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Genetic Claims and Credibility

Revisiting History and Remaking Race

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We may think we know who we are and where we come from, but we live in an age when science and business compete for our attention—telling us in the media, in courtrooms, in clinical settings, and in political contexts that they possess the secrets to our identities. Observing the multiple clashes in law, medicine, and politics, we may rightly ask: What degree of authority should we grant to the claims that geneticists have unlocked the past and uncovered the truth about racial or ethnic or national identities? Does the evidence support the sweeping claims that we have solved historical mysteries of racial origin and lineage once and for all, or settled other contentious disputes from the past with genetic analysis?

Many geneticists and some social scientists answer, yes—the genetic view of race and history has opened the doorway to a future where true differences can be identified, irrefutable historical knowledge obtained, and better, scientifically informed social policies developed. Although our questions about identity and origin may be at once political and scientific, science apparently holds a stronger hand on the truth. The myriad applications of DNA analysis have not merely focused on predicting a future that is "written in our genes,"[1] but also made fundamental, if problematic, claims about who we are in the present, who we have been in the distant past, and what will become of us in the years ahead. Yet, these assertions of scientific truth remain contentious, and the essays above highlight the care with which we must approach genetic claims about identity and the past. Caution is warranted because of geneticists' own conflicted history with the race concept. Many of today's assertions echo the field's noxious claims about race and heredity from the eugenics age of the early twentieth century—claims, which can now be seen as warnings about how a myopic science legitimated the era's racism and racial politics. While the picture of genetics, race, and history today cannot be reduced to such easy caricatures, what is particularly notable is the way in which genetics ventures enact still-unfolding "racial projects" in diverse national contexts.[2]

These new ideas about race and the past can offer both liberating and limiting possibilities. Genetic testing and analysis in these arenas can expand a sense of connection among social groups, foster an individual's sense of reconciliation and belonging to the nation, or even—in the case of the well-known Innocence Project—support actual liberation in the form of release from unjust imprisonment. However, genetic analysis is also a constraining vehicle (for example, by promoting racial reification, supporting scientifically-sanctioned social exclusion, or fostering essentialism around dangerous notions about the primacy of biological kinship). Clearly, questions of race and genetics must be answered with insights drawn from many cases and contexts. As the essays in this volume highlight, the uses of DNA in the United States, Canada, across Europe, or in South Africa cannot be understood apart from the politics of race in these diverse locales; nor can search for an "Irish genome," a French-Canadian genetic identity, or a Native-American genetic past be separated from the politics of citizenship and nation.

Genetic Claims and Credibility

Genetic claims about the knowable past engender a modern collision between identity and identification, on the one hand, and scientific credibility, on the other. The essays here illustrate the contingent nature of credibility as science intersects with business and commercial interests; as science is deployed in courtroom and policing settings; and as the science of race comes into play in political arenas. The question of credibility, as sociologist Howard Becker wrote four decades ago, illuminates the fundamentally social character of belief and knowledge. He invoked "the notion of a hierarchy of credibility" to describe situations in which in "any system of ranked groups, participants take it as given that members of the highest group have the right to define the way things really are." To be sure, this social negotiation is evident wherever DNA-based insights are invoked in courtrooms, in genetic genealogy, or in other settings, to override or supplant popular beliefs about the past. In Becker's classic view of the hierarchy of credibility, "members of lower groups will have incomplete information, and their view of reality will be partial and distorted in consequence."[3] In works that followed Becker, however, historians and sociologists of science have suggested a more complex interaction of expert, lay, and political knowledge in the maintenance of credibility by scientists as they struggle for public relevance and authority. In these accounts, contests over professional authority are commonplace in the sciences.[4] Drawing on such insights, the essays in this volume trace how genetic analysis becomes credible and is, in turn, linked to various kinds of authoritative political (that is, group and governance) claims.

One should be careful about painting all genetic claims about race and history with one brush, because genetic evidence never speaks for itself; it must be interpreted and spoken for. With this in mind, the chapters above illustrate

convergences, divergences, and diverse pathways by which authoritative claims about DNA, race, and history develop. The forensic credibility of DNA claims in the courtroom highlights the ways in which legal standards of evidence and proof are used to evaluate assertions about DNA in relationship to innocence, guilt, liability, and family, backed by the power of the state. In the context of civics and governance, however, political credibility has another standard of evidence—one group's claims about genetic identity are weighed in relation to other groups' claims. In this context, science becomes more credible when it affirms already-existing ideas about the group, its history, and its political agenda. The commercial credibility of genetic genealogy is a different affair—for it depends on the existence, for example, of enough customers who believe that the match between their DNA sample and the company's records can transport them into the past to meet imagined ancestors. Thus, commercial or financial credibility relies too on the reliability of profits. The essays above illuminate the ways in which genetic credibility is an ongoing process, operating at these and many other levels of society.

