UNC SCHOOL OF LAW

NORTH CAROLINA JOURNAL OF LAW & TECHNOLOGY

Volume 11
Issue 1 *Fall 2009*

Article 4

10-1-2009

Just the Facts, Ma'am: Removing Drama from DNA Dragnets

Jennifer K. Wagner

NORTH CAROLINA JOURNAL OF LAW & TECHNOLOGY
VOLUME 11, ISSUE 1: FALL 2009

JUST THE FACTS, MA'AM: REMOVING THE DRAMA FROM DNA DRAGNETS

Jennifer K. Wagner[1]

Law enforcement is increasingly turning to "genetic witnesses" to solve crimes. The incorporation of genetic technologies like DNA ancestry tests and indirect molecular photofitting has drawn criticism as high-tech "racial profiling." In cases where law enforcement has requested voluntary DNA samples to assist with criminal investigations, critics have quickly labeled the conduct "DNA dragnets." To facilitate a constructive debate over whether and how law enforcement uses these genetic technologies, the loaded language is removed and the legal framework and scientific technologies are examined.

I. INTRODUCTION

Current discussions on the criminal law implications of deoxyribonucleic acid ("DNA") ancestry technologies are fraught with loaded language and patent political agendas.[2] When scholars

[1] J.D., Ph.D. candidate at The Pennsylvania State University. The author would like to acknowledge David Kaye and Anne Buchanan for reviewing previous versions of this manuscript and acknowledge Ken Weiss, Nina Jablonski, Mark Shriver, Chloe Silverman, and Jonathan Marks for their unwavering support and constructive criticism of the author's research.

[2] *See, e.g.*, MICHAEL BOYLAN, CENTER FOR AMERICAN PROGRESS, RACIAL PROFILING AND GENETIC PRIVACY: DEFINING THE PARAMETERS IN CRIMINAL CASES (2008), http://zedc3test.techprogress.org/issues/2008/03/pdf/racial_profiling.pdf; Duana Fullwiley, *Can DNA 'Witness' Race?: Forensic Uses of an Imperfect Ancestry Testing Technology*, GENEWATCH, 21(3–4) (2008); TANIA SIMONCELLI & SHELDON KRIMSKY, AMERICAN CONSTITUTION SOCIETY FOR LAW AND POLICY, A NEW ERA OF DNA COLLECTIONS: AT WHAT COST TO CIVIL LIBERTIES? (2007), *available at* http://www.councilforresponsiblegenetics.org/page Documents/PG6T8WPI4A.pdf; Troy Duster, *DNA Dragnets and Race: Larger Social Context, History, and Future.* 21 GENEWATCH (SPECIAL ISSUE) 3, 3–5 (2008), *available at* http://www.councilforresponsiblegenetics.org/page Documents/AJWLK7M1AV.pdf; Sepideh Esmaili, Note, *Searching for a Needle in a Haystack: The Constitutionality of Police DNA Dragnets*, 82

frame the debate as a matter of the legality of "DNA dragnets" or "racial profiling," they effectively stifle any legitimate intellectual arguments relevant to law enforcement's use of DNA technologies that are vital to a democratic society. As United States President Barack Obama recently acknowledged, American society thrives on "free and open inquiry;"[3] yet distortions of the science or the law—intentionally or otherwise—push the discussion down treacherous and unnecessarily divisive tangents. Debating the constitutional merits of non-testamentary identification orders, routinization of DNA sampling upon arrest, and the appropriateness of forensic applications of DNA ancestry testing and indirect molecular photofitting in criminal investigations requires not only a "free and open inquiry" but also a nuanced understanding of genetics and law.

The following discussion first provides an introduction to the relevant legal context of criminal procedure. Because the technologies discussed here (DNA ancestry testing and indirect molecular photofitting) are not intended to serve as accusatory evidence against a defendant,[4] but rather as investigative tools to identify criminal suspects, the legal discussion is properly focused on the investigatory phase prior to any arrest or prosecution. Second, an introduction to the scientific method and theory of DNA ancestry testing and indirect molecular photofitting is provided. Third, law enforcement's application of DNA ancestry

---

CHI-KENT L. REV 495 (2007); Fred W. Drobner, Comment, *DNA Dragnets: Constitutional Aspects of Mass DNA Identification Testing*, 28 CAP. U. L. REV. 479 (2000).

[3] United States President Barack Obama, Remarks by the President at the National Academy of Sciences Annual Meeting (Apr. 27, 2009), *available at* http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-at-the-National-Academy-of-Sciences-Annual-Meeting/ ("Our progress as a nation—and our values as a nation—are rooted in free and open inquiry. To undermine scientific integrity is to undermine our democracy. It is contrary to our way of life.").

[4] While DNA fingerprinting is discussed in Part III.A and DNA fingerprinting is intended to be accusatory evidence introduced during criminal prosecutions, the constitutionality of DNA sampling as an arrest booking procedure is outside the scope of this article. For a thorough discussion on the topic, *see* D.H. Kaye, *Who Needs Special Needs? On the Constitutionality of Collecting DNA and Other Biometric Data from Arrestees*, 34 J.L. MED. & ETHICS 188 (2006).

testing and indirect molecular photofitting is analyzed within the parameters of the Fourth Amendment. Finally, some concluding remarks provide consideration about whether the use of DNA ancestry testing and indirect molecular photofitting by law enforcement is ethically justifiable, legally valid, or socially sensible.

II. SEARCH AND SEIZURE

In order for a police practice to be valid, it not only must conform to the baseline of protections provided by the United States Constitution, but it also must conform to state constitutional protections and statutory provisions. The following discussion first explores federal search and seizure jurisprudence[5] and subsequently examines a sample of state search and seizure laws. Non-testimonial identification orders ("NIOs"), which are court orders based on a level of suspicion lower than probable cause and compel individuals to provide identification evidence to law enforcement, will also be examined, as well as other basic methods for collecting DNA samples.

A. *Federal Constitutional Requirements*

The Fourth Amendment[6] provides that:

> The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.[7]

Whether a search and seizure conforms to the requirements of the Fourth Amendment requires a two-pronged inquiry into the appropriateness of "the 'seizure' of the 'person' necessary to bring him into contact with the government agents, and the subsequent

---

[5] The possibility, albeit unlikely in light of relevant common law, that non-testimonial orders implicate the Fifth Amendment is outside the scope of this discussion and is left for other scholars to address.

[6] The Fourth Amendment is applicable to the states via the Fourteenth Amendment. *See* Schneckloth v. Bustamonte, 412 U.S. 218, 248–49 (1973).

[7] U.S. CONST. amend. IV.

search for and seizure of the evidence."[8] Each prong of that inquiry will be discussed here.

1. *The Seizure of the Person*

Not every encounter between the police and the public is a seizure under the Fourth Amendment. Police interactions with the public can be categorized as three basic types: mere encounters, investigatory stops, and custodial stops.[9] The first—"the mere encounter"—does not implicate the Fourth Amendment.[10] Police officers, for example, do not violate the Fourth Amendment when they ask questions of individuals who are willing to listen.[11] However, the Fourth Amendment is implicated by both the investigatory stop and the accusatory (or custodial) detention.[12] DNA ancestry testing and indirect molecular photofitting are tools with limited capabilities,[13] and, as such, are useful to law enforcement during the investigatory but not the accusatory phase of criminal procedure.[14] Thus, the remaining discussion focuses on

---

[8] United States v. Dionisio, 410 U.S. 1, 8 (1973) (internal citations omitted). *See also* Terry v. Ohio, 392 U.S. 1, 19–20 (1969) ("And in determining whether the seizure and search were 'unreasonable' our inquiry is a dual one—whether the officer's action was justified at its inception, and whether it was reasonably related in scope to the circumstances which justified the inference in the first place.").

[9] *See, e.g.*, Commonwealth v. Chase, 960 A.2d 108, 117 (Pa. 2008); State v. Harrell, 312 S.E.2d 230, 234 (N.C. Ct. App. 1984) (citing State v. Sugg, 300 S.E.2d 248 (N.C. Ct. App. 1983) (explaining the three types of police encounters described in *Terry*)).

[10] *E.g.*, Florida v. Bostick, 501 U.S. 429, 434 (1991); California v. Hodari D., 499 U.S. 621, 628, (1991); *Terry*, 392 U.S. at 19, n.16.

[11] *See* United States v. Drayton, 536 U.S. 194, 195 (2002).

[12] *See Terry*, 392 U.S. at 20 ("We therefore reject the notion that the Fourth Amendment does not come into play at all as a limitation upon police conduct if the officers stop short of something called a 'technical arrest' or a 'full-blown search.' ").

[13] These techniques function together to provide predictions about individuals (i.e. possible surnames and physical traits) based on statistical correlations that the traits have with the genetic information tested and categorized on a population level. Unlike DNA fingerprinting, these techniques do not provide uniquely identifying genetic information or an individual's unique genetic profile.

[14] *See infra* Part III. The technology assists law enforcement in the identification of a suspect but does not have any direct utility for prosecuting a

the constitutional requirements during the search for a suspect in a criminal investigation.

The Supreme Court has addressed when police conduct crosses the line between a mere encounter to an investigatory stop, subject to limitations and requirements of the Fourth Amendment. In *Florida v. Bostick*, the Court stated:

> [A] seizure does not occur simply because a police officer approaches an individual and asks a few questions .... Only when the officer, by means of physical force or show of authority, has in some way restrained the liberty of a citizen may we conclude that a 'seizure' has occurred.[15]

Police may, for example, ask to examine an individual's identification "even when officers have no basis for suspecting a particular individual" of any wrongdoing.[16] An individual may refuse to answer questions posed by the police, and it is well-established that an individual's refusal to cooperate alone is not a sufficient basis to justify seizure.[17] Whether a mere encounter or an investigatory stop has occurred is determined by both considering all of the circumstances and inquiring if "the police conduct would have communicated to a reasonable person that the person was not free to decline the officers' requests or otherwise terminate the encounter."[18] Furthermore, it must be noted that "the potential intrusiveness of the officers' conduct must be judged from the viewpoint of an innocent person" in that position.[19]

---

defendant. The technology provides law enforcement with information with which they may seek to compel a DNA sample for direct comparison with a forensic sample. Only upon a valid DNA fingerprint matching the suspect to the crime scene would law enforcement have probable cause to arrest.

[15] *Bostick*, 501 U.S. at 434 (internal citations omitted).

[16] *Id.* at 435 (citing INS v. Delgado, 466 U.S. 210, 216 (1984)).

[17] *Id.* at 437 (citing a line of cases as early as Brown v. Texas, 443 U.S. 47, 52–53 (1979)).

[18] *Id.* at 438.

[19] Florida v. Royer, 460 U.S. 491, 519, n.4 (1983) (Blackmun, J., dissenting) (citing United States v. Wylie, 569 F.2d 62, 68 (1977). *See also Bostick*, 501 U.S. at 438 (relying on Blackmun's dissent in *Royer*).

The Court has explained that investigative stops, when reasonable, do not violate the Fourth Amendment, stating that:[20]

> The reasonableness of a stop turns on the facts and circumstances of each case. In particular, the Court has emphasized (i) the public interest served by the seizure, (ii) the nature and scope of the intrusion, and (iii) the objective facts upon which the law enforcement officer relied in light of his knowledge and expertise.[21]

In determining reasonableness, the Court has acknowledged that "there is no ready test,"[22] and the Court must balance the need for the seizure with the privacy invasion the seizure entails.[23] The basis for a police officer's seizure that invades an individual's privacy must be "specific and articulable facts which, taken together with rational inferences from those facts, reasonably warrant that intrusion."[24] The Court has long held that an "inchoate and unparticularized suspicion or 'hunch,'" is insufficient to justify an investigatory stop.[25]

2. *The Search and Subsequent Seizure of Evidence*

In *Terry v. Ohio*, the Court reiterated that "police must, whenever practicable, obtain advance judicial approval of searches and seizures through the warrant procedure" unless exigent circumstances excuse police from complying with the warrant requirement.[26] Probable cause is necessary to justify a search and seizure pursuant to a search warrant.[27] General warrants authorizing blanket searches[28] are unreasonable and have been

---

[20] United States v. Mendenhall, 446 U.S. 544, 561 (1980) (describing the *Terry* ruling).

[21] *Id.*

[22] Terry v.Ohio, 392 U.S. 1, 21 (1969).

[23] *Id.*

[24] *Id.*

[25] *Id.* at 27.

[26] *Id.* at 20.

[27] *See id.*

[28] Nolo's Plain English Law Dictionary defines "blanket searches" as "an unconstitutionally broad authorization from a judge that allows the police to search multiple areas for evidence without specifying exactly what they are looking for." NOLO'S PLAIN ENGLISH LAW DICTIONARY (2009), *available at* http://www.nolo.com/dictionary/blanket-search-warrant-term.html. In this context, I use "blanket search" to refer to warrants issued without particularity as to who is to be the subject of the DNA search.

considered by the Court to be invalid for at least 130 years.[29] As the Court has explained, "indiscriminate searches and seizures conducted under the authority of 'general warrants' were the immediate evils that motivated the framing and adoption of the Fourth Amendment."[30] General searches—conducted with or without a warrant—are therefore unconstitutional, and it is this type of search that the Court has referred to as "dragnet-style"[31] or "lawless wholesale roundup."[32]

Police may conduct a constitutionally valid search and seizure of evidence, like a DNA sample, when the suspect provides voluntary consent.[33] Not only has the Court condoned voluntary consent as a means to collect evidence, but the Court has also encouraged cooperation, explaining that "it is an act of responsible citizenship for individuals to give whatever information they may

---

[29] *E.g.*, Virginia v. Moore, 128 S. Ct. 1598 (2008); Payton v. New York, 445 U.S. 573, 583 (1980); United States v. Rabinowitz, 339 U.S. 56, 62 (1950) (stating, "[G]eneral exploratory searches . . . cannot be undertaken by officers with or without a warrant."); Marron v. United States, 275 U.S. 192, 195 (1927) (stating, "General searches have long been deemed to violate fundamental rights . . . the [Fourth] amendment forbids them."); Boyd v. United States, 116 U.S. 616, 627 (1886).

