ILLUSTRATION: ILLUSTRATION WORKS/ALAMY STOCK PHOTO

Edited by **Jennifer Sills**

Both male and female advisers can "mother"

In her Working Life essay "I'm not your mother" (3 November, p. 690), L. R. G. DeSantis—a female professor in a male-dominated field—describes how students often expect her to "mother" them, a role they do not expect of her male colleagues. DeSantis admires her own graduate school adviser, who made sure that their relationship did not go beyond the professional study of paleontology. It is unfortunate and unfair that female faculty are disproportionately expected to counsel students, but the solution is not to turn them away. Academia would benefit if both women and men were willing to support students personally as well as professionally.

There is no question that sexism remains a pervasive structural issue in academia. At the federal level, studies show that female faculty receive disproportionately less funding compared with their male colleagues (*1*). At the classroom level, this gender bias appears in the form of students reviewing professors with male names more highly (*2*). Addressing such issues and being aware of their impact is essential for creating a more equitable scientific task force. However, DeSantis's desire to engage with students only at a professional level could itself be a product of the toxic masculine culture of academia.

The notion that compassion and personal engagement are qualities reserved only for maternal relationships is widespread and fuels structural sexism. According to stereotypical gender roles, boys shall not talk about their struggles or emotions; they simply show up to work and get the job done. And boys certainly do not hug one another. But accepting this notion only cements the status quo "good old boys' club" culture in academia and works against breaking down gender barriers there.

Women drop out of scientific careers at the assistant and associate faculty level partially because of the scarce availability of role models and mentors (*3*). Perhaps female faculty are disproportionately approached with personal concerns not because they are seen as mothers, but rather because they are seen as successful and well-adjusted professionals who have navigated more barriers than their male colleagues—making them better sources for advice. Students are aware of the sexist norms of academia. In their quest to identify trusted allies, it makes sense to test a faculty mentor with low-risk personal scenarios (sometimes involving stories about a disagreement with one's partner). If the reaction is "I don't care," it is highly unlikely that the student will reveal higher-risk scenarios such struggles with sexism, homophobia, or racism in the academy. Discouraging students from partaking in such essential conversations is a missed opportunity to support an equitable task-force. Both male and female advisers should strive to make themselves accessible to students searching for advice. Compassion, engagement, and caring should be agnostic of gender.

Kayarash Karimian
Johns Hopkins University School of Medicine, Baltimore, MD 21231, USA. Email: kkarimi1@jhmi.edu

REFERENCES

1. H. Shen, *Nature* **495**, 22 (2013).
2. L. MacNell, A. Driscoll, A. N. Hunt, *Innovative Higher Ed.* **40**, 291 (2014).
3. L. Bonetta, *Science* 10.1126/science.opms.r1000084 (2010).

10.1126/science.aar5189

Inoculating against misinformation

The unprecedented spread of misinformation threatens citizens' ability to form evidence-based opinions on issues of societal importance, including public health, climate change, and national security. In his Editorial "Nip misinformation in the bud" (27 October, p. 427), R. Weiss argues that fact checking after misinformation has spread is often ineffective. Decades of research in cognitive science (*1*) have buttressed this concern by establishing the robust "continued influence effect": Post-publication retractions and corrections often fail to eliminate the influence of misinformation. In some cases, they reinforce falsehoods simply by repeating them. The more exposure people have to a falsehood, the more truth-value they ascribe to it (*2*). The networked nature of online media enables misinformation to spread rapidly, much like a viral contagion (*3*). Accordingly, Weiss calls for a solution in which scientific facts reach the public before misinformation has a chance to spread and take hold.

A growing body of research suggests that this may be possible, but it must be done preemptively. This process of "inoculation" adheres to a biological analogy: Just as injections containing a weakened strain of a virus trigger antibodies in the immune system to help confer resistance against future infection, the same can be achieved with information. Recent studies find that misinformation can be used against itself: By preemptively warning people against misleading tactics and by exposing people to a weakened version of the misinformation, cognitive resistance can be conferred against a range of falsehoods in diverse domains such as climate change (*4*, *5*), public health (*6*), and emerging technologies (*7*). In the battle against misinformation, it is better to prevent than cure. The benefit of inoculation is that it can spread, too, online and through word-of-mouth (*8*). News outlets and the public can help inoculate each other to achieve societal immunity against misinformation.

