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# On earthquakes and fracturing, science is far from 'settled'

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Billy Calzada

## Hydraulic Fracturing Drilling

A hydraulic fracturing drilling rig shines in the night near Three Rivers, Texas, on Thursday, Dec. 13, 2012.



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Posted: Sunday, May 29, 2016 9:15 am | Updated: 4:37 pm, Wed Jun 1, 2016.

By Scott W. Tinker University of Texas at Austin | 8 comments

Since when did it become wrong to challenge science? There is a recent move to publicly bully, disparage and shame those who challenge a purported scientific consensus. It may feel satisfying in the short term to deal with the "deniers" via public belittling or even legal action, but in the long run, this tactic will erode the integrity of scientific institutions and the very process of science.

A current example of this strategy is the effort by U.S. Attorney General and a coalition of 17 state attorneys general to "defend" science by taking on climate change deniers. Or on the other side, congressional committees conducting extensive interrogations of climate change believers. The use of religious terms such as "believer" and "denier" in these arguments have little place in science. Regardless of the scientific topic or the strength of the science -- from evolution to climate change to earthquakes -- the integrity of science relies on iterative discourse and challenge, however misinformed or conflicted it may appear.

One such scientific issue is increased U.S. earthquake activity, particularly in Texas and Oklahoma. In the past decade, the number of earthquakes, especially those felt at the ground surface, has increased substantially. The question is whether human activity is causing the increase in earthquake activity and, if so, what can be done about it.

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Not surprisingly, addressing and answering that question is difficult. In some places, the increase in earthquakes is associated with the disposal of water that has been produced from oil and gas wells back into the earth. But, as we learned in science class, association does not necessarily imply causation.

In fact, causation in science can be difficult to prove, especially in complex systems such as climate and earthquakes. Instead, the scientific method prescribes how to test various hypotheses. In the case of

earthquakes, a combination of observational, experimental, statistical and modeling approaches and tools is required. Those methods, neither easy nor fast, and rarely definitive, benefit from interdisciplinary collaboration and from scientific challenge. Science depends on independent reproduction of results and rigorous testing, and is improved by challenges brought forth from skeptics, however irritating those challenges may seem.

In 2015 the Texas legislature recognized the complexity and importance of the earthquake issue and put in place a program called TexNet at the Bureau of Economic Geology. TexNet will deploy 22 permanent seismometers across Texas and an additional 36 portable seismometers where seismic activity occurs. It also provides research funding to bring together key scientific, engineering, and other disciplines from several universities to address the complex earthquake issue.

Think about the implications of such collaboration. TexNet, by design, brings together key groups of stakeholders to address the earthquake issue in what I have called "the radical middle" -- that all-to-often lonely space where varying interests should, ideally, converge.

Is this not inherently a conflict of interest? How can industry work together with those who regulate them? Must not academics maintain autonomy from regulators and industry? Not if we want to meaningfully address the problem, which requires data collected from the new seismometer array, and independent analysis and modeling provided by leading university scientists.

Addressing the problem also requires funding, data, cooperation and expertise from the capable technical people exploring for oil and gas as well as those drilling the wells and disposing of the produced water. And finally, addressing the problem requires an understanding of the issues and thoughtful policy from dedicated regulatory staff that adapts, and not overreacts, to evolving scientific understanding. Policy that protects our environment even as it allows industry to operate to provide the energy that fuels our global economy.

Functioning in this radical middle and managing the inherent challenges is not easy, but it is critical for true progress. It takes time to establish trust and bring together different perspectives, data, biases and experiences. It takes patience to deal with, and manage, those who undermine the process. And it takes fortitude to see the process through and thoughtfully address the challenges from skeptics. But it is those very challenges, however frustrating, that will ultimately make the scientific outcome more robust and valuable.

The concept of "settled science" is silly. Scientists should at all costs defend the right to challenge science. In addressing challenges, science advances, little by little.

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Scott W. Tinker is the State Geologist of Texas, Director of the Bureau of Economic Geology, and the Allday Endowed Chair in the Jackson School of Geosciences at The University of Texas at Austin. He has been intimately involved with forming and managing TexNet.

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## 8 comments:

**PsYchedOut** posted at 9:49 am on Fri, Jun 10, 2016.

Posts: 175

Why not challenge science? Correlation does not imply causation. The result is only having more knowledge than before. If we want to keep living the way we are (with cars, technology, and such), we should try to educate ourselves about the planet we live on and, thus, how to treat the environment better for the future.

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**The Gloss** posted at 7:02 am on Fri, Jun 3, 2016.

Posts: 463

Wasn't UT George Prescott Bush's(Jeb's Boy) Alma Mater.....???  
Who Owns a "Fracing Company Based out of Ft Worth.....???)

Fracking on University of Texas Lands The Environmental Effects of Hydraulic Fracturing on Land Owned by the University of Texas System

"Fracking is so dangerous to the environment and human health that it should not occur anywhere. If the University of Texas continues to allow fracking on its land, the university should at least end the worst practices and take immediate steps to protect the public. Specifically, the university should:

- Prohibit drilling on lands with special environmental value, such as Diablo Plateau, the Pecos River watershed, and all land that is habitat for migratory birds and endangered or threatened species.
- Write strong environmental protections into the leases the university signs with oil and gas companies. Those protections should include:

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**Ladd** posted at 2:44 pm on Mon, May 30, 2016.

Posts: 109

Ever notice the people who challenge climate change science are either fossil fuels businesses or lobbyists and politicians campaigning on their behalf. Climate change is a disruption to oil profits. It worked for Big Tobacco for a long time as they lied about the science for decades. This is a familiar story repeating itself all over again. This article is pure propaganda from the people paid as part of the denier campaign.

<http://insideclimateneews.org/news/13042016/climate-change-global-warming-oil-industry-radar-1960s-exxon-api-co2-fossil-fuels>

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**BeeBee** posted at 10:35 am on Mon, May 30, 2016.

Posts: 2910

TR, I believe that it was Ted Cruz that made such an issue of this, and I wouldn't vote for Hillary if she were the only one running.

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TR posted at 7:10 pm on Sun, May 29, 2016.

Posts: 184

BeeBee you liberals don't even know what bathroom to pee in anymore!

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ConcernedCitizen posted at 5:59 pm on Sun, May 29, 2016.

Posts: 898

The average depth all all quakes in Oklahoma since 2014 is 5 miles.

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BeeBee posted at 10:14 am on Sun, May 29, 2016.

Posts: 2910

It most certainly is NOT far from settled. This is just more propaganda from big oil.

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ConcernedCitizen posted at 9:47 am on Sun, May 29, 2016.

Posts: 898

stupid people are conditioned to believe what they are told

without question

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