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GENETIC PRIVACY & THE FOURTH AMENDMENT: UNREGULATED SURREPTITIOUS DNA HARVESTING

*Albert E. Scherr**

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I. INTRODUCTION

Genetic privacy and police practices have come to the fore in the criminal justice system. Developing case law¹ and stories in the media² document that police are surreptitiously harvesting the DNA of putative suspects.³ Some sources indicate that surreptitious data banking may also be in its infancy.⁴ In one twist, a sample of DNA from a five-year-old Pap smear of an unsuspecting and unsuspected relative of the infamous BTK killer in Kansas City contributed to his arrest.⁵

Surreptitious DNA harvesting⁶ by the police is currently unregulated by the Fourth Amendment. The few courts that have addressed the issue consistently find that the police are free to harvest DNA abandoned by a putative suspect in a public place.⁷ Little in the nascent surreptitious–harvesting case law suggests

¹ See, e.g., *Commonwealth v. Bly*, 862 N.E.2d 341, 351–52 (Mass. 2007) (discussing methods employed by Boston police to obtain suspect’s DNA); *State v. Athan*, 158 P.3d 27, 31 (Wash. 2007) (explaining ruse invented by Seattle Police Department to collect defendant’s DNA); *State v. Christian*, No. 04-0900, 2006 WL 2419031, at *1 (Iowa Ct. App. Aug. 23, 2006) (describing subterfuge employed by Iowa City police to collect suspect’s DNA).

² See, e.g., Amy Harmon, *Lawyers Fight DNA Samples Gained on Sly*, N.Y. TIMES, Apr. 3, 2008, at A1 (describing differing opinions on the legality of surreptitiously collected DNA samples).

³ A “putative suspect” is one whom the police suspect of having committed a crime but for whom the police do not have sufficient evidence to meet the probable-cause standard for a search warrant to get a sample of the suspect’s blood or saliva for DNA analysis.

⁴ See, e.g., Jeffrey S. Grand, *The Bleeding of America: Privacy and the DNA Dragnet*, 23 CARDOZO L. REV. 2277, 2280 (2002) (noting that law enforcement agencies may be creating massive database of DNA profiles); Richard Willing, *Local DNA Labs Avoid State and U.S. Limits: Databases Nab Criminals, but Legality in Question*, USA TODAY, Mar. 26, 2007, at 1A (“A growing number of police crime labs are adding DNA from suspects to databases”); Tom Precious, *Crime Lab Lambasted over DNA Database; Policies Defended as Needed Both To Solve and Prevent Crimes*, BUFFALO NEWS, May 21, 2006, at A1 (explaining county’s policy concerning expansion of state’s collection of genetic information).

⁵ Ellen Nakashima, *From DNA of Family, a Tool to Make Arrests: Privacy Advocates Say the Emerging Practice Turns Relatives into Genetic Informants*, WASH. POST, Apr. 21, 2008, at A01.

⁶ The term “surreptitious harvesting” is used in this Article instead of the term “surreptitious sampling.” It is a term that more comprehensively captures the police conduct at issue.

⁷ See, e.g., cases cited *supra* note 1.

that surreptitious data banking would be regulated under current judicial conceptions of the Fourth Amendment.

Interestingly, some evidence exists that surreptitious DNA harvesting is also happening in the noncriminal context. Apparently, some amateur genealogists have made surreptitious efforts to get DNA from a putative relative for ancestry or kinship testing.⁸ In one circumstance, a high-profile celebrity divorce, a private investigator was able to obtain dental floss for DNA paternity analysis from the garbage of the putative father.⁹

Even in its infant stages, DNA harvesting by private parties is regulated. In the cases of the amateur genealogist and the private investigator, it is very possible that such conduct falls within the prohibitions of a genetic-privacy statute in some jurisdictions.¹⁰ If so, the genetic-privacy intruder may be liable for damages in a private cause of action.¹¹

If a private party targeted a putative suspect as a potential research subject rather than a subject of a police investigation, the law applicable to human-subject research would raise a host of barriers.¹² The legal and ethical prohibition against obtaining research samples of any kind from a putative subject without that subject's informed consent is one of the foundational principles of modern human-subject research.¹³

So why does the law regard genetic privacy issues in criminal and civil contexts differently? Why do surreptitious-DNA-harvesting practices by private parties get appreciably more legal scrutiny than such practices by police? One broad-brush answer

⁸ Amy Harmon, *Stalking Strangers' DNA To Fill in the Family Tree*, N.Y. TIMES, Apr. 2, 2007, at A1.

⁹ David M. Halbfinger & Allison Hope Weiner, *Celebrity Lawyer in Talks About Wiretapping Evidence*, N.Y. TIMES, Feb. 25, 2006, at B7.

¹⁰ See, e.g., N.M. STAT. ANN. §§ 24-21-1 to -6 (West 2012) (generally prohibiting use of genetic information without informal and written consent). See generally Elizabeth E. Joh, *DNA Theft: Recognizing the Crime of Nonconsensual Genetic Collection and Testing*, 91 B.U.L. REV. 665 (2011) (arguing for the criminalization of private-party theft of another's DNA).

¹¹ § 24-21-6(B).

¹² See generally CARL H. COLEMAN ET AL., THE ETHICS AND REGULATION OF RESEARCH WITH HUMAN SUBJECTS (2005) (explaining human-subject research law).

¹³ *Id.*

is that society places more value on the public-safety goal of solving crimes than on the needs of amateur genealogists, divorce lawyers, and genetic researchers. That broad-brush answer is unsatisfactory.

Current Fourth Amendment jurisprudence on surreptitious harvesting creates an all-or-nothing dynamic. If a putative suspect—one for whom the police have some reasonable suspicion but not enough for a search warrant—abandons his DNA in a public place, the police can do with the sample what they will, without limitation. The police can do the same for a suspect for whom they have only a hunch. They can also do the same for someone for whom they have no suspicion, including a victim or a witness. They can do so without a suspect's, a witness's, or a victim's consent or knowledge. If surreptitious DNA harvesting is not a "search" under the Fourth Amendment, the police can do whatever they want with anyone's DNA.

The thrust of this Article is that this all-or-nothing dynamic of DNA-harvesting jurisprudence is an understandable but misguided judicial response to the immediate benefits of a new technology. This Article proposes that police may seize abandoned property containing human cells, which include DNA, without a warrant or probable cause; but, the police need a search warrant supported by probable cause to mine those cells for any genetic information.

Part I reviews the current state of forensic DNA technology as it relates to surreptitious harvesting. Part II reviews existing surreptitious-harvesting case law and the debate about surreptitious harvesting of out-of-body DNA among commentators. Part III frames the surreptitious-harvesting circumstance within Fourth Amendment jurisprudence and identifies three fallacies that accompany current perspectives. Part IV posits a model of an expectation of genetic privacy—a kaleidoscope of identity—that accounts for its physical, informational, and dignitary dimensions. Part V evaluates whether such an expectation of genetic privacy is one that society recognizes as reasonable. It examines the use of DNA metaphors in popular news accounts through the prism of linguistic theory to conclude that society recognizes DNA as a

source of core identity. Part VI concludes that a careful, interdisciplinary analysis of surreptitious DNA harvesting within the context of existing Fourth Amendment jurisprudence militates against an all-or-nothing dynamic and in favor of a requirement that police get a search warrant supported by probable cause to mine an abandoned item for DNA.

II. THE TECHNOLOGY

Twenty-five years ago, the police did not have the investigative techniques at their disposal to engage in surreptitious DNA analysis. U.S. commercial laboratories began using forensic DNA analysis for investigative purposes in 1986.¹⁴ The FBI began using DNA analysis in casework in 1988.¹⁵ Today, over one hundred fifty public laboratories are available for forensic DNA testing in the United States.¹⁶

Prior to the advent of forensic DNA technology, fingerprints and blood typing were the primary forensic identification tools.¹⁷ However, fingerprints were found only at crime scenes where the perpetrator handled an item, and blood typing was of limited discriminatory value.¹⁸ Forensic DNA analysis has reduced many of these limitations because DNA exists in any human cell with a nucleus.¹⁹ Biological samples sufficient for use in DNA analysis can exist, for example, in bloodstains,²⁰ semen stains,²¹ bones,²² teeth,²³ hair,²⁴ saliva,²⁵ urine,²⁶ feces,²⁷ fingernail debris,²⁸ muscle

¹⁴ NAT'L RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 28 (1992).

¹⁵ *Id.*

¹⁶ JOHN M. BUTLER, FORENSIC DNA TYPING: BIOLOGY, TECHNOLOGY, AND GENETICS OF STR MARKERS 3 (2d ed. 2005).

¹⁷ NAT'L RESEARCH COUNCIL, *supra* note 14, at 27–29.

¹⁸ BUTLER, *supra* note 16, at 5.

¹⁹ *Id.* at 33.

²⁰ Bruce Budowle et al., *Simple Protocols for Typing Forensic Biological Evidence: Chemiluminescent Detection for Human DNA Quantitation and Restriction Fragment Length Polymorphism (RFLP) Analyses and Manual Typing of Polymerase Chain Reaction (PCR) Amplified Polymorphisms*, 16 ELECTROPHORESIS 1559, 1560 (1995).

²¹ *Id.*

²² Peter Gill et al., *Identification of the Remains of the Romanov Family by DNA Analysis*, 6 NATURE GENETICS 130, 130 (1994).

²³ A. Alvarez Garcia et al., *Effect of Environmental Factors on PCR–DNA Analysis from*

tissue,²⁹ cigarette butts,³⁰ postage stamps,³¹ dandruff,³² and, ironically, fingerprints.³³

Because a human cell and its nucleus can survive departure from the body itself, transfers of DNA from one place to another can occur frequently, be it from suspect to victim, victim to suspect, suspect or victim to an object or location.³⁴ Given advances in technology, the robustness of the sample is becoming less and less important. A forensic scientist can now extract DNA from a sample that is not visible to the human eye.³⁵

The availability of out-of-body DNA for forensic analysis has greatly expanded the investigative options of the police. For example, crime-scene, out-of-body DNA has led to convictions in previously unsolved crimes.³⁶ In some instances, it has led to the

Dental Pulp, 109 INT'L J. LEGAL MED. 125, 125 (1996).

²⁴ Russell Higuchi et al., *DNA Typing from Single Hairs*, 332 NATURE 543, 543 (1988); M.R. Wilson et al., *Extraction, PCR Amplification and Sequencing of Mitochondrial DNA from Human Hair Shafts*, 18 BIOTECHNIQUES, 662, 662 (1995).

²⁵ David Sweet & Gary G. Shutler, *Analysis of Salivary DNA Evidence from a Bite Mark on a Body Submerged in Water*, 44 J. FORENSIC SCI. 1069, 1069 (1999).

²⁶ Toshihiro Yasuda et al., *A Simple Method of DNA Extraction and STR Typing from Urine Samples Using a Commercially Available DNA/RNA Extraction Kit*, 48 J. FORENSIC SCI. 108, 108 (2003).

²⁷ Andrew J. Hopwood et al., *DNA Typing from Human Faeces*, 108 INT'L J. LEGAL MED. 237, 237 (1996).

²⁸ P. Wiegand et al., *DNA Typing of Debris from Fingernails*, 106 INT'L J. LEGAL MED. 81, 81 (1993).

²⁹ Manfred N. Hochmeister, *PCR Analysis of DNA from Fresh and Decomposed Bodies and Skeletal Remains in Medicolegal Death Investigations*, 98 METHODS OF MOLECULAR BIOLOGY 19, 19 (1998).

³⁰ Manfred N. Hochmeister et al., *PCR-Based Typing of DNA Extracted from Cigarette Butts*, 104 INT'L J. LEGAL MED. 229, 229 (1991).

³¹ B. Hopkins et al., *The Use of Minisatellite Variant Repeat–Polymerase Chain Reaction (MVR–PCR) to Determine the Source of Saliva on a Used Postage Stamp*, 39 J. FORENSIC SCI. 526, 526 (1994).

³² Birgit Herber & Kurt Herold, *DNA Typing of Human Dandruff*, 43 J. FORENSIC SCI. 648, 648 (1998).

³³ Roland A.H. van Oorschot & Maxwell K. Jones, *DNA Fingerprints from Fingerprints*, 387 NATURE 767, 767 (1997).

³⁴ H.C. Lee et al., *Guidelines for the Collection and Preservation of DNA Evidence*, 41 J. FORENSIC IDENTIFICATION 344 (1991).

³⁵ BUTLER, *supra* note 16, at 35.

³⁶ See, e.g., *State v. Whittey*, 821 A.2d 1086, 1089 (N.H. 2003) (affirming conviction for murder supported by DNA analysis of crime-scene semen frozen for eighteen years).

exoneration of wrongfully convicted inmates, some of whom had served five, ten, or twenty years in jail.³⁷

It has also led to the collection of DNA from one whom the police think may have committed a crime but for whom they do not have probable cause for a search warrant to get a DNA sample. Whether one calls this technique the collection of abandoned or shed DNA,³⁸ DNA harvesting, or covert involuntary sampling,³⁹ the police are beginning to use the technique more frequently.⁴⁰

Sometimes, the police follow a person of interest and collect a discarded item that may contain sufficient cells for DNA analysis.⁴¹ Sometimes, the police lure a person of interest to the police station for a noncustodial interview and offer that person a cigarette or a soda.⁴² Sometimes, the police have been even more creative, as in *State v. Athan*.⁴³ There, the police had renewed their investigation of Athan, a possible suspect in a twenty-year-old homicide. They sent a letter to Athan, who was living out of state, posing as a fictitious law firm asking him to join an equally fictitious class action lawsuit concerning parking tickets. Athan signed the enclosed class action authorization form and mailed it back. The forensic laboratory obtained a sample of Athan's DNA from saliva on the envelope flap. Athan was subsequently convicted.⁴⁴

³⁷ See generally INNOCENCE PROJECT, <http://www.innocenceproject.org>.

³⁸ D.H. Kaye, *Science Fiction and Shed DNA*, 101 NW. U. L. REV. COLLOQUY 62, 62 (2006).

³⁹ Elizabeth E. Joh, *Reclaiming "Abandoned" DNA: The Fourth Amendment and Genetic Privacy*, 100 NW. U. L. REV. 857, 882 (2006).

⁴⁰ See generally *State v. Christian*, No. 04-0900, 2006 WL 2419031 (Iowa Ct. App. Aug. 23, 2006); *Commonwealth v. Bly*, 862 N.E.2d 341 (Mass. 2007); *State v. Athan*, 158 P.3d 27 (Wash. 2007).

⁴¹ See, e.g., Harmon, *supra* note 2 (describing how police followed suspect and obtained DNA from discarded cigarette butt).

⁴² See, e.g., *Chastain*, 2006 WL 2419031, at *1 (collecting DNA from water bottle offered to suspect during an apparent volunteer-position interview).

⁴³ 158 P.3d at 31–32.

⁴⁴ *Id.*

III. THE COMMENTATORS AND THE CASES

Commentators have evaluated the harvesting of out-of-body DNA from putative suspects in light of Fourth Amendment jurisprudence. One, Elizabeth Joh, has rejected the appropriateness of a Fourth Amendment abandoned-property or “trash” analogy to this circumstance and has stated that “the Fourth Amendment’s protections appear to fall short of providing a constitutional basis from which to challenge abandoned DNA collection.”⁴⁵ She also evaluated other possible analogies—fingerprints, body parts, and human waste—and found these interpretive mechanisms wanting for “what is important about genetic information.”⁴⁶ She has suggested that the deficiencies in these various analogies “make the case for ‘genetic exceptionalism’: that DNA is a unique category, incapable of abandonment (and perhaps of sale or patent), and warranting its own analysis without reference to other body parts or to trash.”⁴⁷

Another commentator, David Kaye, has concluded that the fingerprint analogy is the correct analogy; courts should not be distracted by the occasional deception involved in harvesting out-of-body DNA—to do otherwise “would be to indulge in ‘genetics exceptionalism.’”⁴⁸ He has focused particular attention on the merit of the fingerprint analogy, closely debating with another commentator whether information gathered at the genetic locations used in STR DNA analysis can tell us something about an individual beyond nametag information.⁴⁹

Both Kaye and Joh use the abandonment theory and the *Katz v. United States*⁵⁰ reasonable-expectation-of-privacy test in their analyses. Both conclude that current Fourth Amendment

⁴⁵ Joh, *supra* note 39, at 868.

⁴⁶ *Id.* at 868–69.

⁴⁷ *Id.* at 869.

⁴⁸ David H. Kaye, *The Science of DNA Identification: From The Laboratory to the Courtroom (and Beyond)*, 8 MINN. J. L. SCI. & TECH. 409, 420 (2007).

⁴⁹ Kaye, *supra* note 38, at 66; Simon A. Cole, *Is the “Junk” DNA Designation Bunk?*, 102 NW. U. L. REV. COLLOQUY 54, 54 (2007). See generally David H. Kaye, *Please, Let’s Bury the Junk: The CODIS Loci and the Revelation of Private Information*, 102 NW. U. L. REV. COLLOQUY 70 (2007) (responding to Cole).

⁵⁰ 389 U.S. 347 (1967).

jurisprudence likely does not provide a putative suspect Constitutional protection from surreptitious harvesting of out-of-body DNA. Joh argues that the putative suspect should have such protection because DNA is different; thus, traditional Fourth Amendment analogies—fingerprints, for example—are not appropriate.⁵¹ Kaye argues the putative suspect should not have constitutional protection because a DNA nametag is not different enough from a fingerprint for Fourth Amendment purposes.⁵²

Courts have uniformly rejected Fourth Amendment protection against surreptitious harvesting of out-of-body DNA by the police. By and large, they have found (1) that the putative suspect abandoned the item upon or in which the DNA-laden cells were found and (2) as a result, there was no expectation of privacy in the item or that which it was in or on. By focusing on the putative suspect's privacy in the discarded item, virtually no court has explicitly considered either the person's privacy rights in the DNA itself or the nature and extent of those genetic-privacy rights.

One of the lengthier opinions on the Fourth Amendment implications of surreptitious harvesting of out-of-body DNA is *People v. Sigsbee*.⁵³ In 1975, the police had some evidence, shy of probable cause, to suspect that Donald Sigsbee had murdered a woman found in a remote landfill area. However, forensic DNA testing did not exist at the time. Twenty-eight years later, in 2003, the police began a loose surveillance of Sigsbee.⁵⁴ One investigator followed Sigsbee to a Wendy's restaurant and watched him eat his meal and drink a root beer through a straw.⁵⁵ When Sigsbee left the Wendy's, the investigator retrieved the cup and straw from the trash and submitted it for forensic DNA testing.⁵⁶

⁵¹ Joh, *supra* note 39, at 882–83.

⁵² Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413, 436–40 (2001). Ironically, Kaye suggests, at the least, that an analysis using abandonment theory, which says that individuals have abandoned any Fourth Amendment protection in their DNA when they abandon it in public, is a closer call than Joh seems to suggest.

⁵³ No. 03-0342, slip op. (Onondaga, N.Y. Cnty. Ct. Oct. 30, 2003).

⁵⁴ *Id.* at 8.

⁵⁵ *Id.* at 9.

⁵⁶ *Id.* at 9–10.

The trial court denied Sigsbee's motion to suppress the straw and the DNA test results from the straw based on a Fourth Amendment violation.⁵⁷ It held that Sigsbee had abandoned any Fourth Amendment privacy interest in his DNA on the straw when he abandoned the straw:

[W]hen the defendant discarded the straw he also discarded any expectation of privacy in the DNA evidence on the straw. While it is unlikely that the defendant believed that he was discarding bodily fluids that would show his DNA profile, nonetheless, by discarding the cup and straw into the trash receptacle, he relinquished any expectation of privacy concerning those items themselves or any bodily fluids contained on them. . . . The scientific analysis of the straw does not involve any further search and seizure of the defendant's person or property and does not, therefore, involve any violation of the defendant's constitutional rights to be free from unlawful searches and seizures.⁵⁸

Other courts have taken a similar approach. In *Commonwealth v. Cabral*, the court found that the defendant had voluntarily abandoned the reasonable expectation of privacy he had in his saliva when he "expectorated" on a public street.⁵⁹ With his expectoration, "he assumed the risk of the public witnessing his action and thereafter taking possession of his bodily fluids."⁶⁰ In

⁵⁷ *Id.* at 28.

⁵⁸ *Id.* at 31–32. The *Sigsbee* court also made an effort to analyze the possibility of Sigsbee having an expectation of privacy in his bodily fluids:

Unlike escaping heat from one's home, the voluntary discarding of a cup and straw in a public restaurant involved a conscious and intentional act which affirmatively demonstrated the relinquishment of any expectation of privacy that one may have had in those items. The loss of heat from one's home, for the most part, does not constitute a conscious, intentional or voluntary act of the owner of the home.