[30] *Payton*, 445 U.S. at 583.

[31] *E.g.*, *Bostick*, 501 U.S. at 441 and 450 (Marshall, J., in dissent, remarked, "These sweeps are conducted in 'dragnet' style. The police admittedly act without an 'articulable suspicion' in deciding which buses to board and which passengers to approach for interviewing." Justice Marshall also declared, "the Fourth Amendment clearly condemns the suspicionless, dragnet-style sweep . . . ."); *Dionisio*, 410 U.S. at 11, 93 S. Ct. at 770. *But see* Davis v. Mississippi, 394 U.S. 721, 728–29 (1969) (Harlan, J., concurring, stated, "There may be circumstances, falling short of the 'dragnet' procedures employed in this case, where compelled submission to fingerprinting would not amount to a violation of the Fourth Amendment even in the absence of a warrant, and I would leave that question open.").

[32] *Dionisio*, 410 U.S. at 5; *see also Davis*, 394 U.S. at 726 ("The Fourth Amendment was meant to prevent wholesale intrusions upon the personal security of our citizenry . . . .").

[33] *See Bustamonte*, 412 U.S. at 228 (stating, "In short, a search pursuant to consent may result in considerably less inconvenience for the subject of the search, and, properly conducted, is a constitutionally permissible and wholly legitimate aspect of effective police activity.").

have to aid in law enforcement."[34] Society has a significant interest in encouraging citizens to consent to searches, since "the resulting search may yield necessary evidence . . . that may insure that a wholly innocent person is not wrongly charged with a criminal offense."[35]

The test of voluntariness of consent was adopted over thirty years ago by the Court in *Schneckloth v. Bustamonte*:

> [W]hen the subject of a search is not in custody and the State attempts to justify a search on the basis of his consent, the Fourth and Fourteenth Amendments require that it demonstrate that the consent was in fact voluntarily given, and not the result of duress or coercion, express or implied. Voluntariness is a question of fact to be determined from all of the circumstances, and while the subject's knowledge of a right to refuse is a factor to be taken into account, the prosecution is not required to demonstrate such knowledge as a prerequisite to establishing a voluntary consent.[36]

Notably, the Court explained that voluntariness "has *always* taken into account evidence of minimal schooling, low intelligence, and the lack of any effective warnings to a person of his rights."[37] Accordingly, the Court specifically rejected the criticism that Fourth Amendment protections are accessible only to a privileged class of citizens so long as prosecutors are not required to prove knowledge to establish valid, voluntary consent.[38]

When police act without the benefit of a warrant or voluntary consent, determining what exactly the Fourth Amendment requires for a valid search *of a person* requires a discussion of *Schmerber v. California*.[39] The *Schmerber* Court reasoned that the purpose of

---

[34] *Id.* at 232 (citing Miranda v. Arizona, 384 U.S. 436, 477–78 (1966)).

[35] *Id.* at 243, 93 S. Ct. at 2056 (referring to policy described earlier in Coolidge v. New Hampshire, 403 U.S. 443, 488 (1971)).

[36] *Id.* at 248–49.

[37] *Id.* at 248 (emphasis added).

[38] *Id.* at 247–48 (stating, "It is also argued that the failure to require the Government to establish knowledge as a prerequisite to a valid consent, will relegate the Fourth Amendment to the special province of 'the sophisticated, v. knowledgeable and the privileged.' We cannot agree.")

[39] 384 U.S. 757 (1966). Here, the Court considered, as a matter of first impression, the constitutionality of blood samples taken from the defendant without his consent (search of his person) to test for blood alcohol content (seizure of evidence).

the Fourth Amendment "is to protect personal privacy and dignity against unwarranted intrusion by the State."[40] The Court explained that the amendment is not to constrain all intrusions but rather to constrain only those "intrusions which are not justified in the circumstances, or which are made in an improper manner."[41] Noting that drawing a blood sample from a suspect against his will constitutes a search, and that this type of search necessarily "depend[s] antecedently upon seizures of 'persons' within the meaning of that Amendment,"[42] the Court explained the purpose of the warrant requirement is to ensure:

> that inferences to support the search "be drawn by a neutral and detached magistrate instead of being judged by the officer engaged in the often competitive enterprise of ferreting out crime." The importance of informed, detached and deliberate determinations of the issue whether or not to invade another's body in search of evidence of guilt is indisputable and great.[43]

The Court stated that the Fourth Amendment prohibits "searches involving intrusions beyond the body's surface . . . on the mere chance that desired evidence might be obtained."[44] However, the Court ruled that the search for blood alcohol content via a compelled blood sample was valid since exigent circumstances excused the absence of a warrant.[45]

In *Davis v. Mississippi*—in which twenty-four African-American males were taken to a police station, questioned and fingerprinted without individualized suspicion or pursuant to a search warrant—the Court suggested, in now infamous dicta, there may be an occasion when obtaining fingerprints from individuals during a criminal investigation, even without probable cause,

---

[40] *Id.* at 767.
[41] *Id.* at 768.
[42] *Id.* at 767.
[43] *Id.* at 770 (citations omitted).
[44] *Id.* at 770.
[45] *Id.* at 771. *See also Dionisio*, 410 U.S. at 8–9; United States v. Chapel, 55 F.3d 1416, 1418–19 (9th Cir. 1995) (en banc) (clarifying that the *Schmerber* opinion was not based on a search incident to a lawful arrest, but rather a search conducted under exigent circumstances excusing the warrant requirement).

might be valid under the Fourth Amendment.[46] Justice Brennan, writing for the majority, explained that:

> It is arguable . . . that, because of the unique nature of the fingerprinting process, such detentions might, under narrowly defined circumstances, be found to comply with the Fourth Amendment even though there is no probable cause in the traditional sense. Detention for fingerprinting may constitute a much less serious intrusion upon personal security than other types of police searches and detentions. Fingerprinting involves none of the probing into an individual's private life and thoughts that marks an interrogation or search. Nor can fingerprint detention be employed repeatedly to harass any individual, since the police need only one set of each person's prints. Furthermore, fingerprinting is an inherently more reliable and effective crime-solving tool than eyewitness identifications or confessions and is not subject to such abuses as the improper line-up and the "third-degree." Finally, because there is no danger of destruction of fingerprints, the limited detention need not come unexpectedly or at an inconvenient time.
>
> For this same reason, the general requirement that the authorization of a judicial officer be obtained in advance of detention would seem not to admit of any exception in the fingerprinting context.[47]

As the Court more recently explained in *United States v. Dionisio*, it was not the taking of fingerprints on less than probable cause that made the seizure of identification evidence improper in *Davis*.[48] Rather, "it was the initial seizure—the lawless dragnet detention—that violated the Fourth and Fourteenth Amendments."[49]

The Court has permitted searches and seizures implicating the Fourth Amendment despite the absence of either a search warrant or even individualized suspicion in very narrow circumstances—namely, in "special needs" cases.[50] The rationale provided is that

---

[46] *Davis*, 294 U.S. at 727–28.

[47] *Id.* at 728.

[48] *Dionisio*, 410 U.S. at 11.

[49] *Id.*

[50] *See* Griffin v. Wisconsin, 483 U.S. 868, 873 (1987), quoting New Jersey v. T.L.O., 469 U.S. 325, 351 (1985) (Blackmun, J., concurring) (stating, "we have permitted exceptions when 'special needs' beyond the normal need for law enforcement, make the warrant and probable cause requirements impracticable."); *see generally* United States v. Kincade, 379 F.3d 813 (9th Cir. 2004) (noting that "special needs" searches are a broader category encompassing

the "touchstone of our analysis under the Fourth Amendment is always 'reasonableness,'"[51] and the Court has "made it clear . . . that a showing of individualized suspicion is not a constitutional floor, below which a search must be presumed unreasonable."[52] The special need for a warrantless and suspicionless search, however, "must be substantial—important enough to override the individual's acknowledged privacy interest . . . [and] sufficiently vital to suppress the Fourth Amendment's normal requirement of individualized suspicion."[53] Thus, the special needs doctrine carves out an exception to the warrant and individualized suspicion requirement for searches and is applicable when the governmental interest involves "concerns other than crime detection," i.e., those concerns which are "beyond the normal need for law enforcement."[54] This language has been coined the "primary purpose" limitation.[55]

3. *The Reasonable Expectation of Privacy*

Determining whether a search has occurred at all or whether a search is reasonable necessarily requires analyzing if individuals have a reasonable expectation of privacy in the object of the

---

"administrative searches" by school officials, drug testing of maternity patients by public hospitals, etc.).

[51] *Kincade*, 279 F.3d at 822.

[52] Skinner v. Ry. Labor Executives' Ass'n, 489 U.S. 602, 620 (1989) (citing United States v. Martinez-Fuerte, 428 U.S. 543, 560–61 (1976); *see also* Arizona v. Gant, 129 S. Ct. 1710, 1716 (2009) ("[O]ur analysis begins, as it should in every case addressing the reasonableness of a warrantless search, with the basic rule that 'searches conducted outside the judicial process, without prior approval by judge or magistrate, are *per se* unreasonable under the Fourth Amendment-subject only to a few specifically established and well-delineated exceptions.'" (quoting Katz v. United States, 389 U.S. 347, 357 (1967)) (footnote omitted)).

[53] Chandler v. Miller, 520 U.S. 305, 318 (1997).

[54] *Id.* at 313–14.

[55] *See* Kaye, *supra* note 4, at 197, n.60 ("[I]t seems odd to maintain that the balance of interests permits dispensing with warrants or individualized suspicion when non-law-enforcement interests alone are pursued, but not when both law enforcement and non-law enforcement interests reinforce each other.") (citing D. H. Kaye, *The Constitutionality of DNA Sampling on Arrest*, 10 CORNELL J.L. & PUB. POL'Y 455, 494–95 (2001)).

search.[56] This inquiry is complicated when the object, like DNA, was not considered by the Constitution's drafters. An expectation of privacy has been found in one's body,[57] but that expectation of privacy is not absolute.[58] A person has no privacy interest in personal, physical characteristics that are "constantly exposed to the public," like handwriting, voices, and facial characteristics.[59] Even information within one's body (i.e., characteristics that are hidden from the public) is not granted absolute protection; rather, such information is precluded from governmental search and seizure only when the intrusion is "not justified in the circumstances, or . . . [is] made in an improper manner."[60]

The Court's position on a privacy interest in one's *identity* (as opposed to the saliva sample or any DNA contained therein) is uncertain. It is well-established that "the ability to briefly stop [a suspect], ask questions, or check identification in the absence of probable cause promotes the strong government interest in solving crimes and bringing offenders to justice,"[61] and the Court has not yet enumerated an exhaustive list of the manners by which law enforcement can reasonably "check identification." Is there a meaningful distinction between identity and identification? Obtaining a suspect's identity *by name* during an investigatory stop has long been recognized as serving "important government interests." The Court explained recently in a case involving an individual's arrest for his refusal to identify himself to police officers during an investigative stop for a reported assault that:

> Knowledge of identity may inform an officer that a suspect is wanted for another offense, or has a record of violence or mental disorder. On the other hand, knowing identity may help clear a suspect and allow the

---

[56] *See generally Katz*, 389 U.S. at 361 (1967) (Harlan, J., concurring) ("[T]here is a twofold requirement, first that a person have exhibited an actual (subjective) expectation of privacy and, second, that the expectation be one that society is prepared to recognize as 'reasonable' ".).

[57] *See Schmerber*, 384 U.S. at 766–72.

[58] *See* Kyllo v. United States, 533 U.S. 27 (2001).

[59] *See Dionisio*, 410 U.S. at 4. In other words, "[u]nder existing law, public exposure defeats a reasonable expectation of privacy, insulating the investigative practice from Fourth Amendment scrutiny." Kaye, *supra* note 4, at 189.

[60] *Schmerber* at 768.

[61] United States v. Hensley, 469 U.S. 221, 229 (1985).

> police to concentrate their efforts elsewhere .... Officers ... need to know whom they are dealing with in order to assess the situation, the threat to their own safety, and possible danger to the potential victim.[62]

The Court continued, "[t]he request for identity has an immediate relation to the purpose, rationale, and practical demands of a *Terry* stop."[63] Whether obtaining a suspect's identity via DNA identification—as opposed to testimonial evidence or documentation like a driver's license—is reasonable has not yet been directly addressed by the Court. Moreover, the privacy interest in one's identity as determined by DNA may be analogized to one's identity as determined by fingerprints.[64]

The Court has had opportunity to address sense-enhancing technology, such as thermal imaging devices employed outside of a home to detect heat use patterns within a home, but notably not yet in the context of a search and seizure of a person (or DNA information specifically).[65] In *Kyllo v. United States*,[66] the Court explained that use of "sense-enhancing technology to collect any information regarding the interior of the home that could not otherwise be obtained without physical" invasion is a search "at least where (as here) the technology in question is not in general public use."[67] The applicability of the *Kyllo* analysis to searches of persons for DNA identification is uncertain, as searches of persons have traditionally been analyzed differently from searches of other objects.[68]

---

[62] Hiibel v. Sixth Jud. Dist. Ct. of Nevada, 542 U.S. 177, 186 (2004).

[63] *Id.* at 188.

[64] *See supra* Part II.C. However, DNA is recognizably capable of revealing information that has little to do with identity (e.g., genetic susceptibility to particular conditions or traits).

[65] *See generally Kyllo*, 533 U.S. 27 (2001) (holding that police use of a thermal imaging scan of a house to determine if marijuana was being grown inside it was an unreasonable search).

[66] *Id.*

[67] *Id.* at 34 (emphasis added) (citation omitted).

