INTRODUCTION

Assemblages of Capture

Forensic genetics technologies are popularly touted as science in the service of state institutions of justice, law, and sovereignty to protect the People from dangerous criminals and terrorists. However, in this book I analyze a set of histories of forensic genetics research, development, and implementation involving leading scientists, biotechnology firms, and state security and police agencies in the United States, the European Union, and the People's Republic of China (PRC) and argue that these histories have been shaped by genocidal settler colonialism and allow for the sustained systemic violation of Indigenous peoples' self-determination, rights, and dignity. My central argument and hypothesis is that racially configured hierarchies have permeated forensic genetic technologies' research, development, and implementation. In particular, forensic genetics as technologies use various racially inflected conceptions (e.g., statistical differences in prevalence of genetic markers between "Caucasian" and "Black" populations) to help police, state security agencies, and judiciaries identify, capture, convict, and/or kill those deemed criminals and terrorists. These technologies have in turn involved scientific assemblages (networks) that rely on maintaining various Indigenous peoples in a state of capture and genetic servitude to serve scientists as resources of genetic diversity and difference. This hierarchy involves the research and development of forensic genetic technologies that seek to advance the biopolitical security of privileged populations in core regions of capitalism based on the repression of Indigenous peoples in which systemic racism imposes divisions (caesurae) between who lives and who dies (Dillon 2008, 169–70, 177–8; Foucault 2003, 255; Mbembe 2003, 17).

Death is not only physical but also social and civil, imposed through the systemic nonrecognition and often-violent suppression of the rights,

dignity, and self-determination of Indigenous peoples that is foundational to settler colonialism in countries like Brazil, the US, and the PRC (Foucault 2003, 256; TallBear 2013, 150–1; Weheliye 2014, 37–8). Guided by what anthropologist Patrick Wolfe (2006, 387) termed a logic of elimination, these settler colonial states govern through dominant rationalities (what Foucault termed governmentality) that position "its security in relation to perceptions of indigeneity as insecurity. Coded as sources of threat, expressions of indigenous values, practices, knowledges and subjectivities must be eliminated through various mechanisms of security to ensure the prosperity of settler society" (Crosby and Monaghan 2012, 423). Similarly, in Xinjiang, Dibyesh Anand (2019, 129–30) argues that "The Chinese state and its (Han) majoritarian nationalism brands Uyghurs and Tibetans as sources of insecurity. Mass demonstrations in Tibet in 2008 and Xinjiang in 2009, as well as incidents of violent and non-violent protest, are understood not as the results of legitimate grievances but as products of separatism, extremism and terrorism associated with Uyghur and Tibetan identities. This representation of Xinjiang and Tibet as sites of existential threat legitimizes massive investment in security apparatus and violence against inhabitants there."

This social and civil death and denial of Indigenous peoples' self-determination has also been routine in international forensic genetic research assemblages. In these assemblages (networks), scientists effectively own many Indigenous peoples' genetic materials and data, which they frequently refer to as *resources*. This long-term usage relies on routine acceptance in forensic genetics of claims that decades old informed consent are still valid over tens of thousands of samples and other genetic materials from Indigenous peoples. The claims and usage of these genetic materials as what the involved scientists term resources violates contemporary research ethical and legal norms, which require ongoing informed consent over secondary usages, and international agreements such as the UN Declaration on the Rights of Indigenous Peoples (2007) that place control of genetic resources under Indigenous self-determination. The Declaration's Article 31 states, "Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts."

While genetic researchers utilize the sovereignty-neutralizing term *population*, the sovereignty implications of genetics have long been a

central focus of Indigenous peoples' criticisms, beginning in the early 1990s with their transnational organizing against US government agency patents and the Human Genome Diversity Project (hereafter, the Diversity Project), using the term *biocolonialism* (Barker 2004; Harry 1995, 2009, 2011). In this critique, biotechnology is but the latest wave of technological innovation to exploit Indigenous peoples in the name of Humanity (L.T. Smith 1999). This resistance has been rooted in strong Indigenous critiques and ontologies, or worldviews, that conceptualize genetics in terms of a deeply held sacred respect that defines and guides responsibilities and duties to ancestors and living and future generations, thereby challenging dominant Western-rooted market friendly ontologies (Mead 2007; L.T. Smith 1999; Tsosie 2011). In some settler states, Indigenous peoples' political organizing and lobbying in the wake of major ethics scandals has led to various settler colonial states and Indigenous jurisdictions passing legislation and implementing regulations that recognize Indigenous self-determination and control over research involving their communities (Arbour and Cook 2006, 153–4; Harry 2009; Munsterhjelm 2014, 218–20).[1]

However, such Indigenous criticisms and international legal and ethical norms, legislation, and regulations have been effectively ignored by involved scientists who have used their extensive collections of Indigenous peoples' genetic materials as resources in the research and development of forensic genetic technologies. Indifferent to Indigenous peoples' ontologies, sovereignty, and rights, these forensic genetic research assemblages rationalize their quest through a range of rhetorical claims about improving public security and so serving the People and Humanity while also having the informed consent of their Indigenous research subjects, a seemingly win-win situation. Involved scientists routinely refer to their collections or public biobanks of blood samples, derived cell lines, and associated data as human genetic diversity resources, but these are also effectively forms of property owned by participating scientists, which are exchanged along with the involved scientists' expertise and labour for research funding and other institutional and regulatory support (Ong 2013, 78). This property relation takes various forms, such as private property of collections owned by various laboratories like the Diversity Project in a Paris suburb and Kidd Lab at Yale University, and communal commons type properties over which public access rights are claimed, such as DNA sequences of Indigenous peoples in publicly accessible databases run by both of these institutions, the high resolution DNA genome sequencing of the Karitiana and Surui by the Diversity Project, and the thousands of sequence entries from Indigenous peoples

in the Allele Frequency Database (ALFRED) developed and run by Kidd Lab. In both of these forms, there are claims being made by outsiders on Indigenous peoples' genetic materials and data; claims that are made in the name of Humanity and serving the Greater Good. The fact that these Indigenous peoples' genetic materials were taken many years ago, such as the blood samples taken from the Karitiana and Surui by American and Brazilian scientists in 1987 and from the Ticuna of what is now western Brazil in 1976 has been routinely ignored.

In its main organizing narratives, forensic genetics seeks to assist police forces to identify, track, and capture/kill suspects and so is distinct from medical genetics, which seeks to manage or improve individual and population health in a politics of life, often termed biopolitics (Foucault 2003, 243–4; Toom et al. 2016, e2). In mass media, scientific discourses, and security discourses, forensic genetics is propagated as a means of protection against dangerous Others; as technologies of justice that guide the sovereign violence of law and sovereign violence in the name of the People and/or Humanity, thereby securing privileged populations against those deemed dangerous Others, something that tends to work along racial and class lines. These technologies have been developed within assemblages where scientists in major research centres in the US, Europe, and China have routinely violated Indigenous peoples' rights, sovereignty, and dignity; for example, asserting that informed consent given for other research projects decades ago is still valid. These violations can be analyzed through the concept of racializing assemblages, in which race functions "not as a biological or cultural classification but as a set of sociopolitical processes that discipline humanity into full humans, not-quite-humans, and nonhumans" (Weheliye 2014, 4). These sociopolitical processes are evident in forensic genetic research where many Indigenous peoples have been in a state of biotechnological servitude as a lesser species of human who has not been endowed with meaningful rights and carry extremely onerous obligations to serve Humanity by serving scientists as cryogenically preserved blood samples and/or virally transformed cell lines (derived from blood samples) and data in perpetuity (Munsterhjelm 2015, 41–2; Kowal and Radin 2015, 63).

