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Genetic Privacy & The Constitution: Surreptitious Harvesting of Out-of-Body DNA

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Genetic privacy and police practices have come to the fore in the criminal justice system. Case law and stories in the media document that police are surreptitiously harvesting the out-of-body DNA of putative suspects. Some sources even indicate that surreptitious data banking may also be in its infancy. Surreptitious harvesting of out-of-body DNA by the police is currently unregulated by the Fourth Amendment. The few courts that have addressed the issue find that the police are free to harvest DNA abandoned by a putative suspect in a public place. Little in the nascent surreptitious harvesting case law suggests that surreptitious data banking would be regulated either under current judicial conceptions of the Fourth Amendment.

The surreptitious harvesting courts have misapplied the Katz reasonable-expectation-of-privacy test recently reaffirmed in U.S. v. Jones by the Supreme Court. They have taken a mistaken property-based approach to their analyses. Given the potential for future abuse of the freedom to collect anyone's out-of-body DNA without even a hunch, this article proposes that the police do not need a search warrant or probable cause to seize an abandoned item in or on which cells and DNA exist. But, they do need a search warrant supported by probable cause to enter the cell and harvest the DNA.

An interdisciplinary perspective on the physical, informational and dignitary dimensions of genetic privacy suggests that an expectation of privacy expectation in the kaleidoscope of identity that is in out-of-body DNA. Using linguistic theory on the use of metaphors, the article also examines the use of DNA metaphors in popular culture as a reference point to explain a number of features of core identity in contrast to the superficiality of fingerprint metaphors. Popular culture’s frequent uses of DNA as a reference point reverberate in a way that suggests that society does recognize as reasonable an expectation of privacy in DNA.
GENETIC PRIVACY & THE FOURTH AMENDMENT: UNREGULATED SURREPTITIOUS DNA HARVESTING
ALBERT E. SCHERR*

INTRODUCTION

Genetic privacy and police practices have come to the fore in the criminal justice system. Developing case law\(^1\) and stories in the media\(^2\) document that police are

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surreptitiously harvesting the DNA of putative suspects. Some sources indicate that surreptitious data banking may also be in its infancy. In one twist, sampling of the 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.

Surreptitious DNA harvesting 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. Little in the nascent surreptitious harvesting case law suggests that surreptitious data banking would be regulated either under current judicial conceptions of the Fourth Amendment.

Interestingly, some evidence exists that surreptitious DNA harvesting is also happening in the non-criminal context. Apparently, some amateur genealogists have made surreptitious efforts to get DNA from a putative relative for ancestry or kinship testing of sorts. In one circumstance, a high-profile celebrity divorce, a private investigator for a multi-millionaire was able to obtain dental floss for DNA paternity analysis from the garbage of the putative father of his ex-wife’s child. He was the father; an invasion of privacy lawsuit was filed and the case eventually settled.

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

If a private party targeted a putative suspect above as a potential research subject instead of as the subject of a police investigation, the law applicable to human subject

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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 required to get a search warrant to get a blood or saliva sample for DNA analysis from the suspect.
6 See, e.g., cases cited in footnote 2.
9 Id.
10 New Mexico St, Ann. Sec. 24-21-1 through 6 (1998).
11 Id. at 24-21-6
research would raise a host of barriers. 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.

So why the difference in the regard the law gives to the genetic privacy issues at stake between the criminal and civil contexts? Why do surreptitious-DNA-harvesting practices by private parties get appreciably more legal scrutiny than do such practices by the police? One broad-brush answer lies in the significantly greater interest of society in the public safety goal of solving crimes than in the needs of amateur genealogists, divorce lawyers and genetic researchers. That broad-brush answer is unsatisfactory.

Current Fourth Amendment jurisprudence on surreptitious harvesting, such as it exists, 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 a hunch, and no more. 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 does not count as a search under the Fourth Amendment, the police can do whatever they want with the DNA of anyone.

The thrust of this article is that this all-or-nothing dynamic of DNA-harvesting jurisprudence is an understandable and misguided judicial response to the immediate benefits of a new technology. This article proposes that police may seize abandoned property that contains human cells within which is one’s 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 on surreptitious DNA harvesting. 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

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12 See generally, Carl H, Coleman et al., The Ethics of Research with Human Subjects, Lexis Nexis, 2005.
13 Id.
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 that they use in the opening hypothetical. Commercial laboratories in the United States began using forensic DNA analysis for investigative purposes only in 1986. The FBI began using DNA analysis in casework in 1988. In 2008, every state either has its own forensic DNA laboratory or ready access to one in another state or to a commercial laboratory.

Prior to the advent of DNA technology, fingerprints and blood typing were the primary forensic identification tools. However, fingerprints were found only at crime scenes where the perpetrator handled an item and blood typing was of limited discriminatory value. Forensic DNA analysis has reduced many of these limitations because it exists in any human cell with a nucleus. Biological samples sufficient for use in DNA analysis can exist, for example, in bloodstains, semen stains, bones, teeth, hair, saliva, urine, feces, fingernail debris, muscle tissue, cigarette butts, postage stamps, sealing flaps on envelopes, dandruff and, ironically, fingerprints.

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16 Id. at 3-4.
17 Id. at 33.
19 Id.
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. 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 by the human eye.

The availability of out-of-body DNA for forensic analysis has opened up a much-expanded world of investigative options for the police. For example, crime-scene, out-of-body DNA has allowed the government to obtain convictions in previously unsolved crimes. In some instances, it has led to the exoneration of wrongfully convicted inmates, some of whom had served 5, 10 or 20 years in jail.

It has also led to the collection of out-of-body 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, DNA harvesting, or covert involuntary sampling, the police are beginning to use the technique more frequently.

Sometimes, the police follow the person of interest and collect an item he discards in or upon which may be sufficient cells for DNA analysis. Sometimes, the police lure the person of interest to the police station for a non-custodial interview and offer him a cigarette or a soda. Sometimes, the police have been even more creative, as in State v.

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34 Butler, *Forensic DNA Typing...* at 34.  
36 See generally, www.innocenceproject.org  
40 *State v. Christian*, 723 N.W.2d. 453 (IA App. 2006)
There, the police had renewed their investigation of Athan as 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.42

III. THE COMMENTATORS AND THE CASES

Commentators have evaluated the particular circumstance of the harvesting of out-of-body DNA of 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 but has conceded that “[n]evertheless, the Fourth Amendment’s protections appear to fall short of providing a constitutional basis from which to challenge abandoned DNA collection.”43 She also evaluated other possible analogies – fingerprints, body parts and human waste – and found them wanting as interpretive mechanisms for “what is important about genetic information”.44 She has suggested that the deficiencies in these various analogies “make the case for ‘genetic exceptionalism’ (footnote omitted) 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.”45

Another commentator, David Kaye, has concluded that the fingerprint analogy is the correct analogy; that courts should not be distracted by the occasional deception involved in harvesting out-of-body DNA and that to do otherwise “would be to indulge in ‘genetics exceptionalism…’”46 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.47

