



## Neuroethics at 10, and Counting

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To cite this article: Judy Illes & Paul Root Wolpe (2013) Neuroethics at 10, and Counting, AJOB Neuroscience, 4:1, 1-3, DOI: [10.1080/21507740.2013.757913](https://doi.org/10.1080/21507740.2013.757913)

To link to this article: <http://dx.doi.org/10.1080/21507740.2013.757913>



Published online: 07 Feb 2013.



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# Neuroethics at 10, and Counting

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In the Penfield Papers of the Montreal Neurological Institute, neurosurgeon Wilder Penfield (1891–1976) wrote:

Neurology is the greatest, I think, the most important unexplored field in the whole of science. Certainly our ignorance and the amount to be learned is just as that of outer space. . . . The secrets of the brain and mind are hidden still. The interrelationships of mind and brain are perhaps something we will never be quite sure of. (Augustine 2008, 1)

Clearly we have come a long way since Penfield's musings. The field of neuroscience is now a powerful, leading-edge field of science, and has answered many of the questions Penfield posed. About 10 years ago, bioethicists and others became active in this field, and one gathering in San Francisco in 2002, "Neuroethics: Mapping the Field," was a milestone event signaling that movement. At this decade mark, it is time to look back and reflect, and to look forward and plan for the future.

Many celebrate that neuroethics has come this far. There was early criticism that the creation of a field of neuroethics was self-serving, and that there was no need for a new subdiscipline of bioethics, or of neuroscience for that matter. Undeterred by these distractions, breakthrough science and rich dialogue were taking place. The seemingly constant advances of neuroscientific research kept the field of neuroethics and its related fields humming. Cross-disciplinary conversations began, pushing the boundaries of understanding consciousness, examining neuroenhancement philosophically and empirically, harmonizing policies for handling incidental findings, opening conversations about free will and responsibility, engaging the legal community with questions about agency and responsibility, enriching clinical ethics in psychiatry and neurology with new perspectives on diagnosis and drug treatments, investigating the commercialization of brain technology, and improving education and health literacy about the brain. This illustrative list is long, but it is by no means complete.

Many senior people have emerged from their home disciplines to participate in these new explorations. In a wave of true multidisciplinary, neuroscience, philosophy, psychology, sociology, anthropology, ethics, law, engineering,

medicine, bioinformatics, religion, nursing, and linguistics are all contributing to the conversation—and others as well. The field has generated books and book chapters, created specialized journals and developed special issues of journals, and published an average of about two journal papers per month that directly invoke the term "neuroethics." Hundreds of other papers fall squarely in the domain but under broader terminology or classification. In human neuroscience, several major themes have made a significant debut over the past decade: epigenetics and optogenetics, as well as neuroethics. In bioethics, few new themes have emerged with equal success and sustainability.

We created a professional society—the International Neuroethics Society—that, in a poor economic climate and equally chaotic political one, is no small feat to sustain. Attendance at annual meetings has been truly international and represents the vast geography of neuroethics: Spain, Japan, Sweden, Brazil, Australia, Belgium, Canada, Costa Rica, France, Germany, Israel, Switzerland, Netherlands, and the United Kingdom (Figure 1). Membership is good, but the overall numbers need to be better, domestically and internationally. Other national and international neuroethics conferences, as well as regional meetings, are proliferating, suggesting that there is a clear need to meet, exchange ideas, and leverage the diverse experiences of different disciplines and different societies.

The field is maturing, and young people are becoming the dominant presence at conferences and in the literature. The level of the incoming talent is phenomenal. Even more importantly, perhaps, young people interested in neuroethics are getting jobs, and, notably, some are designated neuroethics positions on the tenure track. Many young scholars are bringing ethics into neuroscience departments that, in the past, would have hardly embraced such interests. Equally importantly, they are bringing neuroscience into the study of ethics—another historical unlikelihood that is yielding rich scholarly benefits today.

As a community of scholars, we need these new voices to enrich the conversation: Neuroethics is recycling too many of the same themes it started with. Depth is important, but our treatment of new topics is often shallow.

The authors thank Dr. Joseph J. Fins at Cornell-Weill Medical Center for his valuable historical insight, and Ania Mizgalewicz at the National Core for Neuroethics at the University of British Columbia for editorial and graphics assistance.

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Figure 1. Map of the many neuroethics nodes worldwide.

We do not want our momentum to wither before we even finish myelinating at our next 10- to 15-year milestone. Where can we expand? Here are a few ideas: neuroethical inquiries about genetics and gene therapy, stem cells, biomarkers and disease prognoses, executive function, neural nets (growing neurons in dishes), remote control of bionic limbs on the one hand, and of machines that can kill people on the other. The potential is only limited by the imagination of the next important paper or original thinker.

As we move toward the next decade, there are people to thank. The innovators in neuroscience are too numerous to mention here, but they have laid, and continue to lay, the groundwork for advances in our understanding of the brain that provide continual fodder for neuroethics. Philosophers of the mind generate provocative theories of consciousness, the mind-body problem, and other puzzles that provide clues to the experimentalists. The empirical researchers then produce data that enrich the more theoretical discussions, such as the way Libet's experiments on decision making have spurred a lively conversation on free will. The early writers in the field of psychiatric ethics, neurological ethics,

and brain science ethics paved the way for the consolidation of the field. Our fellow founders of the International Neuroethics Society have given generously of their time to create a forum for the advancement of the field. Prescient funders have been important nurturers of this nascent field as it was born, and neuroethics would be greatly impoverished without their generous support.

The field of neuroethics welcomes all interested thinkers and researchers. We look for neuroscientists, neuroengineers, and other scientists and researchers to join the conversation with the ethicists, social scientists, philosophers, and legal scholars. As we build on our strengths and address our weaknesses, we hope to continue to successfully negotiate the relationship of the mind and the brain, and their relationship to self and society. We each build on the work of the other, and we will do so meaningfully, respectfully, and ethically in the years to come.

#### REFERENCE

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