As part of the expansion of the US security state under the George W. Bush administration after the 9/11 attacks, the 2004 US$1 billion President's DNA Initiative program run by the US Department of Justice stated, "Alternative genetic markers and assays can potentially provide further information about biological samples under investigation, such as an estimation of ethnic origin, physical characteristics, and skin, hair, or eye color" ("Alternative genetic markers" n.d.). A number of

scientists responded to this call for the expansion of forensic genetic manhunting technologies to include race and ethnicity estimates. For example, in a 2008 US Department of Justice research funding report, Kenneth Kidd showed how human genetic variation (diversity) research was co-opted: "*Our collection* of population samples also provides *a unique resource* for validating SNPs that can be used in investigations to identify the ethnic ancestry of the individual leaving a DNA sample at a crime scene … *Our populations* provide an excellent global overview of human variation as shown in various publications" (Kidd 2008, 17–18, my emphasis). According to *Webster's II New College Dictionary* (Berube 2005, 966), the word *resource* has various meanings including: "Something that can be looked to for support or aid"; "An accessible supply that can be withdrawn from when necessary"; "An ability to handle a situation in an effective manner"; "Means that can be used profitably"; and "Available capital: assets"; all of which are evident in Kidd's Department of Justice funding reports. Kidd's statement shows how human genetic variation was co-opted into manhunting research and development. Kidd Lab's collection includes a large number of Indigenous peoples, such as the Karitiana and Surui of western Brazil who were controversially sampled in 1987 by the Canadian epidemiologist Francis Black of Yale University (Borofsky 2005, 228–9; Cultural Survival 2004; Kidd 2008, 17–18; Rohter 2007; Santos 2002, 98n3; Vander Velden 2004). In the entrepreneurial networks of contemporary forensic genetic research and development, scientists exchange their expertise, labour, and collections of Indigenous peoples' cell lines and data (and that of non-Indigenous peoples) for funding and resources in research cooperation with government security agencies and the corporate sector, interactions mediated through the sharing of the manhunt organizing narrative of improving security by identifying criminals and terrorists. These manhunt narratives therefore have a crucial central role in organizing the production assemblages of forensic genetics.

WHY ARE THESE TECHNOLOGIES SIGNIFICANT?

From its beginnings in the mid-1980s, forensic genetics has incorporated concepts of race and ethnicity as legitimate categories in improving the human hunting capacities of its technologies. Use of forensic genetics as evidence for matching criminal suspects to crime scenes began with the development of so-called DNA fingerprinting, which was invented in 1984 and patented by the British geneticist Alec Jeffreys.[2] The controversies over the introduction of forensic genetics as evidence into the US

and Canadian courts during the late 1980s and early 1990s dealt with whether the limited number of genetic markers being tested might differ in their prevalence between different racialized and regional populations. However, the 1990s involved a period of consultation, standardization, and consolidation of forensic genetics as a standard investigative practice. Today, the FBI's Combined DNA Index System (CODIS) and similar databases in other countries contain the searchable information of millions of convicted criminals and in many jurisdictions also detainees or suspects. CODIS was initially based on thirteen and later twenty genetic markers called short tandem repeats (STRs) that can identify individuals with a high degree of certainty.[3]

However, forensic genetic proponents ask: What if the sample does not match any existing individual profile in a database? The use of racial or ethnic categories was proposed shortly after the invention of DNA fingerprinting. For example, during a roundtable discussion at a 1988 forensic genetic conference in the US, Jack Ballantyne of the Suffolk County Crime Laboratory in New York State suggested the future potential of forensic genetic testing in determining "precise racial data"; for Kenneth Kidd it was "racial origin," something reiterated by other scientists, including DNA fingerprinting inventor Alec Jeffreys, in the early 1990s (Bartram, Plümecke, and Schultz 2021, 5; Track et al. 1989, 344). After 9/11, scientists began to expressly focus on racial taxonomies using conventional categories like Caucasian or Native American and euphemisms of phenotype for visible appearance and ancestry in the expansion of research and development. Early efforts to provide estimates of an unknown suspect's race and appearance date back to the early 2000s. As manhunting technologies, these forensic genetic technologies are resurrecting what had been largely discredited categories of race as somehow biologically inscribed and so scientifically valid (Bliss 2012, 202; Duster 2015; Fullwiley 2014; Obasogie 2012; Dorothy Roberts 2011a, x–xi, and 261–4).[4] A number of authors have argued that because these technologies reify racial categories, they will likely disproportionately target racialized minorities (Ahuriri-Driscoll, Tauri, and Veth 2021, 12; Duster 2015, 3–4; Fullwiley 2014, 808–11; ; M'charek 2008 520–1; M'charek, Toom, and Prainsack 2012, e16–17; Dorothy Roberts 2011a, 263–4; Toom et al. 2016, e2). In the US context, legal scholar and bioethicist Osagie Obasogie (2012) proposes that new biotechnologies using race-related categories must complete "race impact assessments" of the benefits of using racial categories while also acknowledging the costs and potential harms of reifying race as legitimate.

ASSEMBLAGES OF CAPTURE

In this book, I use the concept of *assemblages of capture* to understand how Indigenous peoples have been integrated into forensic genetics, an area of research that has been largely overlooked.[5] An assemblage, a term often used in actor network theory and security studies, is a network of organizations oriented towards a particular goal, it is generally hierarchical in structure, and it is governed by various political economies. Assemblages are a useful analytical concept because they avoid the overemphasis on the state that has been typical of international relations and sociology approaches (see, for example, Callon 1986; Dillon 2008).[6] The assemblages in this book are international heterogeneous networks that coordinate a range of human and nonhuman, individual and collective actants (actors), including state police and security agencies and research institutions, all guided by discourses of public security. In these assemblages, scientists use material equipment like DNA analyzers in university or police agency labs to process stored blood samples and derived cell lines from Indigenous peoples and non-Indigenous peoples and in so doing organize the international production of forensic genetics.

These international research and development assemblages exceed the boundaries of involved states, but state institutions retain a decisive role, contrary to some globalization theses. Dean and Villadsen (2016) argue that Foucault and his interpreters have frequently engaged in "state phobia," denying the relevance of the state or otherwise marginalizing it from theory and analysis. They argue against this analytical tendency and instead for the continued importance of the state, which they borrow from Max Weber's *Economy and Society* to define as:

> The primary formal characteristics of the modern state are as follows: It possesses an administrative and legal order subject to change by legislation, to which the organized activities of the administrative staff, which are also controlled by regulations, are oriented. This system of order claims binding authority, not only over the members of the state, the citizens, most of whom have obtained membership by birth, but also to a very large extent over all action taking place in the area of its jurisdiction. It is thus a compulsory organization with a territorial basis. Furthermore, today, the use of force is regarded as legitimate only so far as it is either permitted by the state or prescribed by it. (1978, 56; as quoted in Dean and Villadsen 2016, 20)

Crucially, the state remains ideologically and civil religiously important through nationalism since forensic genetics justifies itself by claiming to serve law and sovereignty. In this view, police manhunts are a legitimate use of force in which police risk and sometimes sacrifice their lives in the protection of the People of the nation and by extension Humanity against internal and external threats, with police killed in the line of duty honoured in various public memorials as sacred dead heroes (Marvin and Ingle 1999, 65 and 72; Anthony Smith 2000).[7]

VIOLENCE WORK

In this book, I draw on recent critical scholarship that conceptualizes the police as armed petty sovereigns acting in the service of the state through violence-backed discretionary and prerogative powers purportedly in pursuit of public security but in reality imposing and maintaining capitalist social relations (Arnold 2007, 3; Neocleous 2021, 21–2; Seigel 2018, 9–10). Based on anthropological studies, including in-depth interviews with Brazilian police officers involved in torture and extrajudicial killings, Huggins, Haritos-Fatouros, and Zimbardo (2002) developed the concept of *violence work* as a form of labour. US historian and social theorist Micol Seigel (2018, 9–10) calls police *violence workers*; they are an immediate everyday manifestation of state sovereignty and they can enact, "the potential violence that is the essence of their power. Yes, the violence of the police is often latent or withheld, but it is functional precisely because it is suspended." I argue that forensic genetic researchers are also violence workers through both their research and development technologies and their participation in investigations and court cases. Their efforts are guided by the express aim of improving the manhunting capacities of police and security agencies. By extension, Indigenous peoples' genetic materials and data (as well as those of non-Indigenous people, such as those in the well-known Twins UK project) become *violence work resources* that scientists use in research and development of manhunting technologies.