41 State v. Athan, 158 P.3d 27 (WA 2007)
42 State v. Athan, 158 P.3d at 31-32.
43 Joh at 868.
44 Joh at 868-869.
45 Joh at 869.
Both Kaye and Joh use abandonment theory and the *Katz v. United States* reasonable expectation of privacy test in their analyses. Both conclude that current Fourth Amendment jurisprudence likely does not give Fourth Amendment protection from surreptitious harvesting of out-of-body DNA to the putative suspect. Joh argues that the putative suspect should have such protection because DNA is different and thus traditional Fourth Amendment analogies – fingerprints, for example - are not appropriate.⁴⁸ Kaye argues he should not have constitutional protection because a DNA nametag is not different enough from a fingerprint for Fourth Amendment purposes.⁴⁹

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, he had no expectation of privacy in the item or that which it was in or on. Their focus on the putative suspect’s privacy in the discarded item has meant that virtually no court has considered explicitly either focusing on 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*.⁵⁰ 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. Eighteen years later, in 2003, the police began a loose surveillance of Sigsbee. One investigator followed Sigsbee to a Wendy’s restaurant and watched him eat his meal and drink a root beer through a straw. When Sigsbee left the Wendy’s, the investigator retrieved the cup and straw from the trash and submitted it for forensic DNA testing.⁵¹

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. It held that Sigsbee had abandoned any Fourth Amendment privacy interest in his DNA on the straw when he abandoned the straw:

…when the defendant discarded the straw he also discarded any expectation of privacy in the DNA 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

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⁴⁹ Edward Imwinkelried & David Kaye, “DNA Typing: Emerging or Neglected Issues,” 76 Wash. L. Rev. 413, 436-440 (2001). Ironically, Kaye suggests, at the least, that an analysis using the abandonment theory, which says that an individual has abandoned any Fourth Amendment protection in his DNA when he abandons it in public, is a closer call than Joh suggests.
⁵⁰ *People v. Donald Sigsbee*, No. 03-0342 (NY, County Court of Onondaga, Aloi, Anthony F., J.)
⁵¹ Id. at 30.
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.\textsuperscript{52}

Other courts have taken a similar approach. In \textit{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. With his expectoration, “he assumed the risk of the public witnessing his action and thereafter taking possession of his bodily fluids.”\textsuperscript{53} In \textit{Commonwealth v. Bly}, the defendant left the police station after an interview, leaving a water bottle and cigarette butts. The court never reached the abandonment issue identified by the \textit{Sigsbee} trial court. Instead, it grounded its decision on the defendant’s “wholesale failure to manifest any expectation of privacy in the items whatsoever.”\textsuperscript{54} Even in a case where the court suppressed the surreptitiously seized out-of-body DNA, \textit{State v. Reed}, its analysis reflected a pure abandonment approach. The court found that Reed had not abandoned the cigarette butt the police picked up as he had flicked the butt onto his own patio in the back of his apartment, a patio in which he had a reasonable expectation of privacy.\textsuperscript{55}

In \textit{State v. Christian}, an undercover officer sat in on an interview that Christian had with a city agency. 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. When Christian left, he took the magazine he had brought with him and the interview paperwork but not the fork or water bottles. 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.\textsuperscript{56}

Unlike the \textit{Sigsbee}, \textit{Cabral} and \textit{Bly} courts, however, the \textit{Christian} court gave hint of the possibility of the kind of deeper, DNA-focused privacy analysis when it said, “[i]n the absence of any definitive authority to the contrary, we are unable to say that Christian

\textsuperscript{52} \textit{Id.} at 31-32. The \textit{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. (\textit{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.


\textsuperscript{54} \textit{Commonwealth v. Bly}, 862 N.E. 2d at 357.

\textsuperscript{55} \textit{State v. Reed}, 641 S.E. 2d 320, 321-23 (NC Ct. of App. 2007).

\textsuperscript{56} \textit{State v. Christian}, 723 N.W. 2d at 456.
had a subjective or objective expectation of privacy in the DNA shed on the items seized.”

It went on to note that it would have found that Christian had abandoned any such expectation, even if he did exist.

In *State v. Athan*, the police obtained DNA from saliva on the flap of an envelope Athan had licked before he sent it to the police as a part of an elaborate ruse by the police. The defendant asserted that he had a privacy interest in his body and bodily functions, including his saliva. The court found that Athan had “no inherent privacy interest in saliva” in the circumstances of the case. The court noted that the saliva was not taken as part of an invasive procedure as in pre-employment urinalysis testing programs. 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.” The envelope effectively became the property of the police.

Interestingly, in an *amicus* brief, the ACLU also asserted 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. 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 identification purposes only, not for purposes that raise the concerns advanced by the ACLU.

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 in that each of the courts 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. But, the courts’ abandonment analysis – an exclusively intrusion-on-property focus - was

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57 *Id.*
58 *Id.*
59 *State v. Athan*, 158 P.3d at 363; see above for a more detailed description of the elaborate ruse.
60 *Id.* at 366-67.
61 *Id.* at 367.
62 *Id.*
63 *Id.*
64 *Id.*
65 *Id.* at 368.
completely dispositive. So too, the two courts – *Sigsbee and Athan* - that applied an intrusion-on-place analysis (the body in this circumstance) used a very narrow approach focusing on the lack of intrusion into the body as they also articulated the magic words of *Katz*. And, the only court to conduct an intrusion-on-information analysis – *Athan* – also focused its analysis quite narrowly by evaluating only the information actually sought and obtained by the police rather than all the information potentially available.

The narrowness of the analyses by courts in surreptitious harvesting cases reflects a misguided focus borne of a misapplication of *Katz*. Each of the courts that conducted an intrusion-on-property analysis asked whether the defendant had a reasonable expectation of privacy in the discarded items. Almost without exception,\(^66\) 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 in the surreptitious harvesting cases the appropriate question is whether the defendants had a reasonable expectation of privacy in their out-of-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. Each of those analogies conceives 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 it is up for grabs. In the physical-location paradigm, either the out-of-body DNA is no longer part of the body and/or the police did not physically intrude into the body. 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 non-intrusive and one-dimensional. Under any of 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.\(^67\)

### III. The Fourth Amendment: Beyond Property

\(^66\) The *Athan* and *Sigsbee* courts briefly asked versions of the question and concluded in the negative without any substantial analysis. *State v. Athan*, 158 P.3d at 33; *Sigsbee* at 31-32; 33.

\(^67\) Joh at 869; Kaye, “The Science of DNA Identification…” at 420. Joh also suggests that DNA is different and makes an argument that the idea of genetic exceptionalism suggests that we should be more cautious in the speed with which we rely on pre-existing analogies to capture the full import of a new technology.
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…” The prohibition reads like one against intrusions on an individual’s physical privacy by the government - be it her real property, her body or 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 anything about intrusions involving a host of other modern technologies like a GPS, 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 a purely property- or place-based privacy.

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

In 1967, in *Katz v. United States*, the Supreme Court 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. As a result of the evidence gathered from eavesdropping on his conversations, Katz was convicted of illegal gambling activities. 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.