[68] *See Schmerber* at 768 (explaining "limitations on the kinds of property which may be seized under warrant, as distinct from the procedures for search and the permissible scope of search, are not instructive in this context [that is, the context of 'intrusions into the human body']").

B. *Federal Statutory Requirements or Guidelines*

There remains uncertainty as to whether Fourth Amendment challenges are to be resolved under a bright line, per se rule requiring a warrant to be reasonable or, alternatively, a balancing approach based on the totality of the circumstances.[69] As early as 1971, amendments were proposed to Federal Rule of Criminal Procedure 41.1 that would have set a uniform procedure for compulsory nontestimonial identification evidence.[70] The proposed rule would have allowed a federal magistrate to issue NIOs on less than probable cause.[71] The proposed rule would have permitted an order to be issued upon an affidavit establishing (1) probable cause that a crime has been committed; (2) "reasonable grounds, not amounting to probable cause to arrest, to suspect that the person named or described in the affidavit committed the offense;" and (3) that the results would be of "material aid in determining whether the person . . . committed the offense."[72] Nontestimonial identification evidence was defined as including "fingerprints, palm prints, footprints, measurements, blood specimens, urine specimens, saliva samples, hair samples, or other reasonable physical or medical examination, handwriting exemplars, voice samples, photographs, and lineups."[73] The Committee on Rules of Practice and Procedure of the Judicial Conference noted that "carefully written and well-enforced regulations" as to what police conduct is appropriate would

---

[69] For a discussion of the two theories of reasonableness, *see* Mark P. Asselta, Comment, *The Constitutionality of Compulsory Identification Procedures on Less Than Probable Cause: Reassessing the Davis Dictum*, 89 DICK. L. REV. 501, 512–19 (Winter 1984).

[70] FED. R. CRIM. P. 41.1 (Preliminary Draft of Proposed Amendments 1971), *reprinted in* 52 F.R.D. 409, 462 (1971).

[71] 52 F.R.D. 409, 463 (1971). Notice that on occasion, nontestimonial identification orders are referred to as "NTOs" rather than NIOs. *See* Paul C. Giannelli, *ABA Standards on DNA Evidence: Nontestimonial Identification Orders*, CRIM. JUST., Spring 2009, at 24, *available at* 24-SPG Crim. Just. 24. (West).

[72] 52 F.R.D. 409, 463.

[73] *Id.* at 466–67.

"certainly be a helpful step."[74] The proposed rule only had limited support even at the time of its drafting and was never adopted.[75]

The American Bar Association's ("ABA") Standards for Criminal Justice include guidelines for collecting DNA samples.[76] Specifically, the ABA suggests that NIOs for compulsory DNA samples should be permissible only after notice and a hearing.[77] Moreover, the ABA guidelines would require that NIOs should be issued differently depending on whether the person targeted by the NIO is suspected of committing a crime.[78] If the person is suspected of a crime, there must be probable cause that a crime was committed.[79] Furthermore, the ABA guidelines would set the level of suspicion as a function of the intrusiveness of the nontestimonial identification procedure.[80] If the procedure is physically invasive, probable cause that the person committed the crime would be required before an NIO could be issued; however, if the procedure is non-invasive, the NIO could be issued upon a showing of reasonable suspicion that the person committed the crime.[81] For situations when particularized suspicion for any one individual is not available—like those situations when DNA ancestry tests and indirect molecular photofitting may have the most utility—the ABA guidelines provide that NIOs should be issued only after a showing of probable cause that a crime was committed[82] and a showing that:

> a sample is necessary to establish or eliminate that person as a contributor to or source of the DNA evidence or otherwise establishes the profile of a person who may have committed the crime, either because there is reason to believe that the person has contributed to or

---

[74] *Id.* at 468.

[75] *See* James G. Cavoli, Comment, *Can the Government Get Into Your Genes?: A Proposed New York Statute for the Use of Genetic Identification to Establish Probable Cause*, 55 ALB. L. REV. 1355, 1408 (1992).

[76] ABA STANDARDS FOR CRIMINAL JUSTICE: DNA EVIDENCE, 3d ed. 2007, Standard 16-2.2.

[77] *Id.* Standard 16-2.2(b).

[78] *Id.* Standard 2.2(b)(i), contrasted with 2.2(b)(ii).

[79] *Id.* Standard 2.2(b)(i).

[80] *Id.* Standard 16-2.2(b)(i)(B).

[81] *Id.* Standard 2.2(b)(i)(B).

[82] *Id.* Standards 2.2(b)(ii)(B)(2) and 16-2.2(b)(ii)(B)(1).

> been the source of the DNA evidence, or for other good cause shown that the sample of that particular person is necessary for that purpose.[83]

The American Law Institute ("ALI") has also weighed in on the issue of NIOs with the promulgation of Uniform Rule of Criminal Procedure 436 and Model Code of Pre-Arraignment Procedure article 170.[84] In commentary for the latter, ALI explained that a "strict adherence" to probable cause would mean that individuals would unnecessarily have police records, since police often have sufficient evidence to arrest an individual (and thereby obtain identification evidence) but may not yet have sufficient evidence to determine whether prosecution against that individual would be appropriate.[85]

The ABA has also recommended standards for seeking voluntary consent for DNA samples.[86] Specifically, the ABA standards discourage police officers from seeking consent from a number of individuals based on membership in a constitutionally protected class (for example, seeking consent based on a group of individuals' race or sex).[87] Moreover, the ABA standards recommend that police officers obtain written, informed consent from the individuals providing the DNA samples, a process that necessarily involves notifying the individuals of their right to refuse.[88] The ABA's recommendation that law enforcement obtain informed consent evinced by a writing is more than what is constitutionally required[89] and reflects an established requirement

---

[83] *Id.* Standard 16-2.2(b)(ii)(B).

[84] UNIF. R. CRIM. P. 436 (1987); MODEL CODE OF PRE-ARRAIGNMENT PROCEDURE art. 170 (Official Draft 1975).

[85] MODEL CODE OF PRE-ARRAIGNMENT PROCEDURE art. 170 (Official Draft 1975) cmt. at 462, *as reprinted in* Giannelli, *supra* note 71, at 27.

[86] *See* ABA STANDARDS FOR CRIMINAL JUSTICE: DNA EVIDENCE, 3ed. 2007.

[87] *Id.* Standard 2.4. It is yet unclear how the Genetic Information Nondiscrimination Act of 2008 (GINA), Pub. L. No. 110-233, 122 Stat. 881 (2008), will be interpreted. There is a possibility that GINA could be seen as protecting individuals from discrimination on the basis of DNA ancestry tests with only indirect molecular photofitting. It is notable that GINA would only have persuasive effect in a criminal context, as it does not make genism unlawful in all of the 14th Amendment's broad reach, but only in narrow health insurance and employment contexts.

[88] *Id.*

[89] *See* discussion on *Bustamonte* and voluntariness of consent at Part II *infra.*

when collecting DNA in human research settings.[90] Voluntariness is contextual, a point that is often misunderstood when those familiar with research requirements weigh in on what is or should be required for establishing voluntary consent in law enforcement.[91]

C. *State-Specific Requirements*

Generalized discussions of what constitutes reasonable search and seizure tend to ignore that state constitutions do not universally mirror the federal constitution. While some states' constitutions are generally in "lock-step" with the federal constitution,[92] the constitutions of other states, like Pennsylvania, predate the U.S. Constitution and frequently afford their citizens greater privacy protections.[93] Even discussion of the exclusionary rule (which requires unlawfully obtained evidence to be suppressed)[94] must include state-specific considerations, as states vary in the rationale behind the rule. For example, the exclusionary rule in Illinois is founded not only on deterring improper police conduct (like the federal rule) but also the "preservation of judicial integrity."[95] In

---

[90] *See generally* Office of Human Research Protections ("OHRP"), http://www.hhs.gov/ohrp (last visited Oct. 12, 2009) (describing requirements for human subjects in research contexts).

[91] Elaborating on the varying concepts of voluntary consent is outside the scope of this article and left for later discussion.

[92] *E.g.*, Illinois and Nebraska. *See In re* Lakisha M., 882 N.E.2d 570, 581 (Ill. 2008) (stating that the courts in Illinois "look first to the federal constitution, and only if federal law provides no relief turn to the state constitution to determine whether a specific criterion—for example, unique state history or state experience—justifies departure from federal precedent.") (internal quotation marks and citations omitted); *see also* State v. Cronin, 509 N.W.2d 673, 676 (Neb. Ct. App. 1993).

[93] *See* Commonwealth v. Basking, 970 A.2d 1191 (Pa. Super. Ct. 2009). Pennsylvania courts will apply Fourth Amendment jurisprudence only "'where [their] own independent state analysis does not suggest a distinct standard.'" *Id.* at 1193 (quoting Commonwealth v. Cleckley, 738 A.2d 427, 431–32 (Pa. 1999) and asserting accordance with Commonwealth v. Glass, 754 A.2d 655, 660 (Pa. 2000)).

[94] *See* 29 AM. JUR. 2D *Evidence* § 600 (2008).

[95] People v. McGee, 644 N.E.2d 439, 447 (Ill. App. Ct. 1994) (citing Grames v. Illinois State Police, 625 N.E.2d 945 (Ill. App. Ct. 1993); *see also* People v.

Pennsylvania, the exclusionary rule is primarily designed not to deter police misconduct, but rather to protect privacy.[96]

Nationwide, law enforcement can generally acquire DNA samples for comparison with crime scene evidence in five different protocols: (1) pursuant to a search warrant; (2) pursuant to NIOs compelling suspects and/or non-suspects to provide DNA samples; (3) pursuant to grand jury subpoenas compelling individuals to provide DNA samples; (4) with voluntary consent from individuals; and (5) through surreptitious or opportunistic seizures. With the exception of opportunistic seizures (whereby law enforcement obtain DNA samples from an individual unbeknownst to him, such as from the individual's spit on a sidewalk later collected by police officers as soon as the individual had left the area, or from saliva or skin cells deemed "abandoned" on chewing gum, soda cans, coffee cups, or trash),[97] each protocol will be discussed to highlight the variety of ways states have addressed DNA collection.

Whether compulsory saliva samples to acquire DNA require a search warrant varies from state to state. In Michigan, such a taking is deemed "a minor bodily intrusion which is permissible without a search warrant,"[98] but in Pennsylvania taking a saliva sample constitutes a search presumably requiring a search warrant.[99] In Massachusetts there is a recognized expectation of

---

Zymantas, 497 N.E.2d 1248 (Ill. App. Ct. 1986); People v. Garcia, 440 N.E.2d 269 (Ill. App. Ct. 1982)).

[96] *Basking*, 970 A.2d at 1193 (Pa. Super. 2009) (citing Commonwealth v. Williams, 692 A.2d 1031, 1038 (Pa. 1997)).

[97] Discussion of surreptitious or opportunistic DNA sampling is outside the scope of this article. *See, e.g.*, D. H. Kaye & Michael E. Smith, *DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage*, 2003 WIS. L. REV. 413, 435 (2003); JAMES D. WATSON AND ANDREW BERRY, DNA: THE SECRET LIFE 231 (2004); Elizabeth E. Joh, *Reclaiming 'Abandoned' DNA: The Fourth Amendment and Genetic Privacy*, 100 NW. U. L. REV. 857, 860 (2006); New DNA Reader Identifies Suspects at the Scene—Before They Strike Again, POPULAR SCIENCE at 48, 49 (1999); Giannelli, *supra* note 71.

[98] People v. Lovett, 272 N.W.2d 126, 127 (Mich. Ct. App. 1978).

[99] Commonwealth v. Blasioli, 685 A.2d 151, 155–56 (Pa. Super. 1996).

privacy in saliva when it is in one's mouth,[100] and in California, absent an applicable exception to the warrant requirement, a "warrantless search is unreasonable per se."[101] Moreover, even what constitutes a valid search warrant varies.

For a search warrant to be valid in Georgia, it:

> must contain a description of the person and premises to be searched with such particularity as would enable a prudent person executing the warrant to locate the person and premises *definitely and with reasonable certainty*. . . . However, where the name . . . is not given, the description of the premises must be exact.[102]

"John Doe" warrants, for example, are constitutionally sufficient for searches of described premises in Georgia.[103]

In Pennsylvania, search warrants may not be used "as a general investigatory tool to uncover evidence of a crime."[104] The state's rules of criminal procedure grant magistrates the authority to issue search warrants "upon probable cause supported by one or more affidavits sworn to before the issuing authority."[105] Courts in Pennsylvania have explained that before a valid warrant may be issued:

> an issuing authority . . . must be furnished with information sufficient to persuade a reasonable person that probable cause exists to conduct a search. The information offered to demonstrate probable cause must be viewed in a common sense, nontechnical, ungrudging and positive manner . . . [P]robable cause is based on a finding of probability, not a prima facie showing of criminal activity . . . .[106]

The specific requirements of a valid search warrant are set forth in Pennsylvania Rule of Criminal Procedure 205: "[e]ach warrant shall be signed by the issuing authority and [must] . . . name or describe with particularity the person or place to be searched

---

[100] *See* Commonwealth v. Cabral, 866 N.E.2d 429, 433 (Mass. App. Ct. 2007).

[101] People v. Smith, 92 Cal.Rptr.3d 106, 111 (Cal. Ct. App. 2009).

[102] Landers v. State, 359 S.E.2d 748 (Ga. Ct. App. 1987) (emphasis added) (quoting State v. Hatch, 287 S.E.2d 98 (Ga. Ct. App. 1981).

[103] Nichols v. State, 435 S.E.2d 502, 505 (Ga. Ct. App. 1993).

[104] Commonwealth v. Rega, 933 A.2d 997, 1012 (Pa. 2007).

[105] PA. R. CRIM. P. 203 (B) (2007).

[106] Commonwealth v. Lloyd, 948 A.2d 875, 880 (Pa. Super. 2008) (quoting Commonwealth v. Wilkinson, 647 A.2d 583, 585–86 (Pa. Super. 1994) (omitting internal citations and quotation marks)).