This book looks at the scientific cooperation between US, Chinese, and European Union security apparatuses in forensic genetic research and development of ancestry and phenotype genetic marker systems during the 2010s and how they were eventually disrupted from 2019 onwards. The concept of national security apparatuses is useful for long-term geopolitical networks of state institutions, including their personnel and the material infrastructure that is organized through their respective political economies, discourses, values, ideologies, myths,

and histories (Seigel 2018, 21). However, to deal with the larger scale and often short-term networks that make up forensic genetics, I use the concept of assemblages as a more flexible mid-level concept that covers the often global production networks in forensic genetics and genetic research. These assemblages can be short-term, producing, for example, a coauthored study and research paper involving dozens of scientists from many different research institutions and security agencies. They can also be long-term, such as the international biobank the Diversity Project, which has 1,063 cell lines representing about fifty-two populations, including many Indigenous peoples, in a cryogenic storage facility in a Paris suburb and in publicly available genetic databases.

While there is extensive literature on the use of Indigenous peoples in genetic research dating back to the 1990s, including about the Diversity Project, there has been little academic attention given to the use of Indigenous peoples in forensic genetic research and development in the US, the European Union, and the PRC. Indeed, it is only since 2017, with growing international pressure over the increasingly genocidal forced assimilation of the Uyghurs and other Turkic peoples in Xinjiang by the Chinese government, that assemblages of elite scientists at leading research universities and institutes, biotechnology firms, and police and security agencies across the US, the European Union, and China have been subjected to strong public scrutiny; something the research for this book has contributed to (Chang and Fountain 2019; Human Rights Watch 2017; Moreau 2019; Munsterhjelm 2018, 2019; Wee 2019; Wee and Mozur 2019a, 2019b). However, I will also show that such attention has been politically selective; samples from Indigenous peoples taken as long ago as the 1970s and 1980s continue to be used routinely as resources in the research and development of forensic genetics.

THE MANHUNT NARRATIVE

Forensic genetic assemblages are organized around a singular organizing narrative schema about the manhunt. In this regard, the manhunt narrative is performative of how forensic genetics participate in organizing and guiding state violence, including the violence of law and the protection of national sovereignty and public security (Butler and Athanasiou 2013, 20, 89–90). For those who accept the manhunt narrative, the research and development of manhunting technologies as a means of improving public security becomes a sign of moral and ethical merit, a key claim of the foundational epideictic rhetoric (that is, ceremonial rhetoric) that is pervasive in forensic genetics and readily translated by police

and state security agencies as well as the corporate sector. For example, these claims are evident in Verogen's LinkedIn webpage. A spinoff company started by US genetic analysis equipment maker Illumina and biotechnology venture capital firm Telegraph Hill Partners, "Verogen serves those who pursue the truth. It's about advancing next-generation sequencing to help unlock the true potential of forensic genomics. Supporting labs with solutions and expert service purpose-built for the challenges of human identification. And, ultimately, committing to effectively and efficiently ensuring justice, security, and public wellness – for all" (Cage Report 2023; Verogen 2022).

This narrative is also evident in the Human Identification Solutions conferences organized since 2015 by another US scientific equipment maker Thermo Fisher Scientific with titles such as "Increasing Security Solving Crime" (Lackey 2017); "Seeking Answers Solving Crime" (Thermo Fisher 2018b); and "Unite. Together, we find the truth" (Thermo Fisher 2021).[8] Such conferences bring together a range of actors from different institutions, including keynote speakers such as well-known forensic genetic researcher Bruce Budowle, a former FBI Lab senior scientist who is now at the University of North Texas; police forensic expert Wang Le of the Chinese Ministry of Public Security's Institute of Forensic Science; and victims' rights advocate Jayann Sepich, whose daughter was brutally raped and murdered, to extoll the virtues and prospects of these technologies in improving public security (Thermo Fisher 2016; Sepich 2017).[9] In March 2015, Bruce Budowle's (2015a) presentation at the Human Identification Solutions conference in Madrid began with an expression of the foundational mythic quest of forensic genetics: "We all have reasons we do forensic genetics. And of course, the motivations are victims, finding perpetrators, exonerating the innocent, mass disasters, terrorist attacks. All of these things present challenges to society and we have to find ways to help investigate and solve those kinds of problems." Budowle's (2015b) accompanying slide, entitled "The Motivation," featured images of newspaper clippings about crimes as well as exoneration, a thief trying to open a window, school photos of victims, a decaying corpse in a body bag, and one of the planes crashing into the World Trade Center on 9/11, offering a powerful call for justice. This call to action is a persuasive form of epideictic rhetoric that seeks to invoke a sense of common purpose of a shared quest for security, a process that rhetoricians Perelman and Olbrechts-Tyteca (1969, 54–5) termed *communion*.

As Foucault (2003, 89–90) notes, in Thomas Hobbes's *Leviathan*, sovereignty is conceived of as always immanent, tenuous, and contingent,

continuously threatened from within and without by three major enemy or adversarial subjectivities that are manifestations of the state of nature: the criminal, the foreign invader (to which we can add today's terrorist), and Indigenous people. In this immanent Hobbesian view, each of these manifestations constitutes an ongoing threat to sovereignty, highlighting that sovereignty is never final but is rather contingent and tenuous such that security becomes a fundamental guiding principle in governance – and the presence of these figures readily invokes a logic of emergency (Opitz 2010, 93–4; Young 2003 9–10). Just as the "fabricated dialectic between fear of crime and sovereign power saturates U.S. popular culture" (Linnemann and Medley 2021, 67), these enemy subjectivities of the criminal and the terrorist are central to the theories of sovereignty prevalent in the discourses and organizing narratives of forensic genetic technologies. These are not technologies of biopolitical optimization; rather, they are sovereignty enforcement technologies that guide decisions about friends and enemies in the exercise of sovereignty and operate within the overall biopolitics of fear (Debrix and Barder 2009, 400–1).

This biopolitics of fear includes state institutions, but this use of fear extends to entities beyond the state, which encourages "all sorts of public agents/agencies to mobilize the specter of danger, threat, insecurity, and enmity." Reiterating a well-established principle of police, the forensic genetic solution to this fear is better identification technologies (Neocleous 2021). In his 1796 book *The Science of Rights*, German philosopher Johann Gottlieb Fichte advocated the use of personal identification papers, stating that "The chief principle of a well-regulated police is this, that each citizen shall be at all times and places, when it may be necessary, recognised as this or that person. No one must remain unknown to the police" (as quoted in Neocleous 2021, 40). Today, police use a wide range of information and technology to identify, surveil, track, and capture (Neocleous 2021, 40). The political scientist Elspeth Van Veeren (2021, 27) contends that "hunting is a social imaginary … that organises, in profound ways, the social, political and economic through subjects, practices and knowledges, including in relation to security discourses," which have become pervasive since the US government's declaration of the Global War on Terror.