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68 United States Constitution, Amendment IV.
69 Global Positioning System
71 *Id.*
72 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)
73 *Katz v. United States*, 389 U.S. 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 himself 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. [citations omitted] But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected. [citations omitted].

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, the 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. It did not reside in the more tangible space within the public booth. 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 that person-based privacy. Katz 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.”

74 Id.
75 Katz v. United States, 389 U.S. at 361.
Harlan’s “two-fold requirement” for measuring whether the privacy interest at stake warranted 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 of the public telephone has come to play in private communication” captures the court’s methodology for assessing society’s attitude towards Katz’s expectation. 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. 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 privacy. Whatever the nature of the legacy, in 2001, in *Kyllo v. United States*, the Supreme Court reaffirmed the core approach of *Katz*.

In *Kyllo*, 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. The device did not “enter” Kyllo’s house to measure the amount of heat; it measured it only after it left the house. 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 Katz’s home.

The majority relies heavily on factors like information (the potential for acquiring intimate details), location (from within the home) and the language of Constitution (the use of the term “houses” in the Fourth Amendment) to measure the scope of the personal

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76 *Id.* at 351-52.
80 *Id.* at 29-30.
privacy right. To be sure, the opinion is heavily influenced by 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.(emphasis in original)”

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 when its existence derives from heat outside the home.

Most recently, In U.S. v. Jones, the court reaffirmed its commitment to a beyond-just-property analysis. The police had placed a GPS device on the underside of a car driven by Jones and monitored his public whereabouts for four weeks. 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 in his aggregated public whereabouts over the course of four weeks that society would recognize as reasonable.

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. 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 DNA as property, a subtle but powerful analytical shift occurs. The question of abandonment then hinges on the knowledge of and intention to abandon that privacy. The existence of one’s DNA outside

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81 Id. at 37.
82 U.S. v. Jones, 132 S.Ct. 945 (2012). Sottomayor found that such an expectation would exist if that issue had needed to be reached and Alito, Breyer, Ginsburg and Kagan found that one did exist.
83 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 at 866. Joh does go on to question briefly 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.
of one’s body and in public is not an automatic Fourth Amendment disqualifier. And, the limited use by 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 the individual abandoned his saliva, cigarette butt or water bottle to whether he abandoned his expectation of genetic privacy in his 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. [citation omitted] 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. Cf. *Katz v. United States*, 389 U.S. 347, 88 S.Ct. 507, 19 L.Ed.2d 576 (1967). In essence, what is abandoned is not necessarily the defendant's property, but his reasonable expectation of privacy therein. [footnote omitted]

The significance of this shift is immediately apparent. Abandonment requires knowledge and intention. Without a showing that an individual knew that he had abandoned his expectation of genetic privacy in his DNA by his conduct, no 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.”

Some of the classic Fourth Amendment abandonment circumstances involve variations on the theme of the defendant seeing the police and either discarding drugs or some other item or walking away from that item. In these kinds of cases, courts may

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84 *City of St. Paul v. Vaughn*, 237 N.W.2d 365, 370-71 (Minn. 1975);
86 *Katz v. United States*, 389 U.S. at 351.
87 *State v. Crandall*, 136 P.3d 30 (Or. 2006) (defendant summoned by police hides baggie underneath a car); *State v. Britton*, 633 So.2d 1208 (La. 1994) (defendant hides packet with cocaine in it in a gum rack)
89 *United States v. Tugwell*, 125 F. 3d 600 (8th Cir. 1997) (defendant walks away from his suitcase at a bus station after a drug-sniffing dog alerts to it).
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. 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.

No evidence exists that suggest 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 an individual would know that he was shedding DNA,91 that he was aware of the ability of the government to collect that DNA, analyze it and use it as an identity tool; or that he was cognizant of the other kinds of uses the police could make of his DNA, let alone the scope and breadth of genetic information about him that might be available to those who had access to it with 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 likely knowledge attributable to the “owner” of the garbage. In *California v. Greenwood*,92 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.93

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 and/or inclusion in a database.

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 an individual knowingly exposing his fingerprint,94 voice95 and handwriting96 to the public. And, in *U.S. 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.97

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90 *United States v. Jones*, 707 F.2d 1159, 1172 (10th Cir. 1983).
91 Note that the burden of proof in such circumstances is on the prosecution to justify their warrantless conduct. Moscolo, “The Role of Abandonment…” at 403-04.
93 *Id.* at 40.
The fingerprint example is a particularly important one as commentators have debated the appropriateness of analogizing surreptitious harvesting of out-of-body DNA to surreptitious harvesting of fingerprints. 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 your fingerprints that can be used for identification purposes. 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 and/or inclusion in a database.

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

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. In the absence of 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.

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98 Joh at 868-69 (rejecting the appropriateness of the fingerprint analogy); Kaye, “The Science of DNA Identification…” at 420 (supporting the appropriateness of the fingerprint analogy).


100 State v. Athan, 158 P.3d at 366-67.
The essence of the 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.\(^{101}\) 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 fingernails\(^ {102}\) or acquiring DNA by swabbing the inside of one’s mouth.\(^ {103}\) Nonetheless, courts have routinely that an intrusion on a reasonable expectation of privacy occurred.\(^ {104}\)

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 un-seeable by the naked eye and obtain analyzable DNA\(^ {105}\) from cells that exist outside the body,\(^ {106}\) 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*,\(^ {107}\) regulations promulgated by the Federal Railway Administration required railroads to test certain employees for drug and alcohol through urine testing. The collection of the urine sample could involve in-person monitoring but no physical intrusion into the body occurred.\(^ {108}\) 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”\(^ {109}\) and directly addressed the significance of the lack of bodily intrusion:


\(^{102}\) *Capp v. Murphy*, 412 U.S. 291 (1973)

\(^{103}\) e.g., *Nicholas v. Goord*, 430 F.3d 652 (2d Cir. 2005); *State v. O’Hagen*, 914 A.2d 267 (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.

\(^{104}\) *Nicholas v. Goord*, 430 F.3d at 656; *State v. O’Hagen*, 914 A.2d at 280.

\(^{105}\) Butler, *Forensic DNA Typing...* at 34.

\(^{106}\) See footnotes 19-33 supra.

\(^{107}\) 489 U.S. 602 (1989)

\(^{108}\) Id. at 617.

\(^{109}\) Id.
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.  

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.  

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 unlike the sense of privacy “flowing” from the urine in *Skinner* and as partially described in another mandatory urinalysis testing case, *National Treasury Employees Union v. Von Raab*:

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.  

That consideration is the focus of part V. Because of the narrowness of the surreptitious harvesting courts’ place analysis, however, they never reach that challenging core question.

**D. The Limited-Use-of-Information Fallacy**  
One of the surreptitious harvesting courts 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.”  

David Kaye’s 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

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110 *Id.*  
112 *National Treasury Employees Union v. Von Raab*, 816 F.2d 170, 175 (5th Cir. 1987).  
113 *State v. Athan*, 158 P. 3d at 368. The court’s conclusion was in the face of 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.* at 367.
dimension than that obtained from fingerprints. That scientific contention has been the focus of much of the debate about surreptitious harvesting amongst 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 practice and, by implication, an individual’s concern for its potential use.