. . . ."[107] The accompanying comments make clear that " 'when an exact description . . . is not possible, a generic description will suffice.' "[108] It is this issue of specificity—whether police must specifically name an individual who is a suspect subject to a search warrant or non-suspect who is nonetheless a subject of an NIO—that is at the heart of the debate over whether or how law enforcement agencies can or should use DNA ancestry testing and indirect molecular photofitting.

Although the proposed changes to the federal rule concerning use of nontestimonial identification evidence[109] failed to gain sufficient support, some state legislatures and courts have adopted NIOs. Seven states were quick to adopt either statutes or judiciary rules that permitted law enforcement to compel individuals to supply nontestimonial identification evidence.[110] A comparison of the NIO schemes of Colorado, North Carolina, Nebraska, Michigan and New York is illustrative of varying approaches and requirements.

In Colorado, NIOs are authorized by Criminal Procedure 41.1.[111] In 1981, the Supreme Court of Colorado, en banc, ruled that this statute is not only valid under the Fourth Amendment but also the Colorado Constitution.[112] Specifically, the Court stated that:

> Limited intrusions into privacy on less than probable cause are reconcilable with Fourth Amendment guarantees when the following conditions exist. First, there must be an articulable and specific basis in fact for suspecting criminal activity at the outset. Second, the intrusion must be limited in scope, purpose and duration. Third, the intrusion must be justified by substantial law enforcement interests. Last, there must be an opportunity at some point to subject the intrusion to the

---

[107] PA. R. CRIM. P. 205 (2009).

[108] *Rega*, 933 A.2d at 1012.

[109] FED. R. CRIM. PRO. 41.1.

[110] *See* ALASKA R. CRIM. P. 16(c)(1) to 16(c)(3) (1979); ARIZ. REV. STAT. ANN. § 13-3905 (1978); COLO. R. CRIM. P. 41.1 (1973); IDAHO CODE ANN. § 19-625 (1979); NEB. REV. STAT. § 29-3301 to § 29-3307 (1979); N.C. GEN. STAT. § 15A-271 to § 15A-282 (1983); UTAH CODE ANN. § 77-8-1 to § 77-8-4 (1982).

[111] *See* People v. Diaz, 53 P.3d 1171 (Colo. 2002) (en banc).

[112] *See* People v. Madson, 638 P.2d 18, 31–33 (Colo. 1981) (en banc).

> neutral and detached scrutiny of a judicial officer before the evidence detained therefrom may be admitted in a criminal proceeding against the accused.[113]

Criminal Procedure 41.1 requires that the order be executed and returned within ten days of its issuance; the execution of the order occur in the daytime; and that the police detain the individual no "longer than is reasonably necessary" to conduct the ordered identification procedure.[114] Evidence authorized for collection pursuant to a NIO in Colorado includes "[f]ingerprints, measurements, blood specimens, urine specimens, saliva samples, hair samples, specimens of material under fingernails, or other reasonable physical or medical examination, handwriting exemplars, voice samples, photographs, appearing in lineups, and trying on articles of clothing."[115] The order need not name, but may describe, the individual subject to the order.[116] If police do not have probable cause after the results from the NIO are complete, the suspect is entitled to a judicial order requiring the destruction of all products and copies of the non-testimonial identification procedures.[117]

Colorado requires the police to follow a stringent procedure when seeking to obtain non-testimonial identification evidence. Police violate both state and federal constitutional provisions[118] when they obtain non-testimonial identification evidence without either a warrant or a court order pursuant to Criminal Procedure 41.1.[119] While non-testimonial evidence discovered without a warrant and without an NIO should be suppressed pursuant to the exclusionary rule, the Supreme Court of Colorado has made clear that "an illegal seizure of previous identification samples from the defendant by the police does not foreclose the prosecution from obtaining identity evidence through proper means after filing the

---

[113] *Id.* at 31–32.

[114] *Id.* at 33.

[115] CRIM. P. 41.1(h)(2). *See also Madson*, 638 P.2d at 33.

[116] CRIM P. 41.1(e). *See generally* People v. Harris, 762 P.2d 651, 656 (Colo. 1988) (en banc).

[117] Crim. P. 41.1(f).

[118] COLO. CONST. art II. § 7 and U.S. CONST. amend. IV.

[119] People v. Diaz, 53 P.3d 1171, 1174 (Colo. 2002) (citing People v. Harris, 762 P.2d 651 (Colo. 1988) (en banc)).

case."[120] Rather, once criminal proceedings have been initiated against the individual, the prosecution may file a motion seeking non-testimonial identification evidence pursuant to Criminal Procedure 16(II)(A).[121]

In North Carolina, NIOs are authorized pursuant to North Carolina General Statute section 15A-271. Such an order allows police officers to compel a suspect to provide identification by the following procedures: "fingerprints, palm prints, footprints, measurements, blood specimens, urine specimens, saliva samples, hair samples, or other reasonable physical examination, handwriting exemplars, voice samples, photographs, and line-ups or similar identification procedures requiring the presence of a suspect."[122] An NIO "is an investigative tool available in cases where there is not sufficient basis for making a lawful arrest."[123] As the North Carolina Court of Appeals explained in 2000: "Statutes governing nontestimonial identification orders were enacted in order to provide the state with a valuable new investigative tool to compel the presence of unwilling suspects for nontestimonial identification procedures, even though insufficient probable cause existed to permit their arrest."[124] An NIO "has a lower standard than an arrest or search warrant because it has the limited purpose of being used only as an investigative tool to identify the perpetrator."[125]

In Nebraska, NIOs are authorized pursuant to Nebraska Revised Statute section 29-3302, which states in relevant part:

> Judges and magistrates may issue orders authorizing identification procedures for the purpose of obtaining identifying physical characteristics in accordance with the procedures specified .... An order may be issued by any judge of the district court, Court of Appeals, or Supreme Court for service and execution anywhere within the State of Nebraska. An order may also be issued by any judge of the

---

[120] *Id.* at 1177.

[121] *Id.*

[122] N.C. GEN. STAT. § 15A-271.

[123] State v. Wilson, 551 S.E.2d 471, 475 (N.C. Ct. App. 2001) (quoting State v. Welch, 342 S.E.2d 789, 792 (N.C. 1986)).

[124] State v. Coplen, 530 S.E.2d 313 (N.C. Ct. App. 2000).

[125] State v. Pearson, 551 S.E.2d 471, 475 (N.C. Ct. App. 2001) (citing State v. Grooms, 540 S.E.2d 713, 728 (N.C. 2000)).

> county court or other magistrate for service within the county of issuance.[126]

A probable cause requirement, determined by the totality of the circumstances, has been implicitly written into this statute by the courts in 2003.[127] In 1983, the Nebraska Supreme Court upheld this statute as constitutionally valid.[128]

In *State v. McKinney*, the Nebraska Supreme Court stated that the statute authorizing NIOs can be used to compel DNA samples.[129] The *McKinney* court recognized that police officers could not use NIOs to obtain DNA samples unless they "have probable cause to believe that the person whose DNA is sought . . . committed the crime for which the DNA is sought."[130]

In Michigan, there is no NIO statute or court rule, even if warrants authorizing compulsory nontestimonial identification evidence might be referred to as an NIO. However, in 1976 the Michigan Court of Appeals considered—but did not decide—the constitutionality of NIOs issued on less than probable cause and stated "there is a clear trend toward permitting court-ordered detentions for the purpose of obtaining physical identification evidence in the absence of probable cause in the traditional sense."[131] The court refused to sanction NIOs in the absence of a statute or high authority ruling on the matter.[132] Instead, the court found "there is no such 'animal' in this jurisdiction as a court order authorizing the detention of a suspect for the purpose of a search."[133] In other words, in Michigan, the only permissible NIO is a search warrant based on probable cause.

In order for police officers in New York to obtain an order compelling blood samples, there must be probable cause that the suspect has committed the crime.[134] For a court to issue an order

---

[126] NEB. REV. STAT. 29-3302.
[127] *See* State v. Marcus, 660 N.W.2d 837, 842 (Neb. 2003).
[128] *See* State v. Evans, 338 N.W.2d 788, 793 (Neb. 1983).
[129] *But see* United States v. Purdy, 2005 WL 3465721 (D. Neb. 2005).
[130] State v. McKinney, 730 N.W.2d 74, 87 (Neb. 2007).
[131] People v. Marshall, 244 N.W.2d 451, 457 (Mich. Ct. App. 1976).
[132] *Id.*
[133] *Id.*
[134] People v. Afrika, 9 A.D.3d 876 (N.Y. App. Div. 2004).

compelling a blood or saliva sample, the prosecution must establish "(1) probable cause to believe the suspect has committed the crime, (2) a 'clear indication' that relevant material evidence will be found, and (3) the method used to secure it is safe and reliable."[135] Recently, scholars have revisited NIO schemes in light of the growing recognition of law enforcement's reliance on DNA identification evidence to solve crimes. For example, James G. Cavoli proposed that New York adopt an "order for genetic identification" based largely on the proposed Federal Rule of Criminal Procredure 41.1.[136] Others have openly criticized NIOs for DNA sweeps of even a limited set of suspects with specific, articulable ties to the alleged crime.[137] Even in the midst of new criticisms against NIOs, some state legislatures have considered adopting their first NIO statutes,[138] which suggests that states are divided not only on the constitutionality and underlying policy rationales of NIO statutes, but also regarding the desire for means to obtain compulsory nontestimonial identification evidence.

Compulsory nontestimonial identification evidence via a grand jury subpoena is also subject to Fourth Amendment considerations,

---

[135] Marino v. Kahn, 49 A.D. 3d 741 (N.Y. App. Div. 2008) (upholding an order to compel buccal swabs from defendant in connection with an assault investigation and quoting Matter of Abe A., 437 N.E.2d 265 (N.Y. 1982)).

[136] Cavioli, *supra* note 75, at 1409–13 (1992).

[137] *See, e.g.*, STUART TAYLOR JR. & KC JOHNSON, UNTIL PROVEN INNOCENT: POLITICAL CORRECTNESS AND THE SHAMEFUL INJUSTICES OF THE DUKE LACROSSE RAPE CASE 60 (2007). *But see* Giannelli, *supra* note 71 (criticizing the issuance of NIOs compelling forty-six members of the Duke lacrosse team to provide DNA samples and photographs in connection with an alleged sexual assault but concluding that NIOs have merit "when properly applied").

[138] The Pennsylvania General Assembly recently considered adopting an NIO statute but has not yet passed the measure. H.B. 560, Gen. Assem., 2007 Sess. (Pa. 2007). The bill was never voted on; the last action was a referral to the judiciary. The bill would have required a showing of "probable cause to believe that a particular offense has been committed" and "reasonable grounds, not amounting to probable cause to arrest, to suspect that the person named or described in the affidavit committed the particular offense." *Id.* at lines 23–28. Text of bill is available at http://www.legis.state.pa.us/cfdocs/legis/home/session.cfm (search by bill "HB 560" in "2007–2008 Regular Session"). *See also* H.B. 364, Gen. Assem., 2005 Sess. (Pa. 2005) (considered during the 2005 Regular Session) and H.B. 2438 P.N. 3737, Gen. Assem., 2004 Sess. (Pa. 2004) (considered during the 2004 Regular Session).

and courts and states have split on the issue of whether probable cause is required.[139] The key question is "whether the presence of a grand jury subpoena makes the search reasonable on less than the probable cause that presumably would be necessary for the taking of blood at the direction of the police."[140] The laws of Massachusetts and Illinois illustrate some of the considerations that accompany the propriety of grand jury subpoenas to compel nontestimonial identification evidence.

Under Massachusetts common law, there is a recognized expectation of privacy in one's saliva when it is in one's mouth.[141] A showing of "probable cause to believe that the suspect committed a crime and that the evidence sought would aid in the Commonwealth's investigation" is required whenever the prosecution seeks to compel a saliva sample from a person who is neither charged nor under grand jury investigation.[142] However, it is not necessary to show probable cause that the defendant committed the crime when the person is the subject of a grand jury investigation; rather, the grand jury must have "a reasonable basis for believing (have probable cause for believing, if you wish) that a blood sample will provide test results that will significantly aid . . . the grand jury in their investigation of circumstances in which there is good reason to believe a crime has been committed."[143] The distinction between a suspect who is the focus of a grand jury investigation and a suspect who is not flows from the "unique role" grand juries play in the criminal justice system: the identity of the

---

[139] *See, e.g.*, Woolverton v. Multi-County Grand Jury, 859 P.2d 1112 (Okla. Crim. App. 1993); In re Grand Jury Proceedings (T.S.), 816 F. Supp. 1196 (1993); Henry v. Ryan, 775 F. Supp. 247 (1991); In the Matter of a Grand Jury Investigation, 692 N.E.2d 56 (Mass. 1998); and Commonwealth v. Williams, 790 N.E.2d 662 (Pa. 2003).

[140] WAYNE R. LAFAVE, JEROLD H. ISRAEL, NANCY J. KING & ORIN S. KERR, CRIMINAL PROCEDURE § 8.7(d) (3d ed. 2007).

[141] *See* Commonwealth v. Cabral, 866 N.E.2d 429, 433 (Mass. App. Ct. 2007). Contrast with Pennsylvania, where taking a saliva sample has been determined not to constitute a search under either federal or state constitutions. *Blasioli*, 685 A.2d at 155–56.

[142] *Draheim*, 849 N.E.2d at 829.