The discourses of post-9/11 security can be analyzed using recent retheorizations of epideictic rhetoric beyond its typical use in civic rituals like funeral orations to show its central role in public discourse. Epideictic rhetoric is one of three forms of rhetoric originally proposed by Aristotle; the other two are forensic rhetoric (accounts of the past) and

deliberative rhetoric (proposed future action). Cynthia Miecznikowski Sheard (1996, 776) argues that epideictic rhetoric (sometimes termed ceremonial rhetoric) is central to such calls to action: "Much contemporary epideictic rhetoric associated with civic rituals, for instance, or even academic ones, takes as its exigency a problem to be solved, a condition to be changed, a cause to be taken up. Such exigencies would seem to make epideictic discourse preliminary to forensic and deliberative discourses and therefore indispensable (rather than inferior) to them." Through the mobilization of fear, epideictic rhetoric is able to call for greater security of the population. The titles and themes of Thermo Fisher's Human Identification Solutions conferences and Budowle's slides and narration are examples of the epideictic rhetoric of forensic genetics' central organizing narrative, a mythic quest in which scientists research and develop technologies that can help reveal the identity of murderers and terrorists and protect the living while exonerating the innocent (Budowle 2015b, 2). Scientists enact a productive subjectivity in which they research and develop technologies to measure and estimate genetic traits at the individual and collective levels to help identify, track, and capture those deemed as threats, criminals, and/or terrorists by interrogating bodies as objects, aggregates of various genetic markers, rather than as persons or citizens (Epstein 2007, 157). These sorting technologies are part of a larger push towards a comprehensive set of biometric measures that interrogate subjects in various ways to identify, distinguish, and control flows of productive and destructive bodies in contemporary capitalism (Dillon 2008, 174–5; Epstein 2007, 154).

Forensic genetic research and development assemblages are built on the underlying rationality that scientific advances in genetic research can improve the security of populations and ensure they remain safe and productive (Munsterhjelm 2015, 303–4). Ideologically, psychologically, and morally, the manhunt narrative schema in forensic genetics invokes a quest to improve security by protecting society from an evil embodied in the figures of the criminal and the terrorist who threaten to disrupt the social order and unleash a state of nature (McQuade 2020, 66–7; Munsterhjelm 2015, 302–4; Neocleous 2015). In this way then forensic genetics supports the idea that the police are the "thin blue line" that defends order against the forces of chaos (Linnemann and Medley 2021, 69; McQuade 2020, 67–8; Neocleous 2000, 110).

The epideictic rhetoric of forensic genetics promises to help police and security agencies reveal the identity of the psychopathic killer, the criminal, the terrorist, the insurgent, and in general the dangerous Other in the service of sovereign and legal order aimed at the biopolitical security

of populations by catching these dangerous Others who hunt and prey on the People.[10] These technologies are organized through a narrative schema of the manhunt, which has them identifying, finding, and capturing, and/or killing those deemed as threats or enemies: "The police is a hunting institution, the state's arm for pursuit, entrusted by it with tracking, arresting, and imprisoning" (Chamayou 2012). While police perform other social regulation functions (e.g., accident response and rescue), their manhunt role is a powerful form of governance enacting the sovereign violence of the state in ordering society and populations along capitalist lines, which in colonial contexts was termed *pacification*; for example, enforcing the property rights of mining or oil and gas corporations on Indigenous territories against Indigenous protests (Crosby and Monaghan 2016, 39–42; Neocleous 2013, 16–18).[11] Hence, state security and police agencies continue to retain crucial power and significance in their exercise of capital-imposing and capital-sustaining violence (Ince 2018).

According to the French philosopher Grégoire Chamayou (2012, 87–98), police manhunts are not a state of exception like martial law (contra Agamben 1998), but rather a central sovereign exercise of violence and governance practice based on police as petty sovereigns exercising discretion by identifying particular individuals and groups as prey to be hunted (du Plessis 2015). Scientists anticipate this police exercise of sovereign power and so enable it when they conduct forensic genetics research, development, and implementation and provide expert testimony at court trials (Bourne, Johnson, and Lisle 2015, 314; Ong 2006, 101). Importantly, scientists' anticipation of how police, security forces, and judiciaries will use these technologies in manhunts to enforce law and sovereignty also makes them agents in such manhunts and legal and sovereign decisions. To understand how manhunt organizing narratives function in forensic genetics, we have to include the laboratory and the research assemblage (Bourne, Johnson, and Lisle 2015, 310–12). Expanding the scope of the assemblage is similar to the ways security studies analyze how the surveillance and immigration assemblages of private and public institutions function in managing flows of people deemed productive and those deemed dangerous (see, for example, Aradau and Van Munster 2007; Bigo 2008; Dillon 2008; Epstein 2007).

In forensic genetics, heterogeneous assemblages of state security agencies cooperate with private corporations (e.g., genetic analysis equipment makers such as Illumina or Thermo Fisher), academic publishers (e.g., Springer Nature), and researchers in scientific research institutions in the name of the People and/or Humanity and based on a shared epideictic

rhetoric. The goal of these international assemblages is to develop technologies that help police and security forces to identify, capture, and/or kill those deemed threats. During the 2010s, these assemblages included state agencies like the FBI, the US Department of Justice, the Chinese Ministry of Public Security, and various European national police agencies while exceeding the state in scope (cf. Bigo 2008, 10–1). The state is understood here as a collection of heterogeneous apparatuses that include personnel, institutions, and agencies, rather than some monolithic black boxed entity, but one that is also still united through shared national myths, regulation, budgeting, legislation, and sovereignty that are crucial to its organizing (Müller 2015, 32).

In response to this organizing quest for justice and protection from unseen terrorists and criminals, forensic genetic researchers impose the productive subjectivity of Indigenous peoples as resources in the production of knowledge from collections of samples gathered in Indigenous communities and cryogenically frozen and carried by air transport to labs in the United States and elsewhere. One of the major centres has been Yale University's Kidd Lab, where scientists infected the accumulated samples with Epstein-Barr virus to create virally transformed cell lines as resources, cryogenically storing and sharing the resulting cell lines and samples, growing cell lines, and extracting DNA from these cultured cell lines for testing, as well as collecting the cell lines of Indigenous peoples contributed by other scientists. In a 2011 grant funding report to the US Department of Justice's National Institute of Justice (NIJ), noted population geneticist Kenneth Kidd explains this property relationship, and his and his colleagues' expertise and experience, through their development of panels of genetic markers called single nucleotide polymorphisms (SNP or "Snips" in genetic parlance): "We justified *our* goals of continuing to develop both IISNP [individual identification SNP] and AISNP [ancestry inference SNP] panels based on *our unique collection* of population samples (Table 4–1), *our* well-equipped molecular laboratory, *our* extensive experience in population genetics, and considerable experience testifying during the early use of DNA in forensics" (Kidd 2011, 23, my emphasis). The repetition of *our* engages the rhetorical technique of anaphora to emphasize the strengths and capacities of Kidd Lab to achieve the goals of their NIJ grant and so serve the state. In pointing to Kidd's "unique collection" in the service of the US security apparatus, Kidd expresses a form of ownership over genetic materials from a number of Indigenous peoples, including the Karitiana and Surui (Kidd et al. 1991; Rohter 2007). Originally sampled for biomedical research on disease susceptibility and stored, grown, and

shared through biobanks like the Diversity Project or Kidd Lab, Kidd and other scientists have for over thirty years made extensive use of the Karitiana's, Surui's, and other Indigenous peoples' genetic materials in the research and development of forensic genetic technologies. Hence, these forensic genetics as manhunting technologies that are intended to help police identify, track, and capture, and/or kill involve their own hierarchies in which Indigenous peoples captured through genetic sampling decades ago continue to serve scientists in perpetuity.

