

# Preface

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Thinking must never submit itself, neither to a dogma, nor to a party, nor to a passion, nor to an interest, nor to a preconceived idea, nor to anything whatsoever, except to the facts themselves, because for it to submit to anything else would be the end of its existence. *Henri Poincaré (1854–1912)*

‘Truth is sought for its own sake. And those who are engaged upon the quest for anything for its own sake are not interested in other things. Finding the truth is difficult, and the road to it is rough.’ wrote Ibn al-Haytham (965–1039), a pioneer of the scientific method. This book addresses one of the biggest challenges of science; understanding the biological basis of human consciousness. It does so through observation and experimentation in neurological patients, formulating hypotheses about the neural correlates of consciousness and employing an objective and reproducible methodology. This scientific method, as first proposed by Isaac Newton (1643–1727), has proven utterly successful in replacing Dark Age ‘magical thinking’ with an intelligent, rational understanding of nature. Scientific methodology, however, also requires imagination and creativity. For instance, methodologically well-described experiments allowed Louis Pasteur (1822–1895) to reject the millennia-old Aristotelian (384–322 BC) view that living organisms could spontaneously arise from non-living matter. Pasteur’s observations and genius gave rise to the germ theory of disease, which would lead to the use of antiseptics and antibiotics, saving innumerable lives.

The progress of science also largely depends upon the invention and improvement of technology and instruments. For example, the big breakthroughs of Galileo Galilei (1564–1642) were made possible thanks to eyeglass makers’ improvements in lens-grinding techniques, which permitted the construction of his telescopes. Similarly, advances in engineering led to space observatories such as the Hubble Telescope shedding light on where we come from. Rigorous scientific measurements permitted to trace back the beginning of the universe to nearly 14 billion years; the age of the earth to more than 4.5 billion years; the origin of life on earth to (very) approximately 3.5 billion

years; and the apparition of the earth’s first simple animals to about 600 million years. Natural selection, as revealed by Charles Darwin (1809–1882) then gave rise to nervous systems as complex as the human brain, arguably the most complex object in the universe. And, somehow, through the interactions among its 100 billion neurons, connected by trillions of synapses, emerges our conscious experience of the world and of ourselves.

The study of consciousness has remained within the scope of philosophy for millennia. Recent empirical evidence from functional neuroimaging offers a new way to investigate the mind–body conundrum. It also gives new opportunities to the neurological community to improve our understanding and management of patients with disorders of consciousness. This second edition of *The Neurology of Consciousness* aims at revising our understanding of the anatomical and functional underpinnings of human consciousness by emphasizing a lesion approach through the study of neurological patients. This second edition seems critical to us as numerous recent findings and seminal articles have been published since the first edition of the book in 2009. The different chapters review the mapping of conscious perception and cognition in health (e.g., wakefulness, sleep, dreaming, sleepwalking and anaesthesia) and in disease (e.g., post-comatose states, seizures, split-brains, neglect, amnesia, dementia, and so on).

‘A genuine glimpse into what consciousness is would be the scientific achievement, before which all past achievements would pale’ wrote William James in 1899. Testable hypotheses on consciousness, even if still far away from solving all problems related to the neural substrate of consciousness, give us such a glimpse. In our view, scientific and technological advances complemented by an adequate theoretical framework will ultimately lead to an understanding of the neural substrate of consciousness.

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School of Medicine and Public Health. We learned a lot while working on this second edition of *The Neurology of Consciousness* and we hope you do too while reading it.

**Steven Laureys (Liège),  
Olivia Gosseries (Liège and Madison),  
and Giulio Tononi (Madison)**