While lawyers, politicians, and entrepreneurs, along with geneticists do much of the work of translating the complex scientific findings into information and products that are credible to jurors, aggrieved groups, or stockholders, the news media play a powerfully important role in conveying the legitimacy and significance of new genetic findings and disseminating these in the public sphere. Thus, the media is yet another site where scientific credibility is constructed, with recurring stories in which small, even inconsequential, research studies based on limited evidence are woven into grand narratives about what genes mean for identity. Consider, for example, press coverage of a December 2009 genome-wide association study (GWAS) of the genetic relationship between Africans and African Americans. Reporting on the findings, a *Science Daily* story noted that the research team (led by geneticists and computational biologists) had revised what it means to be African American: "People who identify as African-American may be as little as 1 percent West African or as much as 99 percent."[5] When *Science Daily* expounded on the finding, noting that "the data . . . point to the ability of geneticists to *reliably discern* ancestry using such data [emphasis added]," a potential discrepancy between perceived racial identity, lived identity, and scientifically-validated identity emerged. As the news account continued, "Scientists found . . . that they could distinguish African and European ancestry at each region of the genome of self-identified African Americans."[6] In such accounts, genetics is presumed to simultaneously reveal the speciousness of phenotypic views of monolithic races and validate and affirm true historical origins and social identity. Furthermore, the scientists were presented as having a precise tool for revealing an African American identity. Drawing from a press release that had been circulated by the University of Pennsylvania where some of the research was done, the article concluded that the GWAS tool could have "implications for personalized ancestry reconstructions, personalized medicine and more effective drug treatments," not to mention the mapping of genetic risk factors for diseases common to African Americans.[7]

The GWAS study suggests that genetic analyses take on resonance in contexts in which issues of identity and belonging remain unresolved. In the United States, where racial segregation was legally and socially codified but where the intermixing of groups regularly occurred nevertheless, the contested nature of genetic identity takes its meaning from the nation's vexing and still-unresolved ethnoracial ambivalences. In this context, questions of origins and identity have been central to an American cultural imagination," as Jennifer Hamilton notes, and it is perhaps not surprising that the marriage of colonial settler origins, a coerced and volitional migration history, ethnic uncertainty, and capitalism have allowed this brand of genetic genealogy to spread widely from the commercial realm to other social arenas. Thus, context matters enormously to both the production of that genetic evidence and its particular applications and to racial and historical debates. Surveying the map from South Africa to the United States and Canada, we see in the pages above precisely how the locating of genetic ancestors and the meaning associated with one's genetic history play out from one nation to the next. In many instances, the turn toward genetic analysis for resolution is no resolution at all, but rather a step in the evolving cultural process of adjudicating and negotiating identity and national belonging.

Ambiguities and Contradictions

What role should genetic knowledge and analysis play, for example, in ancestry analysis, in the promise of personalized medicine, or in criminal justice—where the pressures to solve a crime or settle an old case are urgent ones? At stake in these settings is the question of the relative credibility of privileged scientific knowledge and lay knowledge about people and the past. Even as national origins stories have become the domain of geneticists, there is an evolving tension between the supposed absolute nature of genetic tests and the seemingly contingent nature of personal accounts. Describing this tension and situating it in particular contexts—as evident in the laboratory, the clinic, the courtroom, the media, and public debates and public policy—has been the topic of the preceding pages. And even with genetic information commanding our attention in these settings, the answers to life's fundamental questions of origin and identity are still necessarily uncertain and contingent. In the end, "the genetic ancestors" are not figures discovered by genomic science who really existed in the past, but they are, rather, assemblages materialized at the intersection of legal and scientific practice, spawned in laboratories, conjured into being by breathless and imaginative reporters, and generated at the intersection of entrepreneurial genealogy businesses and consumer desire.