The Athan court and Kaye essentially suggest that no intrusion on an expectation of privacy occurs in a surreptitious harvesting case because, like the fingerprint circumstance, the information obtained is itself limited and is also used, and can only be used, in a very limited way – for identification purposes only.

This approach is inconsistent with Skinner and with Kyllo. In Kyllo, the thermal-imaging technology detected heat consistent with high-intensity lights consistent with growing marijuana. 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. The court explicitly rejected “limiting the prohibition of thermal imaging to ‘intimate details.’” 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.” The potential for intrusion on information created an expectation of privacy in Kyllo and in Skinner.

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116 “We 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.” Kyllo v. United States, 533 U.S. at 35-36.
117 Id. at 38. In doing so, it said:

Limiting 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. at 38, quoting Oliver v. United States, 466 U.S. 170, 181 (1984).

118 Skinner v. Railway Labor Executives Association, 489 U.S. at 617.
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.  

This language suggests that the 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. That individual may also be the subject of an erroneous match, intentional or otherwise.  

More significantly, unlike the use of a DNA sample taken by authorization of state or federal statute, the use of a surreptitious harvesting sample is likely unregulated by statute. It could be included in what has been referred to as either a “linkage” or “rogue” database of suspects’ or others’ profiles. 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

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of medical diseases, medical and behavioral predispositions and perhaps even sexual orientation.\textsuperscript{124}

To be sure, no evidence currently exists that such analysis is occurring. But, with the use of surreptitious harvesting samples currently unregulated by the Constitution or otherwise, the specter of “mission creep” looms.\textsuperscript{125} The question as to 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.\textsuperscript{126}

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 IV 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.

**IV. “AN EXPECTATION OF GENETIC PRIVACY …”**

The challenge of crafting the sketch of Fourth Amendment genetic privacy is complex. Privacy itself is a multi-dimensional, often amorphous concept that has meant


\textsuperscript{126} 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 said to herself, “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 her analysis. (3) The average layperson, including judges, likely 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, “Reclaiming ‘Abandoned’ DNA…” at 879. To ask a judge in that position to base her judgment on an assessment of the nature and scope of genetic privacy, asks her to accomplish a very difficult task.
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) the control of 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.127

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.128 Whalen v. Roe suggests a constitutional right to informational privacy as a matter of due process.129 The cases flowing from the Fifth Amendment’s prohibition on a person being compelled to be a witness against himself effectively describe a privacy right grounded in one’s personal dignity.130

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.”131 The Supreme Court has yet to directly address genetic privacy as such, be it in informational, decisional/behavioral or dignitary privacy terms.132 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.

127 Daniel J. Solove, Understanding Privacy, 12-13, Harvard University Press, 2008. Solove argues persuasively that none of these conceptions “capture the common denominator of privacy,” Id. at 14-15, and goes on to propose a “taxonomy of privacy” that seeks to provide a better understanding of privacy.
131 (1) The right to be let alone – neither the government nor anyone else belongs “in one's genome” or in the set of personal decisions that come with one with a particular genetic makeup; (2) limited access to the self – one should be able to control who has access to one's genome; (3) secrecy – one can conceal one's genetic disease status from others; (4) the control of personal information – one should have control of one's genetic information (5) personhood – one's genetic identity in all its dimensions is so uniquely personal that it defines who one is and (6) intimacy – the information one's genome contains is profoundly intimate and, as such, one should have control of it.
132 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. Bioethicists and moral philosophers have considered the question in moral terms. Others have proposed model genetic privacy legislation and legislators have passed numerous versions of such legislation. Researchers and health care professionals have wrestled with practical applications of conceptions of genetic privacy. A number of legal scholars have also addressed the issue.

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, if anywhere else, within the Constitution is beyond the scope of this article. Instead, the focus is only on whether the nature and scope of Fourth Amendment genetic privacy, if any, implicated by the police practice of surreptitious harvesting of out-of-body DNA is one that society is willing to recognize as reasonable. Sections V B–D will examine constitutional genetic privacy in light of 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 sketch the outlines of some of the kinds of privacy concerns that a robust portrait would include. For example, courts frequently consider versions of bodily integrity/physical/property privacy and of 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. None develop a full portrait of a multi-dimensional genetic privacy.

136 See the National Conference of State Legislators’ website for a comprehensive catalog of state-by-state genetic privacy legislation at: http://www.ncsl.org/programs/health/genetics/prt.htm (last viewed 8/18/08)
137 E.g., Dorothy C. Wertz, John C. Fletcher and Kare Berg, Guidelines on Ethical Issues in Medical Genetics and the Provision of Genetic Services, World Health Organization, 1995.
139 See note 159 above.
Only two surreptitious-harvesting courts came anywhere close to addressing society’s conception of the reasonableness of any 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.”\(^{140}\) 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 individual’s expectation of privacy absent any legitimate constitutional basis.\(^{141}\)

Neither the *Christian* nor the *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 a compelled body intrusion – Buccal swab or blood sample, most of the courts do no formal *Katz* search analysis.\(^{142}\)

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 captures 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.\(^{143}\) 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.\(^{144}\)

Not surprisingly, those genetic-database courts 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 and/or in information. Most

\(^{140}\) *State v. Christian*, 723 N.W. 2d at 456. 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 at 33-34.

\(^{141}\) *People v. Sigsbee*, at 33. 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 the police would be required to justify their search by a showing of probable cause or some other quantum of evidence. It would not “prohibit any and all testing.”

\(^{142}\) See, e.g., Conn. Gen. Stat. Ann. 54-102g (a) – (e)

\(^{143}\) *E.g.*, *U.S. v. Sczubelek*, 402 F.3d 175, 182-84 (3rd Cir. 2005).

\(^{144}\) *Id.* at 182; *Landry v. Attorney General*, 709 N.E.2d 1085, 1090-92 (MA, 1999).
commonly, genetic-database courts that focused on bodily integrity – the degree of physical intrusion into the body – analogized the intrusion to that of taking blood, fingerprints or photographs.  Some of those courts used those physical-intrusion 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.

The courts that focused primarily on an information conception of genetic privacy also relied on analogies to other well-established areas of privacy. Some courts spoke of the intrusion on information as being like that which occurs in the taking of a fingerprint and others spoke more broadly of the intrusion being upon identity information – 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 – governmental interest, nature of privacy interest and degree of intrusion. The courts were assessing statutory structures that, superficially, had all the appearances of earlier physical-characteristic

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145 E.g., Padgett v. Ferrero, 294 F.Supp. 2d 1338, 1342 (N.D. GA.) (“The bodily intrusion of taking a blood or saliva sample is minimal. It is not significantly greater than taking fingerprints or a photograph”).

