

Essential Tips for Fledgling Scientists

By Abraham Loeb on November 7, 2019

I. On Time Management:

In one of those sleepless nights when the stream of e-mails kept steady until midnight and I could not stop responding to it given my responsibilities as chair of Harvard's Astronomy department, the administrator at the other end asked bluntly: "Wondering how you are so time efficient. Any tips?"

My response was simple: "I keep my desk clean because it takes more time to return again and again to pending tasks that pile up. As they say in combat units: "do not take hostages because they slow you down". Also, I interact as honestly as possible. This confuses people who are used to playing politics and convinces everyone else to trust me. As a result, there is no suspicion that I am trying to manipulate situations with a hidden agenda. This save a lot of time and energy. Wasteful wars are avoided when people trust each other."

The administrator insisted: "This is helpful tactics, but what is your overarching strategy?", to which I replied: "I try my best to avoid 'taking the wrong exit on the highway'. It requires a long time to correct strategic mistakes."

Finally, I concluded this late-night exchange with the most important tip: "Sometimes you have to make difficult decisions. If you are guided by an inner compass of values and principles, critics can never make you feel unhappy. The silver lining is always visible from an elevation that is high enough, where you see the bright sunlight above the dark clouds." As Oscar Wilde said: "[We are all in the gutter, but some of us are looking at the stars.](#)"

II. On Scientific Research:

Fundamentally, science is not a competition or a zero-sum game. It is an [infinite-sum game from which we all benefit](#). As a result, it is neither a chess match nor a mud wrestling game among contestants. The outcome of the scientific process is not up to the practitioners, since reality is set by nature itself without negotiations. Scientists aim to figure out what reality is by collecting as much evidence as possible. They argue with each other about possible interpretations when the evidence is limited, but they do so only as spectators of a show that they were never responsible for.

The scientific process reminds me of Michelangelo. When asked how he produces beautiful sculptures from a featureless block of marble, he replied: "[The sculpture is already complete within the marble block before I start my work. It is already there, I just have to chisel away the superfluous material.](#)" Similarly, science uses evidence to "chisel away" the superfluous hypotheses that are ruled out by the data. Viewed this way, it is a work of art.

III. On Interaction with Colleagues:

It is prudent to be kind to your colleagues, junior or senior, since they will likely referee your papers, review your proposals and follow you in unexpected ways throughout your career. The situation is similar to taking a train ride; after boarding, you may switch seats but the faces you see as you walk down the aisle will stay familiar.

The ancient [Golden Rule](#) captured it best: “treat others as you would like to be treated; do not inflict upon others those things you hate; and wish for others what you wish for yourself.” As Rabbi Hillel noted: ["The rest is commentary."](#)

In treating others, as in pursuing scientific truth, it's essential to think independently and not be swayed by social pressure in order to avoid bullying. We must respect our differences, since diversity of opinions, ethnicity and gender, is the engine that drives innovation.

IV. On the Intelligent Perspective:

The mark of intelligence is the ability to plan actions that promote our well-being for the longest period of time. Life is saturated with destructive events that do not advance our well-being, and we should marginalize their influence. An alien civilization reading our newspapers would likely conclude, based on this measure, that we are not intelligent.

There are two roots for our problems. One involves arrogance stemming from the desire to feel superior relative to other humans. Over history, this tendency led to large-scale genocides and racism. But it also shows-up on a weaker basis in daily personal interactions where we steadily compare ourselves to those around us rather than enjoy what we have. The second common mistake is conviction without evidence, based on the desire for certainty even when it is not warranted due to lack of sufficient information to support it.

Scientists are supposed to counteract these fallacies by promoting modesty and seeking evidence. How can anyone claim superiority relative to another if we all share a common origin to our genetic making, which [can be demonstrated through a simple spit test](#)? Imagine political history if [Adolf Hitler](#) had taken a DNA test and made the results public. There is no alternative to a humble viewpoint, since each of us lives for just an eyeblink – a few billionths of the entire cosmic history. And our home, the Earth, is one out of billions of trillions of similar planets in the observable volume of the universe. Given this, who are we fooling by a sense of superiority except ourselves? Regarding our second problematic tendency, there is no doubt that unbounded convictions stem from ignorance of alternative interpretations. Scientific results always carry uncertainties and caveats that are unavoidable due to our limited information. And unexpected breakthroughs teach us that nature is often richer than our imagination, so we should avoid prejudice which relies solely on past experience. The more we learn - the better we appreciate what we do not know, allowing us to ask sharper questions and collect new evidence for answering them.

Modesty and evidence are the torches that light up the darkness cast by arrogance and conviction. To maintain an intelligent perspective, we must keep these torches lit forever, both inside and outside academia.

ABOUT THE AUTHOR



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(Credit: Nick Higgins)