Id. at 32. The court then went on to reject more directly any theory that Sigsbee had a reasonable expectation of privacy in his bodily fluids.

⁵⁹ *Commonwealth v. Cabral*, 866 N.E.2d 429, 433 (Mass. App. Ct. 2007).

⁶⁰ *Id.*

Commonwealth v. Bly, the defendant left the police station after an interview, leaving a water bottle and cigarette butts.⁶¹ The court never reached the abandonment issue identified by the *Sigsbee* trial court. Instead, it grounded its decision on the defendant's "wholesale failure to manifest any expectation of privacy in the items whatsoever."⁶² Even in a case where the court suppressed the surreptitiously seized out-of-body DNA, *State v. Reed*, its analysis reflected a pure abandonment approach.⁶³ The court found that Reed had not abandoned the cigarette butt he had flicked onto his own patio in the back of his apartment, an area in which he had a reasonable expectation of privacy.⁶⁴

In *State v. Christian*, an undercover officer sat in on an interview that Christian had with a city agency.⁶⁵ During the interview, the officer provided Christian with two water bottles from which he drank and the interviewer provided him with a piece of cake accompanied by a fork.⁶⁶ When Christian left, he took the magazine he had brought with him and the interview paperwork but not the fork or water bottles.⁶⁷ The court found that Christian had abandoned the water bottle and fork when he did not take them with him and thus had no expectation of privacy in them.⁶⁸

Unlike the *Sigsbee*, *Cabral* and *Bly* courts, however, the *Christian* court hinted at the possibility of a deeper, DNA-focused privacy analysis when it said, "[i]n the absence of any definitive authority to the contrary, we are unable to say Christian had a subjective or objective expectation of privacy in the DNA shed on the items seized."⁶⁹ The court went on to note that it would have

⁶¹ *Commonwealth v. Bly*, 862 N.E.2d 341, 349 n.3 (Mass. 2007).

⁶² *Id.* at 357.

⁶³ *State v. Reed*, 641 S.E.2d 320, 321–23 (N.C. Ct. App. 2007).

⁶⁴ *Id.*

⁶⁵ No. 04-0900, 2006 WL 2419031, at *1 (Iowa Ct. App. Aug. 23, 2006).

⁶⁶ *Id.*

⁶⁷ *Id.* at *4.

⁶⁸ *Id.*

⁶⁹ *Id.*

found that Christian had abandoned any such expectation, even if it did exist.⁷⁰

In *State v. Athan*, the police obtained DNA from saliva on the flap of an envelope Athan had licked before he sent it unwittingly to the police as a part of an elaborate ruse.⁷¹ The defendant asserted that he had a privacy interest in his body and bodily functions, including his saliva.⁷² The court found that under the circumstances Athan had “no inherent privacy interest in saliva.”⁷³ The court noted that the saliva was not taken as part of an invasive procedure as in pre-employment urinalysis testing programs.⁷⁴ It found that Athan had abandoned his saliva when he licked the envelope and then mailed it, a circumstance similar to that of “a person spitting on the sidewalk or leaving a cigarette butt in an ashtray.”⁷⁵ The envelope effectively became the property of the police.⁷⁶

Interestingly, the ACLU, as amicus curiae, also argued on Athan’s behalf that DNA “has the potential to reveal a vast amount of personal information, including medical conditions and familial relations,” and thus Athan should have a privacy interest.⁷⁷ The court disagreed:

While this may be true in some circumstances, the State’s use of Athan’s DNA here was narrowly limited to identification purposes. What was done with the letter, including DNA testing for the limited purpose of identification, was not within the sender’s control. The concerns raised by the ACLU, while valid, are not present in this case. The State used the sample for

⁷⁰ *Id.*

⁷¹ 158 P.3d 27, 32 (Wash. 2007). See *supra* note 44 and accompanying text for a more detailed description of the elaborate ruse.

⁷² *Athan*, 158 P.3d at 33.

⁷³ *Id.* at 33–34.

⁷⁴ *Id.* at 33.

⁷⁵ *Id.* at 34.

⁷⁶ *Id.*

⁷⁷ *Id.*

identification purposes only, not for purposes that raise the concerns advanced by the ACLU.⁷⁸

Overall, those courts that have analyzed the Fourth Amendment consequences of surreptitious harvesting of out-of-body DNA by the police have used a very narrow focus for their analysis. Technically, the intrusion-on-property analyses were not *Olmstead*-like; each court that focused on the item upon or within which the DNA was found articulated the magic words of *Katz*'s reasonable-expectation-of-privacy test.⁷⁹ But the courts' abandonment analysis—an exclusively intrusion-on-property focus—was completely dispositive. So too with the two courts—*Sigsbee* and *Athan*—that applied an intrusion-on-place analysis (the body in these cases) used a very narrow approach, focusing on the lack of intrusion into the body and articulating the magic words of *Katz*. Further, the only court to conduct an intrusion-on-information analysis—*Athan*—also focused its analysis quite narrowly, evaluating only the information actually sought and obtained by the police rather than all the information potentially available.

The narrowness of the courts' analyses in surreptitious-harvesting cases reflects a misguided focus borne of a misapplication of *Katz*. Each court that conducted an intrusion-on-property analysis asked whether the defendant had a reasonable expectation of privacy in the discarded items. Almost without exception,⁸⁰ no court asked whether the defendant had a reasonable expectation of privacy in his out-of-body DNA or in the DNA-laden cells. Just as the appropriate question in *Katz* was whether *Katz* had a reasonable expectation of privacy in certain private communications by phone, so too in the surreptitious-harvesting cases, the appropriate question is whether the defendants had a reasonable expectation of privacy in their out-of-

⁷⁸ *Id.*

⁷⁹ See generally *Katz v. United States*, 389 U.S. 347 (1967) (establishing reasonable-expectation-of-privacy test for Fourth Amendment questions).

⁸⁰ The *Athan* and *Sigsbee* courts briefly asked versions of the question and concluded in the negative without any substantial analysis. *Athan*, 158 P.3d at 33; *People v. Sigsbee*, No. 03-0342, slip op. at 31–33 (Onondaga, N.Y. Cnty. Ct. Oct. 30, 2003).

body DNA and whatever the personal sense of privacy attached to that DNA might be.

Neither courts nor commentators have fully developed the Fourth Amendment analysis applicable to surreptitious harvesting of out-of-body DNA by the police. Much of the discussion to date has focused on the abandonment and fingerprint analogies. Those analogies conceive of genetic privacy through the prism of a property, a physical-location (most often, the body), or an information paradigm. In the property paradigm, out-of-body DNA is no longer part of its owner because it has been abandoned and thus is up for grabs. In the physical-location paradigm, either the DNA is no longer part of the body or the police did not physically intrude into the body, or both. In the information paradigm, the police are gathering no more intrusive a body of data than they would if they had gathered fingerprints—information that is relatively nonintrusive and one-dimensional. Under these analytical paradigms, courts have found no Fourth Amendment violation occurred when out-of-body DNA is harvested surreptitiously, and commentators have conceded that those analyses will likely continue to carry the day.⁸¹

IV. THE FOURTH AMENDMENT: BEYOND PROPERTY

A. *KATZ*, *KYLLO*, AND *JONES*

The nature and scope of the Fourth Amendment's protection against an intrusion on genetic privacy is not readily apparent from the text. It guarantees that "[t]he right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated . . ." ⁸²The prohibition reads like one against intrusions on an individual's physical privacy by the government—be it real

⁸¹ Kaye, *supra* note 48, at 420. Joh suggests that DNA is different and argues that the idea of genetic exceptionalism suggests that we should be more cautious in using pre-existing analogies to capture the full import of a new technology. Joh, *supra* note 39, at 873–74.

⁸² U.S. CONST. amend. IV.

property, bodily integrity, other physical items—and makes no explicit mention of more intangible conceptions of privacy.

The Fourth Amendment also says nothing about security from intrusions into out-of-body DNA left in a public place, just as it says nothing about intrusions involving a host of other modern technologies like a GPS,⁸³ public surveillance cameras, or various kinds of technological eavesdropping. Each involves a type of technology that the Framers had not contemplated. Each intrudes on more than purely property- or place-based privacy.

Historically, the Supreme Court's Fourth Amendment jurisprudence reflected a relatively narrow and somewhat rigid, legalistic focus on property and place in defining the extent of Fourth Amendment privacy.⁸⁴ Without a physical invasion, or a search of a person, papers, or tangible material effects, no Fourth Amendment violation occurs.⁸⁵ In this conception, privacy “was tied very closely to notions of property rights.”⁸⁶

In 1967, the Supreme Court, in *Katz v. United States*,⁸⁷ abandoned the property and place paradigms as the exclusive analytical models for determining when an intrusion on Fourth Amendment privacy has occurred. Katz had made several telephone calls from inside a public telephone booth. Because the government suspected Katz of engaging in illegal gambling activities, it affixed a listening and recording device to the outside of the booth to record Katz's end of the conversations.⁸⁸ As a result of the evidence gathered from eavesdropping on his conversations, Katz was convicted of illegal gambling activities.⁸⁹ The police had not intruded on Katz's sense of privacy in his property or in a place that was his, as they never entered the booth.

⁸³ Global Positioning System.

⁸⁴ See, e.g., *Olmstead v. United States*, 277 U.S. 438, 464 (1928) (“The Amendment itself shows that the search is to be of material things—the person, the house, his papers or his effects.”).

⁸⁵ *Id.* at 466.

⁸⁶ Ric Simmons, *From Katz to Kyllo: A Blueprint for Adapting the Fourth Amendment to Twenty-First Century Technologies*, 53 HASTINGS L.J. 1303, 1308–09 (2002).

⁸⁷ 389 U.S. 347 (1967).

⁸⁸ *Id.* at 348, 354.

⁸⁹ *Id.* at 348.

In its decision, the Court redefined its approach to Fourth Amendment privacy in two ways. It shifted the inquiry to a direct focus on the privacy of the person and away from the narrow, technical legal status of the property or place searched. It also expansively defined how to measure the privacy at stake:

For the Fourth Amendment protects people, not places. What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection. . . . But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected.⁹⁰

Thus, Katz could have a Fourth Amendment privacy interest into which the government may not intrude, even if that interest exists in a public place in which, prior to *Katz*, a court would have found no privacy interest.

The “people, not places” language meant that Katz’s Fourth Amendment privacy interest was a much more intangible one than that residing in the space within the phone booth. It resided in Katz’s attitude towards the phone conversation and its content. Katz’s conduct in choosing a phone booth and in closing its door showed that he wanted to have a private conversation, not simply a private space. Katz sought to keep private the content of his phone conversation by his behavior. His behavior and the information he sought to keep secure told the Court the most about Katz’s sense of privacy. The Court did not, however, stop with this substantial shift.

The advantage of the more technical, property-based approach had been the well-bounded, albeit legalistic, nature of its conception of privacy. The legal status of the searched item or place told all. It completely defined the nature and extent of the privacy interest. The shift in focus to a more intangible, personal privacy conception left open the difficult question of how to measure the nature and scope of person-based privacy. *Katz*

⁹⁰ *Id.* at 351–52 (citations omitted).

provided an answer, though not a well-bounded one. Justice Harlan's concurrence described how to assess the nature and scope of any possible Fourth Amendment privacy interest a person might hold: "there is a twofold requirement, first that a person [has] exhibited an actual (subjective) expectation of privacy and, second, that the expectation be one that society is prepared to recognize as 'reasonable.'"⁹¹

Justice Harlan's "two-fold requirement" for measuring whether the privacy interest at stake warrants Fourth Amendment protection—the *Katz* test—expanded the privacy inquiry. Most dramatically, it meant that courts would have to articulate the expectation of privacy a person might have in the circumstances of the case and to measure society's attitude towards that person's expectation.

The Court offered little guidance about how to go about this process other than solving the case in front of it. A single ungrounded, generalized statement about "the vital role that the public telephone has come to play in private communication" captures the Court's methodology for assessing society's attitude towards *Katz*'s expectation.⁹² Thus, post-*Katz*, the two-pronged reasonable-expectation-of-privacy test seems to exist as an unbounded, ad hoc assessment by a court of society's attitude toward the privacy interest at issue.

The legacy of post-*Katz* courts regarding the reasonable-expectation-of-privacy test has been decidedly mixed, according to commentators.⁹³ For example, Orin Kerr has contended that many courts simply continued with some form of a property-based approach to determining the scope of Fourth Amendment

⁹¹ *Id.* at 361 (Harlan, J., concurring).

⁹² *Id.* at 352.

⁹³ See, e.g., Orin S. Kerr, *The Fourth Amendment and New Technologies: Constitutional Myths and the Case for Caution*, 102 MICH. L. REV. 801, 823–24 (2004) (noting that very little has changed since *Katz*); Morgan Cloud, *Rube Goldberg Meets the Constitution: The Supreme Court, Technology and the Fourth Amendment*, 72 MISS. L.J. 5, 20–36 (2002) (concluding that *Katz* is a failure if its original purpose was to regulate modern surveillance technologies with Fourth Amendment standards); Raymond Shih Ray Ku, *The Founders' Privacy: The Fourth Amendment and the Power of Technological Surveillance*, 86 MINN. L. REV. 1325, 1343–62 (2002) (noting how post-*Katz* decisions have taken advantage of *Katz*'s failure to provide any real guidance on determining privacy values).

privacy.⁹⁴ Whatever the nature of the legacy, in 2001, in *Kyllo v. United States*, the Supreme Court reaffirmed the core approach of *Katz*.⁹⁵

The police suspected that Kyllo was growing marijuana in his house using high-intensity lamps that produced large amounts of heat. Rather than obtain a search warrant, they used a thermal imaging device to measure the amount of heat emanating from Kyllo's house.⁹⁶ The device did not "enter" Kyllo's house to measure the amount of heat; it measured it only after the heat left the house.⁹⁷ The Court again rejected a pure property-based analysis. It found that the use of the thermal imaging device constituted the kind of intrusion prohibited by the Fourth Amendment even though the police never entered Kyllo's home.⁹⁸

The majority relied heavily on factors like information (the potential for acquiring intimate details), location (from within the home), and the language of the Constitution (the use of the term "houses" in the Fourth Amendment) to measure the scope of the personal privacy right. To be sure, the opinion is heavily influenced by the property perspective; it goes so far as to say that "[i]n the home, our cases show, *all* details are intimate details, because the entire area is held safe from prying government eyes."⁹⁹

But a pure property analysis would have resulted in a different outcome because the police never trespassed into Kyllo's home. For the *Kyllo* majority, home-based intimacy—a personal-privacy term—deserves Fourth Amendment protection, even for heat outside the home.¹⁰⁰

Most recently, in *United States v. Jones*, the Court reaffirmed its commitment to a beyond-just-property analysis.¹⁰¹ The police had placed a GPS device on the underside of a car driven by Jones

⁹⁴ Kerr, *supra* note 93, at 823–27.

⁹⁵ 533 U.S. 27, 34 (2001).

⁹⁶ *Id.* at 29.

⁹⁷ *Id.* at 30.

⁹⁸ *Id.* at 40.

⁹⁹ *Id.* at 37.

¹⁰⁰ *Id.* at 38.

¹⁰¹ *United States v. Jones*, 132 S. Ct. 945, 951 (2012).

and monitored his public whereabouts for four weeks.¹⁰² In a set of three opinions, all nine members of the Court recognized that, whether one had to do a property analysis at all, it was only the start of an analysis that included the *Katz* test. In fact, five members of the Court did or would have found that Jones had a reasonable expectation of privacy that society would recognize as reasonable in his aggregated public whereabouts over the course of four weeks.¹⁰³

The *Katz* test thus provides some insight into the framework of an analysis of the nature and scope of the Fourth Amendment's protection against the police practice of surreptitious harvesting of out-of-body DNA. One must ask whether the person whose out-of-body DNA was harvested had a reasonable expectation of privacy in that DNA. The property status of that DNA is only one factor.¹⁰⁴ The location of the DNA, the information which that DNA may contain, as well as the individual's attitude towards that DNA and its contents might be informative. One must then ask if that is an expectation that society is willing to recognize as reasonable. The core question, in its simplest terms, is whether the individual and society expect privacy in DNA—whether we expect our DNA to be secure from government intrusion.

If one considers the locus of analysis in surreptitious-harvesting cases to be one's personal sense of genetic privacy rather than only one's sense of DNA as property, a subtle but powerful analytical shift occurs. The abandonment question then hinges on the knowledge of and intention to abandon that privacy. The existence of one's DNA outside of one's body and in public is not an automatic Fourth Amendment disqualifier. And the limited use by

¹⁰² *Id.* at 948.

¹⁰³ Justice Sotomayor found that such an expectation would exist if that issue had needed to be reached. *Id.* at 956. Justices Alito, Breyer, Ginsburg and Kagan found that one did exist. *Id.* at 964.

¹⁰⁴ One commentator on surreptitious DNA harvesting by the police has concluded that, "because it is grounded in physical boundaries, the Fourth Amendment fails to protect genetic privacy adequately." Joh, *supra* note 39, at 866. Joh does briefly question whether abandoned DNA is really abandoned. *Id.* at 867. She also acknowledges that *Katz* formally rejected a property analysis and recognizes the lack of clarity in Fourth Amendment protection for abandoned DNA even under a property perspective. *Id.*

the police of the information contained in that DNA does not resolve the expectation question. In each instance, the shift from a narrow to more expansive focus suggests the possibility of a different result in surreptitious-harvesting cases.

B. THE ABANDONMENT FALLACY

In the property or abandonment context, the *Katz* question changes from whether individuals abandoned their saliva, cigarette butt, or water bottle, to whether they abandoned their expectation of genetic privacy in their DNA. As one court has phrased it:

The distinction between abandonment in the property-law sense and abandonment in the constitutional sense is critical to a proper analysis of the issue. In the law of property, the question, as defendant correctly states, is whether the owner has voluntarily, intentionally, and unconditionally relinquished his interest in the property so that another, having acquired possession, may successfully assert his superior interest. In the law of search and seizure, however, the question is whether the defendant has, in discarding the property, relinquished his reasonable expectation of privacy so that its seizure and search is reasonable within the limits of the Fourth Amendment. In essence, what is abandoned is not necessarily the defendant's property, but his reasonable expectation of privacy therein.¹⁰⁵

The significance of this shift is immediately apparent. Abandonment requires knowledge and intention.¹⁰⁶ Without a showing that individuals knew that by their conduct they had abandoned their expectation of genetic privacy in their DNA, no

¹⁰⁵ *City of St. Paul v. Vaughn*, 237 N.W.2d 365, 370–71 (Minn. 1975) (footnote omitted) (citations omitted).

¹⁰⁶ Edward G. Mascolo, *The Role of Abandonment in the Law of Search and Seizure: An Application of Misdirected Emphasis*, 20 BUFF. L. REV. 399, 401–02 (1971).

abandonment has occurred. The *Katz* Court itself explicitly recognized this proposition when it pointed out that “[w]hat a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection.”¹⁰⁷

Some of the classic Fourth Amendment abandonment circumstances involve variations on the theme of the defendant seeing the police and either discarding drugs¹⁰⁸ or some other item¹⁰⁹ or walking away from that item.¹¹⁰ In these kinds of cases, courts may debate whether the defendant’s acts, words, or other objective facts, reflect an intention to abandon or not; but, all of them require some manifestation of intention.¹¹¹ So, in *Sigsbee, Cabral, Bly et al.* ample evidence existed that those putative suspects knew and intended to abandon the straw, water bottle, saliva, etc. at issue.¹¹²

No evidence exists suggesting any of those putative suspects knew they were abandoning whatever expectation of genetic privacy they had in their DNA when they went out in public. It is speculative, at best, to conclude from a silent record that individuals would know that they were shedding DNA,¹¹³ that they were aware of the ability of the government to collect that DNA, analyze it, and use it as an identification tool; or that they were cognizant of the other kinds of uses the police could make of their DNA, let alone the scope and breadth of genetic information about them that might be available to those with access to it via the appropriate technology.

Courts’ treatment of other privacy-in-public cases supports this type of analysis. The *Katz* garbage cases consider the extent of the

¹⁰⁷ *Katz v. United States*, 389 U.S. 347, 351 (1967).

¹⁰⁸ *State v. Britton*, 633 So. 2d 1208, 1209 (La. 1994) (hiding packet of cocaine in gum rack); *State v. Crandall*, 136 P.3d 30, 31 (Or. 2006) (hiding baggie underneath car).

¹⁰⁹ *United States v. Collis*, 766 F.2d 219, 220 (6th Cir. 1985) (abandoning airplane luggage after seeing DEA agents).