By serving scientists, who themselves claim to be serving the People and/or Humanity, Indigenous peoples can then be understood as also serving the People and/or Humanity. In this way, genetic researchers justify their use of samples from Indigenous peoples as helping society. Analyzing the relationship between whiteness and Indigenous peoples as property in genetic research, Jenny Reardon and Kim TallBear (2012, S242) argue that this research perpetuates long established colonial relations of racial dominance: "In Moore v. Regents of California (1990), the California Supreme Court similarly argued that once tissues leave an individual, the individual does not retain property rights. Although biological anthropologists' and population geneticists' uses and claims about DNA have been allowed, when non-scientists such as tribes or individual research subjects assert claims and the right to control DNA extracted from their bodies, these claims are disallowed." Scientists claim Indigenous peoples are willing donors who provided their samples after informed consent, yet routinely speak of these Indigenous peoples' genetic materials as forms of property.

THE UNIVERSAL NARRATIVE SCHEMA

Kim TallBear (2013, 17) defines so-called Native American DNA as a "material-semiotic object with power to influence indigenous livelihoods and sovereignties, and genetic scientists and entrepreneurs as frontline agents in the constitution of that object." This set of power relations involves the coproduction of scientists as scientists and Indigenous peoples as their objects of research, as "scientists observe the movement of particular nucleotides via human bodies across time and space (between what is today Siberia/Asia and the Americas). The presence of such markers is then used to animate particular 'populations' and individuals and their tissues (both dead and living) as belonging to that identity category" (12). In this way, through the metonymy of genetics in which genetics are fundamental forms of individual and collective ancestral identity, scientists are able to represent Indigenous peoples in a scope

that stretches from the present back to ancient prehistoric migrations (Munsterhjelm 2014, 5–7; Reardon and TallBear 2012, 237; TallBear 2013, 13). Scientists coproduce themselves as scientists by imposing and using this subjectivity of Indigenous peoples as property and resources. The genetic research and forensic genetic research papers analyzed in this book involve the performance of a hierarchy between privileged Western and Chinese scientists and Indigenous peoples, including the Karitiana, Surui, and Uyghurs, among others, who function as resources and objects of exchange in the production of genetic knowledge.

To analyze how scientists hierarchically coproduce themselves along with Indigenous peoples as objects and resources of their research, I will make use of organizational communications theorist Francois Cooren and his colleagues reinterpretation of the universal narrative schema initially developed by A.J. Greimas of the Paris School of Semiotics (see figure I.1).[12] Greimas posited that narratives can be broken down into a particular sequence of phases, each with their respective set of actant positions: *sender* and *receiver*, *subject* and *object*, or *helper* and *opponent* (Cooren 2000, 71–4). A single actor can have a range of these actant positions within a given narrative (72). For example, an opponent in the early stages of a film can be transformed into a loyal ally in the later stages while a helper in the early stages may later commit treason and become an opponent (Callon 1986, 219–21; Cooren 2000, 187, 194).

A major distinction in Francois Cooren's (2000) reinterpretation and synthesis of Greimas's narrative schema, actor network theory, and speech act theory is what Cooren terms the *organizing property of communication*; that is, the emphasis placed upon the hierarchical organizing aspects of these narratives. This hierarchical organizing contrasts with the more flatland networks that Michel Callon and Bruno Latour often engage with (Cooren 2000, 188–9). In particular, Cooren argues that each of the involved actors can translate the organizing narratives as they see fit. For example, an employee might view a job as a source of income, whereas the employer will view the employee as fulfilling a particular role in the organization; however, regardless of their interpretations, by doing their job the employee submits to the employer's dominant organizing narrative (192–3).

Cooren's reinterpretation of Greimas's narrative schema includes a series of five phases that can be used to analyze narratives. A crucial aspect of the narrative schema is that it helps us see the narrative as structured from beginning to end as a hierarchically organized series of steps by involved subjects (e.g., scientists) that lead to the accomplishment or failure of the overall quest for scientific knowledge (Cooren

2000, 189–90). The following framework is based on Cooren and Fairhurst (2004, 798–800) and Cooren (2000, 71–3) but I have adapted their model to forensic genetic articles, which is illustrated in figure I.1.

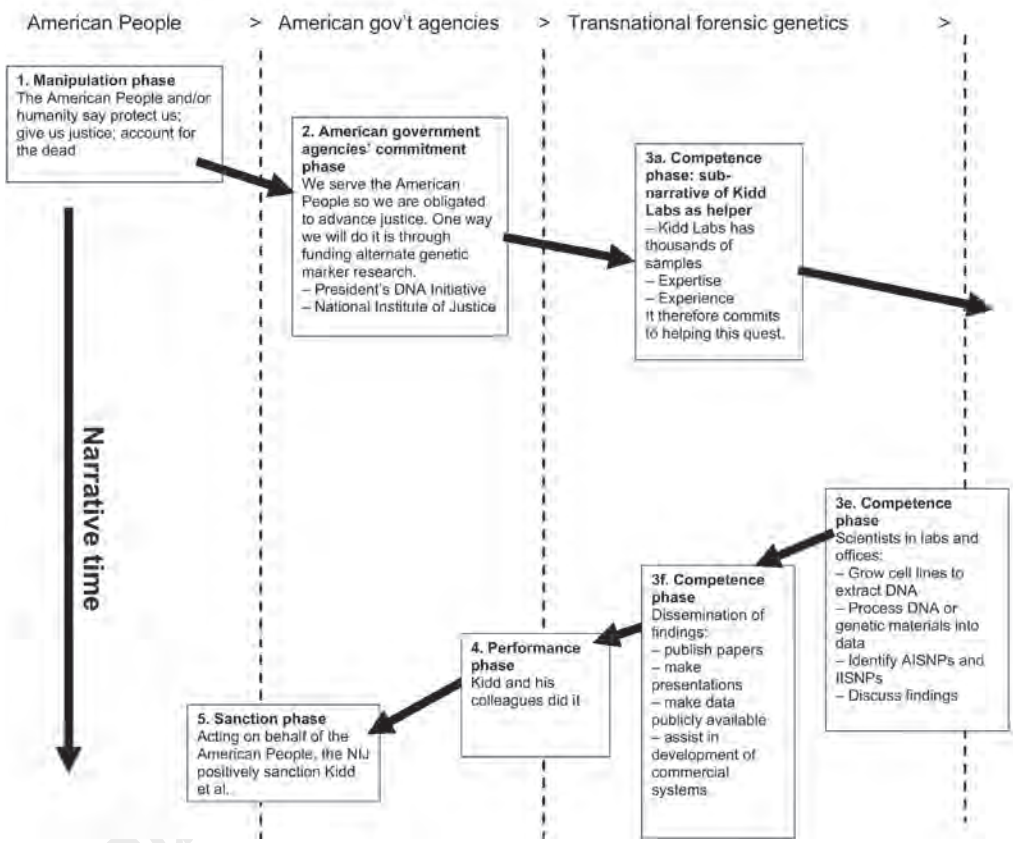
Manipulation phase: In this initial phase, a *sender* defines the problem or imbalance that must be dealt with. The *sender* may be human, but can also be a nonhuman or macroactor such as humanity or scientific knowledge. In this initial phase, the *sender* gives a quest to the *receiver,* an exchange that creates an overall modality, or condition, of *having-to-do*. The main quest in forensic genetic articles is for technologies that help reveal the identity of the criminal, terrorist, and/or insurgent because their anonymity allows them to be threats to social and legal order. The manipulation phase is similar to Foucault's problematization in that it defines a problem to be solved ethically and ontologically through the use of epideictic rhetoric (Osborne 2003). This process also defines both the subject and the object of the quest, because one cannot exist without the other (Cooren and Taylor 2006, 120–1; Munsterhjelm 2014, 37).[13] In forensic genetics, researchers use Indigenous peoples' genetic materials as their objects of research.