[143] Commonwealth v. Williams, 790 N.E.2d 662, 667 (Pa. 2003) (quoting *Matter of a Grand Jury Investigation,* 692 N.E.2d 56, 60 (Mass. 1998)).

offender is typically "developed at the conclusions of the grand jury's labors, not at the beginning."[144]

Illinois recognizes a right to privacy in an individual's "physical person." The inquiry as to the propriety of a search and seizure that implicates such a right to privacy is whether the search or seizure is reasonable, which requires "balancing the need for official intrusion against the constitutionally protected interest of the private citizen."[145] It is well-established that a compelled appearance before a grand jury is not an unreasonable seizure.[146] In assessing reasonableness of grand jury subpoenas, the Supreme Court of Illinois explained, "[t]he purpose of a grand jury investigation is both to exonerate individuals under suspicion of having committed a crime and to establish the probable cause necessary for the arrest of suspected felons. No citizen is immune from a grand jury subpoena."[147] The court held that individualized suspicion and relevance must be established before a person can be compelled to provide noninvasive physical evidence via a grand jury subpoena and that probable cause is required before a person can be compelled by grand jury subpoena to provide invasive physical evidence.[148] The rationale is:

> [W]ithout the necessity of presenting some degree of individualized suspicion to the court, it is conceivable that a grand jury investigating a rape allegedly committed by a man of Oriental appearance might subpoena physical evidence from all 50 Asian-American males in the local community, none of whom was suspect for reasons other than his race. Such a result would be an unreasonable invasion of the privacy right protected by the Illinois Constitution.[149]

---

[144] *Matter of a Grand Jury Investigation,* 692 N.E.2d at 60.

[145] *In re* May 1991 Will County Grand Jury, 604 N.E.2d 929, 935 (Ill. 1992).

[146] *See* Henry v. Ryan, 775 F. Supp. 247 (1991) (citing *Dionisio,* 410 U.S. at 13; United States v. Mara, 410 U.S. 19, 21 (1973)).

[147] *May 1991 Will County Grand Jury*, 604 N.E.2d at 935 (internal citations omitted).

[148] *Id.* at 935–36 and 938–39 (declining to follow Henry v. Ryan, 775 F. Supp. 247 (1991), where a Federal district court refused to enforce a probable cause showing before a grand jury subpoena could be issued compelling hair and blood samples).

[149] *Id.* at 935.

Illinois recognizes a narrow exception to the probable cause requirement for readily observable physical features, which include "handwriting and voice exemplars, fingerprinting, and appearance in lineups[, all of which] leave the individual's body undisturbed."[150] Probable cause exists and supports a grand jury subpoena for invasive bodily specimens when there is "substantial evidence to support an objective belief that evidence of criminality will be found."[151] These same requirements limiting the grand jury from issuing subpoenas—relevance and individualized suspicion for readily observable physical features and probable cause for invasive bodily specimens—are imposed on the police when seeking evidence during an investigation.[152]

Police officers can conduct searches in the absence of a warrant when they obtain voluntary consent from the person being searched.[153] However, what constitutes "voluntary" consent varies across jurisdictions, although the factors to be considered are generally based on the notion that there is a "tendency to submit to the badge."[154]

In Pennsylvania, to be validly given, consent must be "unequivocal, specific, and voluntary" and must be "free from coercion, duress or deception."[155] Factors that should be considered in evaluating whether consent was given voluntarily include "the setting in which the consent was obtained; what was said and done by the parties present; [and] the age, intelligence,

---

[150] *Id.* at 938.

[151] State v. Watson, 825 N.E.2d 251, 266 (Ill. 2005).

[152] People v. Caballes, 851 N.E.2d 26, 54 (Ill. 2006).

[153] *See Blasioli*, 685 A.2d 151 (1996).

[154] In People v. DeBour, 352 N.E.2d 562 (N.Y. 1976), the court explained:

> "Due to the tendency to submit to the badge and our belief that the right to be left alone is 'too precious to entrust to the discretion of those whose job is the detection of crime,' a policeman's right to request information while discharging his law enforcement duties will hinge on the manner and intensity of the interference, the gravity of the crime involved and the circumstances attending the encounter."

[155] *Blasioli*, 685 A.2d at 156 (quoting Commonwealth v. Gibson, 638 A.2d 203, 207 (Pa. 1994)).

and educational background of the person consenting."[156] It is noteworthy that in 1996, the Pennsylvania Superior Court found a saliva sample to be given voluntarily despite the record showing that the suspect testified that police told him he would be arrested if he did not volunteer a sample and that he provided a saliva sample only because of fear of arrest.[157] The court found it significant that (1) the individual was neither under arrest nor in custody at the time the consent was obtained; (2) the individual was informed in advance that the officer was investigating a crime for which the individual was a suspect; and (3) the individual had refused to provide blood and hair samples just prior to providing the saliva sample.[158] Similarly, in Georgia, "a valid consent to a search eliminates the need for either probable cause or a search warrant."[159] There must be more than a showing of "acquiescence to a claim of lawful authority" to prove consent was voluntarily given, but "the voluntariness . . . is determined by the totality of the circumstances; no single factor controls."[160]

III. DNA IDENTIFICATION, DNA ANCESTRY TESTING, AND INDIRECT MOLECULAR PHOTOFITTING

In this part, an introduction to the scientific technologies of DNA identification, DNA ancestry testing, and indirect molecular photofitting is provided. Such an introduction is necessary before any discussion of the legal implications of law enforcement's use of such technologies.

---

[156] *Id.* at 157 (quoting Commonwealth v. Burgos, 299 A.2d 34, 37 (Pa. Super. 1972)).

[157] *Id. But see Gibson,* 638 A.2d 203 (1994) (holding that consent was not voluntarily given when the police had not announced to the suspect the reason for their visit to his apartment).

[158] *Id.*

[159] Brooks v. State, 677 S.E.2d 68 (Ga. 2009) (citing *Bustamonte*, 412 U.S. at 219).

[160] Johnson v. State, 678 S.E.2d 539, 541 (Ga. Ct. App. 2009) (citing State v. Jones, 604 S.E.2d 228 (Ga. Ct. App. 2004) and State v. Jourdan, 589 S.E.2d 682 (Ga. Ct. App. 2003)).

A. *DNA Identification*

DNA identification (also frequently referred to as "DNA fingerprinting") analyzes loci (variable DNA molecules at specific positions or sites) distributed throughout the genetic content of an organism that are not known to have any functional significance (that is, they are not known to "cause" or to predict any disease or behavioral traits).[161] The thirteen loci comprising the standard set assayed for DNA fingerprinting were chosen for their ability to distinguish individuals, and the loci do not reveal any information about one's genetic predisposition to medical conditions or behavioral traits.[162] DNA identification has been described as not assaying the actual information contained in a sequence, but rather as assaying mere occurrences of variation in a sequence's structure.[163] The DNA Identification Act of 1994 initially authorized the FBI's Combined DNA Index System ("CODIS") nationwide database.[164] The database was expanded in 2004 with the Justice for All Act and again in 2006 with the DNA Fingerprint Act of 2005, which expanded law enforcement's ability to collect DNA from arrestees in addition to convicted individuals.[165]

---

[161] The thirteen core loci used by the FBI are short tandem repeats (STRs) or microsatellites. These repetitive sequences are in non-coding regions of the genome. *See* D.H. Kaye, *Please, Let's Bury the Junk: The CODIS Loci and the Revelation of Private Information*, 102 NW. U. L. REV. COLLOQUY 70, 70 (2007) ("There is no scientific evidence that the specific DNA variations used to identify the sources of crime-scene DNA perform any biological function."), *available at* http://www.law.northwestern.edu/lawreview/colloquy/2007/25/. For a discussion on how DNA profiling (or DNA identification) works, *see generally* JAY D. ARONSON, GENETIC WITNESS: SCIENCE, LAW, AND CONTROVERSY IN THE MAKING OF DNA PROFILING (2007).

[162] *See* Angus J. Dodson, *DNA 'Line-Ups' Based on a Reasonable Suspicion Standard*, 71 U. COLO. L. REV. 221, 229–30 (2000) "stating that DNA fingerprinting "performed strictly for identification purposes, reveals nothing about the suspect's physical characteristics, his risk of genetic disease, or any other specific information likely to give rise to significant privacy concerns" and arguing that RFLP analysis "reveals little more about a person's private life than a fingerprint or mug shot").

[163] Drobner, *supra* note 2.

[164] Pub. L. No. 103-322, § 210301, 108 Stat. 1796, § 2065 (1994).

[165] Justice for All Act of 2004, Pub. L. No. 108-405, Title II, § 204(a), 118 Stat. 2260, 2271 (2006); DNA Fingerprint Act of 2005, Pub. L. No. 109-162,

B. *DNA Ancestry Testing*

In contrast to DNA fingerprinting, DNA ancestry tests do not distinguish individuals from each other. Rather, DNA ancestry tests purport to reveal the most likely affiliation of an individual to a population.[166] DNA ancestry tests come in three basic varieties: Y-chromosome, mitochondrial DNA (mtDNA), and autosomal tests.[167] The tests that use the Y-chromosome and the mtDNA are employed to trace uniparental ancestry, specifically patrilineages and matrilineages, respectively.[168] Because these regions of the genome are generally considered to be non-recombining, the inference can be made that genetic markers that are identical by state are so because they are identical by descent, i.e., because they shared common ancestry with the same original mutational event.[169] As mutations occur over time, the haplotypes (the

---

Title X, § 1002(1), 119 Stat. 2960 (2005). For discussion, *see* Simoncelli & Krimsky, *supra* note 2.

[166] *See* DNAPrint Genomics, http://www.dnaprint.com/welcome/products andservices/anestrybydna/ (last visited Sept. 8, 2009) ("Using complex statistical algorithms, the test can determine with confidence to which of the major bio-geographical ancestry groups, Sub-Saharan African, European, East Asian or Native American, a person belongs . . . .").

[167] *See, e.g.*, Elizabeth E. Marchani et al., *Culture Creates Genetic Structure in the Caucasus: Autosomal, Mitochondrial, and Y-Chromosomal Variation in Daghestan*, BMC GENETICS (2008); Carolina Bonilla et al., *Admixture Analysis of a Rural Population of the State of Guerrero, Mexico*, 128 AM. J. PHYS. ANTHROPOL. 861 (2005); Mark D. Shriver & Rick A. Kittles, *Genetic Ancestry and the Search for Personalized Genetic Histories*, 5 NATURE REV. GENETICS 611 (2004); Rick A. Kittles et al., *Autosomal, Mitochondrial, and Y Chromosome DNA Variation in Finland: Evidence for a Male-Specific Bottleneck*, 108 AM. J. PHYS. ANTHROPOLOGY 381–99 (1999).

[168] Patrilineage is a descent group where descent is traced only through males, and matrilineage is a descent group where descent is traced only through females. Because only males have Y-chromosomes, Y-DNA is used to trace genetic ancestry through the male line, or patrilineage. Because all individuals inherit their mtDNA from their mothers, mtDNA is used to trace genetic ancestry through the female line, or matrilineage. For a tutorial on lineages, *see* African Ancestry—Understanding Lineages, http://www.africanancestry.com/ understanding-lineages.html (last visited Oct. 11, 2009). *See generally* MARK A. JOBLING, MATTHEW HURLES, & CHRIS TYLER-SMITH, HUMAN EVOLUTIONARY GENETICS: ORIGINS, PEOPLES & DISEASE (2003).

[169] *See generally* Jobling et al., *supra* note 168.

sequences of individual instances of the specific DNA molecules) evolve a nested, tree-like structure of descendant sequences whose differences reflect the specific mutational changes that have occurred in the lineage of each sequence since its descent from its shared ancestral sequence.[170] Haplogroups (groups of closely related haplotypes that have shared recent common ancestry and similar sets of mutational changes) generally are not fixed or unique to a particular human population, but they do arise in a single geographic area.[171] Thus, the statistically significant differences in frequency of haplogroups among a set of populations that have been pre-selected to represent the ancestral history of a population can be used to estimate with which of these putative parental groups a particular individual's haplotype is affiliated.

The third form of DNA ancestry test[172] utilizes the biparental inheritance of autosomal markers. Autosomal sequences acquire tree-like descent similar to Y-chromsome and mtDNA sequences. However, since each person contains two different copies of each autosome (one from his/her father and one from his/her mother), and since autosomal sequences undergo recombination that scrambles the various haplotype sequences, autosomal ancestry tests do not rely on haplotypes like Y-chromosome or mtDNA tests do. Rather, autosomal ancestry tests rely generally on comparisons of frequencies of alleles at very large numbers of different loci. The loci analyzed are known as ancestry informative markers ("AIMs") and are those whose allele frequencies vary substantially among some set of putative "parental" populations of which individuals may be the admixed descendant.[173] The assumed "parental" populations for ancestry tests performed in the United States often represent four continental populations: European, West African, East Asian, and Indigenous American.[174] An individual is genotyped at these AIMs, and the results are analyzed

---

[170] *Id.*

[171] *Id.*

[172] These are often called "proportional ancestry tests" or "biogeographical ancestry tests."

[173] *See generally* Shriver & Kittles, *supra* note 167.

[174] *Id.*

using a maximum likelihood statistical analysis to determine what combination of the genotypes at the test loci from the "parental" populations would best explain the particular combination of genotypes of the individual.[175]

The limitations and caveats of genomic ancestry testing have been thoroughly discussed;[176] however, a few points deserve reiteration. First, it must always be remembered that proportional ancestry tests do not provide absolute results of ancestry but statistical estimates of ancestry.[177] Second, the "parental" populations in the analysis are samples from contemporary populations used as proxies for "ancestral populations," which may be inaccurate.[178] Third, the affiliations reported are based on probability and subject to interpretation only with reference to the confidence levels of the test.[179]

C. *Indirect Molecular Photofitting*

"The primary reason most forensic scientists want to know about ancestry is to assist them in reconstructing physical appearance; that is, to enable generalizations about overt phenotypes that might help them identify the person, suspect, or victim."[180] Reporters have described *direct* molecular photofitting as going "far beyond doing an identity-proving genetic

---

[175] *Id.*

[176] *See* Kenneth M. Weiss & Jeffrey C. Long, *Non-Darwinian Estimation: My Ancestors, My Genes' Ancestors*, 19 GENOME RESEARCH 703 (2009); *see also* Sandra Soo-Jin Lee et al., *The Illusive Gold Standard in Genetic Ancestry Testing*, 325 SCIENCE 38–39 (2009); Deborah Bolnick et al., *The Science and Business of Genetic Ancestry Testing*, 318 SCIENCE 399–400 (2008); Jeffrey C. Long & Rick A. Kittles, *Human Genetic Diversity and the Nonexistence of Biological Races*, 75 HUM. BIOLOGY 449–71 (2003).