¹¹⁰ *United States v. Tugwell*, 125 F.3d 600, 602 (8th Cir. 1997) (walking away from suitcase at bus station after drug-sniffing dog alerts to it).

¹¹¹ *See, e.g., United States v. Jones*, 707 F.2d 1169, 1172 (10th Cir. 1983) (“[A]n expectation of privacy is a question of intent.”).

¹¹² *See supra* notes 58–62 and accompanying text.

¹¹³ Note that the burden of proof in such circumstances is on the prosecution to justify their warrantless conduct. *Mascolo, supra* note 106, at 403–04.

likely knowledge attributable to the “owner” of the garbage. In *California v. Greenwood*,¹¹⁴ the Supreme Court found that “[i]t is common knowledge that plastic garbage bags left on or at the side of a public street are readily accessible to animals, children, scavengers, snoops, and other members of the public.”¹¹⁵ Such “common knowledge” as to one’s shed DNA would include, at the least, it being accessible to the police with the use of sophisticated biotechnological tools for comparison to crime-scene samples or inclusion in a database, or both.

Courts’ analyses of other sets of privacy-in-public cases reveal a similar approach. The premise of fingerprint, voice-exemplar, and handwriting-exemplar cases rests on individuals knowingly exposing their fingerprints,¹¹⁶ voices,¹¹⁷ and handwriting¹¹⁸ to the public. And, in *United States v. Jones*, the Court found that Antoine Jones had not abandoned his expectation of privacy in his aggregated public behavior by going out in public.¹¹⁹

The fingerprint example is particularly important as commentators have debated the appropriateness of analogizing surreptitious harvesting of out-of-body DNA to surreptitious harvesting of fingerprints.¹²⁰ Superficially, the analogy is attractive as, in each instance, the police are harvesting from publicly available samples what will turn into identity information.

The analogy fails, however. It is “common knowledge” that whenever you touch something in public, you run the risk of leaving fingerprints that can be used for identification purposes.

¹¹⁴ 486 U.S. 35 (1988).

¹¹⁵ *Id.* at 40 (footnotes omitted).

¹¹⁶ See *Davis v. Mississippi*, 394 U.S. 721, 727 (1969) (“Fingerprinting involves none of the probing into an individual’s private life and thoughts that marks an interrogation or search.”).

¹¹⁷ See *United States v. Dionisio*, 410 U.S. 1, 14 (1973) (“The physical characteristics of a person’s voice, its tone and manner . . . are constantly exposed to the public.”).

¹¹⁸ See *United States v. Mara*, 410 U.S. 19, 21 (1973) (“Handwriting . . . is repeatedly shown to the public . . .”).

¹¹⁹ 132 S. Ct. 945, 950–51 (2012).

¹²⁰ Compare *Joh*, *supra* note 39, at 871 (rejecting the appropriateness of the fingerprint analogy), with *Kaye*, *supra* note 48, at 420 (supporting the appropriateness of the fingerprint analogy).

The same cannot be said about shed, out-of-body DNA—even if its use is only for comparison to crime-scene samples by way of the application of sophisticated biotechnological tools to the DNA or inclusion in a database, or both.¹²¹

In *Kyllo*, the focus was on the intrusion by the police into the intimacy of what occurred within the home.¹²² The heat that the police measured outside of the home was their window into that intimacy and thus was an impermissible Fourth Amendment intrusion.¹²³

Had the majority focused on the abandoned heat itself, they would have found no violation as the police “acquired” the heat outside the protected area of the home. Absent any evidence that *Kyllo* knew that heat was escaping from his house *and* that it could reveal intimate details of home activity by virtue of technology not generally available to the public, the majority ignored any possible abandonment analysis. In a surreptitious-harvesting case, if “measurement” of the shed, out-of-body DNA provides the police with a similar window into some measure of genetic intimacy or privacy *and* no evidence exists of the shedder’s knowledge of that, a Fourth Amendment violation may well have occurred even though the DNA was left in public.

C. THE OUT-OF-BODY FALLACY

Some of the surreptitious-harvesting courts—*Sigsbee* and *Athan*—also transacted the *Katz* analysis with a focus on the intrusion on one’s body in addition to the intrusion-on-property focus. The *Athan* court rejected the claim that *Athan* had a reasonable expectation of privacy in his bodily fluids on the mailed envelope because those fluids were not taken as a part of an intrusive procedure.¹²⁴

¹²¹ This analysis does not rely on the genetic-exceptionalism argument *Joh* relies on. It also sidesteps the debate between *Kaye* and *Cole* on how much genetic information is actually available as a result of standard forensic DNA testing. *See supra* note 49 and accompanying text.

¹²² *Kyllo v. United States*, 533 U.S. 27, 38 (2001).

¹²³ *Id.*

¹²⁴ *State v. Athan*, 158 P.3d 27, 33 (Wash. 2007).

The essence of this approach is that any expectation of privacy departs when the DNA leaves the body because it is no longer part of the body. At one level, it is a variant of the abandonment analysis. However, the focus in this analysis is directly on the location of the DNA rather than on its status as property. Simply, where the DNA is located tells all.

It is seductive to define an expectation of privacy in one's body in terms of the physical boundaries of the body. The quintessential Fourth Amendment bodily privacy case, *Schmerber v. California*, involved the police entering Schmerber's body to obtain a sample of his blood for blood-alcohol analysis.¹²⁵ It is hard to divorce the sense that a privacy intrusion has occurred from the physical act of entering the body. Often, the entry is minimal, as when acquiring scrapings from underneath fingernails¹²⁶ or acquiring DNA by swabbing the inside of one's mouth.¹²⁷ Nonetheless, courts have routinely held that an intrusion on a reasonable expectation of privacy occurred.¹²⁸

The advent of forensic DNA technology has begun to stretch the boundaries of what counts as the "body." Because a forensic scientist can analyze cells invisible to the naked eye and obtain analyzable DNA¹²⁹ from cells that exist outside the body,¹³⁰ the police need not intrude on the body itself to obtain what heretofore had been unobtainable without a bodily intrusion. The question in surreptitious-harvesting cases becomes whether the out-of-body status of the DNA automatically eliminates any Fourth Amendment protection.

Two cases inform the beginning of an answer to this question. In *Skinner v. Railway Labor Executives Association*, regulations promulgated by the Federal Railway Administration required

¹²⁵ 384 U.S. 757, 758–59 (1966).

¹²⁶ *Cupp v. Murphy*, 412 U.S. 291, 292 (1973).

¹²⁷ *Nicholas v. Goord*, 430 F.3d 652, 656 n.5 (2d Cir. 2005); *State v. O'Hagen*, 914 A.2d 267, 279 (N.J. 2007). So-called buccal swabs are now the most common method for obtaining DNA samples from a number of classes of individuals for analysis and inclusion in state and federal genetic databases.

¹²⁸ *Goord*, 430 F.3d at 658; *O'Hagen*, 914 A.2d at 280.

¹²⁹ BUTLER, *supra* note 16, at 35.

¹³⁰ See *supra* notes 21–35 and accompanying text.

railroads to test certain employees for drug and alcohol through urine testing.¹³¹ The collection of the urine sample could involve in-person monitoring but no physical intrusion into the body occurred.¹³² In spite of the lack of any bodily intrusion, the Court found it “clear that the collection and testing of urine intrudes upon expectations of privacy that society has long recognized as reasonable”¹³³ and directly addressed the significance of the lack of bodily intrusion:

It is not disputed, however, that chemical analysis of urine, like that of blood, can reveal a host of private medical facts about an employee, including whether he or she is epileptic, pregnant, or diabetic. Nor can it be disputed that the process of collecting the sample to be tested, which may in some cases involve visual or aural monitoring of the act of urination, itself implicates privacy interests.¹³⁴

For the *Skinner* Court, unlike the surreptitious-harvesting courts, the lack of bodily intrusion did not automatically remove the possibility of a reasonable expectation of privacy in the out-of-body fluids and their content.¹³⁵

The possibility that a person may have a reasonable expectation of privacy that society is willing to recognize in out-of-body DNA does not resolve the issue. It may be that the sense of genetic privacy that one has in one’s out-of-body DNA does not rise to the level of an expectation of privacy that society is willing to recognize, as it did in the privacy “flowing” from the urine in *Skinner* and as partially described in another mandatory-urinalysis case, *National Treasury Employees Union v. Von Raab*:

¹³¹ 489 U.S. 602, 606 (1989).

¹³² *Id.* at 617.

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ See generally Justin A. Alfano, Note, *Look What Katz Leaves Out: Why DNA Collection Challenges the Scope of the Fourth Amendment*, 33 HOFSTRA L. REV. 1017 (2005) (arguing for an expansive view beyond bodily intrusion for what constitutes a search).

There are few activities in our society more personal or private than the passing of urine. Most people describe it by euphemisms if they talk about it at all. It is a function traditionally performed without public observation; indeed, its performance in public is generally prohibited by law as well as social custom.¹³⁶

That consideration is the focus of Part V. Because courts narrowly analyze surreptitious-harvesting cases, however, they never reach that challenging core question.

D. THE LIMITED-USE-OF-INFORMATION FALLACY

One surreptitious-harvesting court briefly conducted an analysis focused on a possible intrusion on personal information. The *Athan* court concluded that Athan's Fourth Amendment privacy right was unaffected because the use by the police of his out-of-body DNA was "narrowly limited to identification purposes."¹³⁷ David Kaye contends that the surreptitious harvesting of out-of-body DNA is, in the end, no different than the harvesting of fingerprints left in public. One premise of his contention is that the information obtained from standard 13-loci STR DNA testing is of no greater personal dimension than that obtained from fingerprints.¹³⁸ That scientific contention has been the focus of much of the debate about surreptitious harvesting among some commentators.

This analytical approach suffers from the same narrow scope that has plagued courts' intrusion-on-property and intrusion-on-body analyses. If the analytical focus is on the individual's expectation of privacy rather than on the information itself, one considers not only the information actually obtained by the police but also the potential information that could be obtained by the

¹³⁶ 816 F.2d 170, 175 (5th Cir. 1987), *aff'd in part, rev'd in part*, 489 U.S. 656 (1989).

¹³⁷ *State v. Athan*, 158 P.3d 27, 34 (Wash. 2007). The court's conclusion was contra an assertion by an amicus—the ACLU—that out-of-body DNA "has the potential to reveal a vast amount of personal information, including medical conditions and familial relations." *Id.*

¹³⁸ Imwinkelried & Kaye, *supra* note 52, at 436–40; Kaye, *supra* note 38, at 64–65.

practice and, by implication, an individual's concern for its potential use.

The *Athan* court and Professor Kaye essentially suggest that no intrusion on an expectation of privacy occurs in a surreptitious DNA harvesting because, like the fingerprint harvesting, the information obtained is limited and can only be used in a very limited way—for identification.¹³⁹

This approach is inconsistent with *Skinner* and *Kyllo*. In *Kyllo*, the thermal-imaging technology detected heat consistent with growing marijuana with high-intensity lights.¹⁴⁰ Still, *Kyllo* had a reasonable expectation of privacy because of the potential of thermal-imaging technology in general—of crude quality or otherwise—to detect intimate details within the home.¹⁴¹ The Court explicitly rejected “[l]imiting the prohibition of thermal imaging to ‘intimate details.’”¹⁴² In *Skinner*, the Court confronted a chemical test of urine for drugs and alcohol and said, “chemical analysis of urine, like that of blood, can reveal a host of private medical facts about an employee, including whether he or she is epileptic, pregnant, or diabetic.”¹⁴³ The *potential* for intrusion on

¹³⁹ *Athan*, 158 P.3d at 34; Imwinkelried & Kaye, *supra* note 52, at 436–40; Kaye, *supra* note 49, at 71.

For the debate among Joh, Kaye, and Cole on the can-only-be-used issue, see *supra* note 51 and accompanying text.

¹⁴⁰ *Kyllo v. United States*, 533 U.S. 27, 29–30 (2001).

¹⁴¹ The Court:

rejected such a mechanical interpretation of the Fourth Amendment in *Katz*, where the eavesdropping device picked up only sound waves that reached the exterior of the phone booth. Reversing that approach would leave the homeowner at the mercy of advancing technology—including imaging technology that could discern all human activity in the home. While the technology used in the present case was relatively crude, the rule we adopt must take account of more sophisticated systems that are already in use or in development.

Id. at 35–36.

¹⁴² *Id.* at 38. In doing so, it said that “[l]imiting the prohibition of thermal imaging to ‘intimate details’ would not only be wrong in principle; it would be impractical in application, failing to provide ‘a workable accommodation between the needs of law enforcement and the interests protected by the Fourth Amendment.’” *Id.* (quoting *Oliver v. United States*, 466 U.S. 170, 181 (1984)).

¹⁴³ *Skinner v. Ry. Labor Exec. Ass’n*, 489 U.S. at 602, 617 (1989).

information created an expectation of privacy in *Kyllo* and in *Skinner*.

Even if one only relies on the genetic nametag generated by the standard 13-loci DNA testing—the genetic fingerprint—the potential for intrusions on an individual’s expectation of privacy expand beyond those associated with a fingerprint. For example, the provisions of the Federal CODIS database legislation allow for the inclusion of the DNA identification records of “other persons whose DNA samples are collected under applicable legal authorities, provided that DNA samples that are voluntarily submitted solely for elimination purposes shall not be included in the National DNA Index System.”¹⁴⁴

This language suggests that one’s harvested genetic nametag will appear in the Federal CODIS database as long as such harvesting is constitutional. Once in the database, an “innocent” individual may be the subject of a coincidental match with a crime-scene sample, a match that would likely at least require explanation or a partial match, a match that might lead to a court-authorized search of the family members’ genetic profiles.¹⁴⁵ That individual may also be the subject of an erroneous match, intentional or otherwise.¹⁴⁶

More significantly, unlike the use of a DNA sample taken by authorization of state or federal statute, the use of a surreptitiously harvested sample is likely unregulated by statute.¹⁴⁷ It could be included in what has been referred to as

¹⁴⁴ 42 U.S.C. § 14132(a)(1)(C) (2006).

¹⁴⁵ Frederick R. Bieber et al., *Finding Criminals Through DNA of Their Relatives*, 312 SCIENCE 1315, 1315–16 (2006); David R. Paoletti et al., *Assessing the Implications for Close Relatives in the Event of Similar but Nonmatching DNA Profiles*, 46 JURIMETRICS J. 161, 162 (2006); Nakashima, *supra* note 5.

¹⁴⁶ Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE 892, 892 (2005).

¹⁴⁷ Joh, *supra* note 39, at 875–76. None of the database legislation collected at http://www.aslme.org/dna_04/grid/statute_grid_4_5_2006.html (last visited Aug. 6, 2008) seems to contain exclusivity provisions prohibiting collection of surreptitious and other samples for inclusion in other, “off-line” databases. One Erie County, New York crime lab is aggressively developing a database with samples from crime victims. Tom Precious, *Crime Lab Lambasted over DNA Databases; Policies Defended as Needed Both to Solve and Prevent Crimes*, BUFF. NEWS, May 21, 2006, at A1.

either a “linkage” or “rogue” database of suspects’ or others’ profiles.¹⁴⁸ The sample could be analyzed for information far beyond that provided by the more standard 13-loci STR testing, including not only skin pigmentation, bio-geographical origin, gender, and eye color but also a host of medical diseases, medical and behavioral predispositions, and perhaps even sexual orientation.¹⁴⁹

To be sure, no evidence currently exists that such analysis is occurring. But, with the use of surreptitiously harvested samples currently unregulated by the Constitution or otherwise, the specter of “function creep” looms.¹⁵⁰ The question whether surreptitious harvesting of out-of-body DNA with these potential uses intrudes on an expectation of privacy that society is willing to recognize as reasonable is much more complex.

When the focus is properly on an intrusion upon privacy instead, the scope of the analysis widens. The abandonment question becomes whether an expectation of privacy is abandoned rather than an object. The out-of-body status of surreptitiously harvested DNA does not automatically resolve the reasonable-expectation-of-privacy question. The very limited STR identification information and its equally limited current use expand into a much wider array of genetic information and uses.¹⁵¹

¹⁴⁸ Richard Willing, *Authorities Find More Uses for DNA Databases*, USA TODAY (Mar. 26, 2007), available at http://usatoday30.usatoday.com/news/nation/2007-03-25-dna-databases-inside_n.htm.

¹⁴⁹ See *United States v. Kincade*, 379 F.3d 813, 849–51 (9th Cir. 2004) (Reinhardt, J., dissenting) (addressing potential scope of DNA identification given advancing technology); Joh, *supra* note 39, at 876–79 (same); Laura A. Matejik, *DNA Sampling: Privacy and Police Investigation in a Suspect Society*, 61 ARK. L. REV. 53, 59 (2009) (same).

¹⁵⁰ Tania Simoncelli & Barry Steinhardt, *California’s Proposition 69: A Dangerous Precedent for Criminal DNA Databases*, 34 J.L. MED. & ETHICS 199, 201–04 (2006); Joh, *supra* note 39, at 878–79.

¹⁵¹ An explanation of why courts have so consistently misapplied *Katz* in surreptitious-harvesting cases is slightly off topic, though related. At least three plausible explanations exist for this overly narrow approach. (1) It seems like a fingerprint; some people call it “DNA fingerprinting”; let’s treat it like a fingerprint. (2) All surreptitious harvesting cases to date have involved what I have called putative suspects, i.e., someone for whom the police have some suspicion but not enough to get a search warrant. It is plausible to believe that, at least at an unconscious level, a judge has thought, “it’s not as if we’re talking about the privacy of a ‘completely’ innocent person” and has allowed the bias to restrain unconsciously the depth of the analysis. (3) The average layperson, including judges, likely

A proper reasonable-expectation-of-privacy analysis must consider the nature and scope of DNA or genetic *privacy*. However, that expansion in focus does not automatically provide an answer. Part V takes on the challenge of crafting a preliminary sketch of an expectation of genetic privacy that society might be willing to recognize as reasonable in these circumstances.

V. “AN EXPECTATION OF GENETIC PRIVACY . . .”

Crafting the sketch of Fourth Amendment genetic privacy is complex. Privacy itself is a multi-dimensional, often amorphous concept that has meant many different things to many different people. Daniel Solove has suggested a number of different conceptions that frequent legal and philosophical discourses about privacy:

- (1) the right to be let alone—Samuel Warren and Louis Brandeis’s famous formulation of the right to privacy;
- (2) limited access to the self—the ability to shield oneself from unwanted access by others;
- (3) secrecy—the concealment of certain matters from others;
- (4) control over personal information—the ability to exercise control over information about oneself;
- (5) personhood—the protection of one’s personality, individuality, and dignity; and
- (6) intimacy—control over, or limited access to, one’s intimate relationships or aspects of life.¹⁵²

has little knowledge and even less understanding of the possible meanings of the genetic information we are acquiring at a faster and faster rate. See Joh, *supra* note 39, at 865–69 (describing the characteristics of genetic information and how commentators have reacted to the increased use of DNA in the court system, both of which could sway a judge to misapply *Katz* in surreptitious-harvesting cases). To ask judges in that position to base their judgment on an assessment of the nature and scope of genetic privacy, asks them to accomplish a very difficult task.

¹⁵² DANIEL J. SOLOVE, UNDERSTANDING PRIVACY 12–13, (2008). Solove argues persuasively that none of these conceptions capture the common denominator of privacy, *id.* at 14, and goes on to propose a “taxonomy of privacy” that seeks to provide a better understanding of privacy, *id.* at 101–02.

The Supreme Court has described the idea of constitutional privacy from a number of perspectives beyond the formal confines of the Fourth Amendment. The line of cases that includes *Griswold v. Connecticut* (privacy and birth control), *Roe v. Wade* (privacy and pregnancy termination) and *Lawrence v. Texas* (privacy and consensual same-sex sexual activity) captures a view of privacy that protects certain personal decisions and behavior from governmental interference implicit in a number of constitutional amendments.¹⁵³ *Whalen v. Roe* suggests a constitutional right to informational privacy as a matter of due process.¹⁵⁴ The cases flowing from the Fifth Amendment's prohibition on a compelled self-incrimination effectively describe a privacy right grounded in one's personal dignity.¹⁵⁵

Narrowing the sketch to one of genetic privacy only lessens the complexity slightly. For example, one can readily conceive of some aspect of genetic privacy fitting well into each of Solove's six "conceptions of privacy."¹⁵⁶ The Supreme Court has yet to directly address genetic privacy as such, be it in informational, decisional-behavioral, or dignitary privacy terms.¹⁵⁷ Yet, as with the broader conceptions of privacy, one can envision how genetic privacy straddles some of the varieties of constitutional privacy—informational, decisional-behavioral, or dignitary.

