

Protecting Scientific Innovation from Social Pressure

By Abraham Loeb on March 18, 2019

Social media are very popular these days, but I have no footprint of my own in any of them. As a teenager, I used to drive a tractor to the solitary hills of my village where I would be alone, reading books and writing notes to imaginary readers from whom I expected no response. In adopting this theme at adulthood, I came to recognize the necessity of growing a protecting shell around me for the purpose of enabling free and original thought. True, I could have had many more 'friends' or 'likes' by now, but this is a price worth paying for the privilege of not needing approval for my thoughts from anyone else. I've never gotten a kick out of belonging to honor societies because that requires dancing to the tunes of selection committee members. We can maintain our childhood authenticity only by staying true to our inner compass and not surrendering to the wishes of other people. The protective shell provides a shelter from drifting in the wind of changing trends, since popular views can swing in direction abruptly.

As infants, we are born authentically different. But our environment attempts to smooth our rough edges over time, just as ocean waves erode seashells to be similar even though their shapes are initially distinct from each other. To start with - each shell carries a living creature with a unique heartbeat in its belly but once the heart dies and the shells are swept ashore, these empty vessels rub against each other and grind down into indistinguishable grains of beach sand. Individual uniqueness is lost through the natural tendency of regression to the mean.

Science offers the privilege of maintaining our unique childhood curiosity and adventurous innocence without worrying about the risk of making mistakes in the process of learning about the world. If scientists stop each other from venturing into the unknown, by assuming that the future will always resemble the past based on our gut feelings, we will never make discoveries. Research could be a self-fulfilling prophecy. By forecasting what we expect to find in our research and using new data to justify prejudice, we will avoid creating new realities. Innovation demands risk taking by individuals, sometimes contrary to our best academic instincts of enhancing our reputation within our community of scholars. Learning means giving a higher priority to the world around you than to yourself. Without the humble attitude of a child, innovation slows down and the efficiency of the academic pursuit of the truth grinds to a halt. We all become static museum items rather than dynamic innovators.

As long as we stay unique, we will aspire for new adventures and develop exciting frontiers of knowledge. By resembling kids we could maintain the benefits of staying naïve and dreaming about reshaping reality. A good example involves space exploration. Oscar Wilde said: "We are all in the gutter but some of us are looking at the stars". Since the days of the Apollo Mission, we have lost a generation in not dreaming big enough about venturing into space. An example for a revolutionary leap forward that we can dream about in our future is to [reach for the stars](#) with robots equipped with artificial intelligence and 3D printers.

Mediocre science is the one that reproduces the past without adding new knowledge

about reality. Some old ideas, like string theory, have a prolonged popularity because they were not subjected to experimental testing. Other popular projects reduce huge data sets to improve the precision on just a few known cosmological parameters without searching for unexpected aspects of the data. Under such circumstances, more grants should be allocated to promote deviations from the beaten path. Rather than asking researchers to forecast their expected results in advance of allocating them research grants - as selection committees often do, we should distribute funds to individuals with a proven track record of independent thought. As Galileo reasoned after looking through his telescope, "in the sciences, the authority of a thousand is not worth as much as the humble reasoning of a single individual." The biggest threat to innovation is unimaginative thinking by bureaucratic systems. Instead, a fraction of science funding should follow the rationale of venture capitalists who risk losses on most embryonic projects but gain in total by harvesting the fruits of a small number of extremely successful ventures.

When taking risks on the roads not taken, there is a lot to worry about. But at the same time, there is a famous quote by Nachman of Breslov who said: "The whole world is nothing but a very narrow bridge, and the key is not to be fearful at all". The fundamental purpose of tenure in academia is to enable individuals to take risks and venture to unexplored territories of knowledge without concern to the security of their jobs. Honors should be merely the make-up on the face of academia, but instead they sometimes become an obsession. The fundamental truth is not governed by those with honors or by what people say on Twitter. It is what it is, independently of social trends. We should seek the truth without the burden of seeking popularity.

In a recent interview, a reporter asked me: "How did you protect your unrestricted creativity and maintain your authenticity over the years?" My answer was simple: "By building a thick shell around me that protected the nutrients for maintaining my intellectual freedom, a cocoon out of which I was eventually able to spread my butterfly wings freely as an adult. The wings that you are seeing now were protected in the cocoon during their youthful growth, when they were vulnerable. Only over the past few years I became sufficiently confident in my freedom and status, so as to spread my wings in the open without caring about what others might do to them. But these strong wings were growing all along, folded behind a shell that protected them from corruption by social pressure."

ABOUT THE AUTHOR



Abraham Loeb

Abraham Loeb is chair of the astronomy department at Harvard University, founding director of Harvard's Black Hole Initiative and director of the Institute for Theory and Computation at the Harvard-Smithsonian Center for Astrophysics. He also chairs Board on Physics and Astronomy of the National Academies and the advisory board for the Breakthrough Starshot project. (Credit: Nick Higgins)