146 Id.

147 Boling v. Romer, 101 F.3d 1336, 1340 (10th Cir. 1996) (“…the use of DNA in a manner not significantly different from the use of fingerprints.”); State v. Hauge, 79 P.2d 131, 143 (HI, 2003) (“…we consider the sampling mandated under section 5-4-3 as functionally equivalent to fingerprinting…”); Green v. Berge, 354 F.3d 675, 679-80 (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.”); Vanderlinden v. Kansa, 874 F.Supp. 1210, 1215 (D., KS)

148 Grocean v. U.S. Department of Justice, 354 F.3d 411, 413-14 (5th Cir. 2004) (“…like fingerprinting, collection of a DNA sample for purposes of identification implicates the Fourth Amendment,…”); Miller v. U.S. Parole Commission, 259 F. Supp. 2d 1166, 1177-78 (D. KS 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.”).

149 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); Landry v. Attorney General, 709 N.E. 2d 1085, 1094 (Ma. 1999).
collections of information for identification purposes only like photographs and fingerprints.\textsuperscript{150}

What is more surprising are the genetic-database courts that showed some signs of breaking out of 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 \textit{Nicholas v. Goord}, the Second Circuit expressed an awareness of the potential for a more significant intrusion on privacy in the fact that database samples were kept permanently:

\begin{quote}
\ldots 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.\textsuperscript{151}
\end{quote}

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.\textsuperscript{152}

A few genetic-database courts have sketched out some of the fuller dimensions of genetic privacy. Those sketches have included a 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 \textit{Patterson v. State}, an Indiana appellate Court found that “At 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.\textsuperscript{153}

In his concurrence in \textit{U.S. v. Kincade}, Judge Gould, after harkening back to Brandeis and

\textsuperscript{150} See \textit{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).”

\textsuperscript{151} \textit{Nicholas v. Goord}, 430 F.3d 652, 670 (2d Cir. 2005).

\textsuperscript{152} \textit{Id.; see also State v. Raines}, 857 A.2d 19 (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. \textit{Johnson v. Quander}, 440 F.3d 489 (D.C. Cir. 2006) (a Kyllo analogy); \textit{State ex rel. Juvenile Dep’t v. Orozco}, 878 P.2d 432 (Or. App. 1994); \textit{Padgett v. Donald}, 401 F.3d 1273 (11th Cir. 2005) (an analogy to female guards watching naked men).

\textsuperscript{153} \textit{Patterson v. State}, 742 N.E. 2d 4, 10 (Ind. App. 2000).
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.\textsuperscript{154}

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 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. [emphasis added]\textsuperscript{155}

In an earlier case, also reversed, Judge Keeton of the same District Court had characterized the information obtained in DNA database searches as “immensely private.”\textsuperscript{156}

More dramatically, in his dissent in the en banc decision in \textit{US 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 government may intrude into the secret regions of man’s life at will. [emphasis added]  

“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 case law form the core components of a fully-dimensional portrait of genetic privacy worthy of evaluation in the surreptitious sampling 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. 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 particular circumstance at hand rather than in a single normative standard good for all purposes. 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 would call a kaleidoscope of identity—a constantly changing pattern of elements that define one’s sense of oneself. This sense of oneself is physical in that DNA is within the body or a part of the body—a cell; it is ubiquitous in that it is in every cell; it is permanent and it is relatively immutable. This sense of oneself is informational in that DNA contains a broad range of medical and other information—information that is personal, predictive, intimate, powerful and shared. The sense of oneself is dignitary in that DNA contains the kind and quality of information and is so ubiquitous that, in the

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hands of the government, it may reveal more about who one is than the individual herself will ever know.

In the case law and in public discourse, DNA has often been referred to as a “code,” a “map,” a “language,” a “library” to mention a few. These metaphors capture the predictive, information-laden sense 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 captures. Identity itself has many components – physical, informational, dignitary to mention only a few. It can be socially constructed. It can 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 that may even exist in spite either of what others think or of what much of the information “says.”

Who one is changes over time. One’s hair grays or disappears. One’s posture and physical bearing alters. 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 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: [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…”

163 United States Constitution, Amendment IV.
The crux of the rejection of surreptitious sampling 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.

…when the defendant discarded the straw he also discarded any expectation of privacy in the DNA on the straw. While it is unlikely that the defendant believed that he was discarding bodily fluids that would show his DNA profile, nonetheless,…

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

The relevant question in this case is whether, when a person licks an envelope and places it in the mail, that person retains any privacy interest in his saliva at all.

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.

The fact that the DNA was not in the individual’s body; that it was abandoned; 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 it is that is being searched. If it is the cup, cigarette butt, saliva or blood that is outside the body that one conceives of as that which is being searched, then its 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 when one enters one’s DNA to obtain what will become the alphanumeric id tag used in forensic DNA analysis, then it is an intrusion. Or, if one is mining that which ordinarily exists in the more 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

164 Sigsbee at 31-32.
165 Christian at 462.
166 Athan at 33.
167 Bly at 357.
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 never entered.\(^{168}\) The analogy between the use of thermal-imaging technology to discern activity within the home and the use of forensic-DNA technology to discern what is in the body is imperfect. Both circumstances reflect the recognition of an intrusion that occurs without the crossing of 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 \textit{U. S. 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.\(^{169}\) The police removed the trunk from the car; transported it to a federal facility and then opened it without a warrant, finding marijuana inside.\(^{170}\) The Court found that the police should not have opened the trunk without a warrant.\(^{171}\)

In \textit{California v. Acevedo}, a 1991 follow-up of \textit{Chadwick}, the police stopped a car for which they had probable cause to believe was carrying a bag with marijuana in the trunk.\(^{172}\) In effectively overruling \textit{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.\(^{173}\)

The analogy to the surreptitious sampling circumstance is direct, though perhaps not intuitive. When the police seize the envelope in \textit{Athan}, they seized the \textit{Chadwick/Acevedo} car. When they removed the saliva from the envelope, they seized the \textit{Chadwick/Acevedo} container. When they entered the cell to extract the DNA, they searched the trunk on \textit{Chadwick} and the bag in \textit{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 phone.\(^{174}\) For example, in \textit{State v. Smith}, the police arrested Mr.

\(^{168}\) Kyllo v. U. S., at 34-36.
\(^{170}\) \textit{Id.} at 4-5.
\(^{171}\) \textit{Id.} at 15-16.
\(^{173}\) \textit{Id.} at 580-81.
Smith and found a cell phone in his possession.\(^{175}\) The police searched the cell phone and discovered call records and phone numbers of value to their investigation.\(^{176}\) 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.\(^{177}\)

The analogy to the surreptitious sampling circumstance is direct. For example, when the police seize 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 that they typed, 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 as to the contents of the trunk, bag and cell phones in those case, then the police must have probable cause and, depending on the circumstances, a warrant in order to search for DNA in surreptitious sampling 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 phone in *Smith* had the kind of security that prevented ready scrolling by the police.