¹⁵³ *Griswold v. Connecticut*, 381 U.S. 479, 485–86 (1965) (holding state law forbidding use of contraceptives unconstitutional because it intruded upon right of marital privacy); *Roe v. Wade*, 410 U.S. 113, 153 (1973) (holding right to privacy broad enough to encompass woman's decision whether to terminate pregnancy under Ninth or Fourteenth Amendment); *Lawrence v. Texas*, 539 U.S. 558, 564 (2003) (holding state law criminalizing some consensual same-sex sex acts unconstitutional under the Due Process Clause of Fourteenth Amendment).

¹⁵⁴ *Whalen v. Roe*, 429 U.S. 589, 605–06 (1977) (recognizing Fourteenth Amendment concerns over disclosure to state of prescriptions to certain drugs but ultimately holding no violation of such rights or liberties).

¹⁵⁵ *Miranda v. Arizona*, 384 U. S. 436, 457 (1966) (finding the interrogation environment to be "destructive of human dignity"); *Schmerber v. California*, 384 U. S. 757, 762 (1966) ("[T]he constitutional foundation underlying the privilege is the respect a government—state or federal—must accord to the dignity and integrity of its citizens.").

¹⁵⁶ SOLOVE, *supra* note 152.

¹⁵⁷ Though, as a scientific matter, gender-discrimination cases are arguably genetic-privacy cases.

As the Human Genome Project has unfolded, scholars from a number of disciplines have taken on the challenge of describing conceptions of genetic privacy.¹⁵⁸ Bioethicists and moral philosophers have considered the question in moral terms.¹⁵⁹ Others have proposed model genetic-privacy legislation,¹⁶⁰ and legislators have passed numerous versions of such legislation.¹⁶¹ Researchers and health care professionals have wrestled with practical applications of conceptions of genetic privacy.¹⁶² A number of legal scholars have also addressed the issue.¹⁶³

A broad assessment of what constitutional genetic privacy—let alone genetic privacy in all its possible legal conceptions—might look like and all the places where it might locate itself within the Constitution is beyond the scope of this Article. Instead, my focus is only on the nature and scope of Fourth Amendment genetic privacy, if any, implicated by the surreptitious harvesting of out-of-body DNA and whether genetic privacy is something that society is willing to recognize as reasonable. Section V.B will

¹⁵⁸ See generally Anita L. Allen, *Genetic Privacy: Emerging Concepts and Values*, in GENETIC SECRETS: PROTECTING PRIVACY AND CONFIDENTIALITY IN THE GENETIC ERA 31 (Mark A. Rothstein ed., 1997) (discussing various definitions of “genetic privacy” and the legal and ethical values of each).

¹⁵⁹ See, e.g., Walther Ch. Zimmerli, *Who Has the Right to Know the Genetic Constitution of a Particular Person*, in HUMAN GENETIC INFORMATION: SCIENCE, LAW, AND ETHICS 93 (Derek Chadwick et al., eds., 1990) (discussing genetic privacy from “information ethics” point of view and suggesting perhaps under such view there is no right to private ownership of any kind of information).

¹⁶⁰ See generally GEORGE J. ANNAS ET AL., THE GENETIC PRIVACY ACT AND COMMENTARY (1995) (proposing federal legislation to address the privacy concerns relating to genetic information in light of the Human Genome Project).

¹⁶¹ See the National Conference of State Legislators’ website for a comprehensive catalog of state-by-state genetic-privacy legislation, at <http://www.ncsl.org/issues-research/health/genetic-privacy-laws.aspx> (last viewed Aug. 18, 2008).

¹⁶² See generally DOROTHY C. WERTZ ET AL., GUIDELINES ON ETHICAL ISSUES IN MEDICAL GENETICS AND THE PROVISION OF GENETIC SERVICES (1995) (discussing genetic-privacy issues in light of the Human Genome Initiative from the perspective of healthcare professionals).

¹⁶³ Several journals have dedicated symposium-style issues to the topic. *E.g.*, Symposium, *Technological Innovation & Legal Tradition: Enduring Principles for Changing Times?*, 4 TEX. REV. L. & POL. 1 (1999) (discussing various viewpoints on the treatment of genetic information); Symposium, *Respecting Genetic Privacy: The ASU-58 Conference on Law, Science, and Technology*, 40 JURIMETRICS J. 1 (1999) (proposing a coherent theme for genetic privacy).

examine constitutional genetic privacy given Fourth Amendment conceptions of physical privacy, informational privacy, and dignitary privacy—the versions of privacy most implicated by a conception of genetic privacy.

A. DIRECT FOURTH AMENDMENT GENETIC PRIVACY JURISPRUDENCE

Direct Fourth Amendment jurisprudence as to whether one has an expectation of genetic privacy is limited. As a whole, it only starts to outline some of the kinds of privacy concerns that a robust portrait would include. For example, courts frequently consider versions of bodily integrity, physical, property, and informational privacy when confronted with a genetic-privacy circumstance. A few courts also hint at an additional kind of less tangible privacy at stake in genetic privacy cases—one that I will later more fully identify as a dignitary-privacy concern.¹⁶⁴ None develop the full portrait of multi-dimensional genetic privacy.

Only two surreptitious-harvesting opinions came anywhere close to addressing society's conception of the reasonableness of an expectation of genetic privacy. The *Christian* court found that the defendant did not have an objective expectation of privacy in the DNA "in the absence of any definitive authority to the contrary."¹⁶⁵ The *Sigsbee* court summarily dismissed the idea of any expectation of privacy in bodily fluids (as opposed to one in the items upon which the fluids existed): "such theory would prohibit any and all testing upon items obtained from an individual regardless of whether they were lawfully or unlawfully obtained. This is not only an unacceptable premise but would be an unreasonable extension of an individuals [sic] expectation of privacy absent any legitimate constitutional basis."¹⁶⁶ Neither the *Christian* nor the

¹⁶⁴ See *infra* Part V.B.3.

¹⁶⁵ *State v. Christian*, No. 04-0900, 2006 WL 2419031, at *4 (Iowa Ct. App. Aug. 23, 2006). The *Athan* court found "no inherent privacy interest in saliva" and chose not to address any possible significant privacy interest in DNA because "the State's use of Athan's DNA here was narrowly limited to identification purposes." *State v. Athan*, 158 P.3d 27, 33–34 (Wash. 2007).

¹⁶⁶ *People v. Sigsbee*, No. 03-0342, slip op. at 33 (Onondaga, N.Y. Cnty. Ct. Oct. 30, 2003). The *Sigsbee* court failed to appreciate that, even if one recognized an expectation of privacy in one's DNA that society was willing to recognize as reasonable, it would mean only that

Sigsbee courts chose to characterize the nature or scope of society's conception of reasonable genetic privacy before dismissing the idea.

Courts have also addressed at least the idea of a broad conception of Fourth Amendment genetic privacy in the extensive litigation surrounding the constitutionality of investigative genetic databases. Because those cases always involve the collection of samples via compelled body intrusion—Buccal swab or blood sample—most of the courts do no formal *Katz* search analysis.¹⁶⁷

Nonetheless, several genetic-database courts have taken the opportunity in their analysis of the reasonableness of the search to describe the nature of the privacy interest at stake when the government acquires an individual's DNA. Some courts have used a totality-of-the-circumstances balancing test to assess the reasonableness of the search involved in getting a blood or saliva sample.¹⁶⁸ That test asks the court to balance the nature of the privacy interest at stake and the degree of intrusion on that interest against the importance of the governmental interest at stake.¹⁶⁹

Not surprisingly, those genetic-database opinions that have directly evaluated the nature of the privacy interest at stake often conceptualized the interest as one grounded in well-established privacy conceptions of bodily integrity or in information, or both. Most commonly, genetic-database opinions focusing on bodily integrity—the degree of physical intrusion into the body—analyzed the intrusion to that of taking blood, fingerprints, or photographs.¹⁷⁰ Some of those courts used those physical-intrusion

the police would be required to justify their search by showing probable cause or some other quantum of evidence. It would not “prohibit any and all testing.” *Id.*

¹⁶⁷ See, e.g., CONN. GEN. STAT. ANN. § 54-102g(a)–(e) (West 2009) (compelling certain offenders to give DNA samples).

¹⁶⁸ E.g., *United States v. Sczubelek*, 402 F.3d 175, 182–84 (3d Cir. 2005) (analyzing all relevant facts to determine whether it is reasonable to demand that convict give DNA sample).

¹⁶⁹ *Id.* at 182; see *Landry v. Att’y Gen.*, 709 N.E.2d 1085, 1090–92 (Mass. 1999) (holding involuntary collection of DNA from persons convicted of certain crimes was not unreasonable search and seizure because it involved little risk or pain and government's interest in making record of convicts was strong).

¹⁷⁰ E.g., *Padgett v. Ferrero*, 294 F. Supp. 2d 1338, 1342 (N.D. Ga. 2003) (“The bodily

analogies as the sole basis for their conceptualization of genetic privacy, and others used them in addition to information-intrusion analogies. Both groups of courts found that an individual's genetic privacy had no greater scope than the kind of narrow physical privacy at issue with drawing blood or taking fingerprints.¹⁷¹

The courts that focused primarily on an information conception of genetic privacy also relied on analogies to other well-established areas of privacy. Some spoke of the intrusion on information as being like that which occurs in the taking of a fingerprint,¹⁷² and others spoke more broadly of the intrusion being upon identity information¹⁷³—that the state was accessing either information about an individual's identity or the individual's identity itself. In either case, the courts' conception of genetic privacy was one-dimensional. The intrusion was upon the same kind of limited identifying information as when the government fingerprinted an individual. The conception of genetic privacy as information-based had no greater scope or depth than that.

That these courts would view genetic privacy as having only physical privacy or limited-information privacy dimensions is unsurprising. The impetus to conceive of the full dimensions of genetic privacy was abstract, at best. It occurred in the context of a balancing test with components that were hard to quantify—

intrusion of taking a blood or saliva sample is minimal. It is not significantly greater than taking fingerprints or a photograph.”).

¹⁷¹ *Id.*

¹⁷² See *Green v. Berge*, 354 F.3d 675, 680 (7th Cir. 2004) (“Use of DNA is in this respect no different from use of a fingerprint; only the method of obtaining the information differs, and for prisoners that is a distinction without importance.”); *Boling v. Romer*, 101 F.3d 1336, 1340 (10th Cir. 1996) (approving “use of DNA in a manner not significantly different from the use of fingerprints”); *Vanderlinden v. Kansas*, 874 F. Supp. 1210, 1215 (D. Kan. 1995) (“[T]he court finds persuasive the . . . analogy of the blood and saliva gathering at issue here to traditional identification techniques, such as fingerprinting.”); *People v. Wealer*, 636 N.E.2d 1129, 1137 (Ill. App. Ct. 1994) (“[W]e consider the sampling mandated . . . as functionally equivalent to fingerprinting . . .”).

¹⁷³ See, e.g., *Groceman v. U.S. Dep’t of Justice*, 354 F.3d 411, 413 (5th Cir. 2004) (“[L]ike fingerprinting, collection of a DNA sample for purposes of identification implicates the Fourth Amendment . . .”); *Miller v. U.S. Parole Comm’n*, 259 F. Supp. 2d 1166, 1178 (D. Kan. 2003) (“The DNA sample is used solely to provide identification information and that purpose, and no other, is articulated in 42 U.S.C. § 14135e. DNA identification is often likened to a fingerprint. While some differences exist, they are both identity markers.”).

governmental interest, nature of privacy interest,¹⁷⁴ and degree of intrusion. The courts were assessing statutory structures that, superficially, had all the appearances of earlier physical-characteristic collections of information for identification purposes only, like photographs and fingerprints.¹⁷⁵

What is more surprising are the genetic-database opinions that showed some signs of breaking from the classic, narrow physical-intrusion and information-intrusion paradigms in an effort to give fuller dimension to the concept of genetic privacy. In some instances, these courts merely considered and then rejected a fuller conception of genetic privacy. In *Nicholas v. Goord*, the Second Circuit expressed an awareness of the potential for a more significant intrusion on privacy because database samples were kept permanently: “it is potentially a far greater intrusion than the initial extraction of DNA, since the state analyzes DNA for information and maintains DNA records indefinitely.”¹⁷⁶ The court then concluded that the potential intrusion was unlikely given the procedural safeguards of New York’s database statute that limited the use of the samples.¹⁷⁷

A few genetic-database opinions have sketched some of the fuller dimensions of genetic privacy. Those sketches include a

¹⁷⁴ Note also that the privacy interest at stake belonged to one convicted of a crime. As all the courts that used the balancing test recognized, one convicted of a crime has a diminished expectation of privacy. See, e.g., *Jones v. Murray*, 962 F.2d 302, 306–07 (4th Cir. 1992) (“With . . . arrest comes the loss of at least some, if not all, rights to personal privacy otherwise protected by the Fourth Amendment.”); *Landry*, 709 N.E.2d at 1094 (“[C]onvicted persons . . . have a low expectation of privacy in their identity. . .”).

¹⁷⁵ See *Johnson v. Quander*, 440 F.3d 489, 499 (D.C. Cir. 2006) (“Today, however, the DNA Act applies only to felons, and CODIS operates much like an old-fashioned fingerprint database (albeit more efficiently).”).

¹⁷⁶ 430 F.3d 652, 670 (2d Cir. 2005).

¹⁷⁷ *Id.*; see also *State v. Raines*, 857 A.2d 19, 40 n.17 (Md. 2004) (“Although Appellee and the amici speak of doomsday type scenarios where every person’s, including non-convicts’, DNA would be subject to search by both police and unauthorized persons and soon would be subject to nearly unregulated access, the current version of the Maryland DNA Collection Act does not even approach such unregulated access to DNA profiles.”).

Other courts have acknowledged at least the possibility of a broader conception of genetic privacy. *Quander*, 440 F.3d at 499–500 (a *Kyllo* analogy); *Padgett v. Donald*, 401 F.3d 1273, 1281 (11th Cir. 2005) (an analogy to female guards watching naked men); *State ex rel. Juvenile Dep’t v. Orozco*, 878 P.2d 432, 435 (Or. Ct. App. 1994) (recognizing that blood-testing may be a “greater insult to human dignity than fingerprinting”).

much expanded sense of the breadth and depth of the available genetic information and a preliminary identification of elements of genetic privacy that are grounded in more than just its information-laden status. Those sketches portray a sense that fully dimensioned genetic privacy is of a different character than the privacy attendant to fingerprinting, photographing, and traditional blood testing.

In *Patterson v. State*, an Indiana appellate court found that “[a]t a minimum, it is clear that the results of DNA analysis provide extremely personal information about an individual” even though it upheld the constitutionality of the genetic-database statute.¹⁷⁸ In his concurrence in *United States v. Kincade*, Judge Gould, after harkening back to Brandeis and Warren’s seminal article on the right to privacy, expressed deep concern about the potential abuse of information obtained from DNA:

In our age in which databases can be “mined” in a millisecond using super-fast computers, in which extensive information can, or potentially could, be gleaned from DNA (even the “junk” DNA currently used), and in which this data can easily be stored and shared by governments and private parties worldwide, the threat of a loss of privacy is real, even if we cannot yet discern the full scope of the problem.¹⁷⁹

In a federal district court opinion later overturned by the First Circuit, Judge Young articulated a sense of genetic privacy that went beyond the tangible boundaries of information and bodily integrity:

Today this Court faces the latest iteration in the growing tension between technology’s ability to advance governmental purposes and the Fourth Amendment’s protection of individual privacy. This tension is faced and resolved by balancing the

¹⁷⁸ *Patterson v. State*, 742 N.E.2d 4, 10 n.3 (Ind. Ct. App. 2000).

¹⁷⁹ 379 F.3d 813, 842 (9th Cir. 2004) (en banc) (Gould, J., concurring).

government's purpose against the resulting intrusion on the individual. When conducting such a balancing test, the immediate and tangible imperatives of the governmental purpose often outshine and eclipse *the more telescopic and inchoate value of personal privacy*. The willingness to watch the erosion of such rights silently is most likely where the vanishing liberties are perceived as not our own. It is even more acute where the subjects are those who have derided and evaded, through criminal misconduct, the order and legal structure on which they now rely.¹⁸⁰

In an earlier case, also reversed by the First Circuit, Judge Keeton had characterized the information obtained in DNA database searches as “immensely private.”¹⁸¹

More dramatically, in his dissent in the en banc decision in *United States v. Kincade*, Judge Reinhardt wrote expansively about the core upon which DNA testing intruded:

Yet the current CODIS database, when it is compared to its modest beginnings, represents an alarming trend whereby the *privacy and dignity* of our citizens [are] being whittled away by [] imperceptible steps. Taken individually, each step may be of little consequence. But when viewed as a whole, there begins to emerge a society quite unlike any we have seen—a society in which

¹⁸⁰ *United States v. Stewart*, 468 F. Supp. 2d 261, 282 (D. Mass. 2007) (emphasis added), *rev'd*, 532 F.3d 32 (1st Cir. 2008). The First Circuit did not reject Judge Young's characterization of the privacy interest at stake. It rejected the result of his balancing. 532 F.3d at 33–34.

¹⁸¹ *United States v. Weikert*, 421 F. Supp. 2d 259, 269 (D. Mass. 2006), *rev'd*, 504 F.3d 1 (1st Cir. 2007). The court said: “Not only is the information itself thus immensely private, but the means of storing this information in a centralized database that could potentially be accessed for improper reasons is itself a significant intrusion on privacy interests.” *Id.*

government may intrude into *the secret regions of man's life at will*.¹⁸²

“The more telescopic and inchoate value of personal privacy,” “immensely private,” “privacy and dignity” and “the secret regions of man’s life” all speak of a dimension to genetic privacy in addition to the physical or the informational—one identifiable as a dignitary—privacy dimension. The dimension of dignitary privacy captures a much more intangible sense of violation caused by the repeated intrusion on one’s DNA that occurs in genetic-database circumstances. Taken together, the physical integrity, informational, and dignitary perspectives on privacy revealed by genetic-database cases form the core components of a fully dimensioned portrait of genetic privacy worthy of evaluation in the surreptitious harvesting of out-of-body DNA circumstance.

B. CONCEPTUAL COMPONENTS OF GENETIC PRIVACY

A focus on physical, informational, and dignitary privacy returns us to Solove’s six summary conceptions of privacy: the right to be let alone, limited access to the self, secrecy, the control of personal information, personhood, and intimacy.¹⁸³ These conceptions each contemplate the protection of some core. As Solove suggests with his “taxonomy of privacy,” the protected core of privacy lies within the circumstance at hand rather than in a single normative standard good for all purposes.¹⁸⁴ Inevitably, it varies from circumstance to circumstance. So, the protected core at stake in a home invasion would differ from that in a cyber invasion or in a sodomy prosecution.

In the particular circumstance of surreptitious harvesting, the protected core is what I call a kaleidoscope of identity—a constantly changing pattern of elements that define one’s sense of self. This sense is physical in that DNA is within the body or a

¹⁸² *Kincade*, 379 F.3d at 851 (Reinhardt, J., dissenting) (alterations in original) (emphasis added) (quoting *Osborn v. United States*, 385 U.S. 323, 343 (1966) (Douglas, J., dissenting)).

¹⁸³ SOLOVE, *supra* note 152.

¹⁸⁴ *Id.* at 8–9.

part of the body—a cell; it is ubiquitous in that it is in every cell; it is permanent; and it is relatively immutable. The sense of self is informational in that DNA contains a broad range of medical and other information—information that is personal, predictive, intimate, powerful, and shared. This sense is dignitary in that DNA contains the kind and quality of information and is so ubiquitous that, in the hands of the government, it may reveal more about who individuals are than they themselves will ever know.

In the case law and in public discourse, DNA is often referred to as a “code,”¹⁸⁵ a “map,”¹⁸⁶ a “language,”¹⁸⁷ and a “library”¹⁸⁸ to mention a few. These metaphors capture the predictive, information-laden sense of identity contained within DNA. One might even broaden those metaphors to call DNA an encyclopedia of identity that can be consulted repeatedly over time.

The kaleidoscope metaphor most fully captures the multi-dimensional nature of the identity that DNA embodies. Identity itself has many components—physical, informational, and dignitary to mention only a few. It can be socially constructed. It can be grounded in the physical and measurable. It can depend on the perception of others. It can come from one’s own internal perception grounded in life experience and may even exist in spite of either what others think or what much of the information “says.”

Who one is changes over time. One’s hair grays or disappears. One’s posture and physical bearing alter. One’s personality, malleable as it is or isn’t, evolves over time in response to internal and external events—physical and emotional, voluntary, and involuntary. One interacts with the environment in innumerable ways and the world’s perception—and one’s own—of who one is

¹⁸⁵ *E.g.*, THE CODE OF CODES: SCIENTIFIC AND SOCIAL ISSUES IN THE HUMAN GENOME PROJECT 60 (Daniel J. Kevles & Leroy Hood eds., 1992).

