



THE FREE ENERGY  
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If the universe could be explained with an equation, it should be written as  $F = 0$ . Because, no matter how complicated the explanation, we can always clear everything on one side of the equation and call it  $F$ . The fascinating thing about this idea is that it tells us that the universe (everything we know,  $F$ ) would equal nothingness. In fact, cosmologists tell us that all matter is positive energy and the gravitational force is negative energy, which offsets it and equals zero: yin yang.

Beyond the physics and metaphysics of the whole, most of us are interested in what lies within  $F$ . And, although dualism is defenestrated by postmodernity, it seems clear to me that within  $F$  we find more dual tensions. These tensions have been described by philosophers of all the ages, from Heraclitus' "everything flows, nothing remains" to the Hegelian thesis, antithesis, and synthesis (note that the tension in the triad is dual).

To my taste, the one who has been able to describe most clearly the tension that reigns in *our* world was Nietzsche. The emphasis on "our" indicates that it is a tension characteristic of living beings, which is what we are. Nietzsche described the following dichotomy for  $F$  in *Thus Spake Zarathustra*<sup>1</sup> which we can write as an equation:

$$F = \text{Apollonian} + \text{Dionysian}.$$

The first term refers to everything that emanates from the god Apollo with his light and truth, protector and guide, producer of harmonious creations in music and poetry: a symbol of Cartesianism. A reference for anyone who envisions an orderly, clean, structured, and efficient world that works like a watch in the purest Swiss style. The second term invokes Dionysus, who takes us with dance and wine through a theatre that sometimes approaches madness and stirs the viscera that makes us so human. This is probably a clearer reference for countries like mine, where flamenco and bull's blood are welcome.<sup>2</sup>

Nietzsche's merit was to appreciate the need for both terms to be present in our lives in order to make the human being more human. And how the contempt of the most developed societies towards the Dionysian is a danger that we should not ignore. In these months at Wiko, I have been able to see how this dichotomy appeared again and again in my work (and even in my life), as well as in the lives of the other Fellows.

To understand why, let's assume that  $F$  is a function that we want to maximize, so that the higher its value, the better adapted we are to the environment.  $F$  could represent what several Fellows working in biology would call a fitness function<sup>3</sup> (for example of a

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1 Friedrich Nietzsche, *Thus Spake Zarathustra*, trans. Thomas Common (1917; Penn State Electronic Classics Series, 2013), <https://www.yumpu.com/en/document/read/24307828/thus-spake-zarathustra-penn-state-university>.

2 For more details, listen to "Mediterráneo" by Joan Manuel Serrat.

3 Guy Sella and Aaron E. Hirsh, "The application of statistical physics to evolutionary biology," *Proceedings of the National Academy of Sciences* 102, no. 27 (2005): 9541–9546.

species), where we would measure what percentage of the progeny of the species is able to reproduce. And a typical problem would be to understand if, in order to maximize  $F$ , we can decide whether it is a better strategy to maximize the Apollonian, the Dionysian, or a combination of both.

Assuming that the environment is relatively constant and controlled, it is likely that the species specializes in that environment by developing very efficient mechanisms that allow it to be very good at exploiting resources under those conditions (e.g., building gas pipelines). With all the predictions and means on the table, everything works out Apollonian. However, if conditions change (e.g., a war breaks out) the species is not at all adapted because it has avoided the Dionysian, and the problems begin. Robustness versus evolvability.<sup>4</sup> Despite the terrible war, sharing the vision and experiences of Fellows who came from Ukraine and Russia has been one of my best experiences at Wiko and a reminder of how artificial our Apollonian bubble of comfort is.

And, personally, it has led me to see once again how one of the Darwinian simplifications of evolution, summarized in the survival of the fittest (the most Apollonian), leads us to overlook the acuity with which the deaf can understand the world in its other senses. What Spanish street art in the 1990s denounced with the graffiti “the stump is beautiful” or, as a Wiko Fellow showed us, that a hydrocele testicle may have influenced the work of Edward Gibbon in unsuspected ways.

