

Book Review: MacKellar, Calum. *Cyborg Mind: What Brain–Computer Interfaces Mean for Our Future*. New York: Berghahn Books, 2019. 428 pages. Hardcover.

In *Cyborg Mind*, Calum MacKellar offers an ethical, philosophical, and policy-oriented examination of the brain–computer and neuronal interface technologies. The book’s central contribution is its articulation of cyberneuroethics, a framework intended to address moral challenges that arise when cyber systems interact directly with the human nervous system. Drawing on neuroscience, computing, and bioethics, the volume is aimed at social scientists, ethicists, and policymakers concerned with the societal implications of emerging neurotechnologies.

MacKellar works at the intersection of bioethics, neuroethics, and public policy. His core thesis is that existing bioethical and neuroethical approaches are insufficient for addressing the ethical challenges posed by cyber-mediated neural technologies. Unlike earlier neurotechnologies, neuronal interfaces increasingly involve algorithmic feedback loops that directly shape cognition, mood, agency, and identity. These features, MacKellar argues, introduce qualitatively new ethical problems that justify the development of cyberneuroethics as a distinct field of inquiry.

The book is organized into six chapters that move from conceptual clarification to applied ethical and policy analysis. Chapter 1 establishes the conceptual foundation by explaining why the term “cyberneuroethics” is necessary. MacKellar carefully distinguishes the meanings of “cyber,” “neuro,” and “neuroethics,” emphasizing that ethical implications differ significantly depending on whether interfaces engage the brain, spinal cord, or peripheral nerves. This insistence on anatomical and functional precision is a notable strength, grounding the ethical discussion in biological realities rather than abstract generalization. Chapter 2 examines popular and cultural understandings of neuronal interfaces, highlighting how media representations and speculative narratives shape public expectations and ethical anxieties. Chapters 3 and 4 provide philosophical

and technical background, addressing the brain–mind interface and surveying existing and emerging neuronal interface systems. While these chapters supply useful context, their largely descriptive character limits sustained critical engagement.

Chapter 5 represents the normative core of the book and most clearly demonstrates the value of cyberneuroethics. Here MacKellar discusses “closed-loop” brain implants, including research funded by the U.S. Defense Advanced Research Projects Agency, which integrate neural signal acquisition, algorithmic analysis, and feedback-based stimulation. Although current research focuses on epilepsy patients with pre-existing implants, MacKellar convincingly shows that the ethical implications extend far beyond therapeutic contexts. The ethical concerns raised in this chapter are among the book’s most compelling. MacKellar highlights the risk that artificial stimulation of neural circuits associated with mood disorders could generate extreme or disproportionate emotional states, potentially undermining autonomy and emotional authenticity. He also raises serious concerns about mental privacy, noting that algorithmic systems capable of identifying mood patterns may allow access to aspects of an individual’s inner emotional life that are not externally observable. Particularly insightful is his discussion of psychological inseparability: as neuronal interfaces become integrated into affective regulation, users may become psychologically, not merely physically, dependent on devices. This analysis strongly supports the book’s broader claim that cyber-mediated neural technologies challenge existing ethical categories.

Finally, chapter 6 extends these concerns into the policy realm, addressing governance and regulation. While MacKellar rightly emphasizes the urgency of ethical oversight, this discussion remains largely exploratory. The absence of sustained comparative analysis of existing regulatory frameworks limits the practical force of the policy recommendations.

Critically, *Cyborg Mind* excels in conceptual clarity and ethical foresight but is less consistent in empirical engagement. Many of the ethical concerns are necessarily forward-looking and speculative. While this is understandable given the developmental stage of the technologies discussed, it will be interesting to see greater engagement with concrete case studies or clinical data grow as this will ultimately strengthen the analysis. Moreover, MacKellar makes a persuasive case for cyberneuroethics as a distinct field; however, it might be posited that there is an underestimation of the extent to which existing neuroethical resources might be adapted rather than replaced.

Overall, *Cyborg Mind* makes a valuable contribution to contemporary debates on technology and ethics. Its articulation of cyberneuroethics provides social scientists with a useful framework for analyzing emerging forms of human–machine integration, particularly in relation to autonomy, identity, and governance.

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