Sander van der Linden,[1]* Edward Maibach,[2] John Cook,[2] Anthony Leiserowitz,[3] Stephan Lewandowsky[4,5]
[1]Department of Psychology, School of Biological Sciences, University of Cambridge, Downing Site, Cambridge, CB2 3EB, UK. [2]Center for Climate Change Communication, Department of Communication, George Mason University, Fairfax, VA 22030, USA. [3]Yale Program on Climate Change Communication, School of Forestry and Environmental Studies, Yale University, New Haven, CT 06511, USA. [4]School of Experimental Psychology and Cabot Institute, University of

Bristol, Bristol, BS8 1TU, UK. [5]School of Psychology, University of Western Australia, Crawley, WA 6009, Australia.
*Corresponding author.
Email: sander.vanderlinden@psychol.cam.ac.uk

REFERENCES

1. S. Lewandowsky, U. Ecker, N. Schwartz, J. Cook, *Psychol. Sci. Public Interest* **13**, 106 (2012).
2. L. Fazio, N. Brashier, B. Payne, E. Marsh, *J. Exp. Psychol. Gen*. **144**, 993 (2014).
3. M. Tambuscio, G. Ruffo, A. Flammini, F. Menczer, "Fact-checking effect on viral hoaxes: A model of misinformation spread in social networks," *Proceedings of the 24th International Conference on World Wide Web* (2015), pp. 977–982.
4. S. van der Linden, A. Leiserowitz, S. Rosenthal, E. Maibach, *Glob. Chall*. **1**, 1600008 (2017).
5. J. Cook, S. Lewandowsky, U. Ecker, *PLOS ONE* **12**, e0175799 (2017).
6. J. Niederdeppe, K. Heley, C. Barry, *J. Commun*. **65**, 838 (2015).
7. T. Bolsen, J. Druckman, *J. Commun*. **65**, 745 (2015).
8. B. Ivanov *et al*., *J. Commun*. **62**, 701 (2012).

10.1126/science.aar4533

Museum of the Bible: Questionable science

In her News Feature "Original sin" (20 October, p. 295), L. Wade describes the problematic provenance of many of the artifacts in the Museum of the Bible and observes that the exhibits "tiptoe around subjects that challenge them." Yet she stops short of recognizing that the museum's premise—that the Bible can be supported by scientific evidence—is an extended tiptoeing exercise. Attempting to show historical validity in the Bible nearly 70 years ago, Werner Keller (*1*) and Hugh Schonfield (*2*) presented impressionistic associations between events, artifacts, and alleged prophecies fulfilled. Both bypassed rigorous scholarship and have been appropriately forgotten. Possible evidence to support Biblical events was thoroughly sifted by Hebrew University archaeologist Amihai Mazar (*3*) in a meticulously documented study from more than 150 excavations since World War II. The evidence is tissue thin.

There is no evidence for major Biblical events. No artifacts have shown that a slave community of Hebrews resided in Egypt for 400 years. The 600,000 males, plus families, said to have fled under Moses, supposedly wandered in Sinai for 40 years, but they left no traces—no campsites, fire pits, shelter remnants, middens, or graves. The enormous dimensions of Solomon's temple describe a structure twice the size of any temple excavated in Israel; his palace, reputedly of similar dimensions to accommodate 300 wives and 700 concubines, has left no traces.

Some evidence invalidates Biblical claims. Monotheistic worship of Yahweh is attributed to Abraham, circa 1800 BCE, but inscriptional evidence of polytheism during the monarchy of Israel and Judah, 1000 to 586 BCE, indicates projection of later monotheism to the earlier patriarchal period. Altar inscriptions include the storm-god Baal, and Asherah symbolism from the Canaanite goddess of fertility (*4*); polytheistic leanings evidently persisted throughout the kingship.

The Church of the Nativity allegedly marks the birthplace of Jesus, but its Bethlehem location for its fourth century construction was taken from Matthew and Luke, both written by non-witnesses at least eight decades after the birth. The tomb of Jesus, found with the "True Cross" according to legend by Constantine's mother Helena in the fourth century (*5*), provides a questionable foundation for the later Church of the Holy Sepulchre.