Close examination of the ambiguities of how race is made and unmade via genetic analysis should lead to greater caution at all levels of society—among scientists, policymakers, and consumers. The process of making convincing and credible links between race and ancestry from genes has involved several levels of

deft rhetorical sleights of hand. The essays above track the diverse pathways by which the credibility of genetic claims about race and history are established, including discursive claims to the scientific purity and integrity of earlier historical and political racial categories; scientists' control and use of specialized methods and data; and general boundary control over the scientific enterprise by both scientists and business leaders. Geneticists, for example, today are quick to note that they are not concerned with "races" in the classic sense but with gene pools that are clustered by continents. However, as Lundy Braun and Evelyn Hammonds point out, these continental clusters are often only thinly disguised surrogates for race. Moreover, one important yet unheralded problem in genetic thinking about these originary continental clusters is how (when looking at what were in fact mixed and diverse populations in the past) scientists see them as pure—thereby producing "purity out of mixture, something of great importance to Europeans." The past's continental clusters that are imagined by geneticists, in other words, are ones in which pure groups prevailed and little mixing occurred—defying the historical reality. (Such assumptions of purity are indeed being undermined by genetic scientists themselves. Recent analysis of a 2,000-year-old Italian skeleton suggested maternal Asian ancestry.)[8]

In addition to these curious and historically flawed presumptions of genetic fixity, there is another contradiction in genetic typologies of race today—the science both depends upon nation-specific political categories of race, ethnicity, and identity to characterize populations (Irish, English, Native-American, and French Canadian genomes) and support its claims, while also criticizing those political identities as inferior to scientific views of difference. The genetics of human difference, in other words, is itself caught in the paradox of race. As Hinterberger explains above, although terms such as *ethnic stock* may have fallen into disuse, geneticists still must depend on population classification given to them by the census which continues to shape the identification, monitoring, and inclusion of the kinds of people that make up the nation. Through this process, the evidence of difference that originates in the political process of ethnic identification feeds into the collection of genetic materials for people of the same *ethnic stock*, and thus genetics (for example, in Canada) is caught up in the classification logic of institutionalized multiculturalism, where the "the category *visible minority* is an exemplar of the political logic of multicultural classification."

What are we to make of the fact that, in one context after another, genetic claims relate so intimately and almost seamlessly to site-specific debates about culture, difference, heritage, and diversity? These rhetorical similarities are not coincidental. Marianne Sommer suggests, for example, that we live in a time when public awareness of issues surrounding cultural heritage is heightened and when initiatives like the Human Genome Diversity Project seek to speak to those cultural needs by analogizing the human gene pool to human languages and archeological and historical legacies. The cultural politics of genetic genealogy in Canada is but one instance in which authority is built around, and rests on, the claims to

scientific credibility. Nina Kohli-Laven observes above that the affinities between the ways people in the world of medicine and genetics draw population boundaries and the way Quebec nationalists have used those boundaries to forward their historiographic and ideological agendas are striking. Indeed, "the tendency to represent French-Canadians as homogenous and endogamous, whether in science or society at large, is a symptom of the dominance of the nationalist mood, even though those characterizations of a homogeneous French-Canadian past flies in the face of archival work, which suggests a highly mixed society of French and native interaction. The credibility of genetic analysis in this instance, then, overrides historical evidence while reinforcing the political tendencies of the moment. In this and many other instances, the work of constructing scientific, genetic categories is deeply intertwined with the political and social agendas of the classifiers and classified. In this context, the notion that any racial science can also be an apolitical science is deeply flawed. What emerges from these essays is a view of genetic analysis that, owing to an array of processes, has the appearance of a science that stands separate from politics, but where scientific legitimacy depends intimately upon political logic to locate each of us in the social world.

To demonstrate this point, many of our essayists peer into the black box of how genetic data are turned into racial evidence and observe how troubling assumptions about race are intrinsic to the science of techniques such as admixture mapping. "First, admixture mapping methods assume a particular form of relatedness and unrelatedness among and between the individuals they study," observe Ramya Rajagopolan and Joan Fujimura. That is, they use socioculturally defined categories of race to infer a higher level of relatedness among people in one race category and a lower level of relatedness between people in different categories, and so the associations they find between race and biology cannot be seen in nature. These associations are technical and epistemological products. As Rajagopolan and Fujimura conclude, "the link between disease and group is a product of the scientists' assumptions about relatedness within race groups."

Building Credibility

Nationalists, genetic scientists, and business entrepreneurs build credibility around problematic claims regarding historical events and identities with a complex system of signification in which the manipulation of a database (the larger the better) lends authority to the findings. As Peter Chow-White observes, whatever the limitations of genetic thinking, its power is derived from the operation of massive databases of information, and from the fact that "at all levels of society, from institutions to individual identities, information has become the material that social and political meaning is constructed from, new companies profit from, and states use to govern." By looking into the manipulation of information we see how data translate into power, influence, and credible knowledge. And then, when this system is tied to the raw commercial marketing and popular consumer

appeal of genetic claims about race, genes, and history and linked to specific consumer products, the circular logic of genes and identity is buttressed further. But as Marianne Sommer writes, the "sex appeal of the new technologies is more likely to be due to the aura of old myths." That is, for many individuals, these new genetic technologies are appealing, because they suggest the possibility of the imprimatur of science on origin stories passed down over generations. And in the process, the line between genetics' role in public memory as a science, and as a business enterprise becomes increasingly blurred.

