

# You Must Be Joking... Believes

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## ABSTRACT

The proof is in the pudding<sup>1</sup>. Never have truer words been spoken. If only research was a lavish meal that concluded with a pudding. But now, what is a researcher to do?

## 1. INTRODUCTION

It was at a lunch table at Infocom 2008, that the discussion I was overhearing turned, surprisingly, to writing papers. I most often try to “switch off” at the first sign of this. These are things that we all have talked about again and again, only somehow every time it is with renewed enthusiasm, like children rediscovering the rules to hide-and-seek.

However, the discussion this time took an unexpected turn: “How can you ever believe the claims that a paper makes?” Good point. Especially, if it is a real system paper, where the author wants to show that something works in “practice” for realistic scenarios.

Debater No. 1: “I never trust a paper with simulations.” The justification was the infinite ways you can fiddle with parameters, select the scenarios etc.

It was mentioned that there was a paper that showed that simply using different simulation packages you obtain different results, even if all other user-controlled parameters are the same. (The bitter irony is to imagine the optimism of the TPC of that conference: Let us accept this paper, the community will realize that there is a problem, and solutions will start flying in like piranhas in the classic “The revenge of the flying piranhas” - I am not making this title up - Sadly, that work was published at least 3 years ago.)

Debater No. 2 (a.k.a. Srikanth, my academic twin): “I am not sure I trust an implementation paper either”. Quite the shocker, especially since Srikanth has spent tremendous effort in establishing a testbed. Surprisingly, for us that know him well, he went on to make some very reasonable arguments. Implementations are usually very small in scale. Implementations can vary significantly over time and conditions, time of day etc. This is very true, especially for wireless: opening doors in a corridor, humidity, the existence of a professor with a metallic plate in his head, all of those can severely affect the outcome of the measurement.

Debater No. 3 (I forgot his name, I think he had a mustache) went on to claim that theoretical proofs on practical

issues are also iffy. The reasoning here according to the mustache is that practical problems cannot usually be fully modeled analytically. And if they can, they are unsolvable. Once the simplifying assumptions kick in, all bets are off. Interestingly, I have seen two categories of the almighty assumptions: (a) the single majorly-unacceptable assumption, and (b) the confluence of many small seemingly innocent assumptions that synergistically create an artificial reality.

So, that’s it. No one can prove anything.

But, wait, before you quit your job and go back to tending sheep. There is a new hope<sup>2</sup>.

## 2. TRUST ME, I ’VE GOT IT

This column, hearing the cries of panic and desperation, decided to take the problem head on. When everything else fails (logic, reality, simulation of reality), only one thing is left standing: faith. Yes, ladies and gentlemen, research has to turn to faith. Not religious faith, simply faith.

For example, “I believe in my heart that TCP is the ultimate truth, and I vow to fight any other protocol that attempts to challenge its superiority as the only transport protocol. Protocols in all other layers have to be compatible with the chosen protocol or else they will have to face horrible demise in the bowls of the rejection pile”.

You may say that it sounds like religion, but it is not. Ok, fine, let’s say that it is religious<sup>3</sup>. However, I prefer to use the term “faith-based proof” to make it sound more scientific (ok, I am overdoing it with the invention of words).

Fine, you may say, but, is this going to work in practice? Absolutely.

### 2.1. Faith-Based Research: Foundations and Implementation

Here are some axioms, truths, and practical tips of how this powerful proving technique can become a rigorous scientific method.

**a. Gut is the answer.** I already mentioned Mr. Colbert in a footnote, but the man deserves more credit. Mr. Colbert (maybe the only reason why I pay for cable) has elevated the “gut” to the ultimate way of making decisions and forming beliefs. The gut and the brain are often in conflict, so how

<sup>2</sup>Just like the title of Starwars episode IV, which in fact was the first one. If you think about it, this is similar to grading something on a scale of 1 to 10 with 5 being the highest.

<sup>3</sup>I don’t think that Stephen Colbert should be the only person that invents words, although, admittedly the man is a genius. Watch on-line his famous speech in front of G. W. Bush at the 2006 White House Correspondents’ Association Dinner.

<sup>1</sup>According to Ask-Yahoo! (our ex-student Yihua He works at Yahoo so I thought of giving him some free ad space): According to Bartlett’s Familiar Quotations “the phrase dates back to at least 1615 when Cervantes published Don Quixote. In this comic novel, the phrase is stated as, “The proof of the pudding is the eating.”

can one resolve this? According to Mr. Colbert: his gut tells him that he should listen to his gut.

Here is how this could work. Next time you read a paper, avoid all judging or thinking. Finish the paper, put it aside, close your eyes and let the answer emerge from within. Do you embrace the work or does something deep inside you feels unsettled?