Physically, the surreptitious sampling search is a search for an otherwise inaccessible item and one that is at the core of one’s physical being. For STR testing, the forensic scientist must isolate the DNA molecules from other cellular materials;\(^{178}\) remove any possible inhibitors to the PCR process;\(^{179}\) and quantitate the DNA to make sure it’s the correct amount.\(^{180}\) The analyst then amplifies the DNA so that enough exists for analysis;\(^{181}\) transforms the fluorescently labeled DNA into an image on an electropherogram.\(^{182}\) Then, the analyst can analyze the DNA in the original sample. The

\(^{175}\) State v. Smith, 920 N.E. 2d 949, 950 (OH 2009).
\(^{176}\) Id. at 950.
\(^{177}\) Id. at 955.
\(^{178}\) Butler, *Forensic DNA Typing* at 42.
\(^{179}\) Id. at 49.
\(^{180}\) Id. at 50.
\(^{181}\) Id. at 63.
\(^{182}\) Id. at 101-02.
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.

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.\textsuperscript{183} The “item” for which surreptitious sampling 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 sampling causes no pain.\textsuperscript{184}

Inaccessibility, ubiquity and existence as a part of a body’s core are the essential physical privacy features of DNA. Unlike the Chadwick/Acevedo circumstance, the inaccessibility is passive.\textsuperscript{185} The “double-lock” is a naturally existing one, albeit with many 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.\textsuperscript{186} 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 both 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 in 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

\textsuperscript{183} Id. at 17, 34.
\textsuperscript{184} Contrast this kind of search to the one in Schmerber where the police, via a physician, obtained a blood from a DUI suspect, Schmerber v. California, 384 U.S. 757 (1966) or to the one in Winston v. Lee, where the police, via a surgeon, sought to surgically remove a bullet from the body of an attempted robbery suspect. Winston v. Lee, 470 U.S. 753 (1985).
\textsuperscript{185} Unlike a locked trunk, a closed purse or a bag in a car trunk, the hyper-inaccessibility 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.
DNA comes from the nature of the information. However, some of it comes from the physical location/existence of the information. Fingerprints are valuable for identification purposes (1) because they contain information that is on the tips of fingers – accessible, common to every human and permanent and (2) that information is considered “unique.” Thus, the surrounding physical context for the unique information is an essential predicate to their identifying power.

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, it is also about the physical context within which it exists. And, one’s identity – a part of one’s dignity – also gets additional meaning from the physical context. An examination of the informational and dignitary privacy aspects of the surreptitious sampling circumstance will thus fill in the developing portrait of a 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 sampling 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 one of those courts has, in the end, declined to act based on the informational privacy features of DNA, many of them have highlighted its potential. The classic description of that informational value is Judge Reinhardt’s dissent in U.S. v. Kincade:

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 evidence of the contributor's race or sex.” Ante at 818. Yet that seems to be a dramatic understatement. The DNA “fingerprint” entered into CODIS likely has the potential to reveal information...

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188 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) even that limited information’s use is strictly controlled by statute. See, e.g., State v. Watkins, 955 A.2d 1144, 1154-58 (Vt. 2008); Nicholas v. Goord, 430 F.3d 652 (2d. Cir 2005); State v. Athan, 158 P.3d at 33-34; State v. Raines, 857 A.2d 19 (Md. 2004). In the surreptitious sampling circumstance, neither the state nor the federal government appears to regulate that which is obtained.
about an individual’s “genetic defects, predispositions to diseases, and perhaps even sexual orientation.” [citation omitted] DNA analysis can reveal the presence of traits for thousands of known diseases, and countless numbers of diseases which are currently unknown. [citation omitted] 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. [citation omitted].

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. *See Whalen v. Roe*, 429 U.S. 589, 599, 97 S.Ct. 869, 876, 51 L.Ed.2d 64 (1977) (recognizing the individual's “interest in avoiding disclosure of personal matters”).

In *U.S. 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.”

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

189 *U.S. v. Kincade*, 379 F.3d at 850.
190 *Rise v. Oregon*, 59 F.3d 1556, 1569 (9th Cir. 1995).
The predictive nature of genetic information is notable. One of the fundamental features of genetic information is its probabilistic nature. For example, it is the rare genetic disorder that is controlled by one gene and that is certain to occur based on the existence of a particular gene variant. Huntington’s disease is one such disorder. 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 one who carries such a variant that she has an increased likelihood (five-fold) over the course of her lifetime of developing breast cancer as compared to the general population.

Predictive genetic information comes in many shapes, sizes and degrees of certainty. While newspaper headlines not infrequently trumpet the discovery of the “gene for…,” more often what has been located is a gene which correlates for the presence of a medical disorder, a trait or a behavior. For example, scientists have developed correlations between genes and obesity, risk-taking, smoking, creative dance, schizophrenia and impulsivity and violence.

DeCODE Genetics, an international biotechnology research company in Iceland, advertises its 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 and hypertension and cardiac risk. Its most comprehensive test is a personal genetic scan, deCODEme that:

194 See for example, Gisela Kaplan and Lesley J. Rogers, Gene Worship: Moving Beyond the Nature/Nature Debate Over Genes, Brain, and Gender, Other Press, 2003 in which the authors critique the frequent genetic explanations for human behavior.
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.\textsuperscript{202}

Other companies like 23andME offer similar services, attracting customers with the promise of personalized genetics.\textsuperscript{203}

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.\textsuperscript{204} In terms of informational privacy concerns, though, predictive genetic information provides a future window on an individual’s life. George Annas has eloquently labeled predictive genetic information a “future diary” that “informs our younger selves about our aging selves.”\textsuperscript{205}

\textbf{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.\textsuperscript{206} 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.\textsuperscript{207}

\begin{thebibliography}{99}
\bibitem{202} Id.
\bibitem{203} www.23andme.com/ (last visited 2/26/12). 23andMe uses the catch phrase, “Genetics just got personal.”
\textquote{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 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...in terms of information, I believe that our DNA resembles a future diary that is due the same privacy that we afford other written diaries.}
\end{thebibliography}
Prosecutors also have begun to use genetic information taken from DNA more creatively. Based on the work of Mark Shriver and others, tests exist to identify bio-geographical information from DNA – testing that purports to identify, at least, the continent of origin of the human source of the sample. 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.

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 of unknown origin into the CODIS database. 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. Such a result strongly suggests that the individual who contributed the crime scene sample is closely related to the individual in the database.

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. 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 both personal and intimate. As a present and future diary, it catalogs knowledge about, for example, current and possible future medical conditions about which an individual would otherwise have a choice as to whom she would inform. Therein lies much of the basis for the genetic privacy laws that so many states have passed.

Strikingly, someone in possession of another’s DNA would be able to learn information about another that the other does not know about herself. Consider the circumstance in which a genetic counselor becomes aware that a couple’s child only has a

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208 Frudakis, *Molecular Photofitting...* at 35-145.
211 Id.
212 Id.
213 Id.
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 genetic privacy, the other with that knowledge would be the government.214

**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 anti-discrimination laws in the provision of health insurance.215 A majority of states have such laws addressing the employment context216 and genetic privacy laws are quite common.217 The Americans With Disabilities Act also covers those with a genetic disorder even if the person is asymptomatic.218

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.219 Carrie Buck, the subject of the infamous *Buck v. Bell* case upholding the constitutionality of involuntary sterilization,220 was committed to the Lynchburg Colony in Virginia and involuntarily sterilized because she, her mother and her daughter were believed to be “feeble-minded,” then viewed as a hereditary condition.221

The scope of eugenic legislation went beyond involuntary sterilization statutes. More than 25 states revised their marriage laws to prevent the “biological continuation” of the unfit.222 Immigration restrictions were passed which used “IQ” tests to restrict immigration, particularly of Eastern and Southern Europeans.223

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214 It is critical, once again, to recognize in this discussion of what is genetic privacy that the focus is on the individual’s *expectation* of privacy in her DNA not on her level of certainty as to whether the government has or would access such information and/or what the government would do with such information if they had or did access it.


