

Welcome to Academia

A short message to the prospective graduate student

We go through life wondering, trying to understand the world around us, and academia gives us a wonderful environment, within which to do just that. But how exactly do we do it? And what is it that we do? In other words, what does the term “Academic Research” mean?

It starts with the **Question**, and formulating scientifically meaningful questions can be hard. Fundamental differentiation must be made between the admittedly interesting questions about the meaning of life (let’s leave this to Dostojevski, Apollinaire and Lorca, at least for now) and the systematic method of scientific interrogation that we use. Being academics, we have the freedom to pick problems that resonate with us. We also have the responsibility to choose, from those problems, the ones that benefit humanity in some way. It can be the development of a more efficient energy storage device or a novel DNA sequencing technology. It can also be a more distant target, where the immediate outcome is uncertain, but the fundamental significance of the question so vast that it may become transformative many years later. The mathematical foundation of quantum mechanics, created about a century before Max Planck and Niels Bohr implemented their visions, offers a beautiful example.

Having identified the question, we have made an important step in the right direction, but this in itself is not enough, clearly. When I talk with my father (a composer), he sometimes likes to ask this kind of questions, too. As experimental scientists, our next mission is, therefore, to take the question from one that is purely abstract (necessary, but not sufficient) to one that allows to formulate a defined **Testable Hypothesis**. This brings in the paramount importance of knowing the available methods and techniques. Nobody (not even Sir Isaac Newton) would have dared to propose building solar panels just mere few centuries ago, and by the end of this century we will have advanced so much that the focus will have shifted completely, yet again. With this, the quote that is often ascribed to Victor Hugo comes to mind: *“nothing is as powerful as the idea, whose time has come”*

So, having defined the question, the hypothesis and the method, where do we go? No one can ever really predict how a scientific research project will evolve – the rest is **Adventure**. We go in, equipped with love and passion for knowledge; we rarely know direction and usually fail. However, once in a while there is this wonderful moment – one that cannot be replaced by anything else: the moment that we create something new. Or discover a hitherto unknown effect, or maybe gain insight into how life may have emerged. Often coming as a surprise to the creator, who will often have been looking for something completely different, this is the most incredible experience, and this is why, once you get the taste, you fall in love with academia.

So let’s continue our travel through space and time, always remaining curious, wondering, trying to understand the world around us, knowing how little we will be able to accomplish in our brief lifetime, but never giving up still...

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