Commitment phase: If genetic researchers accept and so submit to the quest sent to them by Humanity, Science, and/or the People, they are transformed into *receiver-subjects* who have a fiduciary duty to see the quest through (though they could instead reject the quest). This submission to science involves significant moral and ethical claims and so creates a modality of *wanting-to-do*. In forensic genetics, scientists have expertise and knowledge and so they accept the quest and the moral obligation (fiduciary duty) to serve in the quest for knowledge that helps in investigations. This duty is evident in Bruce Budowle's (2015b) commentary and slide entitled "The Motivation" discussed above.

Competence phase: This phase makes up most of the narrative and provides an account of the steps through which the research was completed. It can be analyzed as a series of subnarratives embedded within the overall narrative, like scenes in a movie, in which the *receiver-subject* gains helpers and overcomes obstacles and opponents (or not). In these subnarratives, the *receiver-subject* demonstrates the modalities of *knowing-how-to-do* and *being-able-to-do*. In forensic genetic articles, the researchers engage in a series of subnarratives that explain their methodology and how the samples were obtained (generally stating informed consent was obtained), outline how they processed the samples and conducted their statistical analysis, and finally discuss their findings' significance to the field.

Performance phase: In this phase, the *receiver-subjects* succeed or fail in their quest. This phase involves the modality of *to-do*.

Kidd's translation of the US security organizing narrative schema: embedded hierarchy of organizing narratives and actant time-spaces



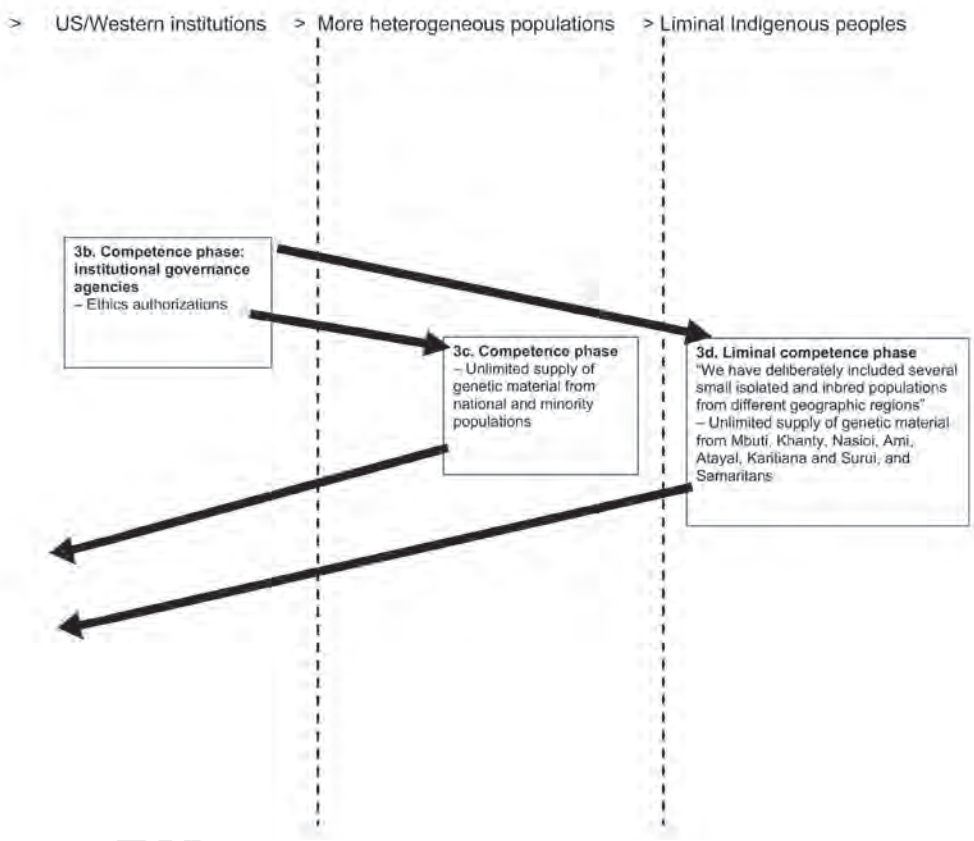


Figure I.1 | Exceeding the State: This diagram shows how Kidd Lab submits to the National Institute of Justice's quest for justice narrative schema by organizing a hierarchy of time-spaces, including state agencies, into a transnational assemblage. This assemblage uses Indigenous peoples to produce forensic genetic research to develop panels of AISNP and IISNP markers.

Sanction phase: In this final phase, the *senders* of the quest or their representatives (e.g., scientific journal editors) positively or negatively sanction the *receiver-subjects* based on the *receiver-subjects'* success or failure. This involves an *evaluative modality*. For forensic genetic articles, publication is a sign of positive sanction; the article has passed the peer review process and been published by international journals, which are distributed through corporate owned databases like Springer Nature.

As we will see in the remainder of the book, this model provides a systematic way to analyze research articles, funding reports, patents, and media accounts of how various actants, human and nonhuman, individual and collective, organize across time and space in the production of scientific knowledge. It also provides a way to analyze how robust these research assemblages are and whether external criticism and political pressure can destabilize them (which I do in chapter 11).

In the above mapping of the organizing narrative schema for Kidd Lab, the objective of the research is the quest for genetic knowledge to help investigations. This genetic research article links and hierarchically orders a set of events involving different actants in their respective time-spaces into a seemingly coherent account of how the involved researchers carried out their project. This sequence and importantly the hierarchy of submission among the actants within their respective time-spaces can be mapped and visualized (figure I.1). At the bottom of this hierarchy are Indigenous peoples, who are constructed as having submitted to the scientists, who in turn have submitted to the US People and/or Humanity and are acting on their behalf. These organizing narratives use persuasion to create an attractive passage point (cf. Callon 1986, 205–6) that involves "An *articulation* – that amounts to associating any two or more projects by finding any common point – can create a *translation* – that consists in establishing the equivalencies between these different projects – resulting in *identification*; that is, the fact that these diverse projects are now united, while each actor keeps his, her, or its own agenda" (Cooren and Taylor 2000, 185, emphasis in original). Through this shared attractive passage point, ethics review panels gave permission to the scientists, security and science agencies gave funding, Indigenous communities gave samples, and scientists processed cell lines. This narrative sequence of events form a coherent whole, a story about how the scientists conducted their research project and produced new findings that will help improve security (Cooren 2000, 189). In the organizing narratives of genetic research assemblages, scientists constitute themselves as heroic receiver-subjects of the quest by constituting

Indigenous peoples genetics as material-semiotic objects that are transformed as scientists process Indigenous peoples across disparate forms of time-space in an instance of coproduction (Munsterhjelm 2014, 51; TallBear 2013, 11–12, 17, 70–1). This circuit of production involves a series of translations that hierarchically organizes and articulates the sequence of events in different time-spaces involving different actants into a narrative form and so into a coherent whole.

There have been extensive debates over the validity of racial categories in genetic research, but it has been argued this leads to an analytical impasse that fails to address the pervasiveness and utility of racial concepts in forensic genetics (Ossorio and Duster 2005, 115–16; St Louis 2021, 209). Rather, building on Chun (2009), sociologist Brett St Louis (2021) contends, "the logical incoherence and negligible bio-materiality of race has not stymied its conventional meaning or functionality. Therefore, a central question arising regarding race as a technology is not what race is, but what does race do?" (St Louis 2021, 209). Anthropologist Duana Fullwiley (2015, 36) critiques the use of race in genetic technologies: "Race is a sorting schema that is rarely neutral. It permits people to be classed, judged, included, excluded, normalized, pathologized and, at the extreme, killed." Fullwiley analyzes biomedical and forensic genetic research and development and contends that "when technologies are born of race sorting logics, then the resultant race problems and their proposed solutions contain the same disturbing seed elements" (37).