[177] *See* J.K. Wagner, *Redefining Native Americans in a Post-Genomic Era: Legal Implications of Genetic and Genomic Ancestry Tests*, AM. INDIAN Q. (forthcoming); *see also* J.K. Wagner, Redefining Native Americans in a Post-Genomic Era: Legal Implications of Genetic and Genomic Ancestry Tests (Oct. 18, 2008).

[178] *Id.*

[179] *Id.*

[180] TONY N. FRUDAKIS, MOLECULAR PHOTOFITTING: PREDICTING ANCESTRY AND PHENOTYPE USING DNA 429 (2008).

fingerprint."[181] Direct molecular photofitting is the technique used to infer phenotypes (i.e., physical traits) from their functional loci (in other words, examining the "genes for" particular traits).[182] Physical traits are more often than not the result of complex (and often illusive) mechanisms of gene-gene and gene-environment interactions.[183] Direct molecular photofitting is still in its infancy; however, anthropological geneticists and scientists funded by the U.S. Department of Justice[184] are actively working on the research and design of techniques to reconstruct (i.e., predict) skin, eye, and hair pigmentation as well as facial morphology from a DNA sample.[185]

While the world anxiously awaits development of reliable *direct* molecular photofitting technologies, law enforcement is currently able to utilize *indirect* molecular photofitting techniques.[186] Indirect molecular photofitting does not rely upon the functional loci causing the phenotypic expression of the trait.[187] The superficial physical traits which were commonly the target of

---

[181] Dick Ahlstrom, *DNA Sample May Be Enough to Build an Image of Your Face*, IRISH TIMES, Feb. 16, 2009, at 8, *available at* http://www.irishtimes.com/newspaper/frontpage/2009/0216/1233867939011.html.

[182] *See* Bert-Jaap Koops & Maurice Schellekens, *Forensic DNA Phenotyping: Regulatory Issues*, 9 COLUM. SCI. & TECH. L. REV. 158, 158 (2008) (explaining that direct molecular photofitting—i.e. what the authors call "direct phenotyping"—is to test an individual's genotype at specific loci that code for phenotypes like hair color or texture).

[183] *See id.; see also* Anne Buchanan & Kenneth Weiss, *GWAS Revisited: Vanishing Returns at Expanding Costs*, at http://ecodevoevo.blogspot.com/2009/04/gwas-revisited-vanishing-returns.html.

[184] The DNA Initiative, started in 2004, has funded, for example, "Identifying and Communicating Genetic Determinants of Facial Features: Practical Considerations in Forensic Molecular Photofitting," and "Determination of the Physical Characteristics of an Individual from Biological Stains." *See* Alternative Genetic Markers, http://www.dna.gov/research/alternative_markers/.

[185] *See* Gautam Naik, *To Sketch a Thief: Genes Draw Likeness of Suspects*, THE WALL STREET JOURNAL, Mar. 27, 2009, at A9.

[186] *See* Bert-Jaap Koops & Maurice Schellekens, *Forensic DNA Phenotyping: Regulatory Issues*, 9 COLUM. SCI. & TECH. L. REV. 158, 179–80 (2008).

[187] Such a technique relying on functional loci would be considered *direct* molecular photofitting. Generally the science is not yet able to do this as human genetics does not function in a "one gene, one trait" manner, but rather is complex with gene-gene and gene-environment interactions.

overt racism (such as skin pigmentation and facial morphology) tend to be a function of DNA ancestry.[188] In other words, indirect molecular photofitting uses DNA ancestry information as a proxy for the functional, or "phenotypically active," loci underlying expression of these superficial traits.[189] Currently, the technique involves comparing the ancestry proportions of a sample of interest to photographs of individuals with similar ancestry proportions.[190] It is important to note that individuals with similar ancestry proportions may identify themselves with varying ethnicities and/or races.[191] Moreover, it is critical to acknowledge that neither DNA ancestry information nor indirect molecular photofitting speaks to causation. DNA ancestry does not *cause* a trait—whether criminal behavior or skin pigmentation—instead, DNA ancestry is merely correlated with a trait or set of traits.[192]

DNA ancestry information and indirect molecular photofitting, like composite sketches created from eye-witness descriptions, have probative value despite their limitations.[193] It is well known,

---

[188] *See* Jennifer Wagner and Mark Shriver, E-Letter to the Editor, *Misinformation, Social Construction and Genomic Ancestry Testing*, SCIENCE (2007), *available at* http://www.sciencemag.org/cgi/eletters/318/5849/399 ("Social constructions (like anti-miscegenation laws and class/caste systems) reduce gene flow and by influencing with whom we partner drive biological differentiation.").

[189] Frudakis, *supra* note 180, at 429.

[190] Personal communication with Zack Gaskins, DNAPrint Genomics' former technical director of forensics (June 25, 2009).

[191] *See* Yann C. Klimentidis et al., *Genetic Admixture, Self-Reported Ethnicity, Self-Estimated Admixture, and Skin Pigmentation Among Hispanics and Native Americans*, 138 AM. J. PHYS. ANTHROPOLOGY 375, 375–83 (2009).

[192] For an explanation of the theory of admixture mapping generally, *see* Paul M. McKeigue, *Prospects for Admixture Mapping of Complex Traits*, 76 AM. J. HUM. GENET. 1, 1 (2005); *see also* Kaye, *supra* note 4, at 9 ("The pivotal fact is that the few STR loci that are in use reveal nothing about propensities to disease, behavioral traits, or the like.").

[193] Molecular photofitting technologies are notably limited to the extent that causation is not synonymous with predictive value. Because any particular trait is the product of a complex interaction of genetic and environmental factors, any particular allele might have only a minor (yet statistically significant and "causal") effect on the expression of the trait. As a result, the identification of causative alleles for a particular trait does not necessarily imply the ability to

for example, that eye-witness accounts are biased by "the other effect" and are often unreliable as a result.[194] Indirect molecular photofitting as an investigatory tool may be used to corroborate or contradict eye-witness descriptions.[195] As such, the technology is not inherently inculpatory and may prove to be, more often than not, an exculpatory or quality control tool for law enforcement. Pilar Ossorio, an associate professor of law and bioethics at the University of Wisconsin and an opponent of the technology, has explained that:

> Genetically-based descriptions will not produce a particular suspect, but a class or population of suspects. Of course, given the notorious inaccuracy of eye-witness descriptions, trait genetic descriptions need not be very specific or accurate to be at least as good as the status quo, or to provide a useful independent means of assessing eyewitness descriptions and other types of forensic profiles.[196]

When investigators already have identified suspects on the basis of other factors,[197] DNA ancestry and indirect molecular photofitting can help narrow the search to a member of that group of potential

---

predict a reliable or accurate expression of the trait from merely genotype information for those particular causative loci.

[194] Institutionalized racial profiling in law enforcement—like that against those perceived to be of Middle Eastern ancestry in the wake of incidents on Sept. 11, 2001, which was criticized by the Committee on the Elimination of Racial Discrimination for the United Nations to the United States (2008) in their Concluding Observations and motivated the U.N. to urge the United States to adopt the End Racial Profiling Act—is often complicated by eye-witness identifications tainted by biases, stereotypes, and facial recognition inaccuracies. Co-founder of the Innocence Project, Barry Scheck, has reportedly stated, "[t]he majority race is not as good at identifying minorities as it is its own race. This is hard-wired in some way that we don't completely understand." ASSOCIATED PRESS, *Race Sometimes a Problem in Eyewitness IDs*, *available at* www.msnbc.msn.com/id/26123421/. However, "the other race effect" has long been recognized by anthropologists, psychologists, and others who have done a poor job of explaining it to the legal profession and general public. *See* S. Sangrigoli et al., *Reversibility of the Other-Race Effect in Face Recognition During Childhood*, 16 PSYCHOL. SCI. 440 (2005).

[195] As implied by the product name of DNAWitness™.

[196] Pilar N. Ossorio, *About Face: Forensic Genetic Testing for Race and Visible Traits*, 34 J.L. MED. & ETHICS 277, 284 (2006).

[197] Such as being employed at the same location as the victim, driving a car of the same make and model as that leaving a crime scene, or living in close proximity to the crime scene.

suspects or widen the search if no one in the initial suspect pool resembles the likely features predicted by DNA ancestry and indirect molecular photofitting. It is critical to remember that while DNA ancestry information and indirect molecular photofitting are of extreme value to investigators who are dealing with a cold case or when investigators have conflicting eyewitness accounts, the technology is of virtually no value when investigators have reached the accusatory stage and are merely acquiring evidence to prosecute a specific suspect.[198]

IV. ANALYSIS

Investigators seeking DNA samples can obtain them in three basic ways: (1) pursuant to voluntary consent from the individual or group of individuals of interest; (2) pursuant to "DNA line-ups," NIOs, or grand jury subpoenas on the basis of reasonable suspicion; or (3) pursuant to probable cause or a warrant.[199] The first of these methods is generally what critics refer to when discussing "DNA dragnets." Voluntariness of the consent, efficacy, and efficiency of mass collection of DNA samples for comparison with forensic samples are just some of the many criticisms of this method.[200] The DNA line-up has been argued to

---

[198] As the Supreme Court in Draper v. United States, 358 U.S. 307, 321 (1959) stated:

> [A]ny arrest based on suspicion alone is illegal. This indisputable rule of law has grave implications for a number of traditional police investigative practices. The round-up or dragnet arrest, the arrest on suspicion, for questioning, for investigation or on an open charge all are prohibited by the law. It is undeniable that if those arrests were sanctioned by law, the police would be in a position to investigate a crime and to detect the real culprit much more easily, much more efficiently, much more economically, and with much more dispatch. It is equally true, however, that society cannot confer such power on the police without ripping away much of the fabric of a way of life which seeks to give the maximum of liberty to the individual citizen. The finger of suspicion is a long one. In an individual case it may point to all of a certain race, age group or locale . . . .

(internal citation omitted).

[199] *See* Dodson, *supra* note 162.

[200] *See* Boylan, *supra* note 2 (arguing that racial profiling is ineffective and statistical correlation is not enough to justify stopping innocent individuals as

provide law enforcement with all of the benefits of DNA profiling while simultaneously protecting civil liberties by requiring investigators to adhere to strict procedural guidelines and limiting the application of the technique to only the most serious investigations.[201] The last of these three methods is the least controversial since the level of individualized suspicion is greatest. A fourth method, which cannot yet be considered a viable option, is to compel individuals or groups of individuals to submit DNA samples for identification purposes in the absence of a warrant, probable cause, or voluntary consent. Such a method would require recognition of a new exception to the probable cause and warrant requirement, like a categorical exception for biometric identification.[202]

The logical application of DNA ancestry information and indirect molecular photofitting by law enforcement is to provide a sufficient basis for subjecting an individual or small group of individuals to compelled DNA sampling for identification purposes. DNA ancestry tests and indirect molecular photofitting—unlike DNA identification tests—do not provide definitive results bringing an investigation to its end or declaring a suspect to be the perpetrator of a crime with 99.9% certainty. Instead, provide predictions and estimates that may prompt additional investigation of an individual or group of individuals. The critical question is not whether DNA ancestry information and indirect molecular photofitting proves one's guilt beyond a reasonable doubt; rather, the question is whether they can potentially provide enough clues to support either (1) probable cause to obtain a warrant or (2) reasonable suspicion to conduct investigatory stops (such as for DNA line-ups[203]) or to obtain NIOs and grand jury subpoenas.

---

part of an investigation, as "racial profiling is an unjustified expression of racism . . . .").

[201] *See generally* Dodson, *supra* note 162.

[202] Kaye, *supra* note 4, at 192–95.

[203] *See* Dodson, *supra* note 162. "DNA line-ups" refers not to mass collections of DNA (sometimes called "sweeps" or "dragnets"), but rather to obtaining DNA samples from small groups of individuals based on reasonable

A single eyewitness statement has been deemed sufficient not only to issue a warrant based on probable cause to conduct a search during an investigation, but also to find a suspect guilty beyond a reasonable doubt, even in the absence of any other inculpatory information.[204] While identifying the person or persons to be searched by name is sufficient, it is not necessary for a search to be constitutionally valid.[205] Physical characteristics have been deemed sufficient—even without a suspect's name—to establish a valid search warrant based on probable cause.[206] While merely describing the race or ethnicity of the person to be searched is too general to support a valid search,[207] the physical characteristics may be sufficient—even when they are described inaccurately.[208]

---

suspicion that each member of the group may have committed the crime under investigation.

[204] *See* Yancey v. State of Alabama, 2009 WL 725198, at 16 ("[T]he testimony of *an* eyewitness, *standing alone*, is sufficient to support a defendant's conviction . . . .' ") (internal citation omitted) (emphasis added).

[205] *See generally* case law on "John Doe Arrest Warrants."