217 *E.g.*, N.H.R.S.A. 141-H.


220 *Buck v. Bell*, 47 S. Ct. 584 (1927)

221 Kevles, *In The Name of Eugenics..., at 110-12.

222 *Id.* at 99-100.

223 *Id.* at 94-95.
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. It is neither intimate nor personal in the nature of the information it provides.

Fingerprints’ power shares one aspect of the power of DNA information: its identifying power. Like forensic DNA information, fingerprints can individuate the identity of the source of a crime scene sample and is a potent investigative tool when available. Otherwise, it is profoundly one-dimensional, quite different the multi-dimensional cascade of DNA information.224

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. An associated risk is that of genetic determinism - your genes determine who you are - and genetic essentialism – what your genes say about you is all we need to know about you. And, the risk of genetic exceptionalism – genes and genetic information are different and special - completes the list of concepts attendant 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 who the essence of a person is225 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

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224 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.

brought that discussion to the world of genetics.\textsuperscript{226} 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.\textsuperscript{227} \textit{Gataca}, a recent movie, has captured one dystopic version of a society overly obsessed with deterministic essentialism of genetic identity.

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 essence of one’s identity. Genetic information contributes to portrait of identity in important ways 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 – exists 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 piece. Often, one region of DNA interacts with another region of DNA to produce “an effect.” For example, some cancers involve the mutation of genes which, un-mutated, would suppress the unregulated growth of certain cells – cells which themselves are produced by other genes.\textsuperscript{228}

More broadly, as genetic research has intensified with the sequencing of human genomes, scientists are increasingly become 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 a non-gene regions of DNA and has concluded that, “through the analysis of 1% of the human genome that the humble,

\textsuperscript{228} Siddhartha Mukherjee, \textit{The Emperor of All Maladies}, 368-69, Scribner, 2010.
unpretentious non-gene sequences have essential regulatory roles.”

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 and diabetes. Interactions between one’s genes, the physical environment within or outside one’s body and/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, inter alia, genetic roots stands at the beginning of a much more profound scientific understanding of such disorders as asthma, atherosclerosis, diabetes, hypertension, obesity. 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 through time and space is a complex metaphor with little parallel. Michael Ondaatje, in his novel Divisadero, describes a belfry that has been constructed like a coil or screw and analogizes it to a helix. It provokes his character to consider the helical-like 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


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 at 783.
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.\textsuperscript{233}

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.\textsuperscript{234} 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 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.\textsuperscript{235} 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.\textsuperscript{236}

For other conceptions, the protected core is primarily something much less concrete and much more intangible – one’s identity, one’s sense of oneself or one’s dignity. In the language of Solove’s traditional expressions: the right to be alone, to personhood and to intimacy.\textsuperscript{237} 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.

\textsuperscript{234} Kaye, \textit{The Science of DNA Identification},” at 420; see also Lawrence O. Gostin and James G. Hodge Jr., “Genetic Privacy and The Law: An End to Genetics Exceptionalism,” 40 Jurimetrics J. 21 (1999).
\textsuperscript{235} Solove, \textit{Understanding Privacy},... at 12-13.
\textsuperscript{236} Id.
\textsuperscript{237} Id.
For example, when someone’s home is burglarized, she has suffered an intrusion on several very tangible aspects of a protected core – her home, items that were taken and perhaps information to which the burglar had access. She 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 to her. The second 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 of friends or family who say in reference to a burglary of their residence, “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 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 sampling of out-of-body DNA aligns this calculus of privacy values differently. Currently, courts and commentators view the physical intrusion as non-existent 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 sampling cases. Though the victim of governmental surreptitious sampling feels no physical pain, the presence of the government “in her DNA” and the knowledge of that presence are intrusions on her 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 “the secret regions of man’s life.” 238 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 affect might occur even though the government may never actively do anything with the DNA. The dignity inherent in individual autonomy free of interference from the government flows from one’s inherent dignity as a human being – what many call a “negative liberty”. 239

The idea of dignity as a constitutional consideration is common. Noemi Rao has written of the presence of the concept of inherent dignity in much of the Supreme Court’s

238 See supra, notes 159-161
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 dignity in the First, Fourth, Fifth, Sixth and Fourteenth Amendments.\(^{240}\) 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 [emphasis added].\(^{241}\)

The *Miranda* Court was also emphatic about the role of dignity in their analysis of the Fifth Amendment right against self-incrimination when it said:

> All these policies point to 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* [emphasis added].\(^{242}\)

More specifically, the idea of dignitary privacy is one that 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)\(^{243}\) to a case like *City of Ontario, California v. Quon* (the fourth Amendment guarantees privacy, dignity and the security).\(^{244}\)

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 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.\(^{245}\) 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.

\(^{240}\) *Id.* at 207-16.
\(^{243}\) *Schmerber* at 767.
\(^{244}\) *City of Ontario, California v. Quon*, 130 S.Ct. 2619, 2627 (2010).
In the public-video surveillance circumstance, the police position cameras in advantageous locations to film all the activity and people occurring there.\(^{246}\) 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 different ways beyond simply the gathering of personal or intimate information - Does one have the right to be left alone, even in public?\(^ {247}\) Does one have a right to anonymity even when in public?\(^ {248}\) Does one have the right not to always be 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 state Supreme Court recognized a very substantial informational privacy interest in 24-hour GPS surveillance. In doing so, it also noted with approval the analysis of the Oregon Supreme Court in a radio transmitter case in evaluating a kind of privacy interest on top of what they found to be the already significant informational one:

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.”[*quoting State v. Campbell*, 306 Ore. 157, 172 (1988)]. 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.” [*quoting State v. Campbell*, 306 Ore. At 172].\(^ {249}\)
Yet, in *U.S. v. Jones*, the Supreme Court did not explicitly describe the privacy interest at stake in a case involving surreptitious GPS surveillance as a dignitary one. And, the public-video surveillance cases have not yet made their way into the case law in this country.

Whatever the current level of recognition of a dignitary privacy invasion in the GPS cases, the above examples show that the focal point of a dignitary privacy claim is the presence of an “other” as the scrutinizer. Whether it is the scrutiny accompanying a bodily invasion, (*Schmerber*), a cell-phone (*Quon*), one’s decision-making (*Casey*) or one’s psyche (*Miranda*), it is the fact that someone else is there; that one is not alone; that the other is uninvited that is the essence of the violation.

And, the sense of violation that accompanies the dignitary intrusion does not grow merely out of the other’s physical presence or out of 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. Or, as Justice Sotomayor noted in her *Jones* concurrence, “Awareness that the Government may be watching chills associational and expressive freedoms.” To be scrutinized in and of itself offends one’s dignity whatever the use to which the scrutiny is put.