In this book, I conceptualize this race sorting logic. This selectively draws on the extensive retheorization of synecdoche and metonymy since the 1950s (Bierwiaczonek 2020, 225–9; Nerlich and Clarke 1999, 198–201; Wachowski 2019, 54–73). These provide a useful set of conceptual tools for understanding the ways racial/ethnic categories are fundamental to forensic genetic research. Linguists Brigitte Nerlich and David Clarke (1999, 201) define the differences between metonymy and synecdoche: "To summarise, one can therefore say that metonymy is based on qualitative, synecdoche on quantitative relations, that is on set-inclusion. Metonymy is based on our world-knowledge about space and time, cause and effect, part and whole, whereas synecdoche is based on our taxonomic or categorical knowledge. Metonymy exploits our knowledge of how the world is, synecdoche of how it is ordered in our mind." Linguist Ken-ichi Seto (1999, 92) contends that synecdoche involves a conceptual transfer of meaning "between a more comprehensive category and a less comprehensive one." Synecdoche involves the use of taxonomies, in which "genus–species relations, based on set-inclusion,

are quantitative, i.e., they involve classes of entities which differ in the number of their members, whereby the smaller class is included in the bigger class" (Bierwiaczonek 2020, 226). In this taxonomy:

> Racial Category (biogeographic continental like "Native American")
> Population (e.g., seventy-four donors represent the Karitiana)
> Individual Donors (e.g., Karitiana members sampled in 1987)

The way this taxonomic hierarchy works in genetic research papers is consistent with linguist Wojciech Wachowski's (2019, 63–7) view that moving back and forth between higher level (superordinate or genus) categories, like Native American, to subcategories or species like Karitiana, which involves shifts from more inclusive to less inclusive categories, all involve synecdochical transfers of meaning, not metonymy. Therefore, in forensic genetic research articles, synecdoche as genus-species (in a taxonomic, not biological, sense) relations defines the categories of racial/ethnic taxonomies like Native American as genus that include smaller classes such as Karitiana, Surui, and Ticuna peoples as species.

Metonymy is distinct from synecdoche because, according to linguist Bogusław Bierwiaczonek (2020, 226), metonymy involves "part–whole relations, as other relations based on contiguity, [that] are essentially qualitative, i.e., they involve associated entities or concepts which are of different kinds" in which meaning is transferred from one kind to another. In forensic genetic articles, these metonymic transfers between different types of entities are evident in the seemingly contiguous or continuous relationships between donors and their blood samples, which are virally transformed into cell lines that are grown in labs then processed into DNA extract and then run through genetic analyzers or sequencers to create genetic data that is considered representative of those donors in a type of part-of (partonomy) relation. This series of transformations from donor to genetic data involves a series of metonymic transfers that form a *metonymic chain* in that the genetic data represents a donor.

Within these narratively organized assemblages, concepts of genes, genetics, DNA, and the human genome all function as objects of exchange (what Star and Griesemer [1989] call *boundary objects*) that are flexible conceptually and can be translated readily to mean and signify different things to different institutional and individual actors across time and space (Munsterhjelm 2014, 33–5; Shea 2008, 514–15; Star and Griesemer 1989). As material semiotic objects of exchange, Indigenous peoples' genetics are plastic and able to metonymically retain traces of agency as they are processed from cell lines to DNA extract to data and

circulated across and so connect the disparate time-spaces (Cooren and Taylor 1997, 247; Latour 1987, 161; Munsterhjelm 2014, 33–4, 2015; Star and Griesemer 1989, 393; TallBear 2013, 17). However, they retain sufficient rigidity to still be considered real representatives of whatever they signify; in this case, genetic samples, cell lines, and data are accepted as representative of Indigenous peoples (Munsterhjelm 2014, 74–5).

Drawing on Bierwiaczonek's concept of synecdochic metonymy (2020, 228–34), this representation relies on synecdoche in its categorization and then metonymy of genetics in which genetic materials and data stand in for and provide access to Indigenous peoples, including the dead, living, and unborn, something popularized in many TV documentaries, such as has been done by genetic anthropologist Spencer Wells in the PBS Nova series *The Journey of Man* (Littlemore 2015, 9; Munsterhjelm 2014, 5, 41; Reardon and TallBear 2012). This linking together and articulation or organizing of the various stages of the research article narrative relies upon a chain of metonymy that begins with scientists taking blood samples from Indigenous peoples in their villages (Brdar 2015, 86–9). This chain of synecdochic defined metonymy will be explained in detail in the next chapter but can be summarized as:

1 Donors FOR Indigenous people
2 Blood samples FOR donors
3 Cell lines grown from blood samples FOR blood samples
4 DNA extract FOR cell lines
5 Data FOR DNA extract
6 Findings FOR Data (Brdar 2015; Denroche 2015, 120–4; Radden and Kövecses 1999, 31, 41–2).[14]

Synecdoche is involved in the racial categorization of Indigenous peoples, and the genetic materials and data representing them as metonymic chains across time and space have been fundamental to the production of considerable forensic genetic knowledge. However, as we will see, these chains are vulnerable when challenged as immoral and unjust by sufficiently strong external assemblages (see table I.1 for a summary of the forensic genetic narrative schema).

According to Bierwiaczonek (2020, 229) in analyzing synecdochic metonymy, which he terms syntonymy, "we should distinguish two kinds of synecdoche, namely, the specializing genus for species synecdoche proper (more traditionally known as specialization) and the generalizing species for genus syntonymy (traditionally known as generalization)." In the organizing narrative schema of forensic genetics,

Table I.1 | Summary of forensic genetic narrative schema

Schematic phase	*Modality*	*Form of rhetoric*	*Synecdochic and synecdochic metonymic transfers*
Manipulation Science is the sender that gives quest	Having-to-do	Epideictic rhetoric	Synecdoche of racial categories (genus) e.g., European, Native American, African East Asian, Eurasian, Oceania TO
Commitment Scientists as receiver-subjects accept their quest Receiver-subjects define how they complete quest creating fiduciary contract	Wanting-to-do	Epideictic rhetoric Deliberative rhetoric (future plan)	Synecdoche of specific populations (species) e.g., Karitiana, Surui, Uyghur, Nasioi TO
Competence	Knowing-how-to-do Being-able-to-do	Forensic rhetoric (account of past events)	Synecdochic defined metonymic chains e.g., Karitiana data FOR DNA extract FOR cell lines FOR blood samples FOR donors TO
Performance	To do	Epideictic rhetoric	Synecdoche of racial categories (genus)
Sanction	Evaluation and acknowledgment of what has been done	Epideictic rhetoric	Synecdoche of racial categories (genus)

Source: Based in part on Cooren and Fairhurst (2004, 802), Fairhurst (2007, 34), and Munsterhjelm (2014, 70–1).

