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PRESENTACIÓN

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> Casi todos los males de pueblos e individuos dimanan de no haber sabido ser prudentes y enérgicos durante un momento histórico, que no volverá jamás.
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> [Almost all the ills of peoples and individuals arise from not having known how to be prudent and energetic during a historical moment, which will never return.]
>
> Santiago Ramón y Cajal, *Charlas de café*

The beginnings of neuroethics as an independent discipline date back almost twenty years. In 2002, a group of experts met at an academic conference held in the city of San Francisco, CA, USA, to discuss numerous and diverse issues at the intersection of ethics and neuroscience. The following are some of the issues compiled in the conference proceedings:

- The self (*c*)
- The neuroscience of morality (*b*)
- Reductionism and emergence (*c*)
- Legal responsibility in the case of brain-injured persons (*b*)
- Ethical implications of neuropharmacology (*a*)
- The ethics of neuroenhancement (*a*)

- Neuroscience and public discourse (*c*)

Though an initial definition by William Safire stated that neuroethics is "the examination of what is right and wrong, good and bad about the treatment of, perfection of, or unwelcome invasion of and worrisome manipulation of the human brain," this seemed to limit the field to the ethical, legal, and social implications of neuroscience and neurotechnology (the issues marked (*a*) in the above list): the *ethics of neuroscience*. Nevertheless, it is widely accepted—although not unanimously—that neuroethics also encompasses the neurobiological bases of free will, moral responsibility, and ethical behavior (the issues marked (*b*) in the above list), that is, the *neuroscience of ethics*. Even some broader metaphysical (e.g., emergence, the sense of self) and sociopolitical (e.g., public discourse) questions are usually included within its scope (the issues marked (*c*) in the above list), as they are highly relevant for understanding several problems pertaining to both the subfields just mentioned.

Two decades after its foundational conference, all these are still very relevant, cutting-edge questions in neuroethics, and new, exciting ones have been arising and being added to the list all the time. The present monographic section comprises four articles that deal with some of the most pressing neuroethical concerns of the day. These papers, written by leading academics from Europe and Latin America, appeal to both general readers interested in introducing themselves to this thrilling discipline and specialized scholars seeking the emerging debates.

The section starts with an article authored by Kathinka Evers and Arleen Salles, two prominent researchers working at the Centre for Research Ethics & Bioethics (Uppsala University, Sweden), who are also deeply involved in working on responsible innovation within the Human Brain Project (https://www.humanbrainproject.eu/), a European Union flagship initiative. In this paper, they analyze the cutting-edge phenomenon of the so-called digital twins and the ethical challenges that their development entails. The authors give special emphasis on attempts to create virtual brains (that is, digital twins of the human brain), which are particularly complex from both an ethical and a technological point of view. Finally, they make a strong defense of conceptual clarity as an essential requirement to aim for the construction of virtual

brains such that they can be theoretically sound and also—as importantly—socially beneficial.

Renato César Cardoso, a professor working at the Federal University of Minas Gerais and one of the most renowned Brazilian scholars studying interactions between law and neuroscience, devotes the second article to make a very clear overview of the field of neurolaw, which is usually considered—not without controversy—as a specific branch of neuroethics. Cardoso begins by providing a comprehensive description and analysis of the main concepts and problems that are part of this discipline, including the definition of neurolaw, its relations to neuroethics, the use of neuroscientific evidence (e.g., neuroimaging) in courts, and neuroprediction of future crimes, just to mention a few. He continues by looking at the question of whether neuroscience has really sparked a revolution for law and also focuses on the current trends. Finally, he makes an in-depth analysis of the neuroscience of free will (especially, the Libet and Libet-style experiments), which has important implications for the question of moral and legal responsibility.

The third article is authored by Nicolás Ezequiel Llamas and José Ángel Marinaro, who are members of a research group on neuroscience and law led by the latter at the National University of La Matanza. Marinaro's work and initiatives have been essential for the development of neurolaw in Argentina. Much like the previous one, this article too is devoted to the relationship between law and neuroscience, although in this case the analysis is focused on the debate on the so-called neurorights. After a brief overview of some of the more important neurotechnologies, Llamas and Marinaro investigate how new advances in neuroscience may eventually pose a threat to us through our brains and minds. Then, they turn to analyze the newly proposed human rights that may be introduced as a response to this threat, namely cognitive liberty, mental privacy, mental integrity, and psychological continuity. They also include the question of whether creating these *ad hoc* human rights is acceptable or, alternatively, can lead to an inflation of rights. The article ends with a case study about forced treatment and the execution of sentences.

Luis Enrique Echarte, one of the most prominent neuroethicists in Spain, who works at the University of Navarra, closes the section by proposing new ways of reconnecting the neuroscience of law (i.e., neurolaw) and the law

of neuroscience (e.g., neurorights), which in his view are currently quite detached. He analyzes this disconnection very masterfully through an in-depth, creative study of Aldous Huxley's technological "points of no return": (1) the accumulation (i.e., centralization) of power, (2) the alienating bureaucratization of science and society, and (3) the idealism in scientific studies. Ultimately, Echarte suggests that we direct our attention more to "neuroduties" than to neurorights:

> [Huxley] shows us that, in the hopes of helping people both defend themselves from tyrants and, most importantly, avoid becoming one, it is better to assume a few duties […] than to develop a set of bans and restrictions to protect citizens against the misuse of science and technology. From a practical point of view, of course, both strategies seem necessary and complementary. Yet, Huxley's warning about the point of no return helps us to understand that it is essential to prevent short-term corrective measures (rights-focused measures) that overshadow duties-focused measures.

Together, these four articles show how important it is to explore the implications of neuroscience to adequately understand the ethical issues involved at the same time that the ethical reflections on neuroscientific practice become critical in our current societies. Indeed, this interdisciplinary work should run bidirectionally; as *The Routledge Handbook of Neuroethics* puts it: "Where an ancient philosopher might have been metaphysician and physicist, ethicist and biologist, a neuroscientist of today can, in essence, return to her philosophical roots and be both scientist and philosopher—a neuroethicist". These papers also show how current work at the intersection of philosophy and neuroscience may decisively inform stakeholders and policy makers about "how to be prudent and energetic during [this] historical moment"—in Cajal's words—in which advances in neuroscience are unfolding in increasingly rapid, surprising ways and challenging many long-standing assumptions that we took for granted about our societies and about ourselves as human beings.

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We want to dedicate this monographic section to our Spanish fellow countryman Ramón y Cajal. He was not only the father of modern neuroscience and one of the greatest scientists in history but also—as his writings show—a great humanist and a prominent thinker. Moreover, as a humble and good person, he always found ways to put his family first. We want to honor his memory, an honor he truly deserves for the colossal legacy he has left behind for all of us to benefit from.