¹⁸⁶ *E.g.*, BARBARA KATZ ROTHMAN, GENETIC MAPS AND HUMAN IMAGINATIONS: THE LIMITS OF SCIENCE IN UNDERSTANDING WHO WE ARE 189 (1998).

¹⁸⁷ *E.g.*, FRANCIS S. COLLINS, THE LANGUAGE OF LIFE: DNA AND THE REVOLUTION IN PERSONALIZED MEDICINE 6 (1st ed. 2010).

¹⁸⁸ *E.g.*, KEVIN DAVIES, CRACKING THE GENOME: INSIDE THE RACE TO UNLOCK HUMAN DNA 33 (2001).

depends where one looks and the resolution of that focus. The kaleidoscopic nature of identity mirrors the dynamic, multi-dimensional core of genetic privacy.

1. *Physical Privacy*. The term “physical privacy” encompasses at least three, often overlapping, versions of the physical. It can refer to the body or bodily integrity—my body is private to me. It can refer to a sense of location—the physical location means it is private. It can also refer to a sense of tangibleness or even property—this physical item is mine and you can’t have it or go in it. The language of the Fourth Amendment itself captures elements of each of these in its list of examples: “The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated”¹⁸⁹

The crux of the rejection of surreptitious harvesting as a search is that the samples retrieved are outside the individual’s body. In the language of those cases, one can hear the echoes of the three versions of physical privacy.

[W]hen the defendant *discarded the straw* he also discarded any expectation of privacy in the DNA evidence on the straw. While it is unlikely that the defendant believed that he was discarding bodily fluids that would show his DNA profile, nonetheless¹⁹⁰

In any event, we believe the same *abandonment analysis* applies equally to the items seized or the shed DNA samples obtained from them.¹⁹¹

The relevant question in this case is whether, when a person licks an envelope and *places it in the mail*, that

¹⁸⁹ U.S. CONST. amend. IV.

¹⁹⁰ *People v. Sigsbee*, No. 03-0342, slip op. at 31–32 (Onondaga, N.Y. Cnty. Ct. Oct. 30, 2003) (emphasis added).

¹⁹¹ *State v. Christian*, No. 04-0900, 2006 WL 2419031, at *4 (Iowa Ct. App. Aug. 23, 2006) (emphasis added).

person retains any privacy interest in his saliva at all.¹⁹²

Our conclusion that Bly had no subjective expectation of privacy is compelled not by a finding that he *legally abandoned* them as much as it is by his wholesale failure to manifest any expectation of privacy in the items whatsoever.¹⁹³

The fact that the DNA was not in the individual's body, that it was abandoned, or that it was placed in the mail resolved the matter for each of these courts.

That analytical crux depends on one's conception of the physical and what is being searched. If one conceives the search to be of the cup, cigarette butt, saliva, or blood that is outside the body, then DNA's out-of-body status matters. One does not enter the physical boundaries of the body if one enters the cup, blood, or saliva. An individual most often knowingly abandons such items and bodily fluids and would likely have no expectation of privacy in them.

If one conceives of the locus of intrusion as one's DNA, the calculus changes. If "entry" of the physical boundaries of the body occurs when one enters one's DNA to obtain what will become the alphanumeric identification tag used in forensic DNA analysis, then it is an intrusion. Or, if one is mining that which ordinarily exists in the traditional boundaries of the body—DNA—without entering the body, then it is an intrusion.

In and of itself, the proposition that any entry of out-of-body DNA or an out-of-body cell constitutes an intrusion into the body appears to stretch credulity. It would seem to expand the boundaries of what constitutes the body beyond that which is either practical or sensible.

Yet such a seemingly novel conception may not be so far-fetched. As discussed previously, the *Kyllo* Court found that the search of a location—a home—occurred even though the home was

¹⁹² State v. Athan, 158 P.3d 27, 33 (Wash. 2007) (emphasis added).

¹⁹³ Commonwealth v. Bly, 862 N.E.2d 341, 357 (Mass. 2007) (emphasis added).

never entered.¹⁹⁴ The analogy between using thermal-imaging technology to discern activity within the home and using forensic-DNA technology to discern what is in the body is imperfect. Both circumstances recognize that an intrusion can occur without crossing a traditional physical boundary.

Other physical-privacy cases focusing on the location of that which is searched buttress the suggestion that neither traditional physical boundaries nor location necessarily resolve the Fourth Amendment issue. In *United States v. Chadwick*, the Supreme Court analyzed a situation in which the police were legally in possession of a car and legally inside the car. Therein, they discovered a double-locked trunk.¹⁹⁵ The police removed the trunk from the car; transported it to a federal facility and then opened it without a warrant, finding marijuana inside.¹⁹⁶ The Court found that the police should not have opened the trunk without a warrant.¹⁹⁷

In *California v. Acevedo*, a 1991 follow-up to *Chadwick*, the police stopped a car with probable cause to believe contained a bag with marijuana in the trunk.¹⁹⁸ In effectively overruling *Chadwick*, the Court found that the police could search the container within the car without a warrant as long as they had probable cause to search that container.¹⁹⁹

The analogy to surreptitious harvesting is direct, though perhaps not intuitive. When the police seized the envelope in *Athan*, they seized the *Chadwick–Acevedo* car. When they removed the saliva from the envelope, they seized the *Chadwick–Acevedo* container. When they entered the cell to extract the DNA, they searched the trunk in *Chadwick* and the bag in *Acevedo*.

This analogy also extends to more technologically sophisticated circumstances. In cell phone cases, courts have found that the phone's owner has an expectation of privacy in the contents of the

¹⁹⁴ *Kyllo v. United States*, 533 U.S. 27, 34–36 (2001).

¹⁹⁵ *United States v. Chadwick*, 433 U.S. 1, 3–4 (1977), *abrogated by California v. Acevedo*, 500 U.S. 565 (1991).

¹⁹⁶ *Id.* at 4–5.

¹⁹⁷ *Id.* at 15–16.

¹⁹⁸ *Acevedo*, 500 U.S. at 567.

¹⁹⁹ *Id.* at 580–81.

phone.²⁰⁰ For example, in *State v. Smith*, the police arrested Smith and found a cell phone in his possession.²⁰¹ The police searched the cell phone and discovered call records and phone numbers of value to their investigation.²⁰² The Ohio Supreme Court found that Smith had a protected privacy interest in the contents of his cell phone and declined to apply the search-incident-to-arrest exception, finding that the police should have obtained a warrant.²⁰³

The analogy to surreptitious harvesting is direct. For example, when the police seized the envelope in *Athan*, they seized the defendant in *Smith*. When they removed the saliva from the envelope, they seized the *Smith* cell phone. When they entered the saliva and its cells to extract the DNA, they searched the contents of the cell phone in *Smith*.

The import of the *Chadwick–Acevedo* and *Smith* analogies is plain. If there is a reasonable expectation of privacy in the DNA obtained from the search of the saliva and cells in *Athan* as the courts found in the contents of the trunk, bag, and cell phones in those cases, then the police must have probable cause and, depending on the circumstances, a warrant to search for DNA in surreptitious harvesting cases.

Those analogies hold only if a reasonable expectation of privacy in one's DNA is as merited as a reasonable expectation of privacy in a double-locked trunk (*Chadwick*), a bag (*Acevedo*), or a cell phone (*Smith*). A double-locked trunk speaks of a heightened, proactive sense of security, a paper bag less so. A cell phone may or may not have security features, though it appears that the

²⁰⁰ *United States v. Zavala*, 541 F.3d 562, 577 (5th Cir. 2008); *United States v. Finley*, 477 F.3d 250, 259 (5th Cir. 2007); *United States v. Quintana*, 594 F. Supp. 2d 1291, 1299 (M.D. Fla. 2009); *United States v. Morales–Ortiz*, 376 F. Supp. 2d 1131, 1139 (D. N.M. 2004); *State v. Boyd*, 992 A.2d 1071, 1075 (Conn. 2010), *cert. denied*, 131 S. Ct. 1474 (2011). *But see United States v. Mercado–Nava*, 486 F. Supp. 2d 1271, 1276 (D. Kan. 2007) (“Mere physical possession or control of property is not sufficient to establish standing to object to a search of that property.” (quoting *United States v. Arango*, 912 F.2d 444, 444–46 (10th Cir. 1990))).

²⁰¹ *State v. Smith*, 920 N.E.2d 949, 950 (Ohio 2009).

²⁰² *Id.*

²⁰³ *Id.* at 955.

phone in *Smith* had the kind of security that prevented ready scrolling by the police.

Physically, the surreptitious harvesting search is a search for an otherwise inaccessible item and one at the core of one's physical being. For STR testing, the forensic scientist must isolate the DNA molecules from other cellular materials,²⁰⁴ remove any possible inhibitors to the PCR process,²⁰⁵ and quantitate the DNA to make sure it is from a human subject.²⁰⁶ The analyst then amplifies the DNA so that enough exists for analysis²⁰⁷ and transforms the fluorescently labeled DNA into an image on an electropherogram.²⁰⁸ Only then can the analyst analyze the DNA in the original sample. The unlocking of the cellular "trunk" or scrolling of the "cellular" phone is a sophisticated molecular biological process using, for example, chemicals, enzymes, thermal cyclers, and DNA templates.²⁰⁹

Yet, as inaccessible as DNA is, it is equally ubiquitous. It is in every cell in the human body, whether that cell is a part of skin, bodily fluids, hair root, living bone, etc.²¹⁰ The "item" for surreptitious-harvesting searches is also at the physical core of every human being. It is in the nucleus of the cell and is a physical starting point for life itself, yet obtaining it through surreptitious harvesting causes no pain.²¹¹

Inaccessibility, ubiquity, and existence as a core part of the body are the essential physical privacy features of DNA. Unlike the *Chadwick-Acevedo* circumstance, the inaccessibility is passive.²¹² The "double-lock" naturally exists, albeit with many

²⁰⁴ BUTLER, *supra* note 16, at 42.

²⁰⁵ *Id.* at 49.

²⁰⁶ *Id.* at 50.

²⁰⁷ *Id.* at 63.

²⁰⁸ *Id.* at 330.

²⁰⁹ See generally *id.* (explaining the process of forensic DNA typing as applied to criminal forensics).

²¹⁰ *Id.* at 17, 34.

²¹¹ Contrast this kind of search to the one in *Schmerber v. California*, 384 U.S. 757, 758 (1966), where the police, via a physician, obtained a blood sample from a DUI suspect, or to the one in *Winston v. Lee*, 470 U.S. 753, 756 (1985), where the police, via a surgeon, sought to surgically remove a bullet from the body of an attempted robbery suspect.

²¹² Unlike a locked trunk, a closed purse, or a bag in a car trunk, the hyper-inaccessibility

more locks of much greater technological sophistication. Its ubiquity is unique, and its existence as part of the body's core is, oddly, not dependent on whether it is within or outside the body.

The fingerprint analogy presents an interesting contrast. Fingerprints, though permanent like DNA, are neither inaccessible nor at the body's core. They exist only on the outside of the body and are literally superficial—on one's fingertips. A forensic scientist must use a measure of discipline and attention to detail to develop a fingerprint from an individual's fingers, let alone from a crime scene.²¹³ But the technological or biological sophistication necessary to obtain a fingerprint is much less than that required for DNA.

They are, in measure, ubiquitous in that everyone has them and they are found on all ten fingers. However, they possess none of the biological ubiquity of DNA. In terms of the physical privacy features, then, fingerprints are not comparable to DNA given DNA's inaccessibility, ubiquity, and existence at the physical core of a human.

That conclusion does not resolve with finality the fingerprint–DNA comparison though. What fingerprints and DNA most share in common is that they both contain valuable identifying information. Much of the identifying utility of both fingerprints and DNA comes from the nature of the information. However, some of it comes from the physical location or existence of the information. Fingerprints are valuable for identification purposes because (1) they contain information from the tips of fingers—accessible, common to every human, and permanent and (2) that information is considered “unique.”²¹⁴ Thus, the surrounding physical context for the unique information is an essential predicate to their identifying power.

of DNA is not an active step taken by an individual. Some might argue that this militates against a finding of a subjective expectation of privacy.

²¹³ See generally SIMON A. COLE, *SUSPECT IDENTITIES: A HISTORY OF FINGERPRINTING AND CRIMINAL IDENTIFICATION* (2001) (explaining the complexity of the fingerprint identification process).

²¹⁴ Putting aside recent litigation surrounding fingerprints. See, e.g., *Commonwealth v. Patterson*, 840 N.E.2d 12, 26–28 (Mass. 2005) (comparing the degrees to which different fingerprinting analysis techniques reliably identify an individual).

The same is true with DNA. Its physical privacy features—inaccessibility, ubiquity, and existence at the body’s core—provide the physical context within which its identifying value becomes powerful. Put differently, it is not just about the substance of the information, but it is also about the physical context within which it exists. And one’s identity—part of one’s dignity—also gets additional meaning from the physical context. An examination of the informational- and dignitary-privacy aspects of surreptitious harvesting will thus fill in the developing portrait of the kaleidoscope of identity.

2. *Informational Privacy.* The informational privacy features of DNA are the most prominent colors in the genetic-privacy kaleidoscope of identity. Information from DNA analysis can be intimate, personal, shared, predictive, and powerful. To the extent that one’s identity is captured by a composite of data, the DNA from surreptitious harvesting captures the full breadth of that informational dimension of identity.

The informational-privacy dimension of DNA has been the primary focus of the genetic-database case law on genetic privacy. Though every court has, in the end, declined to act based on the informational-privacy features of DNA,²¹⁵ many of them have highlighted its potential. The classic description of DNA’s informational value is Judge Reinhardt’s dissent in *United States v. Kincaid*:

What type of information might the government eventually be able to extract from samples of junk DNA? Even today, as the plurality admits, “DNA profiles derived by STR may yield probabilistic

²¹⁵ The courts have arrived at this conclusion because (1) the information obtained for inclusion in a genetic database is alphanumeric and one-dimensional and (2) the use of that limited information is strictly controlled by statute. See, e.g., *Nicholas v. Goord*, 430 F.3d 652, 668 (2d Cir 2005) (observing that “junk DNA” serves no known purpose other than to establish identity); *State v. Raines*, 857 A.2d 19, 33 (Md. 2004) (dismissing fears of “unregulated access to DNA profile[s]”); *State v. Martin*, 955 A.2d 1144, 1155 (Vt. 2008) (noting that database indexes genes “not associated with any known physical trait”); *State v. Athan*, 158 P.3d 27, 34 (Wash. 2007) (acknowledging potential for privacy violations with DNA information). In the surreptitious-harvesting circumstance, neither the state nor the federal government appears to regulate the information obtained.

evidence of the contributor's race or sex." Yet that seems to be a dramatic understatement. The DNA "fingerprint" entered into CODIS likely has the potential to reveal information about an individual's "genetic defects, predispositions to diseases, and perhaps even sexual orientation." DNA analysis can reveal the presence of traits for thousands of known diseases, and countless numbers of diseases which are currently unknown. More ominously, some have predicted that the DNA profiles entered into CODIS will someday be able to predict the likelihood that a given individual will engage in certain types of criminal, or non-criminal but perhaps socially disfavored, behavior.²¹⁶

In his dissent in *Rise v. Oregon*, Judge Nelson also highlighted the particularly sensitive nature of the information in DNA: "DNA genetic pattern analysis catalogs uniquely private genetic facts about the individual that should be subject to rigorous confidentiality requirements even broader than the protection of an individual's medical records."²¹⁷ In *United States v. Weikert*, Judge Keeton further characterized a genetic database as one in which "the files that are kept for perpetuity are replete with information the scope of which science has not yet discovered."²¹⁸

The case law thus describes DNA as containing: (1) information about genetic defects, predispositions to diseases, perhaps sexual orientation, the presence of traits for thousands of known diseases, and countless numbers of diseases which are currently unknown; (2) possible predictive information about certain types of criminal, or noncriminal but perhaps socially disfavored, behavior; (3) more generally, information of the most sensitive and personal nature

²¹⁶ *United States v. Kincade*, 379 F.3d 813, 850 (9th Cir. 2004) (en banc) (Reinhardt, J., dissenting) (citations omitted).

²¹⁷ 59 F.3d 1556, 1569 (9th Cir. 1995) (Nelson, J., dissenting), *abrogated by* *City of Indianapolis v. Edmond*, 531 U.S. 32 (2000), *and* *Ferguson v. City of Charleston*, 532 U.S. 67 (2001).

²¹⁸ *United States v. Weikert*, 421 F. Supp. 2d 259, 269 (D. Mass. 2006), *rev'd*, 504 F.3d 1 (1st Cir. 2007).

and a catalog of uniquely private genetic facts more than akin to those facts contained in medical records.

This cascade of information is only a relatively small window into the body of new information flowing from recent genetic research. For purposes of a focus on genetic privacy, the salient features of the information flowing from that research are that it is intimate, personal, shared, predictive, and powerful.

a. Predictive. The predictive nature of genetic information is notable. One of the fundamental features of genetic information is its probabilistic nature. For example, genetic disorders are rarely controlled by a single gene that necessarily causes the disorder.²¹⁹ Most information flowing from a genetic analysis, particularly as to medical conditions, is predictive rather than certain. For example, the variants of the “breast cancer gene” that have been identified as causing cancer only inform carriers such a variant that they have an increased likelihood (five-fold) over the course of their lifetime of developing breast cancer as compared to the general population.²²⁰

Predictive genetic information comes in many shapes, sizes, and degrees of certainty. While newspaper headlines frequently trumpet the discovery of the “gene for . . .,” more often what has been located is a gene that correlates to the presence of a medical disorder, a trait, or a behavior.²²¹ For example, scientists have developed correlations between genes and obesity,²²² risk-taking,²²³

²¹⁹ NHS NAT'L GENETICS EDUC. & DEV. CTR., *Single Gene Disorder*, <http://www.geneticseducation.nhs.uk/teaching-genetics/glossary/single-gene-disorder.aspx> (last visited Sept. 23, 2012). A notable exception is Huntington's disease. NAT'L CTR. FOR BIOTECHNOLOGY INFO., *Huntington's Disease*, <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001775/> (last visited Aug. 17, 2011).

²²⁰ NAT'L CANCER INST., *BRCA1 and BRCA2: Cancer Risk and Genetic Testing*, <http://www.cancer.gov/cancertopics/factsheet/Risk/BRCA> (last visited Aug. 17, 2011).

²²¹ See generally GISELA KAPLAN & LESLEY J. ROGERS, *GENE WORSHIP: MOVING BEYOND THE NATURE/NUTURE DEBATE OVER GENES, BRAIN, AND GENDER* (2003) (critiquing the frequent genetic explanations for human behavior).

²²² Alan Herbert et al., *A Common Genetic Variant Is Associated with Adult and Childhood Obesity*, 312 *SCIENCE* 279, 279 (2006).

²²³ Chin-Hsing Lin et al., *The Dosage of the NeuroD2 Transcription Factor Regulates Amygdala Development and Emotional Learning*, 102 *PROC. NAT'L ACAD. SCI.* 14877, 14879 (2005).

smoking,²²⁴ creative dance,²²⁵ schizophrenia,²²⁶ and impulsivity and violence.²²⁷

DeCODE Genetics, an international biotechnology research company in Iceland, advertises diagnostic tests for a variety of genetic conditions on its website, including tests for obesity, common forms of breast cancer, prostate cancer, glaucoma, elevated cholesterol, as well as hypertension and cardiac risk.²²⁸ Its most comprehensive test is a personal genetic scan, deCODEme, that “analyses genetic risk factors for 48 diseases ranging from heart attack and diabetes to lung cancer and traits like ABO bloodtypes, eye color and male pattern baldness.”²²⁹ Other companies like 23andME offer similar services, attracting customers with the promise of personalized genetics.²³⁰

To be sure, genetic information about physical traits or conditions can be certain. Forensic tests for eye color, hair color, and other traits continue to be developed in an effort to provide investigators with a hazy physical portrait of a potential suspect drawn from a crime scene sample.²³¹ In terms of informational privacy concerns, though, predictive genetic information provides a future window into an individual’s life. George Annas has eloquently labeled predictive genetic information a “future diary” that “informs our younger selves about our aging selves.”²³²

²²⁴ V. Malaiyandi et al., *Impact of CYP2A6 Genotype on Pretreatment Smoking Behaviour and Nicotine Levels from and Usage of Nicotine Replacement Therapy*, 11 MOLECULAR PSYCHIATRY 400, 400 (2006).

