

## INTRODUCTION

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SILVIA SALARDI\*

The past decade has witnessed an unprecedented increase in the interest in neurotechnology. Despite some types of modern neurotechnology being applied in the medical field since the 1970s, never before have the discussions about this technology been so heated and interdisciplinary. And never before have legal claims for new human rights stood so squarely in the centre of academic, institutional, and societal concerns for human protection. In the past decade, neurotechnology has been marked not only by speed, proliferation, and remarkable innovation, but also by profound concerns about human destiny. The ability of this technology to “access, monitor, investigate, assess, manipulate, and/or emulate the structure and function of the neural systems of natural persons”<sup>1</sup> has raised ethical, political, cultural, legal, and societal concerns about how to address the paradigmatic anthropological change induced by its advent. The human being no longer has a secret and safe shelter, i.e. the brain, where the person can decide to hide intentions, beliefs, and emotions from undesired exposure. The brain has become *nude, transparent*. This new condition may impact the exercise of autonomy, self-determination, and privacy as we have known them so far. Indeed, unlike other technological devices, neurotechnology is *uniquely disruptive*.<sup>2</sup> For this reason, its use forces reconsideration of traditional ethical and legal categories. This operation needs to analyse the different contexts of neurotechnology application. In fact, neurotechnology is no longer confined to medical use. On the contrary, neurotechnology has expanded its applications beyond the medical field to include, among others, direct-to-consumer non-invasive neurotechnology for wellness and well-being, forensic neurotechnology, neurogaming, and neuroenhancement.

In addressing many of these topics and their relationship with human rights, this volume aims to survey the current state of affairs, analyse emerging trends and problems, and gesture towards future development in this field. The volume was

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\* Associate Professor of Philosophy of Law and Bioethics (School of Law, University of Milano-Bicocca), Italy.

<sup>1</sup> OECD, *Recommendation on Responsible Innovation in Neurotechnologies*, 2019, p.6.

<sup>2</sup> Human Rights Council, *Impact, opportunities and challenges of neurotechnology with regard to the promotion and protection of all human rights. Report of the Human Rights Council Advisory Committee*, 2024.

motivated by the concern to investigate the ethical and legal questions arising by this unique technology in the age of human rights.

The chapters in the volume draw on the International Conference on Neurotechnology in the Age of Human Rights, held on September 17th, 2025, and sponsored jointly by the University of Milano-Bicocca, School of Law, and Trivent Publishing. In response to a call for papers for researchers in the legal and neuroscientific fields, the conference gathered selected contributions from legal scholars and scientists, who engaged in a fruitful and interactive dialogue with discussants, reflecting on the multifaceted landscape of neurotechnological challenges and opportunities.<sup>3</sup>

The present collection comprises a selection of papers presented at the conference. It is divided into five parts, overall mirroring the conference programme. Following Peter Kirchschräger's keynote speech proposing a human rights-based neurotechnology, the first part is dedicated to the ethical challenges of neurotechnology in vulnerable cases, focusing on autonomy, disability, and prediction and provides the contributions by Beatrice Picollo focusing on gaps in the legal field, by Tamami Fukushi, Hitoshi Shimada, and Nobuyuki Shirakawa concentrating on ethical concerns arising from the use of amyloid Pet applied for diagnosis of dementia in Japan, by Carlos Granados Domínguez discussing the intersection between neurotechnology and disability rights, and by Giordana Truscelli examining arguments against the replicability of consciousness. The second part deals with human rights, cognitive liberty, and freedom of the mind. It comprises the contributions by Rachael L. McIntosh, examining the ethical governance of cognitive liberty, and by Maria Giulia Servida discussing neurotechnology regulations globally. The third part addresses privacy and the application of neurotechnology in the criminal field. It comprises the contributions by Alessandro Manfredi and Fenice Valentina Valenti concentrating on neuroprivacy in criminal law, by Martina Greppi proposing neuroinformed instruments of re-education in compliance with the restorative justice approach. The fourth part examines the debate on neurorights. It provides the contributions by Francesco Stocchi critically analysing the distinction between regulation and deregulation trends, by Masathoshi Kokubo investigating cognitive liberty in Japanese Constitutional Law, and by Claudia Aniballi addressing the topic of cognitive and moral enhancement. The fifth part covers neurogaming and the use of neurotechnology in the workplace. It comprises the contributions by José M. Diéguez-Rodríguez focusing on workers' rights with particular attention paid to privacy and fair working conditions, by Diego Saldivar considering neurorights applied to neurogames, and by Alessia Del Pizzo proposing a reflection on the right to remain opaque.

The collection as a whole suggests that there are good reasons to continue critically reflecting on this topic from a human rights perspective, taking a cautious view of the potentialities and risks of neurotechnology. At the same time, the collection shows that only an interdisciplinary and transborder dialogue of shared experience can enhance the possibility of robust solutions.

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<sup>3</sup> The proceedings of the conference can be accessed at the following link: <https://www.youtube.com/watch?v=IdzB9z2MPcQ>.

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I am also profoundly grateful to all the discussants who took part in the conference and through their suggestions and comments have contributed to ameliorating the quality of the papers published in this volume. A final heartfelt thank you to the authors of the papers published in this volume, who gave their relevant insights on a fascinating, albeit complex, topic.

Silvia Salardi  
University of Milano - Bicocca