So it seems that our equation above is missing a term that would multiply the Dionysian, which we could metaphorically call temperature,  $T$ , and would represent the amplitude of the perturbations around us:

$$F = \text{Apollonian} + T \times \text{Dionysian},$$

so that the higher the  $T$ , the more we will have to pay attention to the Dionysian to be well adapted. In physics, an analogous equation (saving the sign criterion) is that of free energy, where the Apollonian would be analogous to internal energy and the Dionysian to entropy, the latter familiarly related to disorder.

Listening to another Fellow, I also saw an example of this duality in the brain, since having a good model of the world allows us to perceive information, predict possible

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4 Andreas Wagner, “Robustness and evolvability: a paradox resolved,” *Proceedings of the Royal Society B* 275 (2008): 91–100.

events, and take action. And these predictions will be better, the fewer unexpected events happen (surprise, and therefore entropy, is low). But, again, if uncertainty increases and our model of the world is not prepared for big surprises, we may have problems unless we find another way. This is the free energy of the brain,<sup>5</sup> which means that, if you need a change in your life, just... increase the temperature (during my stay at Wiko: expecting a kid).

So maybe that's why I think I've seen in many Fellows at Wiko that, like Nietzsche, they claim the need to expose ourselves to the Dionysian. For example, a Fellow gave us a great example with live music, which I adapt to the argument. Suppose we listen to a classical violin piece, perfectly executed, is there anything more Apollonian? Now let us ask the artist to repeat the work, after winding a few strands of polyester along her bow. In this scenario, the uncertainty that the strands introduce to her movement forces her model of the world to completely adapt. But, far from wanting her to try to interpret the original piece as accurately as possible, why not create new music that moves on the edge of the strands? And contemporary music appeared.

The examples came one after the other. As when a Fellow reminded us that there is no objectivity in the definition of family, because it defines itself, and another Fellow noted that this is indeed why the search for an Apollonian definition of family becomes one of the most important problems for the Roman Catholic Church ("Volk Gottes" can never be Apollonian). Similarly, another recovered the intimacy of the subjective individual to show how the desire for an Apollonian pharaonic rural revolution – orchestrated from top to bottom in China – led to collective death. This view connected with another Fellow's asking whether death could speak, and with another one capturing the guts in the eyes of people in South Africa's apartheid. Or when some Fellows challenged the ontology of an apple, while another highlighted the value of believing in instantiation (or in incarnation), yet another one said that that applies even in quantum entanglement. Also, in a workshop, some suggested that it would be possible to put the freedom of the Internet not under the law but in spontaneous self-regulation, and indeed another Fellow pointed out that capitalism in Apollonian democracies has continued to advance differentiating "good" citizens from "migrants." This is perhaps why someone pointed out in another workshop that the future of work and economy should lie in degrowth. But the funny thing is that, when we were about to finish all discussions and leave, a Fellow reminded

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5 Karl Friston, "The free-energy principle: a unified brain theory?", *Nature Reviews Neuroscience* 11 (2010): 127–138.

us that all our words, even if we want to talk about very different aspects of reality with epistemological rigor, may be nothing more than a camel (Conversation About My Existence and Life). In the end, The Camel is what we understand the least.

To conclude, I would like to reclaim once more the need for the Dionysian in the scientific world. Because we often hear scientists themselves speak of objectivity in their work without recognizing their own subjectivity. We see the obsession with the search for immediate utility that makes our lives alien to (or alienated from) entropy. We suffer the stagnation of a system of scientific production intoxicated by publish-or-perish quantification. These are tendencies that reflect a misconception in which science is intended to be 100% Apollonian.

Wiko (and Berlin) is a place where the temperature rises in discussions from the Fellows' club to the nightclubs. It invites you to mix with other models of the world, increasing surprise, pushing creativity elsewhere and making the new models more resilient. A context that allows me, far from my area, to talk about Nietzsche.

A place where the free energy of free spirits flows. And knowledge remains.