²²⁵ Rachel Bachner–Melman et al., *AVPR1a and SLC6A4 Gene Polymorphisms Are Associated with Creative Dance Performance*, 1 PLOS GENETICS 394, 394 (2005).

²²⁶ Vladimir Vacic et al., *Duplications of the Neuropeptide Receptor Gene VIPR2 Confer Significant Risk for Schizophrenia*, 471 NATURE 499, 499 (2011).

²²⁷ Andreas Meyer–Lindenberg et al., *Neural Mechanisms of Genetic Risk for Impulsivity and Violence in Humans*, PROC. NAT’L ACAD. SCI., <http://www.pnas.org/cgi/doi/10.1073/pnas.0511311103> (last visited Feb. 26, 2012).

²²⁸ DECODE GENETICS, <http://www.decode.com/products/> (last visited Aug. 17, 2011).

²²⁹ *Id.*

²³⁰ 23ANDME, <http://www.23andme.com/> (last visited Feb. 26, 2012). 23andMe uses the catch phrase, “Genetics just got personal.”

²³¹ TONY N. FRUDAKIS, MOLECULAR PHOTOFITTING: PREDICTING ANCESTRY AND PHENOTYPE USING DNA 613 (2008).

²³² It is in code and probabilistic, but just as private. It is information about *you*, information about which you should have a right *not* to know, a right to say, “I don’t want to know this.” But even if you want to know it, you

b. Shared. Genetic information is also shared information. Because genetic information is hereditary, the DNA of blood relatives is more similar than that of the unrelated population. For example, with paternity testing, laboratories compare the DNA of a putative parent and child to determine possible parentage.²³³ One begins to know to whom one is related when one is in possession of an individual's DNA. As noted above, this proposition has formed the basis for the activities of amateur genealogists, divorce lawyers, and DNA paparazzi.²³⁴

Prosecutors have also begun to use genetic information taken from DNA more creatively. Based on the work of Mark Shriver and others, tests exist to discern bio-geographical information from DNA—testing that purports to identify, at least, the continent of origin of the human source of the sample.²³⁵ For example, a serial murder case in Louisiana changed direction based on bio-geographical testing that directed the police to a non-Caucasian suspect rather than a Caucasian suspect.²³⁶

Even more recently, the police and prosecutors have engaged in a practice known as familial searching—an outgrowth of the compilation of state-by-state and federal databases containing 13-loci genetic information on those convicted of certain crimes. The police submit the 13-loci genetic profile of the crime-scene sample

should have a right to say, "I don't want anybody else to know it. I don't want my employer to know it. I don't want the FBI to know it. I don't want my school to know it. I don't want my colleagues to know it. I don't want my spouse to know it. I don't want my children to know it." It should be your choice. . . . [I]n terms of information, I believe that our DNA resembles a future diary that is due the same privacy that we afford other written diaries.

George J. Annas, *Genetic Privacy: There Ought To Be a Law*, 4 TEX. REV. L. & POL. 9, 11 (1999).

²³³ NAT'L RESEARCH COUNCIL, THE EVALUATION OF FORENSIC DNA EVIDENCE 53–54 (1996).

²³⁴ See *supra* notes 8–9 and accompanying text. See generally Mark A. Rothstein, *Genetic Stalking and Voyeurism: A New Challenge to Privacy*, 57 U. KAN. L. REV. 539 (2009) (discussing uses and publication of genetic information and recommending legislation).

²³⁵ FRUDAKIS, *supra* note 231, at 35–145.

²³⁶ Nicholas Wade, *Unusual Use of DNA Aided in Serial Killer Search*, N.Y. TIMES, June 3, 2003, at A28.

of unknown origin into the CODIS database.²³⁷ Sometimes, the search produces a partial match in which the sample of unknown origin matches the sample of known origin at, most often, six or more loci but not all.²³⁸ Such a result strongly suggests that the individual who contributed the crime-scene sample is closely related to the individual in the database.²³⁹

The prosecution then seeks a search warrant to get a blood sample from relevant relatives of the database individual, basing their claim of probable cause on the suggestive partial match.²⁴⁰ These examples confirm that genetic information from DNA tells others not only information about who you are—physically and going forward—but also to whom you are related and to what ancestral groups you belong. Genetic information is shared information that is identifying both at an individuating level—to whom you “belong”—and at a group-membership level—you belong with them.

c. Personal and Intimate. Because it contains both predictive and shared information, DNA information is also personal and intimate. As a present and future diary, it catalogs knowledge about, for example, current and possible future medical conditions that an individual could otherwise choose to disclose. Therein lies much of the basis for the genetic-privacy laws that so many states have passed.

Strikingly, someone in possession of others’ DNA would be able to learn information about them that they do not know about themselves. Consider the circumstance in which a genetic counselor becomes aware that a couple’s child only has a genetic relationship to one of the parents. The personal and intimate nature of such information in the hands of a third party is apparent. And note that in the context of Fourth Amendment

²³⁷ Jules Epstein, “Genetic Surveillance”—*The Bogeyman Response to Familial DNA Investigations*, 2009 U. ILL. J.L. TECH. & POL’Y 141, 145.

²³⁸ *Id.* at 146.

²³⁹ *Id.*

²⁴⁰ *Id.* at 145–46.

genetic privacy, the third party with that knowledge would be the government.²⁴¹

d. Powerful. The predictive, shared, personal, and intimate nature of genetic information also makes it powerful. The degree of that power is reflected in the variety of laws passed to rein in its abuse. Most states now have genetic antidiscrimination laws in the provision of health insurance.²⁴² A number of states have such laws addressing the employment context,²⁴³ and genetic-privacy laws are quite common.²⁴⁴

Even pseudo-genetic information has had power, historically. The eugenics era in this and other countries in the first part of the twentieth century is a vivid and painful historical reminder of the power of genetic information. Hundreds of thousands of individuals were sterilized based on pseudo-genetic information.²⁴⁵ Carrie Buck, the subject of the infamous *Buck v. Bell* case upholding the constitutionality of involuntary sterilization,²⁴⁶ was committed to the Virginia Colony for Epileptics and Feeble-minded, in Lynchburg and involuntarily sterilized because she, her mother, and her daughter were believed to be “feeble-minded,” then viewed as a hereditary condition.²⁴⁷

The scope of eugenic legislation went beyond involuntary sterilization statutes. More than twenty-five states revised their marriage laws to prevent the “biological continuation” of the unfit.²⁴⁸ Immigration restrictions were passed that used “IQ” tests

²⁴¹ It is critical, once again, to recognize in this discussion of what is genetic privacy that the focus is on the individuals' *expectation* of privacy in their DNA, not on their level of certainty as to whether the government has or would access such information or what the government would do with such information if it had or did access the information.

²⁴² Nancy E. Kass, *The Implications of Genetic Testing for Health and Life Insurance*, in GENETIC SECRETS, *supra* note 158, at 299, 312–13.

²⁴³ Mark A. Rothstein, *The Law of Medical and Genetic Privacy in the Workplace*, in GENETIC SECRETS, *supra* note 158, at 281, 291–93.

²⁴⁴ *E.g.*, N.H. REV. STAT. ANN. § 141-H (“[N]o individual . . . shall be required to undergo genetic testing as a condition of doing business with another person.”).

²⁴⁵ See DANIEL KEVLES, IN THE NAME OF EUGENICS: GENETICS AND THE USES OF HUMAN HEREDITY 100 (1985) (discussing introduction of sterilization laws in the United States).

²⁴⁶ *Buck v. Bell*, 274 U.S. 200, 207 (1927).

²⁴⁷ KEVLES, *supra* note 245, at 110–11.

²⁴⁸ *Id.* at 99–100.

to restrict immigration, particularly of Eastern and Southern Europeans.²⁴⁹

The powerful, intimate, personal, predictive, and shared nature of information from DNA—its multi-dimensional informational quality—contrasts sharply with the one-dimensional quality of the information flowing from fingerprints. Fingerprint information is unique but unshared—no two people have the same fingerprints. It has no predictive value of which anyone is aware. The information it provides is neither intimate nor personal in the nature.

Fingerprints share one aspect with DNA information: its identifying power. Like forensic DNA information, fingerprints can identify the source of a crime-scene sample and is a potent investigative tool when available. Otherwise, it is profoundly one-dimensional, quite different from the multi-dimensional cascade of DNA information.²⁵⁰

DNA's multi-dimensional cascade is also profoundly identifying. To the extent that at least some of one's identity can be captured by a matrix of data, data from DNA does that. The cascade of data—about physical features, medical conditions and predispositions, behavioral conditions and predispositions, ancestry, relatedness and group membership etc.—substantially enriches the image of the kaleidoscope of identity at the core of genetic privacy.

A set of distorting concepts accompanies the association of genetic information with identity. One is the risk of the “geneticization” of identity—you are your disease(s) or you are your genes.²⁵¹ Associated risks are those of genetic determinism—your genes determine who you are—and genetic essentialism—

²⁴⁹ *Id.* at 94–95.

²⁵⁰ Interestingly, while fingerprints can be obliterated to some extent by physical mutilation, DNA cannot, thereby lending it an informational permanence akin to its physical permanence.

²⁵¹ See Jennifer Fitzgerald, *Geneticizing Disability: The Human Genome Project and the Commodification of Self*, 14 *ISSUES L. & MED.* 147, 153 (1998) (arguing that wealth of genetic information discovered by Human Genome Project could intensify risk that people with disabilities will have their identity reduced to disease or disability).

what your genes say about you is all we need to know about you.²⁵² And the risk of genetic exceptionalism completes the list of concepts attending to the association of genetic information with identity.

The identity features of genetic information are different from these concepts. Genetic information tells us something about who one is. It does not tell us about the essence of a person²⁵³ to the exclusion of other components of identity, be it the social construction of identity or one's own sense of who one is.

The construction of identity is a complex, layered phenomenon that resists essentialist simplicity. Anthropologists have long debated identity essentialism and have brought that discussion to the world of genetics.²⁵⁴ Since the earliest days of the new genetic research, biologists have struggled with the concepts of genetic determinism and essentialism. Richard Lewontin and others have written at length and compellingly about the dangers of drawing too much meaning from one's genes to the exclusion of other fundamental factors at play in genetic expression like environment and the host organism.²⁵⁵ *GATTACA*, a recent movie, captures one dystopic version of a society overly obsessed with deterministic essentialism of genetic identity.²⁵⁶

To say that DNA contains information that tells one, and others, a lot about oneself is not to say that it tells one all one needs to know about oneself or necessarily the most important

²⁵² See *id.* at 154 (associating genetic essentialism and biological determinism with the problem of geneticization of identity).

²⁵³ See Hugh Miller, III, *DNA Blueprints, Personhood, and Genetic Privacy*, 8 HEALTH MATRIX 179, 219 (1998) ("DNA structure should not be conflated with the 'essential encoder' of an immutable personal identity or character.").

²⁵⁴ See, e.g., Paul Brodwin, *Genetics, Identity, and the Anthropology of Essentialism*, 75 ANTHROPOLOGICAL Q. 323 *passim* (2002) (discussing some of the issues that arise when genetic information is used to help determine cultural identity).

²⁵⁵ See generally R.C. LEWONTIN ET AL., NOT IN OUR GENES: BIOLOGY, IDEOLOGY, AND HUMAN NATURE (1984) (discussing the political and social ideologies that underlie biological determinism and arguing that determinists miss a number of important factors in human behavior beyond simple genetics, such as environment); RICHARD LEWONTIN, THE TRIPLE HELIX: GENE, ORGANISM AND ENVIRONMENT (Harvard Univ. Press 2000) (discussing the danger of viewing an organism as merely "computed" from its DNA rather than taking into account environment and other factors).

²⁵⁶ *GATTACA* (Columbia Pictures 1997).

essence of one's identity. Genetic information contributes to the portrait of identity and need not be diminished or exaggerated in its importance to do so.

Yet the kaleidoscopic nature of the identity captured by the physical and informational aspects of DNA is very robust. The hallmarks of its physical and informational natures—inaccessibility, uniqueness, permanence, and existence at the body's core, and its powerful, intimate, personal, predictive, and shared nature—exist not only in the present but over the dimensions of time and space. One's DNA is present at one's beginning. Some of it is present before one's beginning—in one's ancestors—and some of it is present after one's end—in one's descendants.

The spatial and temporal dynamism of DNA's physical and informational presence also accentuate the kaleidoscopic nature of the identifying features it possesses. For example, one piece of DNA does not exist in isolation from another. Often, one region of DNA interacts with another region to produce “an effect.” For example, some cancers involve the mutation of genes which, unmutated, would suppress the unregulated growth of certain cells—cells which themselves are produced by other genes.²⁵⁷

More broadly, as with the sequencing of human genomes has intensified, scientists have become increasingly aware of the profound dynamism within the human genome, even in regions of DNA thought to be dormant or unused. The ENCODE Project Consortium has begun looking at non-gene regions of DNA and has concluded that “through the analysis of 1% of the human genome that the humble, unpretentious nongene sequences have essential regulatory roles.”²⁵⁸

²⁵⁷ See SIDDHARTHA MUKHERJEE, *THE EMPEROR OF ALL MALADIES: A BIOGRAPHY OF CANCER* 368–69 (2010) (discussing how the lack of “negative” genes leads to the formation of cancer cells).

²⁵⁸ John M. Greally, *Encyclopedia of Humble DNA*, 447 *NATURE* 782, 782 (2007) (discussing The Encode Project Consortium, *Identification and Analysis of Functional Elements in 1% of the Human Genome by the ENCODE Pilot Project*, 447 *NATURE* 799 (2007)). The regions the consortium studied had previously been known as regions containing “junk” DNA—DNA of no known use. See Gina Kolata, *Bits of Mystery DNA, Far From 'Junk,' Play Crucial Role*, *N.Y. TIMES*, Sept. 5, 2012, <http://www.nytimes>.

Multi-factorial genetic disorders—disorders that have genetic, behavioral, and environmental roots—are much more common than Mendelian genetic disorders. The interplay between genes, environment, and behavior is the hallmark of multi-factorial disorders, such as some types of cancer, asthma,²⁵⁹ and diabetes.²⁶⁰ Interactions between one’s genes, the physical environment within or outside one’s body, or with the consequences of one’s behavior may cause genes to be turned off or on or to take a different path of expression.

The recent understanding that many complex disorders have, among other things, genetic roots stands at the beginning of a much more profound scientific understanding of such disorders as asthma, atherosclerosis, diabetes, hypertension, and obesity.²⁶¹ It already tells us how profoundly DNA is intertwined in a layered, dynamic process refracting through time and space to create portions of who we are, physically and informationally. It is a multi-faceted, multi-generational kaleidoscope of identity.

This image of a kaleidoscope of identity refracting through time and space is a complex metaphor with little parallel. Michael Ondaatje, in his novel *Divisadero*, describes a belfry that has been

com/2012/09/06/science/far-from-junk-dna-dark-matter-proves-crucial-to-health.html?page wanted=all (noting that DNA studied by ENCODE Project was previously considered “junk” DNA). As Greally entertainingly explains:

The results of the pilot phase of this project, which involved an analysis of 1% (30 megabases) of the human genome, are not good news for genes, which will no longer be able to hog the limelight. Even this preliminary study reveals that the genome is much more than a mere vehicle for genes, and sheds light on the extensive molecular decision-making that takes place before a gene is expressed.

Greally, *supra*, at 783.

²⁵⁹ See generally F.D. Martinez, *Genes, Environments, Development and Asthma: A Reappraisal*, 29 EUR. RESPIRATORY J. 179 (2007) (studying interactions between genetic determinants for asthma and their genetic, environmental, and developmental contexts).

²⁶⁰ See generally Ulf Risérus et al., *Dietary Fats and Prevention of Type 2 Diabetes*, 48 PROGRESS IN LIPID RES. 44 (2009) (studying the effect of dietary fat on the risk of type 2 diabetes).

²⁶¹ See Ron Korstanje & Beverly Paigen, *From QTL to Gene: The Harvest Begins*, 31 NATURE GENETICS 235 *passim* (2002) (discussing the technique of mapping QTL genes, which identifies chromosomal regions affecting various illnesses, and asserting that “the harvest of QTL genes is just beginning”).

constructed like a coil or screw and analogizes it to a helix.²⁶² It provokes his character to consider the helical effect of his memory. He relates it to the effect of a villanelle, a particular poetic form in which tercets recur and repeat themselves:

It's like a villanelle, this inclination of going back to events in our past, the way the villanelle's form refuses to move forward in linear development, circling instead at those familiar moments of emotion. Only the rereading counts, Nabokov said. So the strange form of that belfry, turning onto itself again and again, felt familiar to me. For we live with those retrievals from childhood that coalesce and echo throughout our lives, the way shattered pieces of glass in a kaleidoscope reappear in new forms and are songlike in their refrains and rhymes, making up a single monologue. We live permanently in the recurrence of our own stories, whatever story we tell.²⁶³

To paraphrase Ondaatje, the complex image of the kaleidoscope of identity that is DNA coalesces and echoes throughout our lives, reappearing in new forms over time and space, yet making up a single identity. We live permanently in the recurrence of our DNA, whatever identity we show.

As noted above, genetic information is powerful, personal, intimate, shared, and predictive. These features make it different than other information. But one need not label that information exceptional in its features in order to appreciate those features for the purpose of understanding genetic privacy.²⁶⁴ The matrix of these features, while possibly unique as compared to other collections of information, will be treated as private for Fourth Amendment purposes depending on people's expectations about

²⁶² MICHAEL ONDAATJE, *DIVISADERO* 135 (2007).

²⁶³ *Id.* at 136.

²⁶⁴ Kaye, *supra* note 38, at 65; see also Lawrence O. Gostin & James G. Hodge, Jr., *Genetic Privacy and the Law: An End to Genetics Exceptionalism*, 40 *JURIMETRICS J.* 21 (1999) ("Genetic information is not truly unique compared to other health information.").

genetic privacy rather than on whether these features are exceptional or not.

3. *Dignitary Privacy.* Dignitary privacy contemplates a portrait of privacy less driven by physical and informational images. All conceptions of privacy in some respect contemplate an intrusion upon a protected core. For some of these conceptions, the protected core is, primarily, something relatively concrete—a body, a place, an object, even information.²⁶⁵ In Solove's capturing of the traditional expressions of the idea of privacy, these conceptions of privacy would include: limited access to the self, secrecy, and the control of personal information.²⁶⁶

For other conceptions, the protected core is primarily something much less concrete and much more intangible—one's identity, one's sense of self, or one's dignity. In the language of Solove's traditional expressions: the right to be let alone, to personhood, and to intimacy.²⁶⁷ These features of the protected core do not exist independent of the more concrete ones. But they capture an aspect of that core that, at once, builds on and is different from its more concrete siblings.

For example, when a home is burglarized, the homeowner has suffered an intrusion on several very tangible aspects of a protected core—the home, items that were taken, and perhaps information to which the burglar had access. The homeowner also has suffered an intrusion on a more intangible aspect of that core—the sense that an unwanted person has been within a zone that is personal and intimate. The second intrusion to some extent builds on the first because no intrusion on the intangible core would occur without the more concrete intrusion on home, property, and information.

But more has occurred than just the concrete intrusion. We sometimes hear friends or family who, referring to a burglary of their residence, say: "It's not what they took, it's the sense that someone was in my house" or "it's creepy to think someone was here." It may go too far to suggest in this context that the

²⁶⁵ SOLOVE, *supra* note 152, at 12–13.

²⁶⁶ *Id.*

²⁶⁷ *Id.*

intangible violation goes to the core of who one is or one's dignity. It seems almost completely dependent on the physical intrusion. Part of that reluctance is because the physical intrusion itself looms so vivid and large in comparison to what I call the dignitary intrusion.

Surreptitious harvesting of out-of-body DNA aligns this calculus of privacy values differently. Currently, courts and commentators view the physical intrusion as nonexistent and the informational intrusion as limited at least in its use. Whether those judges measure that particular calculus appropriately, the significance of dignitary privacy is brought into higher relief in surreptitious harvesting cases. Though the victim of governmental surreptitious harvesting feels no physical pain, the presence of the government "in her DNA" and the knowledge of that presence are intrusions on one's dignity and self-identity.

Recall the genetic-database cases in which judges spoke of "[t]he more telescopic and inchoate value of personal privacy"; of DNA being "immensely private"; of "privacy and dignity"; and of "the secret regions of man's life."²⁶⁸ To have the government present in one's DNA and to have the government store one's DNA without any limits on its use speaks of a limit on individual autonomy. That presence and that storage, secret as it may be, might affect one's conduct and self-identity. And this effect might occur even though the government may never actively do anything with the DNA. The dignity inherent in individual autonomy free of governmental interference flows from one's inherent dignity as a human being—what many call a "negative liberty."²⁶⁹

The idea of dignity as a constitutional consideration is common. Noemi Rao has written that the concept of inherent dignity is present in much of the Supreme Court's constitutional jurisprudence. For example, as the Court has addressed issues of drug testing, self-representation, sexual autonomy, reproductive rights, and free speech, it has discerned the concept of inherent

²⁶⁸ See *supra* notes 180–82 and accompanying text.

