A myriad expanse of our behavioral repertoire is driven by our unconscious self. Unbeknownst to us in the moment, outside our awareness, an abyss of emotions, habits, and other thinking processes are voraciously fighting to navigate the world. But rising from the depths of the unconscious is information processing of another kind. Ignited by a biological spark, the blaze of color, feeling, and entirety of our experience—the kaleidoscope of consciousness.

Consciousness is a state of our brain that allows us to reflect on the smell of a rose garden, feel the fiery passions of love coursing through our veins, and experience the beauty of artwork.

Inside the Rijksmuseum in Amsterdam one can find The Night's Watch (Figure 1), a massive Rembrandt painting, timelessly demanding respect of art enthusiasts around the world. Meticulous lighting and shading with paint oils leads the eyes of the viewer to the two men in the center and the woman in the center-left background. By brilliantly directing our eyes to features of the greatest portrait of the Dutch Baroque era, this Rembrandt demonstrates a concept important to consciousness. A concept called attention.

Attention is thought of as a gateway for consciousness. To be consciously perceived, the spotlight of attention must be focused on a feature enough to reach a stage of information processing that registers into our conscious awareness. Most of the functions of attention, though, operate outside our awareness. Unconsciously, part of the brain can "know" something, but somehow this knowledge never makes it into our conscious awareness.

Why, then, do some things turn into conscious perceptions, while others remain unconscious?

Brian scientists can bring this question under the empirical microscope by creating tasks to search for objective mechanisms of our experience—systematic patterns in brain activity that measure the transition from unconsciousness to consciousness. Clever researchers have developed manipulations that hold a visual stimulus constant, while its subjective interpretation by the research subject keeps changing. Evidence that something is changing inside your brain, despite identical inputs. But can we measure this subjective change? An electrical component of information processing, called the P300, is often claimed to be a key signature of conscious access. Trials where subjects report to have seen the stimulus are associated with a more pronounced P300, supporting the theory that the P300 is a marker of conscious perception.

The mainstream thought structure is that consciousness is caused by the interworking of components of nervous systems and is recognized in the configurations of those nervous systems. Promising as P300-like research appears, experiments have not been conceived to reveal exactly how the brain causes consciousness. Nor do we understand why we have this internal experience.

Back at the Rijksmuseum, around the corner from the Rembrandt, one can find the installation Internal Object in Three Parts (Figure 2), a creation by Anish Kapoor. Layers of red and white resin and silicon evoke perceptions of bloody, wiry lumps of flesh. In an instant, one is struck with a visceral gut-wrenching feeling of disgust. Yet, wonderment at the same time of how an artist can evoke such feelings.

What satisfactory explanation could science possibly have for this wonder? In the nineteenth century, distinguishing heat from temperature was key to making progress in thermodynamics: with heat as the form of recurrent energy cycling from hot to cold, while temperature is measurable by how hot or cold something is. The same principles of energy cycling have led to new understanding of the origins of life, with universal metabolic cycles organizing energy flows in biology by different forms of ecosystem, rather than a property of the individual organism – thinking of life not as something that happens *on* a planet, but instead as recurrent energetic cycles that happen *to* a planet (geosphere and lithosphere into biosphere). We should expect the same cycling principles and metabolic universalities to apply to recurrent hierarchical information processing in the brain. Evolving as a field from information

processing models of cognition to representational affordances that happen to a brain in response to the metabolic demands of incoming information.

Qualia is the form of recurrent energy cycling that happens to a brain when information is processed from a metabolic source to sink, while the ‘what it is like’ is the subjective property experienced by the individual organism.

In our study of consciousness, scientists must turn to metaphysics and empirical methodology as a compass. We need to think bigger than the traditional. We need a theory that extends the concepts of mind and brain sciences to the larger universe. Consciousness is caused by highly complex differentiated and integrated recursively organized energy in the brain. Let’s get to work.

Figure 1

Figure 2