The archaeological Museum of the Bible, like the Creation Museum in Kentucky, is a Medieval throwback featuring spurious evidence in support of an invented narrative misread as historical fact. Pieces of Dead Sea Scrolls, whether forged or authentic, provide no more than fragments from earlier copies of Biblical texts; they authenticate nothing. The engagement of archaeological scholars and provenance experts to authenticate artifacts means little if the premise that archaeology can verify Biblical narrative is mistaken—"extremely problematic" in Jodi Magness's restrained judgment. The Bible narrative was assembled from several sources, fragmented by ancient legal codes, and expanded by progressively longer gospels of Jesus. Its compositional assembly is still misunderstood despite more than a century of analysis of both the Old and New Testaments (*6*, *7*). The Museum of the Bible is arranged around various misreadings, thus assuring its status as spurious religion and questionable science.

Barry Wood
University of Houston, Houston, TX 77073, USA.
Email: bwood@uh.edu

REFERENCES

1. W. Keller, *The Bible as History* (Hodder and Stoughton, New York, 1956).
2. H. Schonfield, *The Bible Was Right* (New American Library, New York, 1959).
3. A. Mazar, *Archaeology of the Land of the Bible, 10,000–586 B.C.E.* (Doubleday, New York, 1990).
4. M. S. Smith, *The Early History of God* (Harper & Row, New York, 1987), pp. 41–114.
5. C. B. Coleman, in *Constantine the Great and Christianity* (Columbia University, 1914), pp. 116–120.
6. R. E. Friedman, *Who Wrote the Bible?* (Harper & Row, New York, 1987).
7. R. M. Helms, *Who Wrote the Gospels?* (Millennium Press, New York, 1997).

10.1126/science.aar4252

TECHNICAL COMMENT ABSTRACTS

Comment on "Water harvesting from air with metal-organic frameworks powered by natural sunlight"

Duc Thuan Bui, Kian Jon Chua, Jeffrey M. Gordon

Kim *et al*. (Reports, 28 April 2017, p. 430) presented results for the solar-driven harvesting of water from air via metal-organic frameworks as a prodigious potential advance toward remedying global water shortages. Basic thermodynamics and a survey of multiple off-the-shelf technologies show that their approach is vastly inferior in efficiency (and thereby in feasibility) to available alternatives.
Full text: dx.doi.org/10.1126/science.aao0791

Response to comment on "Water harvesting from air with metal-organic frameworks powered by natural sunlight"

Hyunho Kim, Sameer R. Rao, Shankar Narayanan, Eugene A. Kapustin, Sungwoo Yang, Hiroyasu Furukawa, Ari S. Umans, Omar M. Yaghi, Evelyn N. Wang

In their comment, Bui *et al*. argue that the approach we described in our Report is vastly inferior in efficiency to alternative off-the-shelf technologies. Their conclusion is invalid, as they compare efficiencies in completely different operating conditions. Here, using heat transfer and thermodynamics principles, we show how Bui *et al*.'s conclusions about the efficiencies of off-the-shelf technologies are fundamentally flawed and inaccurate for the operating conditions described in our study.
Full text: dx.doi.org/10.1126/science.aao3139

ERRATA

Erratum for the Report "Experimental measurement of binding energy, selectivity, and allostery using fluctuation theorems" by J. Camunas-Soler *et al.*, *Science* **358,** eaar4581 (2017). Published online 17 November 2017; 10.1126/science.aar4581

Erratum for the Perspective "Finding the first Americans" by T. J. Braje *et al.*, *Science* **358,** eaar3828 (2017). Published online 3 November 2017; 10.1126/science.aar3828

Erratum for the Report "Global climatic drivers of leaf size" by I. J. Wright *et al.*, *Science* **358,** eaaq0577 (2017). Published online 6 October 2017; 10.1126/science.aaq0577

Erratum for the Report "Two histone marks establish the inner centromere and chromosome bi-orientation" by Y. Yamagishi *et al*., *Science* **358,** eaaq0573 (2017). Published online 6 October 2017; 10.1126/science.aaq0573

Inoculating against misinformation

Sander van der Linden, Edward Maibach, John Cook, Anthony Leiserowitz and Stephan Lewandowsky

Science **358** (6367), 1141-1142.
DOI: 10.1126/science.aar4533