THE ETHICAL CHALLENGES OF EMERGING MEDICAL TECHNOLOGIES

Edited by
Arthur L. Caplan and Brendan Parent

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ARTHUR L. CAPLAN AND BRENDAN PARENT
New York University, School of Medicine

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About the Editors

Arthur L. Caplan is the Drs. William F and Virginia Connolly Mitty Professor and founding head of the Division of Bioethics at New York University Langone Medical Center in New York City. He is the author or editor of 32 books and over 600 papers in peer reviewed journals. Caplan is the recipient of many awards and honors including the McGovern Medal of the American Medical Writers Association and the Franklin Award from the City of Philadelphia. He was a person of the Year-2001 from *USA Today*. He was described as one of the ten most influential people in science by *Discover* magazine in 2008. He has also been honored as one of the 50 most influential people in American healthcare by *Modern Health Care* magazine, one of the ten most influential people in America in biotechnology by the *National Journal*, one of the ten most influential people in the ethics of biotechnology by the editors of *Nature Biotechnology* and one of the 100 most influential people in biotechnology by *Scientific American* magazine. In 2014 he was selected to receive the Public Service Award from the National Science Foundation/National Science Board, which honors individuals and groups that have made substantial contributions to increasing public understanding of science and engineering in the United States. In 2016 he was honored by the National Organization for Rare Disorders (NORD) with a 'Rare Impact Award'.

Brendan Parent is the director of Applied Health at NYU School of Professional Studies, and a faculty affiliate of the Division of Bioethics at New York University Langone Medical Center. He also serves as a member of the Institutional Review Board for the Visiting Nurse Service of New York. His current research areas include ethics of genetic engineering, organ donation and transplant policies, and social responsibility in sports. Previously, he was Special Legal Adviser for the New York Task Force on Life and the Law, a government agency that assists the State with policy in medicine, law, and ethics. He has also worked as a staff associate at the Center for Genetics and Society in Berkeley, California, and as a researcher in the department of Bioethics at the National Institutes of Health. He designed his undergraduate major in Bioethics at the University of California, Santa Cruz, and received his JD from Georgetown University Law Center where he was presented with the ABA Award for Excellence in Health Law.

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Series Preface

Scientific discovery and technological innovation are producing, and will continue to generate, a truly broad array of tools and techniques, each of which offers benefits while posing societal and ethical challenges. These emerging technologies include (but are not limited to) information technology, genomics, biotechnology, synthetic biology, nanotechnology, personalized medicine, stem cell and regenerative medicine, neuroscience, robotics, and geoengineering. The societal and ethical issues which arise within those fields go beyond safety and traditional risks such as public health threats and environmental damage, to encompass privacy, fairness, security, and the acceptability of various forms of human enhancement. The Library of Essays on the Ethics of Emerging Technologies demonstrates the breadth of the challenges and the difficult tradeoffs entailed in reaping the benefits of technological innovation while minimizing possible harms.

Editors selected for each of the eight volumes are leaders within their respective fields. They were charged with providing a roadmap of core concerns with the help of an introductory essay and the careful selection of articles that have played or will play an important role in ongoing debates. Many of these articles can be thought of as "golden oldies," important works of scholarship that are cited time and again. Other articles selected address cutting-edge issues posed by synthetic organisms, cognitive enhancements, robotic weaponry, and additional technologies under development.

In recent years information technologies have transformed society. In the coming decades advances in genomics and nanotechnologies may have an even greater impact. The pathways for technological progress are uncertain as new discoveries and convergences between areas of research afford novel, and often unanticipated, opportunities. However, the determination of which technological possibilities are being realized or probable, and which are merely plausible or highly speculative, functions as a central question that cuts across many fields. This in turns informs which ethical issues being raised warrant immediate attention. Calls for precautionary measures to stave off harms from speculative possibilities can unnecessarily interfere with innovation. On the other hand, if futuristic challenges, such as smarter-than-human robotics, are indeed possible, then it behooves us to invest now in means to ensure artificial intelligence will be provably beneficial, robust, safe, and controllable.

Most of the ethical concerns discussed in the volumes are less dramatic, but just as intriguing. What criteria must be met before newly created organisms can be released outside of a laboratory? Should fears about the possible toxicity of a few unidentified nanomaterials, among thousands, significantly slow the pace of development in a field that promises great rewards? Does medical research that mines large databases (big data), including the genomes of millions of people, have a downside? Are geoengineering technologies for managing climate change warranted, or more dangerous than the problem they purport to solve?

The ethical languages enlisted to evaluate an innovative technological go beyond the

utilitarian analysis of costs and benefits. For example, the principles of biomedical ethics and the laws of armed conflict play a central role in judgments made about whether the healthcare industry or the military should adopt a proposed device or procedure. The differing ethical languages underscore different considerations, each of which will need to be factored into decisions regarding whether to embrace, regulate, or reject the new technology.

Scientific discovery and technological innovation proceed at an accelerating pace, while attention to the ethical, societal, and governance concerns they raise lags far behind. Scholars have been diligent in trying to bring those concerns to the fore. But, as the essays in these volumes will make clear, there is a great deal of work ahead if we, humanity as a whole, are to successfully navigate the promise and perils of emerging technologies.

Wendell Wallach

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