Technological advances in computing have enabled these manipulations of data. Since the beginning of the recombinant DNA technology in the mid 1970s, commercial goals have infiltrated the fields of genetics and molecular biology. The promise of genetics as a business enterprise, aided by the high-throughput technological abilities of supercomputers and micro-chip storage capacities, has shifted the terminology of the field from "pharmacogen-etics" to "pharmacogen-omics." Whereas the former focused on investigations of single gene-to-gene interactions, the latter relies on technological advances to make possible instantaneous comparisons of multiple genes. Genetic scientists and entrepreneurs tout these advances as laying the foundations for "genetic recipes," which will link genes to identity and products and yield the holy grail of genomic medical research—individualized medicine. It remains to be seen how these pharmacogenomic drugs (if and when they are ever produced) will support, undermine, or intersect with existing notions of identity and difference. In the meantime, commercial claims about the potential for genetic science to identify and ameliorate diverse problems, especially medical ones, outpace actual discoveries. And, potential consumers—patients and physicians—wait for a time when genetic science will lead to medical cures (despite the fact that some leading geneticists are cautious about when, if ever, these advances will materialize).[9]

In contrast to medicine, the courtroom has been one important realm in which the power of genetic information to validate ancestral claims has been actually deployed, tested, and challenged. But even here, ultimately the logic and appeal of these innovative linkages between race, genetics, and history (from North America, through Europe and Africa) are political in character—that is, these linkages are fundamentally concerned with public governance and the power to manage and organize people and their interactions in a society. The complexities of DNA's links to race and the past are as numerous as those of the political terrain itself. In post-apartheid South Africa, for example, Jay Aronson observes that DNA is not so much being used to define the boundaries of race, or to trace the origins of a particular group of people, but rather to ameliorate past injustices to a historically marginalized group defined entirely by race. The success or failure of this effort depends not on the logic of the evidence, but on the shifting politics of reconciliation, blame, and retribution.

In this legal arena, Jonathan Kahn finds a complex interplay between old and new racial concepts. The legal credibility of a genetic race hinges upon our

everyday understanding and acceptance that there are indeed different races—a fundamental feature of racialist thinking in American society. In practical terms, the criminal justice system's use of racially identified population databases may improve only slightly the odds of implicating a matched defendant in a criminal case. Nevertheless, there is "an inertial power" to racial thinking that propels its continued use long after any original rationale for its introduction may have passed away. The powerful valence of racial thinking in the courtroom explains how, in one locale, tools like Forensic DNA Phenotyping (FDP), despite its numerous flaws, has succeeded in effectively redirecting investigations, by shifting police attention from suspects in one racial grouping to those in another. In another setting, Native Americans and other groups might turn to genetic information to try to validate their claims to land, restitution, and belonging. This variability in legal uses of genetics and biological evidence indicates the highly charged nature of claims that cry out for a political denouement. The diversity also illuminates the fact that science cannot provide the final blueprint for resolving these essentially political, legal, and social tensions.

Often, scholars championing the next discovery in the genetics of race are quick to dismiss any critics as politically correct naysayers. Reanne Frank rightly observes that defenders of the science "are often represented (and represent themselves) as 'brave scientific martyr-pioneers' who are fighting against the repressive forces of political correctness to bring to light knowledge that other scientists consider taboo." These authors see a stark division between the world of politics and the world of science—a simple, dichotomous view that we do not share. For these martyr-pioneers, politics is not a constituent part of science; rather, science becomes mired in politics only when those who do not fully understand its complexity, constraints and limitations misuse or misinterpret it. As opposed to these views, the preceding chapters have illustrated that the genetic science at the heart of this book is constituted from these complexities, constraints and limitations. All efforts to connect to the past are bound to be speculative, fraught with supposition, and troubled by problems of evidence. Just as selective editing and interpretation is common in the way we each fashion ourselves and our historical identities, so too genetic analysis is shown to be highly selective and politicized from its very inception. If the essays above demonstrate anything, it is that the line between the political and the scientific is blurry and ever-shifting—particularly when geneticists, savvy politicians, and enterprising business leaders wander into the realms of race and history and push us all to revise our ideas about who we are, to what family and community we belong, and what nation we should call home.

