

# SOCIETAL EVOLUTION: IMPACTS ON DIVERSITY IN STEM

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Today I offer a brief opinion on diversity in STEM. The subcontext of diversity that I can stake a claim to is LGBT issues. As an LGBT person in STEM, I have noticed a couple of discrepancies between societal expectations and self with regards to participants in STEM fields that I would like to discuss in short.

As a scientist perhaps I can restate these phenomena as a [admittedly somewhat convoluted] scientific analogue. I think an appropriate example of the compounding effects of societal expectations on career choices can be compared to a new technology out of David Liu's lab at Harvard called Phage Assisted Continuous Evolution (PACE)<sup>1</sup>. The principle behind PACE is to use the proliferative nature of bacteriophage and the evolutionary properties of the cell to select for mutations or interactions between biomolecules that result in more robust expression of a protein derived from gene III. Expression of gene III then allows for proliferation of cells containing these mutations throughout the population, while inversely cells with less useful mutations are outcompeted. In this way, there is a somewhat a steady-state "solution" from each population. I believe that there is an argument to be made which states that a similar sequence of events takes place within the structure of STEM fields yielding a similar steady-state representation of a rather homogenous group of participants.

What do I mean by this nebulous example? Growing up as an LGBT youth, I was made to believe that certain career choices were more suitable for me (primarily with the arts – which is not to say these pursuits are not equally worthwhile). STEM careers were not something that I felt connected to my identity, and so other career options, which were correlated with my identity, began to outcompete the others. Feeling excluded or unsuccessful in an academic area during development can be transformative, and I feel that many LGBT youths are subjected to this subtle influence, which may contribute to the low participation of LGBT people in STEM fields.

So, what can be done about this effect? The viewpoints of the United States – and much of abroad – have progressed in leaps and bounds over the past decade with regard to LGBT issues, but we're not quite there yet. In addition to aiming at the root of the problem to try to stamp out prejudice and bigotry on a more ubiquitous scale, we need to celebrate accomplished investigators in STEM fields who identify as LGBT or LGBT allies. We need to show that there is no boundary placed around LGBT youth for their chance to participate in these fields.

In a perfect world, this conversation would not be necessary. Everyone would be able to pursue their own interests regardless of gender, sexual orientation, ethnicity, socioeconomic status, or disability. However that is not the world we live in. It's easy for people not within these groups to avoid thinking about the problems that we face, and in doing so the problem is propagated. And while not everyone feels the pangs of such societal expectations, imagine a world in which a more diverse set of thoughts

was available in every field. I believe – a belief corroborated by many scientific studies; some summarized in the article titled "[5 Numbers That Explain Why STEM Diversity Matters to All of Us](#)" - that as a society we would be able to make much more significant strides forward if STEM participants were comprised of people from a more diverse background. We should celebrate the accomplishments that we have made and continue to push for a world in which inclusion is the new norm.

1. Esvelt KM, Carlson JC, Liu DR. A system for the continuous directed evolution of biomolecules. *Nature* 2011; 472:499-505; PMID:21478873