secretary Ryan Zinke reportedly is considering a rollback of the Sage Grouse Management Plan that was hammered out by a wide range of stakeholers over a decade of discussions before being adopted in 2015.

spokesman.com/blogs/outdoors/2017/sep/28/zinke-aims-new-low-rolling-back-collaborative-sage-grouse-plan/

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Trump Ignores Climate Change. That's Very Bad for Disaster Planners.

By **BRAD PLUMER** NOV. 9, 2017

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Flooded streets in Naples, Fla., the morning after Hurricane Irma swept through in September.

Spencer Platt/Getty Images

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