[206] See Kimberly C. Simmons, Annotation, *Sufficiency of Description in Warrant of Person to be Searched*, 43 A.L.R.5th 1 § 8(a) (1996). *See, e.g.*, State v. Frazier, 665 A.2d 142 (Conn. App. Ct. 1995); Dow v. State, 113 A.2d 423 (Md. 1955); Giordano v. State, 100 A.2d 31 (Md. 1953); Saum v. State, 88 A.2d 562 (Md. 1952); State v. Malave, 316 A.2d 706 (N.J. Super. Ct. App. Div. 1974); State v. Moriarty, 338 A.2d 14 (Super. Ct. App. Div. 1975); State v. Martinez, 753 P.2d 1011 (Wash. Ct. App. 1988). *But see* State v. Maddasion, 539 P.2d 966 (Ariz. Ct. App. 1975) (search was upheld where the warrant described only the sex of the individuals to be searched and their clothing); People v. Simmons, 569 N.E.2d 591 (Ill. App. Ct. 1991) (a search can be valid even when the person(s) to be searched is/are not identified by name but merely described, though here the search was invalidated and evidence suppressed where the officer executing the warrant testified he did not pay attention to the details of the description, particularly the height, when determining which persons to search); and Gonzales v. State, 761 S.W.2d 809 (Tex. App. 1988).

[207] *See* Simmons, *supra* note 206, at B § 8(b); *see also Gonzales*, 761 S.W.2d 809 (search was upheld where the warrant permitted the search of two "latin males" but did not provide any additional description of the persons; however, it did limit the search to a single specified apartment); State v. Hamilton, 840 P.2d 1061 (Ariz. Ct. App. 1992) (invalidating a search where the person was described as "Jim, a black male").

[208] *See generally* People v. Velez, 562 N.E.2d 247 (Ill. App. Ct. 1990) (upholding the search where the warrant authorized the search of a person of "Israel, a white male Hispanic, 5'7", 145 lbs., with black hair" but the defendant

Critics are justifiably concerned about the risk "that forensic genetic profiles that include racial descriptions or racialized language will reinforce or recreate stereotypes of minorities as dangerous, criminal and morally inferior."[209] However, racial descriptions—without more—have long been rejected as an adequate basis for reasonable suspicion or probable cause.[210] The use of proportional DNA ancestry and indirect molecular photofitting might actually serve to dispel false black-white dichotomies and typological stereotypes by allowing to appreciate the complex "ethnogenetic layers"[211] and substantial diversity found within groups of individuals who happen to have been categorized, by themselves or by others, as belonging to the same

---

was 5'11", 195 pounds and where the informant whose information was relied upon for the affidavit accompanied the officer executing the warrant and identified the defendant).

[209] Ossorio, *supra* note 196, at 285.

[210] *See generally* Davis, *supra* note 31.

[211] Fatimah L.C. Jackson, *Anthropological Measurement: The Mismeasure of African Americans*, 568 ANNALS AM. ACAD. POL. & SOC. SCI. 154, 164. Professor Jackson states that:

> Ethnogenetic layering (applied to the U.S. context) relies on the historical fact that, as different ethnic groups have occupied various regions of the country and as genes and culture have flowed between resident groups, the United States has become a mosaic over geographical space. Over the last 500 years, waves of different groups from various specific parts of the world have come to particular U.S. geographical regions, established residence, interacted with each other, and been acted upon by the existing biotic and abiotic environments. The major ancestral groups contributing to the U.S. gene pool are Western and Northern Europeans, Western and Central Africans, Native American Indians, and East Asians. However, among specific regional groups of Americans, both the percentage and specific allelic contributions of these ancestral groups vary. Over the generations, each part of the country developed different constellations of ethnic origins, creating a mosaic over geographical space and through time. By carefully documenting the genetic aspects of this mosaic, a framework emerges for identifying pockets of particular types of variation. Studies of the molecular genetics of various groups of Americans have revealed that some of these pockets of variation provide insights into the ancestral origins and extent of variability within the nation.

Id.

race and/or ethnicity.[212] Developing rigid, uniform standards for laboratory technicians reporting the results to investigative officers might prove sufficient to prevent any actual or perceived racial discrimination by law enforcement utilizing DNA ancestry and indirect molecular photofitting technologies. For example, standards should require every laboratory to provide similar visual representation of the test results that reflect the statistical, probabilistic nature of the results.[213]

DNA Witness™ is a method developed to identify a suspect through genomic ancestry testing that could be used by law enforcement to bolster eyewitness identifications or to provide

---

[212] *See* Indrani Halder et al., *A Panel of Ancestry Informative Markers for Estimating Individual Biogeographical Ancestry and Admixture from Four Continents: Utility and Applications*, 29 HUM. MUTATION 648, 649 (2008). The authors explain:

> There are relatively few genomic regions that differ substantially among populations. Yet, based on continental origin and ethnogeographic affiliation, some phenotypes (e.g., skin color, height, facial features, and hair textures) exhibit substantial variation as a function, seemingly, of genetic ancestry. Given the substantial interindividual variability in admixture proportions within most historically intermixed populations, the relationship between overt phenotypes and genetic ancestry (or social constructs) is tenuous. For example, dark skin color imparted by eumelanin expression would not be a good indicator of West African ancestry, since many other populations such as Australian, Melanesian, and South Asians also express higher levels of eumelanin and exhibit darker skin color. In other cases, cryptic population structure contributed by recent ancestral admixture can be common for many populations, yet not always appreciable and certainly not quantifiable through self-assessment or visual cues. Hence, the practice of binning persons into single population groups can be inaccurate, and can confound genetic associations contributing to both type I and II errors.

Id. See also Wagner & Shriver, *supra* note 188.

[213] Forensic laboratories should all test with a standardized set of genetic markers. It is unclear whether laboratories all test the same set of markers. Testing different marker panels could give different results and prevent comparisons between tests done in different labs. *See generally* Turi E. King & Mark A. Jobling, *What's in a Name? Y Chromosomes, Surnames and the Genetic Genealogy Revolution*, 25 TRENDS IN GENETICS, 351–60 (2009).

leads on seemingly cold cases;[214] however, it is not infallible and may be discriminatorily applied. A discriminatory impact could result from this purportedly neutral tool if the underlying research methods make it preferentially more probable that someone from one population can be identified, prosecuted, and convicted on genetic evidence compared to individuals from other populations.[215] Furthermore, there is an important distinction between (1) predicting phenotypes of (and thereby identifying) suspects based on genetic evidence and (2) predicting criminal behavior based on genetic evidence, though the line is a thin one (and possibly unrecognized by the minds of those prospective jurors who spend their evenings watching "CSI"). The interests of victims—who often want law enforcement to exhaust all resources to catch those responsible—must be balanced with the interests the innocent have in not being unjustly persecuted. These equal protection considerations apply even to guilty persons: the disparate impact may arise if the utilization of this technology makes it more likely for law enforcement to identify and capture a guilty person of one ethnicity than a guilty person of a different ethnicity.

Technocratic statements that a DNA ancestry estimate is the equivalent of evidence of race or ethnic identity[216] are dangerous exaggerations of the weight and relevancy law enforcement should give to genetic test results. When a company provides law enforcement officers with proportional ancestry estimates and photos of individuals with similar estimates, there is little room to argue from a legal standpoint that this is not racial profiling—although scientists involved have done so, arguing that

---

[214] DNA Witness 2.5™ is trademarked by DNAPrint Genomics. *See* DNAPrint Genomics, http://www.dnaprint.com/welcome/productsandservices/forensics/ (last visited Oct. 11, 2009).

[215] This might arise from various sampling biases, for example.

[216] Melba Newsome, A *New DNA Test Can ID a Suspect's Race, But Police Won't Touch It*, WIRED, Jan. 2008, at 74.

"DNAWitness™ will hold up to scientific scrutiny whereas personal feelings and biases won't."[217]

When using any kind of evidence of the race and/or ethnicity[218] of an individual to make an initial determination whether to include that person as a possible suspect, one is engaging in profiling. While DNA ancestry testing is statistically rigorous, it is not free from biases due to the nature of reference databases and markers chosen. Even the concept itself *assumes* the existence of definable populations that can therefore have a "profile." Moreover, there is a critical distinction between using DNA ancestry to predict *genealogical ancestry* or *personal identity* (as in well-established usage of fingerprints) and using it to predict *appearance* or *ethnic identity.* Ancestry involves assumptions about the predictive power of known genetic variation to accurately reflect the ancestral genealogical lineages of individuals, while predicting appearance requires a much more problematic assumption about the level of genetic determinism and the degree to which epigenomic factors obscure that connection. Prosecutors, defense attorneys, judges, and legislators alike must be educated on the intricacies of estimates of genomic ancestry based on maximum likelihood analysis, as it is vital to the debate over whether such evidence, which is marketed suggestively as the equivalent to eyewitness testimony, sometimes with little or no additional evidence, is sufficient to support a conviction requiring guilt to be proven beyond a reasonable doubt. Translating the nuanced scientific terminology into a digestible format for members of the legal profession is not an easy task, but it is an

---

[217] Sheri Fink, *Reasonable Doubt: Questions about the Forensic Infallibility of DNA Emerge Even as Police Begin to Use It to Profile Suspect by Race,* DISCOVER MAGAZINE, July 2006, at 54, 58.

[218] I define race and ethnicity following Kevin Cokley, *Critical Issues in the Measurement of Ethnic and Racial Identity: A Referendum on the State of the Field*, 54 J. COUNSELING PSYCHOL. 224, 225 (2007). Race is "a characterization of a group of people believed to share physical characteristics such as skin color, facial features, and other hereditary traits." Ethnicity is "a characterization of a group of people who see themselves and are seen by others as having a common ancestry, shared history, shared traditions, and shared cultural traits such as language, beliefs, values, music, dress, and food" which can be defined broadly to include biological traits or narrowly to exclude them.

essential one, as the decisions handed down by courts reinforce the beliefs of the public and may determine life or death, freedom or incarceration, trust or distrust in law enforcement.

The validity of law enforcement using DNA ancestry testing with indirect molecular photofitting to obtain a sample for DNA identification must be addressed by first asking if testing a saliva sample for DNA identification markers is a search subject to Fourth Amendment restrictions. If such a testing is a search as defined by the Fourth Amendment, then the reasonableness of this search must be examined. To answer the first question, courts must determine whether there is a reasonable expectation of privacy in one's DNA identification markers. To answer the latter question, courts must determine whether the search is made pursuant to (1) voluntary consent; (2) a warrant based upon probable cause; or (3) an established exception to the warrant requirement.

It is clear that American society values privacy.[219] However, the right to privacy, which was not recognized until 1890,[220] can take a variety of forms: informational, decisional, physical, and proprietary.[221] There is some indication that the various forms of privacy are becoming less important as the courts hint at a "composite approach" to privacy.[222] Privacy has long been understood, however, as individual autonomy to control access to:

> knowledge about oneself. But it is not simply control over the quantity of information abroad; there are modulations in the quality of the knowledge as well. We may not mind that a person knows a general

---

[219] According to a CBS/New York Times poll taken in 2005, 52% of Americans view their right to privacy as "under serious threat." *See* Joel Roberts, *Poll: Privacy Rights Under Attack: Americans Want Government to Do More to Protect Their Privacy*, CBS NEWS, Oct. 2, 2005, *available at* http://www.cbsnews.com/stories/2005/09/30/opinion/polls/main894733.shtml.

[220] Samuel Warren & Louis Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193 (1890).

[221] *See* Anita L. Allen, Genetic Privacy: Emerging Concepts and Values, *in* GENETIC SECRETS: PROTECTING PRIVACY AND CONFIDENTIALITY IN THE GENETIC ERA 31, 33–34 (Mark A. Rothstein ed., 1997).

[222] *See* Drobner, *supra* note 2.

> fact about us, and yet feel our privacy invaded if he knows the details."[223]

Moreover, with the much touted passage of the Genetic Information Nondiscrimination Act of 2008 ("GINA"),[224] genetic privacy is now widely acknowledged.[225] However, this genetic privacy interest is due in part to a relatively poor understanding of the complexity of genetics and, specifically, to genetic exceptionalism.[226] Is this merely an instance where, as Judge Richard A. Posner of the U.S. Court of Appeals for the Seventh Circuit argues, the individual's claim to privacy is merely the individual's interest "to manipulate the world around them by selective disclosure of facts about themselves"?[227] Posner's point may be valid when the information the individual wants to protect (or, from Posner's perspective, hide) is absolute, certain, and immutable; however, much of genetic information, including genetic ancestry information and predicted phenotypes, is merely

---

[223] Charles Fried, *Privacy*, 77 YALE L.J. 475, 483 (1968), *as reprinted in* SOLOVE ET AL., INFORMATION PRIVACY LAW 45 (2d ed. 2006).

[224] Pub. L. No. 110-233, 122 Stat. 881 (2008).

[225] The Human Genome Organization ("HUGO") is devoting a significant portion of its Genomics, Ethics, Law and Society symposium in Geneva, Switzerland (Nov. 2009) to the topic of genomic privacy. The late Senator Edward Kennedy called the Genetic Information Nondiscrimination Act "the first major new Civil Rights bill of the new century." Kathy L. Hudson et al., *Keeping Pace with the Time—The Genetic Information Nondiscrimination Act of 2008*, 358 NEW ENG. J. MED. 2661, 2662 (2008). *See* 23andMe "What Is GINA?" *available at* https://www.23andme.com/you/faqwin/gina/ (last visited Oct. 11, 2009); EPIC, *Genetic Privacy*, http://epic.org/privacy/genetic/ (last visited Oct. 11, 2009). For a database of states' genetic privacy laws, *see* Genetic Privacy Laws, http://www.ncsl.org/default.aspx?tabid=14287 (last visited Oct. 11, 2009). For a discussion on genetic privacy and a transition to open consent, *see* Jeantine Lunshof et al., *From Genetic Privacy to Open Consent*, 9 NATURE REV. GENETICS 406 (2008).

[226] *See* Mark A. Rothstein, *Is GINA Worth the Wait?*, 36 J. L. MED & ETHICS 174 (2008). *See also* J.K. Wagner, *The Genetic Information Nondiscrimination Act of 2008: Minimal Protections but Maximum Publicity.* Poster presented at the Annual meeting of the American Society of Human Genetics Nov. 2008; J.K. Wagner, *Understanding the Signs at the Crossroads of Genomics, Ethics, Law and Society, Requirers Multidisciplinary Interpreters: DNA Ancestry Tests as a Case Study*, PERSP. IN BIOLOGY & MED. (forthcoming).

