

# An Introduction to Reality 101

The way things have been the last several hundred years is not the way they have been for the bulk of the human past, nor will be for the bulk of human future. You exist in a near-stroboscopic blip of time in which humanity is churning through millions of years of resources in a one-time pulse. This has ramifications both wonderful and terrible, and we should probably make ourselves aware of them if we are to make self-awareness actually good for anything.

This course is called Reality 101, where we will attempt to present a more seamless and coherent worldview, synthesized by combining many disparate branches of science, culture, and the human condition. These branches are normally thought of separately.

How are the deep past and the deep future relevant to what we do today and tomorrow? How does energy relate to money, money relate to dopamine, dopamine relate to sexual signaling and sexual signaling to the environment? How is happiness related to possessions? Why and how was it beneficial for us to evolve blindness to many aspects of reality? Indeed, what is a human, and what is life? Which key things that our society believes just aren't so? How is human civilization like a foraging bear? What do humans really eat? What do the expert economists get totally wrong? Do you know the personalities of your invisible slaves? What does "renewable energy" really mean? Are your genes your friends? Do you have a clear idea where your virtual world ends and the physical world begins? Do you think about how your brain works, and why it does what it does? Why are the big problems of human civilization not being solved? How is human thinking predictably biased? What can we know for sure about the future? And how are these things linked to success and happiness? What would success even be?

You may find this to be a bit of an odd class. In addition to teaching some new connections, it will attempt to teach a new way of thinking and analyzing the world around you, as well as your own inner world. Of knowing yourself, your society, and your species a bit better for what you are, as a way of helping you decide what you'd like to be. To make your own decisions about what success will look like.

It may be a peek into the future, because in our opinion this way of thinking should be taught to students much younger than yourselves, in parallel with all other subjects. However, that hasn't been done yet, so you may find some things in this class surprising. We all have some things to un-learn.

Connecting all these subjects is not so much a complex thing as an unusual thing. Humans in current society don't, for the most part, think this way. We are taught subjects quite separately, and tend to remember them that way. That's a good way to become a well-programmed member of a highly social society, but it isn't very creative.

And even though you seldom get graded on it, creativity is more important than we often give it credit for; it's the difference between competence and brilliance, rote memory versus deep understanding. The really important answers tend not to fall entirely within single subject areas; they occur when you train yourself to think across subjects and disciplines, letting your mind fit the pieces together.

My hope for this class is that it helps you be a sophisticated generalist, with a good - even if hazy - visualization of how everything really fits together. Because everything *does* fit together. The physical world itself exists as an integrated whole, with everything happening at once. The demarcations we make between areas of knowledge are pretty arbitrary, and our knowledge and very ways of thinking are imperfect by their nature. Once you know how things fit together, have that mental model, you can always find the details by using the internet, or just figuring them out. Conversely, if a person knows a lot of specialized things but has no feel for how they fit together, they may become isolated abilities which may or may not be useful.

Having an integrated mental model is crucial. For instance, if you have a smart phone you're probably fairly good at using it, and know what tricks it can do, how to add functionality. You probably also know an older person who wants nothing to do with a smart phone because it won't do tricks for them. The difference is the mental model. You build a virtual model in your head of what and how your smart phone works, and once you've done that you can interact with it fluently. Without that mental model, a smart phone is just an inert piece of material. **Yet we graduate students out of college without much of a mental model of how the world works.** Despite the fact that "how the world works" may be the most important thing to for students (and citizens) to know. Indeed, many of our most famous societal "experts" are expert in just one narrow area, and may have few clues outside that area.

We have high hopes for this experimental class. Experimental in the sense that it's never been taught before, and you're the test subjects. It's our hope and intention that you benefit greatly from taking this class, both immediately and for the rest of your life. But the reframing of knowledge, the teaching of an altered paradigm for thinking about the world, does need to come with a few caveats.

For the clarity that this synthesis brings to many otherwise-disparate areas of human knowledge means it also brings likely human futures into much clearer focus. Some people might consider this a blessing and others a curse, because knowledge can strike sparks against belief, and as members of a social society we tend to believe many things that the people around us do, by default. Many of those things will be shown to be incorrect. And looking at our own species as an evolving thermodynamic system will make clear things that are both exciting and sobering, for we are coming up against natural limits, and that will have human implications.