²⁶⁹ Neomi Rao, *Three Concepts of Dignity in Constitutional Law*, 86 NOTRE DAME L. REV. 183, 203–05 (2011). Much of what follows draws on Rao's analysis of the three kinds of dignity that constitutions protect.

dignity in the First, Fourth, Sixth, and Fourteenth Amendments.²⁷⁰ In *Planned Parenthood of Southeastern Pennsylvania v. Casey*, the plurality said:

These matters, involving the most intimate and personal choices a person may make in a lifetime, choices central to personal dignity and autonomy, are central to the liberty protected by the Fourteenth Amendment. *At the heart of liberty is the right to define one's own concept of existence, of meaning, of the universe, and of the mystery of human life.* Beliefs about these matters could not define the attributes of personhood were they formed under compulsion of the State.²⁷¹

The *Miranda* Court was also emphatic about the role of dignity in its analysis of the Fifth Amendment right against self-incrimination when it spoke of “one overriding thought: the constitutional foundation underlying the privilege is *the respect a government—state or federal—must accord to the dignity and integrity of its citizens.*”²⁷²

More specifically, the idea of dignitary privacy is central to the Fourth Amendment. It is the most explicit privacy amendment to the Constitution and, over the years, the Court has consistently identified dignity as one of the interests protected by the Fourth Amendment from a case like *Schmerber* (the Fourth Amendment protects personal privacy and dignity)²⁷³ to a case like *City of Ontario, California v. Quon* (the Fourth Amendment guarantees privacy, dignity, and security).²⁷⁴

The idea of dignitary privacy also appears in circumstances involving newer technology. Conceptually, the GPS-tracking and the public-video surveillance examples seem to represent practical

²⁷⁰ *Id.* at 207–16.

²⁷¹ 505 U.S. 833, 851 (1992) (emphasis added).

²⁷² *Miranda v. Arizona*, 384 U.S. 436, 460 (1966) (emphasis added).

²⁷³ 384 U.S. 757, 767 (1966).

²⁷⁴ 130 S. Ct. 2619, 2627 (2010).

circumstances that raise dignitary, as well as other, privacy concerns. In the GPS cases, most commonly, the police place a GPS device on the outside of a suspect's car while it is in a public place in order to track the travels of the car's driver.²⁷⁵ The police do not engage in any physical intrusion, either into the suspect's car or onto his property in order to access the car.

In the public-video surveillance circumstance, the police position cameras in advantageous locations to film all the activity and people there.²⁷⁶ Again, in capturing people's faces and conduct as they go about their daily business, the police intrude neither on their body nor on any physical zone of privacy.

In both circumstances, the privacy intrusion is one that essentially occurs in public. It is to a protected core that relates to one's presence in the public world. One can conceive of this core in a number of ways beyond simply the gathering of personal or intimate information: Does one have the right to be left alone, even in public?²⁷⁷ Does one have a right to anonymity even when in public?²⁷⁸ Does one have the right not to be always watched by the government?

This less tangible, more dignitary sense of privacy is, at best, a nascent one in the GPS cases. In *State v. Jackson*, a 2003 GPS case, the Washington Supreme Court recognized a very substantial informational-privacy interest against 24-hour GPS

²⁷⁵ *United States v. Jones*, 132 S. Ct. 945, 949 (2012) (tracking suspect's whereabouts via GPS constitutes search for Fourth Amendment purposes); *United States v. Moran*, 349 F. Supp. 2d 425, 467 (N.D.N.Y. 2005) (attaching a GPS device to defendant's vehicle did not constitute search or seizure); *Osburn v. State*, 44 P.3d 523, 526 (Nev. 2002) (suspect "had neither a subjective nor an objective expectation of privacy in the bumper of his vehicle"); *State v. Jackson*, 76 P.3d 217, 224 (Wash. 2003) ("[C]itizens of this State have a right to be free from the type of governmental intrusion that occurs when a GPS device is attached to a citizen's vehicle, regardless of reduced privacy expectations due to advances in technology.").

²⁷⁶ See Christopher Slobogin, *Public Privacy: Camera Surveillance of Public Places and the Right to Anonymity*, 72 MISS. L.J. 213, 219–22 (2002) (describing the use of surveillance cameras in the United States); CHRISTOPHER SLOBOGIN, *PRIVACY AT RISK: THE NEW GOVERNMENT SURVEILLANCE AND THE FOURTH AMENDMENT* 82–83 (2007) (same).

²⁷⁷ See generally Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193 (1890) (describing the right to be left alone).

²⁷⁸ SLOBOGIN, *supra* note 276, at 79–117.

surveillance.²⁷⁹ In doing so, it also noted with approval the analysis of the Oregon Supreme Court in a radio-transmitter case. In the case, the court evaluated a kind of privacy interest on top of the already significant informational one it had found:

The court reasoned that use of a device that enabled the police to locate a person within a 40-mile radius day or night “is a significant limitation on freedom from scrutiny” and “a staggering limitation upon personal freedom.” The court noted that allowing use of such radio transmitters would mean that “individuals must more readily assume that they are the objects of government scrutiny” noting that commentators “have observed that *freedom may be impaired as much, if not more so, by the threat of scrutiny as by the fact of scrutiny.*”²⁸⁰

Yet in *United States v. Jones*, a case involving surreptitious GPS surveillance, the Supreme Court did not explicitly describe the privacy interest at stake.²⁸¹ And the public-video-surveillance cases have not yet made their way into the case law in this country.²⁸²

Whatever the current level of recognition of a dignitary-privacy invasion in the GPS-tracking cases, the above examples show that the focal point of a dignitary-privacy claim is the presence of an “other” as the scrutinizer. Whether the scrutiny accompanies a bodily invasion, (*Schmerber*), a cell phone (*Quon*), one’s decisionmaking (*Casey*), or one’s psyche (*Miranda*), it is the fact

²⁷⁹ 76 P.3d at 224.

²⁸⁰ *Id.* at 224 (emphasis added) (quoting *State v. Campbell*, 759 P.2d 1040, 1048 (Or. 1988)).

²⁸¹ The plurality focused narrowly on a property analysis, one that a group of four justices felt resolved the issue. *See* 132 S. Ct. at 949–53. Justices Sotomayor’s and Alito’s opinions at least explored the informational-privacy dimension of the practice. *See id.* at 957 (Sotomayor, J., concurring) (arguing for right of privacy information); *id.* at 964 (Alito, J., dissenting) (concluding that the public has an expectation of privacy in GPS tracking data).

²⁸² Public-video-surveillance usage is much more developed in England. *See* SLOBOGIN, *supra* note 276, at 83–84 (discussing the extent of surveillance in the United Kingdom).

that someone else is there, that one is not alone, or that the other is uninvited that is the essence of the violation.

The sense of violation that accompanies the dignitary intrusion does not grow merely out of the other's physical presence or the other's active interference with one's body or one's personal information. To paraphrase and extend the logic of one court, freedom may be impaired as much, if not more so, by the thought that someone has been there, is there, or may be there, whether they did, said, or took anything.²⁸³ Or, as Justice Sotomayor noted in her *Jones* concurrence, "[a]wareness that the Government may be watching chills associational and expressive freedoms."²⁸⁴ To be scrutinized in and of itself offends one's dignity whatever the use to which the scrutiny is put.

The nature of a Fourth Amendment dignitary-privacy invasion requires that a governmental authority engage in the scrutiny. The idea that the government in some capacity is present in one's decisionmaking, one's cell-phone conversations, one's psyche, or one's daily whereabouts accentuates the harm to one's dignity.²⁸⁵

Anthony Amsterdam directly addressed the fundamental issue in his 1974 piece on *Katz* and the Fourth Amendment:

The ultimate question, plainly, is a value judgment. It is whether, if the particular form of surveillance practiced by the police is permitted to go unregulated by constitutional restraints, the amount of privacy and freedom remaining to citizens would be diminished to a compass inconsistent with the aims of a free and open society. That, in outright terms, is the judgment lurking underneath the Supreme Court's decision in *Katz*, and it seems to me the judgment that the fourth amendment inexorably requires the Court to make.²⁸⁶

²⁸³ *Campbell*, 759 P.2d at 1048.

²⁸⁴ 132 S. Ct. at 956.

²⁸⁵ Decisionmaking and psyche invasions like those in *Casey* and *Miranda* occur under the Fifth and Fourteenth Amendments. Nonetheless, the specter of the governmental presence is the same.

²⁸⁶ Anthony G. Amsterdam, *Perspectives on the Fourth Amendment*, 58 MINN. L. REV. 349,

What offends one's dignity is that scrutiny of DNA offers up the kaleidoscope of identity to those with access. The dignitary intrusion is not what the government will or may do with such access. It is that the government gets to look into the kaleidoscope in all its layered, temporal, and spatial richness. The mere presence of the government at that window on core identity is the dignitary intrusion²⁸⁷ and it compounds the physical and informational intrusion.

By contrast, the dignitary intrusion associated with fingerprinting is less significant. Fingerprints too represent a color in the identity spectrum. Like DNA, fingerprints are in code and are available in public. Unlike DNA, they are less biologically locked, and the quality of their identifying information is relatively one-dimensional in contrast to DNA's kaleidoscope of identity. Superficial by nature, fingerprints do not give rise to a sense that they provide a window on core identity. Thus, while a mild dignitary invasion may exist when the government possesses fingerprints, it is different in kind from that associated with DNA.²⁸⁸

Any assessment of the expectation of privacy that people have in DNA will be an approximation that inevitably includes a measure of subjective judgment. This is because the concept of harming one's dignity implies a level of definitional certainty and objectivity that is anything but the case. Dignity is, by its nature, a very subjective concept—one person's dignity may be another's prickliness. Historically, it has been very much a moving target, particularly as a legal concept.²⁸⁹ Including an assessment of the

403 (1974).

²⁸⁷ This dignitary intrusion is exacerbated because some police departments have begun compiling DNA databases of samples collected in circumstances outside those covered by the regulatory structures of state and federal law. For example, the New York City medical examiner's office purportedly has a "linkage" or "rogue" database that includes former suspects, arrestees, and others never convicted of a crime. See Richard Willing, *Authorities Find More Uses for DNA Databases*, USA TODAY, Mar. 26, 2007, http://usatoday30.usatoday.com/news/nation/2007-03-25-dna-databases-inside_n.htm (discussing content and use of rogue databases).

²⁸⁸ See *infra* Part VI.

²⁸⁹ Neomi Rao captures this slipperiness well:

extent of dignitary harm in measuring one's expectation of privacy risks reducing the assessment to merely one individual's judgment.

The *Katz* test accounts for this concern. It requires a subjective expectation of privacy and an expectation of privacy that society is willing to recognize as reasonable.²⁹⁰ The objective focus of the second prong moderates the risk of the test offering Fourth Amendment protection to over personalized, idiosyncratic senses of privacy. The challenge then is to lend at least some empirical meaning to the genetic privacy that "society is prepared to recognize as reasonable,"²⁹¹ to do so in a way that transcends the idiosyncratic, the personal and the anecdotal, and to avoid mere theorizing.

VI. "SOCIETY IS WILLING TO RECOGNIZE AS REASONABLE . . ."—A SOCIETAL PERSPECTIVE ON GENETIC PRIVACY

Post-*Katz*, the Supreme Court has periodically referred to a desire to look for the legitimation of the expectations of privacy to be protected outside the Fourth Amendment itself. In *Rakas v. Illinois*, the Court expressed an interest in external legal concepts, like property law and in "understandings that are recognized and permitted by society"²⁹² as such sources, and that idea has continued to appear in the Court's jurisprudence.²⁹³

As a fundamental precept of human rights and basic liberties, dignity really took hold after the Universal Declaration of Human Rights stated: "All human beings are born free and equal in dignity and rights." But even in the Universal Declaration, the start of international efforts to protect human dignity, the drafters disagreed about the meaning of human dignity.

Today, widespread adoption of dignity in modern constitutions and human rights documents has not led to any greater consensus—rather different conceptions of dignity remain. The fact that "dignity" is an important yet slippery concept has become commonplace.

Rao, *supra* note 269, at 185–86 (footnotes omitted).

²⁹⁰ *Katz v. United States*, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

²⁹¹ *Id.* (internal quotation marks omitted).

²⁹² *Rakas v. Illinois*, 439 U.S. 128, 143 n.12 (1978); see also Christopher Slobogin & Joseph E. Schumacher, *Reasonable Expectations of Privacy and Autonomy in Fourth Amendment Cases: An Empirical Look at "Understandings Recognized and Permitted by Society,"* 42 DUKE L.J. 727, 731 (1993) ("Although this language appeared in a footnote, and was

Christopher Slobogin and Joseph Schumacher have made the most direct effort to capture empirically the public's understanding of a variety of Fourth Amendment privacy interests. In a 1993 study, Slobogin and Schumacher surveyed over 200 people "to ascertain their understanding of the interests implicated by various types of police investigative techniques."²⁹⁴

From the survey, they developed the preliminary hypothesis that court decisions about where expectations of privacy lie do not necessarily reflect societal understandings and, in fact, "tend to underestimate the privacy and autonomy interests infringed on by police actions."²⁹⁵ Unfortunately, Slobogin and Schumacher conducted their survey at a time when the police were not using either genetic databases or surreptitious DNA harvesting. Others have not extended this empirical approach to those kinds of police investigative efforts.

Some polling however exists on the general idea of genetic privacy, particularly as to genetic information and genetic discrimination.²⁹⁶ One such study surveyed 1,199 individuals about their level of trust in doctors, spouses, researchers, law enforcement, health insurers, and employers with access to test results for genetic disorders.²⁹⁷ At the extremes, 86% had some or a lot of trust in their doctors, and only 16% had some or a lot of trust in their employers.²⁹⁸ Law enforcement fell in the low middle with 46% expressing some or a lot of trust and 54% expressing only a little or no trust.²⁹⁹

directed solely toward defining the standing concept, it has since been relied upon in the text of several other cases involving the 'search' issue, often rephrased in terms of expectations of privacy 'society is prepared to recognize as reasonable.'").

²⁹³ Slobogin & Schumacher, *supra* note 292, at 731–32.

²⁹⁴ *Id.* at 732.

²⁹⁵ *Id.*

²⁹⁶ See, e.g., Kira A. Apse et al., *Perceptions of Genetic Discrimination Among At-Risk Relatives of Colorectal Cancer Patients*, 6 GENETICS IN MED. 510, 511 (2004) (studying people's fears over genetic discrimination).

²⁹⁷ GENETICS & PUB. POLICY CTR., U.S. PUBLIC OPINION ON USES OF GENETIC INFORMATION AND GENETIC DISCRIMINATION 1–2 (2007), available at <http://www.dnapolicy.org/policy.polls.htm> (last visited Mar. 7, 2012).

²⁹⁸ *Id.* at 2.

²⁹⁹ *Id.*

Absent direct survey results on surreptitious DNA harvesting or on the privacy concerns stemming from police possession of genetic information, a look at the use of DNA images in public culture helps to reveal fundamental attitudes about DNA.

Genetics and DNA have been a focus of public culture for a long time. Karen Rothenberg has written about the space that genetics has occupied in the public imagination as revealed by drama during the eugenic era of the early twentieth century and during the “new genetics” era since 1990.³⁰⁰ The 1997 science-fiction film, *Gattaca*, portrays an acutely dystopic vision of a future society in which the predictive value of genetic information organizes society into the gene elite and the “de-gene-erates.”³⁰¹ Privacy is nonexistent in a society in which one’s DNA determined all.³⁰²

Beyond film and literature, a look at public discourse, especially the use of DNA metaphors, through the prism of language theory suggests that public attitudes towards DNA and its relationship with core identity is deeply embedded in our culture. Language theorists tell us that in using a metaphor to describe something, we are trying to bring a better understanding of that “something” to the audience by referencing a reference point that we already know and understand.³⁰³ By doing so, we lend conception of the reference point to our conception of the less known thing, thereby bringing in more definition.³⁰⁴

³⁰⁰ See generally Karen H. Rothenberg, *From Eugenics to the “New” Genetics: “The Play’s the Thing,”* 79 *FORDHAM L. REV.* 407 (2010) (concluding that the ethical, legal, and social implications of genetics have captured and will continue to capture the imagination of both science and theatre).

³⁰¹ *GATTACA* (Columbia Pictures 1997); see also David A. Kirby, *The Devil in Our DNA: A Brief History of Eugenics in Science Fiction Films*, 26 *LITERATURE & MED. J.* 83, 103–06 (2007) (“*GATTACA* depicts many of the ethical issues associated with the new eugenics, such as genetic discrimination, genetic prophecy, and the homogenization of society.”).

³⁰² Cf. Kirby, *supra* note 301, at 104 (explaining the film’s depiction of human beings’ value relative to the value of their cast-off DNA).

³⁰³ What follows is based on the important work of language theorists like George Lakoff and Mark Johnson and captured in their classic book, *GEORGE LAKOFF & MARK JOHNSON, METAPHORS WE LIVE BY* (1980).

³⁰⁴ Lina Hellsten has described the process as applied to the metaphor “horsepower” as follows:

[A] metaphor consists of two or more separate issues, the source domain (e.g., horses) and the target domain (e.g., car engines), and a set of elements

For instance, Lakoff and Johnson offer two examples of ontological metaphors for the mind. Statements like:

“We’re still trying to *grind out* the solution to this equation”

“My mind isn’t *operating* today”

“Boy, the *wheels are turning* now!”

“I’m a *little rusty* today”³⁰⁵

contain metaphors that capture the idea of the “Mind as a Machine” and bring another layer of understanding to the way the mind works.³⁰⁶

Statements like:

“Her ego is very *fragile*”

“You have to *handle him with care* since his wife’s death”

“He *broke* under cross-examination”

“She is easily *crushed*”³⁰⁷

contain metaphors that capture the idea of “The Mind is a Brittle Object.”³⁰⁸ Both metaphorical images present conceptual models for understanding a less-than-fully-understood thing—the mind. Both lend a different layer of understanding to the mind. As Lakoff and Johnson describe:

The MACHINE metaphor gives us a conception of the mind as having an on-off state, a level of efficiency, a productive capacity, an internal mechanism, a source

that are mapped across the source and the target domains (e.g., function as a source of power for a vehicle). The purpose of metaphorical mapping, at a general level, is to approach new issues in terms of something that is already familiar to the user(s) of that metaphor.

Lina Hellsten, *Popular Metaphors of Biosciences: Bridges over Time?*, 16 CONFIGURATIONS 11, 14 (2009) (footnote omitted).

³⁰⁵ *Id.* at 27.

³⁰⁶ *Id.* at 27–28.

³⁰⁷ *Id.* at 28.

³⁰⁸ *Id.*

of energy, and an operating condition. The BRITTLE OBJECT metaphor is not nearly as rich. It allows us to talk only about psychological strength. However, there is a range of mental experience that can be conceived of in terms of either metaphor.³⁰⁹

Note that the accuracy of the metaphor is not the issue—the question is not whether the mind actually works as a machine or is a brittle object at the neuro-psychological level. Rather, the metaphors we choose to explain the mind tell us about how we order our world—the metaphors we live by.

Additionally, the use of metaphors helps us bring some boundaries to things that otherwise seem boundary-less. The expression “Harry is *in* love” conceptualizes love as a kind of location or container, bringing more definition to the concept of love.³¹⁰ It grounds the less clearly delineated in the more clearly delineated.³¹¹

Several scholars have examined the different metaphors and imagery used to describe genetics and DNA as a means of explaining and understanding society’s attitudes. Celeste Condit has explored the metaphors and rhetoric about “the gene” in the public discourse over the course of the twentieth century. In particular, she tracked the changes in metaphors used to “explain” human heredity from the eugenics era to the end of the twentieth century.³¹² José Van Dijck has explored the role of images in the popular representations of the new genetics since the 1950s.³¹³ She evaluated how different and conflicting popular representations of genetics over time reflected the interplay

³⁰⁹ *Id.*

³¹⁰ *Id.* at 58–59.

³¹¹ *Id.* at 59.

³¹² See generally CELESTE MICHELLE CONDIT, *THE MEANINGS OF THE GENE: PUBLIC DEBATES ABOUT HUMAN HEREDITY* (David J. De Pew et al. eds., 1999) (describing a sequence of metaphors over time used to describe human heredity: a breeding-stock metaphor; the idea of the gene controlling of humans; the code metaphor; and the blueprint metaphor).