[227] Richard A. Posner, *The Right of Privacy*, 12 GA. L. REV. 393 (1978), *excerpted in* Solove et al., *supra* note 223, at 63.

probabilistic. Is it reasonable for anyone to have an expectation of probabilistic privacy? Notions of genetic privacy—and the push for legislation to protect such a right—are misguided. Commentators have noted that "[g]enetic information is unique because it is regarded as unique."[228] Indeed, the entire genetic privacy movement has been described as "a response to fears of genetic determinism."[229]

The reasonableness of an expectation of genetic privacy cannot be judged as a static one-time determination, regardless of the conservative forces of legal precedent. As early as the right to privacy itself, scholars understood that rights must be judged with a contextual awareness and that privacy law must adapt to changing needs of society.[230] When individuals recognize the naïveté of genetic determinism and begin to understand both the complexities of gene-gene and gene-environment interactions and the distinctions between various types of genetic information or tests, the expectation of genetic privacy will necessarily diminish—at least for some loci. While there is unquestionably a reasonable expectation of privacy in one's medically relevant genetic information,[231] the reasonableness of an expectation of

---

[228] Margaret Everett, *Can You Keep a (Genetic) Secret? The Genetic Privacy Movement*, 13 J. GENETIC COUNSELING 273, 282 (2004) (quoting Mark A. Rothstein, *Genetic Secrets: A Policy Framework*, *in* GENETIC SECRETS: PROTECTING PRIVACY AND CONFIDENTIALITY IN THE GENETIC ERA 451, 459 (1997)). *But see* Laura Plantinga et al., *Disclosure, Confidentiality, and Families: Experiences and Attitudes of Those with Genetic Versus Nongenetic Medical Conditions*, 119 AM. J. MED. GENETICS 51, 59 (2003) (finding "no evidence that patients feel more strongly about the confidentiality of their genetic or familial information than they do about any of their medical information. . . .").

[229] *See* Everett, *supra* note 228, at 283.

[230] Stephanie L. Anderson, 25 J. LEGAL MED. 119, 121 (2004) (reviewing Graeme Laurie's *Genetic Privacy: A Challenge to Medico-Legal Norms* and quoting Samuel D. Warren & Louis Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193 (1890)).

[231] While genetic information is a powerful tool for biomedical researchers and healthcare providers, "the role of the environment is extremely important for nearly all behaviors and common diseases, and gene-environment interactions are complex and dynamic . . . the presence of specific susceptibility genes is far from a perfect predictor of the true probability of experiencing a given illness or

genetic privacy *solely in identification markers* is far from certain. There is a compelling argument that increasing our knowledge of genetic identities, specifically via a national database, "will promote 'racial justice,'" rather than promote racial profiling or discrimination on a genetic level.[232] Just as highlighting every sentence on a page is the equivalent of highlighting nothing, so too would be a national database. A national database would theoretically eliminate or mitigate many of the criticized problems with current DNA databases (such as the disproportionate representation of minorities or the need for controversial familial searches) and would theoretically provide equal benefits by providing not only equal probability of getting caught for crimes the individual has committed and left DNA evidence but also equal opportunity to be identified in the aftermath of any abductions, human trafficking, natural disasters or terrorist attacks.

While people generally do not intentionally advertise their medical or genetic conditions, they do publicly expose their identity (whether by name, physical appearance, ethnic affiliations, group memberships, or other information that can tie them to various aspects of their lives, including genetic information). For example, Americans increasingly have Facebook profiles[233] and blogs[234] that announce their identities to the world—albeit some in

---

exhibiting a given trait." Vence L. Bonham et al., *Race and Ethnicity in the Genome Era: The Complexity of the Constructs*, 60 AM. PSYCH. 9, 13 (2005). Genetic information, in most cases, will not accurately predict some information most important to patients like how a particular condition will manifest itself in that specific individual (e.g. time of onset, severity, and duration of the condition). *See* Eric T. Juengst, *Face Facts: Why Human Genetics Will Always Provoke Bioethics*, 32 J.L. MED. & ETHICS 267, 268 (2004).

[232] Mark A. Rothstein & Meghan K. Talbott, *The Expanding Use of DNA in Law Enforcement: What Role for Privacy?*, 34 J.L. MED. & ETHICS 153, 155 (2006).

[233] Facebook membership, for example, reportedly doubled its membership in just eight months between August 2008 and April 2009. *See* Tim Stevens, *Facebook: 200 Million Served*, SWITCHED, Apr. 9, 2009, http://www.switched.com/2009/04/09/facebook-200-million-served/.

[234] *See* Danny Schechter, *They Blog, I Blog, We All Blog*, NIEMAN REPORTS, http://www.nieman.harvard.edu/reportsitem.aspx?id=101572 (stating that more than 12 million American adults maintain a blog, more than 120,000 blogs are created daily, and more than 1.4 million new blog posts are made daily).

more revealing detail than others. Getting one's genome tattooed onto one's arm has been reported.[235] While many Americans hold tight to personal interests of genetic privacy for themselves, many other Americans purchase direct-to-consumer DNA kits to test paternity or direct-to-consumer services which have become widely known as "recreational genetics."[236] Customers of 23andMe, Inc., for example, can (and frequently do) share their DNA ancestry results and genetic results for a variety of clinical and research traits with their friends, family, co-workers, and other customers.[237] DNA testing is becoming routine in medical and public spheres, which may correct the public's mistaken assumptions of genetic essentialism or determinism and, simultaneously, may shut the door on the special treatment of genetic information.[238] For example, recent scholars have concluded at least in the medical context that "[t]he association of biomedical data with social identities is less risky when differences in genetic frequencies or disease incidences are viewed as consequences of the ways in which people are grouped rather than as biological confirmations of perceived differences between those groups."[239]

One possible solution that would provide clarity and consistency to DNA sampling and Fourth Amendment questions is that the Supreme Court set forth a narrow, categorical exception for biometric identification, the verification of an individual's identity through the use of "measurable physiological or behavioral

---

[235] Griffin Longley, *Human Bar Code*, WEST AUSTRALIAN, Oct. 1, 2005, *available at* 2005 WLNR 15538123 (discussing a company that offers not only to preserve a customer's DNA indefinitely but also to print the customer's genetic code on consumer goods like t-shirts or mugs).

[236] *See Opening Bell*, THE BRADENTON HERALD, Sept. 20, 2002, at 1B.

[237] *See* 23andMe's "Genome Sharing" feature. I personally share my genomic information with some of my family members, friends, and co-workers.

[238] *See* M.W. Foster et al., *The Routinization of Genomics and Genetics: Implications for Ethical Practices*, 32 J. MED. ETHICS 635 (2006) (concluding that "[G]enetic information may no longer be treated as exceptional in comparison to other kinds of biomedical information," and recognizing the routinization of genetics and genomics may bring with it many unintended consequences requiring bioethical discussions).

[239] *Id.* at 637.

characteristics."[240] As David Kaye, Distinguished Professor of Law at the Pennsylvania State University's Dickinson School of Law and expert in genetics evidence has explained, determining whether the exception is applicable to the case would involve a three-prong analysis to determine that: (1) "[t]he process is not physically or mentally invasive;" (2) "[t]he data are useful primarily to link individuals to crime scenes or to establish the true identity of a given individual;" and (3) "[t]he data are valid, reliable, and effective for linking individuals to crime scenes or establishing the true identity of a given individual."[241]

V. CONCLUDING REMARKS

DNA ancestry testing and indirect molecular photofitting are forensic tools with limited utility. Law enforcement is often called upon to catch criminal offenders on scant clues. DNA ancestry results and indirect molecular photofitting provide probative information that could assist with an otherwise mystifying investigation. The usefulness of DNA ancestry testing and indirect molecular photofitting is inversely related to the amount of evidence available concerning the crime at hand. It would be erroneous to argue that an individual should be prosecuted because of similarity between the individual's DNA ancestry proportions and those of a forensic sample. Likewise, it would be misguided to suggest an individual should be prosecuted because of similarity between the individual's appearance and predictions of a perpetrator's appearance, whether those predictions are based on an eyewitness's description, a video image, or indirect molecular photofitting. However, it would be equally misguided to argue that law enforcement should knowingly ignore clues exposed using

---

[240] Kaye, *supra* note 4, at 192–95, n.78. Application of Y-DNA ancestry tests and surname prediction has been, according to King and Jobling, proven in theory but not yet applied. The authors caution premature forensic application without consideration of several important research design questions, warning that because the link between Y-DNA ancestry and surnames is weak for common surnames and because including all rare variations of surnames into the search is impractical, the utility may be compromised in urban populations. King & Jobling, *supra* note 213, at 355–57.

[241] Kaye, *supra* note 4, at 193–94 (emphasis removed).

these technologies that suggest some leads be given more weight than others.

Critics are right to question the fairness and reliability of any investigatory tool, including DNA technologies, especially since the American legal system values a presumption of innocence. Yet citizens have a duty to cooperate with law enforcement and help ensure that innocent people are not wrongly prosecuted. Critics correctly insist that investigations and prosecutions are conducted without discriminating against any protected class (such as race, ethnicity, nationality, sex, or religion). Yet critics of DNA ancestry testing and indirect molecular photofitting should not confuse the distinct roles that investigators and prosecutors play in our criminal justice system, or the critical distinctions between suspects and defendants.[242] Policymakers, judges, law enforcement officers, and civil rights activists alike must develop a more nuanced understanding of genetics—one that appreciates the complex interactions between genes and environment and the significance of biological, cultural, and biocultural forces that shape the world. Criminal behavior is not caused by DNA ancestry, a suite of physical characteristics, or DNA identification markers, yet DNA ancestry is often correlated with suites of physical characteristics, and physical characteristics are of undeniable value when trying to identify a person.

DNA ancestry testing and indirect molecular photofitting might help investigators narrow the pool of potential suspects from whom they seek DNA identification samples—regardless of the method selected from those just described. While selective investigation and prosecution of minorities is a legitimate cause for concern, there is no logical reason to assume the use of DNA technologies by law enforcement would "further distort the racial bias in the criminal justice system."[243] Criminal profiling (as

---

[242] *See* Fullwiley, *supra* note 2 (incorrectly focusing on the trial phase when DNA ancestry and indirect molecular photofitting is applied at the investigatory stage and would be irrelevant at trial).

[243] Troy Duster, *DNA Dragnets and Race: Larger Social Context, History and Future,* 25 GENEWATCH 3–5 (2008) (arguing racialized dragnets, expansion of DNA databases to include arrestees and the CSI effect "can and will further distort the racial bias in the criminal justice system.").

opposed to racial profiling)—i.e., using specific crime scene information to create or infer a general description or "profile" of the criminal suspect—has long been acceptable investigative work: excluding individuals from a suspect pool simply because the individuals are right-handed and the perpetrator is predicted to be left-handed would not raise controversy. Conversely, using DNA ancestry testing alone raises concerns since there is the potential that investigators without a firm understanding of the technology's capabilities and limitations will place individuals inside or outside of the suspect pool merely on the basis of the suspect's *predicted* membership in a protected class (i.e., on the basis of race or ethnicity).

DNA ancestry with indirect molecular photofitting (and eventually direct molecular photofitting, if labors of current research ever bear fruit) is concededly far from an exact science. However, the technology is able to provide investigators with more probative information, like whether a suspect with given genetic ancestry proportions is likely to have certain physical features or perhaps even a surname or variant thereof.[244] Some scholars have argued that the dangers of the technique can be minimized by limiting the traits that investigators are permitted to predict.[245] For example, Koops and Schellekens, Tilburg Institute for Law, Technology and Society professor of regulation and technology and assistant professor of law and technology, respectively, argue that "externally perceptible traits" (like hair color) and "non-sensitive behavioral traits" (like handedness) should be permissible since police already use such information as obtained through alternative criminal profiling techniques.[246] It is uncertain whether DNA ancestry tests and indirect molecular photofitting would increase investigators' "tunnel vision" and cause them to value the DNA predictions above other relevant clues, or whether the

[244] *See* King & Jobling, *supra* note 213.

[245] *See* Koops & Schellekens, *supra* note 182.

[246] *Id.* These authors have a narrow definition of indirect molecular photofitting. Koops and Schellekens define indirect molecular photofitting as providing only predictions of geographic origin and surnames and direct molecular photofitting as predicting body features and behavioral characteristics.

technologies may help remove the prejudicial blinders that investigators may have toward minorities.[247]

The public's perception of racial profiling, DNA dragnets, and genetic witnesses is just as important as the reality of law enforcement's use of DNA ancestry testing and indirect molecular photofitting. The Supreme Court could remove the drama from the situation by specifically deciding (1) whether NIOs are constitutional under the Federal Constitution, (2) whether a Federal Constitutional exception should be made for DNA identification testing, and (3) whether individuals have a reasonable expectation of privacy in his/her DNA identification markers or other non-medically relevant DNA loci. Until these questions are answered by the Supreme Court, it would be wise to encourage Congress and states to establish and to adopt uniform standards for laboratories using DNA ancestry and indirect molecular photofitting during investigations. Such standards would ensure that the investigators on the street are given the results based on genetic realism (rather than results based on genetic determinism, essentialism, or exceptionalism). Moreover, law enforcement agencies applying DNA ancestry and indirect molecular photofitting would be wise to adopt uniform standards (including written informed consent) for its investigators seeking voluntary DNA samples (from individuals or DNA line-ups) so as to dispel even the hint of impropriety, coercion or duress. Finally, while we all should stay on alert for infringements on our civil rights and liberties as law enforcement develops and incorporates new investigatory tools in questionable constitutional territory, we should not allow scientific illiteracy or misconceptions about DNA ancestry testing specifically or genetic information generally to control the debate.

---

[247] *Id.* at 90.