In this way, the information to be covered in this class is existentially challenging, but the human condition has always faced existential challenges of one sort or another which required living humans to rise to them. It's possible to live a full and happy life while engaging with challenges. However, there's a psychological adjustment to make when learning Reality 101, and that has to do with the tapestry of pre-existing expectations and beliefs about the future which we have soaked up from the cultural narratives we exist within. We call this the "christmas pony" effect. If a child comes to mistakenly believe they're getting a pony for christmas, they are likely to be disappointed when receiving anything less than a pony, even what they get is something very nice, like a train set or microscope. If their christmas is to be saved, the imaginary pony needs to be taken to the imaginary glue factory. Indeed, this situation foreshadows many of the things we'll discuss: the roles of belief, energy, and the future. Physical

prospects for the future will be the same after you take this class as before, but your own awareness and perspective will have shifted. The degree to which you find this exhilarating or dispiriting will have a lot to do with your current belief in those metaphorical Christmas ponies. And you may have unexamined beliefs you don't realize you're carrying around with you coming into this semester.

In this class we'll talk about the limits imposed on reality by physical law and probability, and how to think about the future in a more systematic way than people usually do, as a chaotic system playing out within these strongly bounded limits. Limits which can in principle be known beforehand. And we'll extend this understanding back to the dawn of life on earth and forward to its end, a direction which is inexorable, but with results that are never inevitable.

We'll describe those hard limits as the bottle of life's existence, inside which the chaos of contingent paths plays out. And we'll discuss how energy and resource limits cause the bottle to expand and contract, creating "bottleneck events" which are difficult for life's complexity to pass through; in the deep past, the deep future, and within our lifetimes. What creates bottleneck events, and to what extent can they be controlled or anticipated? And if a species like ours can learn to anticipate such events, what practical and ethical questions might arise?

The blind dance of evolution has brought us from single-celled bacteria to self-aware personhood; but it has also given us a lot of excess baggage. What things that we think and do originate from this mindless genetic agenda, and what things are truly the product of our conscious reflective minds? Exploring this question will take a lot of twists and turns, into the story of how evolution can - and must - design a brain. And it raises the seldom-asked question of loyalty to the backward-looking agenda of the gene versus the agendas of empathy and self-aware minds. ***It turns out that understanding the way we think is utterly necessary to understand and engage in the world.***

A big part of that is appreciating the difference between our virtual worlds and the physical world. None of us will ever experience the physical world except indirectly. It's not, even remotely, what we perceive it to be, any more than the picture on an HD tv resembles the stream of digital data which went into the back of the set. The virtual worlds which run as structured information streams within our physical brains are the only reality we can know, and they are not like the physical world, nor would we want them to be. Rather, the realities we each experience are an interface for physical reality, an interface designed by millions of years of backwards-looking evolution to execute successful adaptations to past problems. Brilliantly adapted with pre-programmed hopes, fears, and priorities for a tribal hunter-gatherer existence that we no longer live within. The things which mean the most to us exist within our virtual worlds; and a certain amount of illogic and even delusionality is necessary for our sanity and happiness. Yet unless we are self-aware enough to realize it, we are a species not only approaching physical limits, but doing so blindly, and while speeding.

Our species has called itself *homo sapiens*, wise man. As you'll see in this course, we have not earned that quite yet (more apt perhaps is pan-ignis - "fire ape"). But we may yet earn the title of Sapiens; and if we do it will be because we have understood the way things work in the world, and come up with a way for our species to last another million years or more on an intact planet.

That's not the way things seem to be going now. Yet it is still eminently possible. The same evolved biases and fallacies which cause us to make mistakes can also lead us to erroneously feel there's no hope, despite many wonderful things still being possible. Things you may think of, that your teachers haven't. Tag, you're it.

This course is about building blocks - *not so much to use in succeeding in a career as about deciding for yourself what success might mean to you, in the context of the society and world you'll live in these coming 50 or 70 years.* It's a time period whose events will profoundly determine the shape of life on earth for the next half-billion years, and not incidentally the number of human childhoods which will exist in deep time.

You're young, you're smart, and you have incredible resources at your disposal. Your generation also faces challenges never before faced by any species evolved on earth. There are paths forward which lead to wonderful futures, and paths forward we should avoid. Figuring out which are which is probably a good idea. This century will be a time for creativity, engagement, and heroism. It will also, judged by historical norms, probably feature a lot of strife and weirdness. We hope to give you some tools to help choose a good path.

Welcome to Reality 101.