³¹³ JOSÉ VAN DIJCK, *IMAGENATION: POPULAR IMAGES OF GENETICS* (1998) (describing how different groups have described genetics in metaphors and how those metaphors changed over time).

between these images and the meaning lent by society to developments in genetics.

Both Condit and Van Dijck focused on what images or metaphors people used to explain DNA or the gene. They were able to gain a new understanding about how society thought about the unfamiliar—genetics—by virtue of the familiar images they used to explain it—breeding, stock, code, blueprint etc. In the language of Hellsten, the source domain—the blueprint—helps explain the target domain—DNA—by bringing the elements of a blueprint to one’s efforts to understand DNA.

Dorothy Nelkin and M. Susan Lindee began to flip this dynamic around. In *The DNA Mystique: The Gene as a Cultural Icon*, they explored how popular culture used images of the gene and DNA to see what those images told us about societal attitudes towards the gene.³¹⁴ They found that the gene was treated as “a cultural icon, a symbol, almost a magical force” in popular culture.³¹⁵ In particular, they concluded that “the images and narratives of the gene in popular culture reflect and convey a message we will call genetic essentialism.”³¹⁶ That message reduces humans with all their “social, historical, and moral complexity” to a molecular entity, the gene.³¹⁷

If one flips the dynamic used by Condit and Van Dijck around completely, one would look at how popular culture uses the DNA metaphor to understand the culture’s attitude toward DNA. Instead of treating DNA as the thing in need of more understanding or grounding, one would use DNA as the source domain or reference point and any variety of less familiar or less grounded things as target domains. The use of DNA as a referential metaphor would then reflect how society thought of DNA itself.

³¹⁴ DOROTHY NELKIN & M. SUSAN LINDEE, *THE DNA MYSTIQUE: THE GENE AS A CULTURAL ICON* (2004).

³¹⁵ *Id.* at 2.

³¹⁶ *Id.*

³¹⁷ *Id.* Nelkin and Lindee looked at a wide expanse of images, for example, the visual, the artistic, and the oral, and not just those that were metaphors. As such, their classic study is only so useful in discerning societal attitudes towards the kaleidoscope of identity described above.

I examined how the term “DNA” was used over a one-year period in the *New York Times* and *USA Today*.³¹⁸ This study begins to inform us about societal attitudes toward DNA. In both newspapers, the significant majority of its uses were as a scientific term referencing genetic research or forensics rather than as a metaphor. The *New York Times* had 267 mentions of DNA over the course of the year and 73.8% of them were scientific references, not metaphorical ones. In *USA Today*, 63.9% of the 180 references were scientific. Nonetheless, just about one-quarter of the *Times* references and over one-third of the *USA Today* references were metaphorical.³¹⁹

The articles in which DNA was used metaphorically were primarily of three sorts: sports, business, and the arts. In *USA Today*, the metaphorical use of DNA occurred most frequently in sports articles, followed closely by business articles, and then, to a lesser extent, in articles on the arts, including television.³²⁰ In the *New York Times*, the use of DNA occurred most frequently in business articles, then arts articles, and to a lesser extent in sports articles.³²¹

Whatever the subject of the articles, the thing sought to be better understood or grounded—the target domain—was almost always behavior of some kind.³²² In articles about business, it was

³¹⁸ I recorded every mention of DNA over a one-year period in both newspapers. The papers were selected because both have a national circulation and arguably different, though probably overlapping, readerships. Though the term was used by journalists, the premise underlying this study is that journalists would use the kinds of metaphors that would be within their audience’s comprehension to explain something that is less understood or grounded. In other words, journalists would likely not use a quantum-physics metaphor to explain anything other than impenetrable complexity.

³¹⁹ Out of 267 references in the *New York Times*, 197 were scientific and 70 were metaphorical. In *USA Today*, 115 references were scientific and 65 were metaphorical.

³²⁰ Of the 65 references in *USA Today*, DNA was used metaphorically 22 times in sports articles, 18 times in business/marketing articles, and 10 times in arts articles. There was lesser use in political articles (5), book reviews (3), and personal articles (2).

³²¹ Of the 70 metaphorical uses of DNA in the *New York Times*, 20 occurred in business/marketing articles, 19 occurred in arts articles, and 9 uses occurred in sports articles.

³²² Over 90% of the metaphorical uses of DNA in *USA Today* and the *New York Times* involved behavior of some sort as the target domain.

the behavior of a company,³²³ in articles about music or the arts, it was the behavior of a band,³²⁴ an artist,³²⁵ or an author; and in articles about sports, it was an individual's³²⁶ or a team's³²⁷ behavior. More specifically, the use of a DNA metaphor virtually always sought to explain an aspect of identity. Sometimes, the reference was direct—he acted this way because it is who he is:

“He is the epitome of what the Heat is about,” team president Pat Riley said. “He is our anchor, he is a true warrior and a great professional.”

That's why Wade reached out to Haslem constantly during the free-agent process, if only to remind him that was the case.

“I would be changing my DNA if I left just for money,” Haslem said.³²⁸

Or:

Pie-making is in the DNA of Melissa . . . and Emily Elsen. Their grandmother baked pies for their

³²³ E.g., Nick Bunkley, *Dutch Car Maker Still Pushing to Buy Saab*, N.Y. TIMES, Jan. 12, 2010, <http://www.nytimes.com/2010/01/13/business/global/13saab.html?emc=tnt&tntemail0=y> (questioning Saab's DNA).

³²⁴ E.g., Jon Caramanica, *Dapper, Privileged and Unapologetic*, N.Y. TIMES, Jan. 15, 2010, <http://www.nytimes.com/2010/01/16/arts/music/16vampire.html?emc=tnt&tntemail0=y> (traces of ska in Vampire Weekend's DNA).

³²⁵ E.g., Stephen Holden, *Three Loners on a Road Leading to One Another*, N.Y. TIMES, Feb. 25, 2010, <http://www.nytimes.com/2010/02/26/movies/26yellow.html?emc=tnt&tntemail0=y> (character not in actor's DNA).

³²⁶ E.g., *Peyton Manning Not Looking for Drastic Solutions to End Slump*, USA TODAY, Dec. 8, 2010, http://www.usatoday.com/sports/football/nfl/colts/2010-12-08-peyton-slump_N.htm (Peyton's preparation in his DNA).

³²⁷ E.g., Mike Dodd, *Why Can't Cubs Win? Quirks at Wrigley Field Among Theories*, USA TODAY, Aug. 20, 2010, http://www.usatoday.com/sports/baseball/nl/cubs/2010-08-17-baseball-chicago-cubs-lou-piniella-wrigley-field_N.htm (Cubs' championship-prohibiting DNA).

³²⁸ *Haslem Staying with Miami; Mike Miller Expected To Join as Well*, USA TODAY, July 13, 2010, http://www.usatoday.com/sports/basketball/nba/heat/2010-07-12-udonis-haslem-contract_N.htm.

mother's restaurant in Hecla, S.D., and it was from her that they learned their craft.³²⁹

Sometimes, the DNA metaphor explains why a particular group acted the way it did:

Because the festival, which runs through May 2, was born in the ashes of the World Trade Center as a community development project to revive the devastated economy of Lower Manhattan, you might say "My Trip to Al-Qaeda" is woven into [the Tribeca Film Festival's] DNA.³³⁰

Other times, the reference was to accumulated behavior and offered to identify who someone or some group is:

"Value is an intrinsic part of the DNA of Nymphenburg [the porcelain manufactory of the Bavarian crown]," he said. "We are a raw diamond, an independent company with a social responsibility to the place and the people."³³¹

Or:

At first, Disney had high hopes for the characters, exploring additional licensing and even a feature film. But focus group research soured Disney on them. Mothers, the research showed, disliked the violence—particularly the hand-to-hand combat—that is part of the franchise's DNA.³³²

³²⁹ Florence Fabricant, *Sisters Open a Pie Shop in Brooklyn*, N.Y. TIMES, Apr. 20, 2010, <http://www.nytimes.com/2010/04/21/dining/21pies.html?emc=tnt&tntemail0=y>.

³³⁰ Stephen Holden, *12 Days, 132 Films, 38 Countries*, N.Y. TIMES, Apr. 15, 2010, <http://www.nytimes.com/2010/04/16/movies/16tribeca.html?emc=tnt&tntemail0=y>.

³³¹ Suzy Menkes, *Nymphenburg Porcelain Gets a Fresh New Look*, N.Y. TIMES, Apr. 26, 2010, <http://www.nytimes.com/2010/04/27/fashion/27iht-fnymph.html?emc=tnt&tntemail0=y>.

³³² Brian Stelter & Brooks Barnes, *Disney Sells a Franchise That Mothers Didn't Like*, N.Y. TIMES, May 12, 2010, <http://www.nytimes.com/2010/05/13/business/media/13saban.htm>

And, occasionally, the DNA metaphor was a broad-stroke statement of identity:

That might have been the end of the story, except that this is South Africa, the country that ended a vicious system of racial segregation 16 years ago to create a noisy, fractious, vibrant democracy. Poking a finger in the eye of authority is part of the national DNA.³³³

As is apparent from the above, often DNA is being used metaphorically to capture a *core* aspect of identity, not simply a transitory or passing feature. Lakoff and Johnson call such aspects of metaphorical use “entailments,” which bring even more depth to the metaphorical reference.³³⁴

The entailments that come with the use of the DNA metaphor to capture aspects of identity involve:

Permanence:

“That’s who I am,” he said. “I can’t be afraid to express myself. I have to be me.”

Manuel almost seems to draw a spiritual lift from his deep, staccato laugh, which usually follows one of his humorous remarks. The jokes, witticisms and wry comments are part of his DNA, and they are not going away because of games that are lost.³³⁵

l?emc=tnt&tntemail0=y.

³³³ Celia W. Dugger, *South Africa Pushes To Make the Cup Its Own*, N.Y. TIMES, May 23, 2010, <http://www.nytimes.com/2010/05/24/sports/soccer/24safrica.html?emc=tnt&tntemail0=y>.

³³⁴ LAKOFF & JOHNSON, *supra* note 303, at 139. Lakoff and Johnson use the example of the metaphor, LOVE IS A COLLABORATIVE WORK OF ART to illustrate common entailments like, “Love is work. Love is active. Love requires cooperation. Love requires dedication . . . Love involves shared responsibility . . . Love demands sacrifice . . .” etc. *Id.* at 140.

³³⁵ David Waldstein, *Manuel Under Pressure, but Hardly Showing It*, N.Y. TIMES, May 23, 2010, <http://www.nytimes.com/2010/05/24/sports/baseball/24mets.html?emc=tnt&tntemail0=y>.

Immutability:

The years clicked by. Boys became men. All but one went off to fight World War II. One didn't come back. Careers replaced carousing. Still, they remained friends, a lifelong affection for one another somehow inscribed in their DNA. Every so often, they demonstrated their unflinching fidelity by gathering for a reunion dinner.³³⁶

Inevitability or fatalism:

Morris agrees. “[A] huge problem is that the irresponsibility of those large company CEOs has painted a negative portrayal of ALL business . . .”

“[W]e WILL end up paying for the free lunch we've been enjoying. Capitalism/entrepreneurship is in the human DNA. Drift is temporary,” tweeted Larry Strassner, CEO of Russell & Mackenna, which makes cottage-style furniture.³³⁷

Intimacy or at one's core:

Nor is there anything new about complaints that BP is secretive in its operations and given to doubletalk in responding to valid criticisms in host countries. This is certainly not the whole story, but these very British negatives are deeply embedded in its corporate DNA.³³⁸

Or, most ironically:

³³⁶ N.R. Kleinfeld, *Together More Than 70 Years, Friends Reunite*, N.Y. TIMES, June 8, 2010, <http://www.nytimes.com/2010/06/09/nyregion/09friends.html?emc=tnt&tntemail0=y>.

³³⁷ Del Jones, *CEOs Tweet in News Story Reported Completely on Twitter*, USA TODAY, May 28, 2009, http://www.usatoday.com/money/companies/management/2009-05-27-ceos-twitter-reporting-capitalism_N.htm.

³³⁸ Karl E. Meyer & Shareen Blair Brysac, *How British (Really) is BP?*, N.Y. TIMES, June 16, 2010, <http://www.nytimes.com/2010/06/17/opinion/17iht-edmeyer.html?emc=tnt&tntemail0=y>.

Q: How much of my privacy am I giving up?

A: You're giving up none of your privacy. Our business is about consumer first, advertiser second, and AdKeeper third.

Services like Facebook and Google have done a disservice to the industry because they don't think that privacy is in their DNA. At Facebook their DNA is to share. We will never give your personal data to an advertiser. Advertisers would like to have that. But we're not giving it to them.³³⁹

The depth and breadth of the core-identity imagery associated with the DNA metaphor in these examples of public discourse is unmistakable. The ubiquity goes beyond the *New York Times* and *USA Today*. In a debate on the U.S. Senate floor on the quality of President Obama's judicial nominees, Senator Jeff Sessions said, "I'm sure that less than one percent of the lawyers in America are members of the ACLU. . . . It seems if you have the ACLU DNA, you get a pretty good leg up to being nominated by this president."³⁴⁰

In his biography of the late Steve Jobs, Walter Isaacson quoted a one-time Jobs girlfriend commenting about Jobs and Daniel Kottke, "Daniel didn't have that DNA of ruthlessness, so he was a bit flipped by Steve's behavior."³⁴¹ Later, Isaacson quotes Jobs as saying, "It's in Apple's DNA that technology alone is not enough. We believe that it's technology married with the humanities that yields us the result that makes our heart sing."³⁴²

In the language of Lakoff and Johnson, these entailments—permanence, immutability, inevitability, intimacy—reverberate

³³⁹ David Lieberman, *Advertisers Betting That AdKeeper's a Web Business Keeper*, USA TODAY, Nov. 3, 2010, <http://content.usatoday.com/communities/technologylive/post/2010/11/advertisers-betting-that-adkeepers-a-web-business-keeper/1>.

³⁴⁰ Ryan J. Reilly, *Jeff Sessions Rants Against Judicial Nominees with 'ACLU DNA' (VIDEO)*, TPM.COM, Dec. 21, 2010, http://tpmmuckraker.talkingpointsmemo.com/2010/12/jeff_sessions_rants_against_judicial_nominees_with_aclu_dna_video.php.

³⁴¹ WALTER ISAACSON, *STEVE JOBS* 89 (2011) (internal quotation marks omitted).

³⁴² *Id.* at 527.

within the core-identity DNA metaphor.³⁴³ They bring deeper meaning to society's understanding of behavior and identity. More to the point here, the richness of the features captured by the DNA metaphor tells us more about what society thinks about DNA.

That DNA is about core identity for those who use DNA metaphors to explain behavior and identity reinforces the sense that society views DNA as involving core identity. The use of DNA metaphors by writers, reviewers, journalists, and senators to help their audiences understand behavior and identity presumes that the core-identity DNA metaphor is a familiar one shared by their audiences.

It also suggests that society's sense of the role of DNA in defining part of one's identity is much more profound than its sense of the role of fingerprints. An examination of the use of a fingerprint as a metaphor in *USA Today* and the *New York Times* reinforces this distinction. Over approximately six-months, 86.4% of the uses of the word "fingerprint" in *USA Today* were scientific or forensic and 13.6% were metaphorical. In the *New York Times*, 79.6% were scientific or forensic and 20.4% were metaphorical.³⁴⁴

As with DNA metaphors, the fingerprint metaphors were always metaphors about identity. Whatever the metaphor was lending more meaning or grounding to, it did so by capturing an aspect of identity represented by a fingerprint. For example:

The neighborhood itself is a spur to creativity, she said.

"The really amazing thing about that area is one building will be a stage, but if you look into the next little warehouse, somebody's packing tomatoes, and if you look into the one beyond, somebody's making glass," Ms. Dokoza said. "It's a very unusual neighborhood, with the Polish bakeries—like a fingerprint of yesteryear."³⁴⁵

³⁴³ LAKOFF & JOHNSON, *supra* note 303, at 140.

³⁴⁴ There were 98 uses in the *New York Times* and 59 uses in *USA Today*.

³⁴⁵ Alison Gregor, *Lights, Camera, Pierogi: Movies in Greenpoint*, N.Y. TIMES, Apr. 20, 2010,

The aspect of identity captured by the fingerprint metaphors differed from that captured by the DNA metaphor. The DNA metaphor captured core-identity aspects: permanence, immutability, fatalism, etc. The fingerprint metaphor captured only more superficial aspects of identity—trace, brand, identification tag, and signature. For example:

Some of the answers will become clearer with further analysis of the radiation in the water, Sich said, noting that the presence of certain isotopes could help determine whether the contamination came from the reactor core or a spent fuel pool.

“We need to see the chemical analysis of the water,” he said. “That’s the fingerprint.”³⁴⁶

The contrast between the metaphorical uses of DNA and fingerprints in the public discourse mirrors the distinctions drawn between the two in the discussion above about genetic privacy.³⁴⁷ DNA contains a multi-dimensional kaleidoscope of identity, and a fingerprint operates as a one-dimensional trace of physical presence. The manifestations of societal attitudes revealed in the uses of such metaphors confirm the relative weightiness and richness of attitudes towards DNA.

These attitudes do not directly address the critical *Katz* inquiry—whether society is willing to recognize an expectation of privacy in DNA as reasonable. However, if society’s attitudes concerning DNA reflect a sense that it is about core-identity, it strongly suggests that society would accept as reasonable that one expects privacy in that identity.

<http://www.nytimes.com/2010/04/21/realestate/commercial/21greenpoint.html?scp=100&sq=fingerprint&st=nyt>.

³⁴⁶ *Radiation Spreading to Seawater, Soil in Japan*, ASSOCIATED PRESS, Mar. 28, 2011, available at http://www.usatoday.com/news/world/2011-03-27-japan-nuclear_N.htm.

³⁴⁷ See *supra* Part V.

VII. CONCLUSION

Unregulated surreptitious DNA harvesting is at the intersection of modern technology and the Fourth Amendment. It is a creative crime-solving tool that capitalizes on advances in modern genetic research and forensic science. It follows on the heels of more frequent applications of forensic DNA technology that use suspect samples obtained via search warrants and genetic databases. It is at the forefront of genetic investigation creativity with familial searching and the indictment of genetic profiles in the absence of a known suspect.

The early courts that evaluated the constitutionality of DNA harvesting have not been as creative. Using a Fourth Amendment analytical model focused narrowly on property-oriented privacy, those courts have mishandled the analysis. They have relied on a superficial abandonment approach that not only allows the police to engage in the practice without any prior justification but also effectively allows the police to use the harvested DNA for any purpose at any time.

A rigorous application of the traditional *Katz* test for Fourth Amendment searches produces a different focus. Such an analysis asks whether an individual has abandoned the expectation of privacy in the DNA within the nucleus of a cell that is found on an abandoned item, not whether one has abandoned the DNA.

The result of that analysis is quite different from that of the early DNA harvesting courts. The physical, informational, and dignitary dimensions of genetic privacy produce an expectation of privacy in the kaleidoscope of identity that is DNA. And that expectation of privacy is one that society more than likely is willing to recognize as reasonable. Popular culture uses DNA metaphors as a reference point to explain a number of features of core identity—permanence, immutability, inevitability, and intimacy. Popular culture's frequent uses of DNA as a reference point for core-identity reverberate in a way that suggests that society does recognize as reasonable an expectation of privacy in DNA.

If so, then the police conduct a search for Fourth Amendment purposes when they enter a cell, its nucleus, and the DNA therein to get identity information. They do not need a search warrant or probable cause to seize the abandoned item in or on which the cells and DNA exist. But they do need a search warrant supported by probable cause to enter the cell to harvest and sample the DNA.³⁴⁸

This rule is consistent with Fourth Amendment jurisprudence. It acknowledges the changes in expectation of privacy of identifying information that has come with the rapid advances in genetic research and technology. It places an appropriate and well-measured hurdle between the police and the individual.

³⁴⁸ This requirement, as yet unsupported by case law, is partially supported by the Standard 16-2.2(b) of the ABA Criminal Justice Standards for DNA Evidence:

(b) Except in exigent circumstances, a judicial order for collecting a DNA sample from the body of a person should be issued only upon notice and after an opportunity for a hearing at which the person has a right to counsel, including the right to appointed counsel if the person is indigent.

(i) If the person from whom the sample is to be collected is suspected of committing a crime, an order should issue only upon an application demonstrating:

- (A) probable cause that a serious crime has been committed, and
- (B) if the sample is to be collected from a person is:
 - (1) a sample collected by a physically noninvasive means, reasonable suspicion that the person committed the crime charged.

ABA STANDARDS FOR CRIMINAL JUSTICE: DNA EVIDENCE § 16-2.2(b) (2006).