

BOOK REVIEW**WILEY**

The Postgenomic condition: Ethics, justice, and knowledge after the genome

Jenny Reardon

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Reardon's book, the *Postgenomic Condition: Ethics, Justice, and Knowledge after the Genome* is a thoughtful reckoning of how DNA's relationship with the public, research participants, and biotech industries have been drastically altered since the publication of the first human genome sequence by the Human Genome Project in 2003. Each chapter aims to tell a story that reveals not only the lofty and generally admirable *intentions* of scientists, companies, and institutions working in this postgenomic era, with all the technological advantages this brings (namely sequencing capabilities and digitized data storage), but also, and more importantly, the actual *impact* of this genomic work. Reardon contextualizes her thoughts on intention versus impact within each Chapters' highlighted key events and projects in the wake of the genomic age. The postgenomic condition, as Reardon coins and defines it, is comprised of the ways in which we navigate a world where our genomic information is thought to have vast potential: potential to improve understanding on disease (Chapters 2 and 3), potential to invoke collective identities (Chapters 4 and 5), and potential to democratize DNA (Chapters 6 and 7). But in each of these scenarios, there are inevitable limitations and lessons to be learned. In each story, Reardon circles back to challenge us to truly consider what the actual value of postgenomic information is, and she uses two benchmarks to measure its value—justice and knowledge contextualized within the practice of ethical science.

The idea that knowledge production was the primary impetus for sequencing the whole genome has manifested in many ways throughout the postgenomic era. This book reviews the kinds of knowledge produced, and critically claims that not all knowledge conforms to ideals of justice—namely social justice. One byproduct of the Human Genome Project (HGP) was that computational power and sequencing technologies were the keys to its success, and as such, knowledge in the form of biotechnological innovations continue to be at the epicenter of the “knowledge” produced in the postgenomic era. But who does this kind of knowledge actually benefit, outside of the major biotech industry? What about justice, and the ideas of democratizing genomics for the public, something that 23andMe held up as one of their main company values (although the quality of that available knowledge produced by them would eventually become questioned). However, Reardon highlights the fine line between where access to

such information is real in a way that the public can actually benefit from it, compared to a veneer of socially responsible DNA. As the stories of Personal Genome Project in Chapter 7 shows, while the goals were to make volunteer participants' genomes publicly accessible, it soon became clear that although the genomic information may be publicly available, this is not the same as being accessible—an essential difference when considering justice and genomics.

The accessibility of benefits, the recipients of such benefits, and how to decide what those benefits would be, are explored across each of the projects reviewed in Chapters 2–8. The postgenomic era's early lofty goals of eradicating racial ideologies and health disparities are shown to be more complicated than anticipated, even with the best intentions. Ultimately Reardon makes a clear argument that without deeply collaborative efforts across those invested in genomic research (scientists, social scientists, communities, and companies), science and technology will continue to have a clear relationship with inequality that is not so easily mitigated. From thwarted efforts to build a genome sequencing center at Tuskegee (Chapter 3), to the limited efforts to diversify genomic databanks (such as in Chapters 6 and 7). If, inclusive genomics for all is still a goal of genomics, Reardon posits that scientists need to carefully attend to who is included and, more importantly, excluded from such initiatives.

While Reardon's book is appropriate for anyone interested in the history and future of biotechnology, I think her book has the greatest implications for researchers (STEM and social scientists alike) at all stages of their careers. This book is a reminder that collaborative, interdisciplinary, and community based science are our best bets for the future of ethical and just genomic research and the production of knowledge. With the continued emphasis on the broader impacts of successful federally-funded research, this book gives several examples of how the structural parameters of the funding institutions themselves do not always allow science to explicitly benefit those individuals directly involved in the work, even when the scientists are heavily motivated to produce those benefits (Chapter 2).

While the book examines large scale highly nuanced projects, the lessons learned and questions raised can be applied to anyone's research, as we are all faced with similar challenges when working with human subjects and, in particular, their DNA: Who is benefiting from this work—actually benefitting—and can those benefits be clearly

defined and tangible to the participating communities? How can we ensure that our work has exhausted all possible avenues of aligning our research benefits with that of the people we are working with? Just as anthropologists played a significant role in addressing the implications of genomic research in the early years after HGP, anthropologists continue to be involved in both genomic research and the ethics behind it today. In an effort to curtail the production of new, and the maintenance of ongoing inequalities, Bardill et al.'s (2018) *Science* piece on ethical practices of paleogenomics aligns well with Reardon's own calls for deeper questioning of the ethical and justice implications of the knowledge produced by genomic research. Indeed, Malhi and Bader's (2015) review of large and small-scale genomic research that is grounded in mutually-beneficial partnerships of scientists and Native American communities shows promise that the kinds of challenges described in this book *can* be overcome, even with communities whose history with science has been anything but ethical. Biological anthropologists will continue to be at the forefront of these challenges, and can draw lessons from those projects that keep ethical science, and *all* that entails, at the forefront. Training and supporting underrepresented scientists, clear discussions with participants to identify the value of genomics for the community, and federal funding resources to fund these dynamic practices all can help realize the kind

of genomic liberalism Reardon calls for—where the human genome becomes meaningful for the broad public in very tangible ways.

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