Syllogism	*Predominant form of time-space (others forms have implied presence)*
(Deductive: universal to local or specific project) Universal premise: "Science must study genetics to learn about genetic diversity and/or racial categories to create AISNP or PISNP panels to help police a nd security forces to hunt down criminals and/or terrorists"	– Transnational science
Local particular premise: "We are scientists and we want to study genetic diversity to create AISNP or PISNP panels to help hunt criminals and/or terrorists." Local premise: "Indigenous peoples and/or non-Indigenous peoples can be studied for genetic diversity and/or racial categories to create AISNP or PISNP panels" Conclusion: "We scientists will study them"	– e.g., Brazil, USA, European Union, China, etc.
(Inductive: local or specific project to the universal) Local premise: "We received authorizations." Local premise: "We enroled and sampled Indigenous and/or non-Indigenous peoples" Local premise: "We variously tested Indigenous and/or non-Indigenous peoples' samples, cell lines, DNA extract, and/or data." Local premise: "We found the following results about AISNPs or PISNPs" Local premise: "We discuss our results in relation to, and thereby associate our results with, established knowledge about genetic diversity and/or racial categories to improve AISNPs or PISNPs."	– Settler state institutions – Indigenous and non-Indigenous territories – Laboratories – Transnational science
Universal premise: "We have contributed to scientific knowledge about genetic diversity and/or racial categories to improve AISNPs or PISNPs manhunting technologies"	– Transnational science
Universal conclusion: Peer reviewers say, "You have contributed to scientific knowledge about genetic diversity and/or racial categories to improve AISNPs or PISNPs"	– Transnational science

synecdochic transfers between different taxonomic levels are crucial in forensic genetics in the initial deductive transfers from the manipulation phase TO the commitment phase, which involves moving from the universal space of forensic genetic discourses and knowledge to the specific projects of the authors. Then a series of inductive synecdochic metonymic transfers articulate the competence phase, performance phase, and sanction phase. These transfers move from the specific project contexts of the materials and methods section in which Indigenous and non-Indigenous donors are enroled in their local communities through to the authors claiming that they have contributed to universal scientific knowledge about ancestry and phenotype related SNPs and other types of markers, which is positively sanctioned by the journal publishing their article.

SCOPE OF THE BOOK AND OUTLINE

This book is not a survey of the entire field of forensic genetics. It utilizes a case study and multimodal approach to examine the first research assemblages to emerge around Yale University's Kidd Lab, as well as related assemblages, including the Human Genome Diversity Project, that engaged in early diversity collection efforts by leading scientists, including Kenneth Kidd of Yale University and Lucas L. Cavalli-Sforza of Stanford University, targeting various Indigenous peoples. It then considers how defence counsels co-opted some of these Indigenous peoples' genetic data into the US and Canadian courts during the early 1990s, and their subsequent integration as diversity resources in the post 9/11 research and development of individual identification and ancestry inference panels. It then considers influential scientists' research on phenotype (external appearance like eye colour and hair shape) inference SNP marker technologies in the US, the European Union, and China and the destabilization and reconfiguration of these assemblages using Uyghur and other Turkic peoples. Readers may find the semiotic narrative analysis of forensic genetic articles technical at times, but my intention is to both introduce these technologies and empirically show how these assemblages of research use genetic materials captured from Indigenous peoples as violence research and development resources. Genetic research involving Indigenous peoples has long been shaped by Indigenous resistance and activism (Barker 2004; Harry 2009; Munsterhjelm 2014, 49–51; Reardon and TallBear 2012). The derailment of the Diversity Project in the late 1990s finds its contemporary in the discrediting of Kidd's cooperation with the Chinese Ministry of Public Security and other such projects in the present.

The book is organized as follows. Chapter 1 traces out the conquest and colonization of the Western Amazon region by the genocidal Brazilian settler state from the 1960s through to the 1980s as a context under which US and Brazilian scientists sampled the Ticuna in 1976 and the Karitiana and Surui in 1987. I then analyze a 1991 paper by Kenneth Kidd, Judith Kidd, and other prominent researchers as an account of how assemblages of capture function as the means through which scientists enrolled the Karitiana, Surui, and Maya Indigenous peoples into a state of servitude within global genetic research and development assemblages. Chapter 2 then deals with how, during the "DNA Wars" of the early 1990s over the introduction of forensic genetic test evidence, defence counsels appropriated Kidd et al.'s Karitiana, Surui, and Maya data. The data then circulated among defence counsels, who used it for over a decade in US and Canadian courts as evidence of significant group differences in genetic marker frequencies to try to undermine prosecution's use of forensic genetic tests that matched suspects to crime scenes.

There are significant distinctions in forensic genetics before and after the 11 September 2001 attacks. The 9/11 bombings' identification problems and expansion of security state–related biometric research led to calls for the expansion of forensic genetic testing to include ancestry and phenotype. Chapter 3 shows that after 9/11, Kenneth Kidd and other major researchers integrated these Indigenous peoples into various long-term forensic genetic research projects on individual identification SNP, ancestry informative SNPs, and phenotype informative SNPs. The individual identification SNP and ancestry marker panel were integrated into the Illumina FGx forensic genetic sequencer system. This system was tested by Bruce Budowle and his colleagues in a paper on samples taken from the Yavapai Indigenous people of central Arizona before the 1990s, likely by the US National Health Service. This testing was part of the validation process of the new system, done in part with US NIJ funding. Chapter 4 provides a critical introduction to Chinese settler colonialism in Xinjiang in Northwest China, then covers how Kenneth Kidd and Bruce Budowle's cooperation and sharing of DNA extracts with scientists from the Chinese Ministry of Public Security's Institute of Forensic Science (also referred to as the Material or Physical Evidence Identification Centre) in Beijing helped develop a twenty-seven SNP ancestry panel intended to differentiate Han Chinese from Uyghurs and other Indigenous groups. Chapter 5 then analyzes how involved Institute of Forensic Science researchers utilized this research cooperation as part of a series of ancestry-related genetics Chinese patent filings

that seek to differentiate Han Chinese from Uyghurs and Tibetans and other Indigenous peoples in China.

The second segment of the book shifts to an analysis of European-Chinese cooperation in the development of phenotype inference SNP genetic markers. Chapter 6 considers European Union–centred assemblages of the Visible Genetic Traits (VisiGen) Consortium and an interlocking series of projects including the Twins UK, the Rotterdam Study, and the Queensland Institute of Medical Research in Australia. Chapter 7 offers the case study of the early development of forensic genetic phenotyping involving Uyghurs and Han Chinese by researchers at the Chinese Academy of Sciences-Max Planck Society Partner Institute of Computational Biology in Shanghai. Chapter 8 shows how the VisiGen Consortium cooperated with the Beijing Institute of Genomics (BIG) and Partner Institute of Computational Biology in Shanghai in a series of four papers on appearance-related genetic phenotyping involving tens of thousands of research subjects from Latin America, Europe, Australia, the US, and China, including over seven hundred Uyghurs. These articles were published between December 2017 and November 2019, during the PRC's escalating repression of the Uyghurs and other Indigenous peoples in Xinjiang.

Chapter 9 analyzes PRC government planning documents and journal articles to show how phenotyping has been integrated into a biometric suite of security technologies under the government's 13th Five-Year Plan (2016–2020). It shows how the researchers at BIG and the Partner Institute of Computational Biology in turn began research cooperation with the Institute of Forensic Science in 2014–15. In Chapter 10, we see how this cooperation culminated in a series of papers published between 2017 and 2019 involving a new project that sampled over seven hundred Uyghurs from Tumxuk in the south of Xinjiang. Chapter 11 is about how the Uyghur diaspora, activist academics, human rights organizations, media outlets, and eventually the US government destabilized the Institute of Forensic Science research assemblages studying ancestry inference with Kenneth Kidd and those cooperating with the European Union's VisiGen phenotype inference SNP markers. It shows how international forensic genetic networks have been disrupted by growing international criticism of PRC repression in Xinjiang and by the ongoing and escalating political economic conflicts between the US, the European Union, and China, three of the world's largest economies and military/police security apparatuses. However, despite the disruptions with regard to using Uyghurs and other Turkic Indigenous peoples from Xinjiang, all three apparatuses continue to use Indigenous peoples as productive resources in forensic genetics.