

### **Physicist Arrogance and Purposeful Ignorance**

I found a breath of fresh air in a recent article in Physics Today Feb.2003 Vol. 56 No.2, p.54-5 (<http://www.physicstoday.org/vol-56/iss-2/p54.html>) which was aptly titled "Arrogance-A Dangerous Weapon of the Physics Trade," by J. Gibson. Of course there was a disclaimer that this was an opinion piece and that "The opinions expressed in this article are his [the author's] own," but many good points were made including the following:

*Ask a scientist who is not a physicist and you might hear that we physicists are an arrogant bunch. And to a layperson, scientists in general often seem arrogant. No, we shrug, we're not really arrogant, we are just very objective and thus usually right! We are certainly a group with admirable strength in our convictions. Could there be a problem with well-tempered arrogance?*

Arrogance is OK if you are right, but isn't that the ultimate in arrogance in physics since every theory will someday be supplanted by a better one. Even though a theory may work well for everything that we know now, as time goes on and our scientific experience broadens, it will be found to be lacking. The only time that the physicist will be exactly right, is when we know everything about the universe...and I don't expect that to happen for some time.

That is why physicists who accept special and general relativity as dogma are ignorant clods who are a disservice to science. The most intelligent scientists that I have come across, are the ones who admit that they don't know everything and want to try and find the holes in current theory, only then can they improve the theory and advance science. These souls are rare though.

Just as arrogance can rarely be a good thing (i.e., trying to prove a new theory that the mainstream won't accept), ignorance can sometimes be used to one's advantage. I am a classic example of this with my method of "Purposeful Ignorance", where by not having the baggage of a particular educational indoctrination, I can think creatively about a field of scientific endeavor and pursue new lines of thought. Once I have come up with my own thought processes and solutions to a problem, I review the literature to find out what the current status is for that problem. Sometimes, I'll find that I came to the same conclusions, sometimes that I didn't even make it halfway, but rarely I'll come up with a better solution or idea.

Purposeful Ignorance is not for everyone though. One must be intelligent enough to understand the problem and later self-teach oneself the current state of the art. Though I may have formalized the process, I am not the first who has used "ignorance" to their advantage as Gibson notes:

*Rodney Hodgson, an ex-colleague of mine from IBM's Thomas J. Watson Research Center, once counseled me that "ignorance is a powerful weapon." Although Charles Townes had argued that it would be increasingly difficult to build lasers as one approached very short wavelengths, Hodgson was unaware of that argument. Instead, he tried to produce a vacuum ultraviolet hydrogen laser--and succeeded. (His creative approach included hammering a nail through a capacitor to create a discharge.)*

Yes, I was arrogant when a roomful of physicists from a multibillion dollar company told me that my optical clock design was impossible, but it also was that same arrogance which led me to develop that optical clock in my basement a year later and found a rising optoelectronic timing company. But trying to prove revolutionary ideas is the only time that arrogance is acceptable. Arrogance in any other setting is nonproductive and only demonstrates to the world one's ignorance. Be smart, be open-minded, and be humble, for we only know a miniscule amount of what there is to know.

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