**b. It is not the research, it is the character.** People in the US have a head start here. We already seem to be voting our president based on “character”. Credentials, education, past experience, vision, platform, all seem to play second fiddle. The main question is: what are its core values and character? How cool is this approach? Personally, if it was an option, I would vote for my mother: determined, visionary, resourceful. She made sure all her children got PhDs, while she was forced to stop after high-school. It could be a movie. How could she possibly not make an excellent president? Ok, fine, she hates anything public and “authority” (I truly suspect she is an anarchist) in any form, but still.

The same thing goes here. We can judge research by the character of the researcher. Is he honest? Does she treat her graduate students well? Are they willing to do service for the community? Have they been prompt at completing their reviews? Say no more, it is a 5/5 for me.

*Flip-flopping.* This is another aspect of the character but it is so important that needs to be addressed separately. For the non-US crowd, flip-flopping has become a major term in US politics to indicate people that flip-flop. Changing an opinion over an issue is automatically a fault: people with character and values stick to their word. Forever. How should research be any different? If you make a statement, you’d better stick by it. That’s character.

There are several subtle issues in deploying the character based evaluation.

First, how do you deal with new researchers? You have never seen this name, there are no character references, you have no clue whether to believe or not. It’s a toughy. I have two suggestions. Researchers put a small bio and a self-statement on character and ethics on the web. Second, new people should be given the benefit of the doubt: accept their first two papers sight unseen, and then, we slowly start building a character-record.

Second, how do we evaluate the work of a group? What if two researchers are the paramount of virtue but the third collaborator is known for perjury and crimes against the humanity? Do you believe one third of the claims? Do you estimate the total “character mass” (patent-pending) of the paper as a weighted sum? It seems simple, but it is not. Do you assign negative values to low-character people or do you give them zero? Does their order in the author list matter? Too many questions exist. I urge the community to think about this and email me their suggestions.

## 2.2. Implications and Random thoughts

I have been thinking. Here is the outcome.

**The rise of super-structures and string theory.** I wonder if this approach over the years will create complex structures in a self-organized fashion.

First, we may have the clustering of honest people, while seedy characters will stick together. The seedy clusters will clearly attempt to challenge the definition of honesty and pretend that the good groups are bad. In other words, we could have the classic fight of good versus evil in science,

just like in the movies only with less attractive people.

Second, I wonder if there will be any inherent feedback mechanisms, and if the feedback mechanism will have a corrective ability, where slowly everyone is pushed to become honest, or an amplification effect, where the honest become more honest and the crooked become more crooked. In other words, it is not clear if there would be a Nash equilibrium, divergence or a chaotic behavior and end up paying the price of anarchy.

Third, we may have the emergence of complicated structures of beliefs. It is not easy to explain without using an example<sup>4</sup>. Let us say that a group starts with a fundamental dogma: TCP is the truth. Now, another group builds on this dogma, and develops applications or MAC protocols that are based on the dogma. The two groups meet in conferences, smile at each other, sit together for lunches, and make fun of the researchers on the “out” crowd.

What happens now, if the first group changes their mind and moves on to a new protocol? It could be that they realized that their first approach was wrong, they got bored, or simply need something new to justify new funding.

What happens to the early religious system of beliefs and protocols? Should it be revisited in its totality? Is it heresy? Is a crusade an acceptable solution?

The title mentions string theory. String theory has nothing to do with what I am talking about. Actually, it does, but I am getting tired typing.

Here is an interesting thought in terms of character. The Pope will become the most sought after collaborator. Do I need to spell this out? The guy is infallible. Forget the Erdos number, what is your Pope number?

Statements we would like to see in papers:

- “I truly believe in my heart that the proposed algorithm will outperform TCP-Vanilla by 35% in most cases and as much as 80% in divinely constructed scenarios. We leave as future work the actual simulations that will validate our beliefs.”
- “Although their protocol TCP-Sucks seems to handle better the special case of “end-users with paranoia”, it is clear that it violates core beliefs of our networking architecture. As a result, we are forced to: (a) not consider this protocol further, (b) exclude it from any comparisons, for fear that it may contaminate our community with heretic images of fair bandwidth sharing.”
- “I. N. Fidel et al. [23] propose an unethical variation of TCP.”
- “Network coding is the answer to all our problems. In the case the reader cannot see this yet, we optimistically claim that they should not give up, there is still hope. We will include you in our daily research thoughts.”

## 3. CONCLUSION

You may ask: is this really going to work?

My answer is, yes, you just have to believe. In essence, this is the meta-paper of faith-based research: once you believe this article, a new world of possibilities begins.

May the research be with you.

[ Thanks to Jennifer Rexford for her excellent comments. ]

<sup>4</sup>Primarily, because I don’t know what I am talking about, but let’s keep this on the down-low.