NOTES

1. Adam Geller, "Consumers Turn to Their DNA for Answers," *Boston Globe,* March 28, 2006; www.boston.com/business/personalfinance/articles/2006/03/28/consumers_turn_to_their_dna_for_answers/ [Accessed March 19, 2010].

2. Michael Omi and Howard Winant, *Racial Formations in the United States: From the 1960s to the 1990s*, 2nd ed. (New York: Routledge, 1994), 56–58.
3. Howard S. Becker, "Whose Side Are We On?" *Social Problems* 14 (Winter 1967):241.
4. Abby J. Kinchy and Daniel Lee Kleinman, "Organizing Credibility: Discursive and Organizational Orthodoxy on the Borders of Ecology and Politics," *Social Studies of Science* 33 (December 2003):869–896; Steven Epstein, *Impure Science: AIDS, Activism and the Politics of Knowledge* (Berkeley: University of California Press); Tomas F. Gieryn, *Cultural Boundaries of Science: Credibility on the Line* (Chicago: University of Chicago Press, 1999); Sheila S. Jasanoff, "Contested Boundaries in Policy-Relevant Science," *Social Studies of Science* 17 (1987):195–230; Bruno Latour and Steve Woolgar, "The Cycle of Credibility," in *Science in Context: Readings in the Sociology of Science,* ed. Barry Barnes and David Edge (1979; rpt. Milton Keynes: Open University Press, 1982), 35–43.
5. Katarzyna Bryc, Adam Auton, Matthew R. Nelson, Jorge R. Oksenberg, Stephen L. Hauser, Scott Williams, Alain Froment, Jean-Marie Bodo, Charles Wambebe, Sarah A. Tishkoffh, and Carlos D. Bustamante, "Genome-Wide Patterns of Population Structure and Admixture in West Africans and African Americans," *Proceedings of the National Academy of Sciences* 107 (December 22, 2009), www.pnas.org/content/107/2/786.full.pdf+html?sid=1dee1ff6–68b9–40bc-96bd-a1ad7806cbe7.
6. "Genetic Study Clarifies African-American Ancestry," *Science Daily* (December 24, 2009): www.sciencedaily.com/releases/2009/12/091221212823.htm [emphasis added].
7. Ibid.
8. "DNA Testing of 2,000-Year-Old Bones in Italy Reveal East Asian Ancestry," *Science Daily* (February 2, 2010): *www.sciencedaily.com/releases/2010/02/100201171756*.htm. In this same year, there were also reports, based on so-called "ancient DNA" analyses, that Native Americans had traveled to the Americas 500 years prior to Columbus and that a woman of Native American or East Asian ancestry had lived among the Vikings. See Giles Tremlett, "First Americans 'Reached Europe Five Centuries before Columbus Discoveries'" *Guardian,* 16 November 2010, www.guardian.co.uk/science/2010/nov/16/first-americans-europe-research?CMP=twt_gu; and "Vikings Brought Amerindian to Iceland 1,000 Years Ago: Study," *The Independent* (November 21, 2010), www.independent.co.uk/life-style/ health-and-families/vikings-brought-amerindian-to-iceland-1000-years-ago-study-2140130.html.
9. The tenth anniversary of the decoding of a draft of the human genome in July 2010 brought with it cautious appraisals of the genomics era and medical genetics from unlikely quarters. The *New York Times* reporter Nicholas Wade, typically an enthusiatic booster of developments in genetic science, wrote that the "primary goal" of the Human Genome Project—medical applications—"remains largely elusive." More strikingly, maverick geneticist Craig Venter declared in the press that we "have learned nothing from the genome other than probabilities." In late 2011, there was news of a successful instance in which whole genome sequencing resulted in treatement for symptoms of a genetic condition called dopa-responsive dystonia. At present, however, such developments continue to be quite rare, and personalized medicine, indeed, remains elusive. See Nicholas Wade, "A Decade Later, Genetic Map Yields Few Cures," *New York Times,* June 10, 2010, www.nytimes.com/2010/06/13/health/research/13genome.html; "Spiegel Interview with Craig Venter: 'We Have Learned Nothing from the Genome,'" *Der Spiegel*, July 29, 2010, www.spiegel.de/international/world/0,1518,709174–2,00.html; and Ericka Check Hayden, "Genome Study Solves Twins' Mystery Condition," *Nature* (June 15, 2011), www.nature.com/news/2011/110615/full/news.2011.368.html.