The particular nature of the Fourth Amendment dignitary privacy invasion is that it is a governmental authority that engages in the scrutiny. The idea that the government in some capacity is present in one’s decision-making; one’s cell-phone conversations, one’s psyche or one’s whereabouts over time and space accentuates the harm to one’s dignity.

Anthony Amsterdam directly addressed the 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 a 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

250 *U.S. v. Jones*, 132 S. Ct. 945 (2012). The lead opinion focused narrowly on a property analysis, one that group of four judges felt resolved the issue. Sotomayor’s and Alito’s opinions at least explored the informational privacy dimension of the practice.

251 Note that public-video surveillance usage is a much more developed in England, for example.


253 *Jones* at 955.

254 It is understood that, as to the decision-making and psyche examples drawn from *Casey* and *Miranda*, those dignitary invasions occur under the Fifth and Fourteenth Amendments. Nonetheless, the specter of the governmental presence is the same.
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.\textsuperscript{255}

The scrutiny that offends one’s dignity is of that which the DNA kaleidoscope of identity offers up to those with access. The dignitary intrusion is not that which the government will or may do with access to this kaleidoscope of identity. 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 intrusion\textsuperscript{256} 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. As superficial by nature, fingerprints likely 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 and likely much less than that associated with DNA.\textsuperscript{257}

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Any assessment of the expectation of privacy that people have in DNA will be an approximation that inevitably includes a measure of subjective judgment. For example, the very concept of harm to 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 of a moving target, particularly as a legal concept.\textsuperscript{258} The risk of including any

\textsuperscript{255} A. Amsterdam, “Perspectives on the Fourth Amendment,” 58 Minn. L. Rev. 349, 403 (1974).

\textsuperscript{256} This dignitary intrusion is compounded by the fact that some police departments are beginning to compile DNA databases of samples that they collect in circumstances other than those covered by the regulatory structure of the state and federal statutory DNA databases. 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. Richard Willing, “Authorities find more uses for DNA databases,” *USA Today*, March 26, 2007.

\textsuperscript{257} See the following section that compares that to which people use DNA metaphors to lend meaning with that to which they use fingerprint metaphors to lend meaning.

\textsuperscript{258} Neomi Rao captures this slipperiness well:

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.” [footnote omitted]. But even in the Universal Declaration, the start of international efforts to protect human dignity, the drafters disagreed about the meaning of human dignity [footnote omitted]. 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
assessment of the extent of dignitary harm in any measure of one’s expectation of privacy in DNA is that the assessment itself becomes suspect as merely one individual’s judgment subject to as much variation as there are individuals.

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. 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 that which “society is willing to recognize as reasonable” in the context of genetic privacy; to do so in a way that transcends the idiosyncratic, the personal and the anecdotal and to avoid mere theorizing.

**V. “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 external legal concepts, like property law and in “understandings that are recognized and permitted by society” as such sources and that idea has continued to appear in the court’s jurisprudence.

Christopher Slobogin and Joseph Schumacher have made the most direct effort to capture empirically the understandings the public has about 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.”

From the survey, they develop 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…” Unfortunately, Slobogin and Schumacher conducted their survey at a time when the police were not using either the genetic databases or surreptitious DNA concept has become commonplace.

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261 *Id.* at 731-32
262 *Id.* at 732.
263 *Id.* at 732.
Some polling exists on the more general idea of genetic privacy, particularly as to genetic information and genetic discrimination. One such study surveyed 1,199 individuals about their level of trust in doctors, spouses, researchers, law enforcement, health insurers and employers having access to genetic tests results for genetic disorders. 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. 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.

In the absence of direct survey results on the issue of surreptitious DNA sampling or on police possession of genetic information in the context of the Fourth Amendment, a look at the use of DNA images in public culture is useful in revealing fundamental attitudes about DNA.

Genetics and DNA have been a focus of public culture over a long period of 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 earlier twentieth century and during the “new genetics” era since 1990. The 1997 science-fiction film, Gattaca, portrayed an acutely dystopic vision of a future society in which the predictive value of genetic information organized the world into the gene elite and the “de-gene-erates.” Privacy was non-existent in a society in which one’s DNA determined all.

Beyond film and literature, a look at public discourse and at its 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 when we use a metaphor to describe something, we are trying to bring a better understanding of that “something” to those listening by reference to a reference point that we already know and understand. By doing so, we lend our

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268 What follows is based on the important work of language theorists like George Lakoff and Mark Johnson, captured in their classic book, Metaphors We Live By, The University of Chicago Press, 2003 edition with a new forward.
brain’s way of understanding the reference point to our way of understanding the less known thing, thereby bringing it more definition.²⁶⁹

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

“Were still trying to grind out the solution to this problem.”
“My mind isn’t operating today”
“Boy, the wheels are turning now!”
“I’m a little rusty today”²⁷⁰

contain metaphors that capture the idea of the “Mind as a Machine” and bring another layer of understanding to the way the mind works.²⁷¹

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”²⁷²

contain metaphors that capture the idea of the “The Mind is a Brittle Object.”²⁷³ 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 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.²⁷⁴

²⁶⁹ Lina Hellsten has described the process as applied to the metaphor, “horsepower” as follows:
...a metaphor consists of two or more issues, the source domain (e.g. horses) and the target domain (e.g. car engines) and a set of elements 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.
²⁷⁰ Id. at 27.
²⁷¹ Id at 27-28.
²⁷² Id. at 28.
²⁷³ Id. at 28.
²⁷⁴ Id. at 28.
Note that the accuracy of the metaphor is not the issue, i.e., the question is not whether the mind actually works as a machine or is a brittle object at a 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.\(^{275}\) It grounds the less clearly delineated in the more clearly delineated.\(^{276}\)

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 present 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.\(^{277}\) Jose Van Dijck has explored the role of images in the popular representations of the new genetics since the 1950s.\(^{278}\) She evaluated how different and conflicting popular representations of genetics over time reflected the interplay between these images and the meaning lent by society to developments in genetics.

Both Condit and Van Dyk focused on what images or metaphors people used to explain DNA or the gene. They were able to gain 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 of DNA to see what those images told us about societal attitudes towards the gene.\(^{279}\) The found that the gene was “a cultural icon, a symbol, almost a magical

\(^{275}\) *Id.* at 58-59.
\(^{276}\) *Id.* at 59-60.
\(^{277}\) Celeste Condit, *The Meanings of The Gene: Public Debates about Human Heredity*, University of Wisconsin Press, 1999. Condit described a sequence of metaphors over time use to describe human heredity: a breeding-stock metaphor; the idea of the gene in control of humans; the code metaphor and the blueprint metaphor.
The study of the circumstances in which the term “DNA” was used over a one-year period in the New York Times and in USA Today begins to inform us about societal attitudes towards DNA. In both newspapers, the significant majority of uses were as a scientific term rather than as a metaphor often referencing genetic research or forensics. 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.

The primary subjects of the articles in which “DNA” was used metaphorically were 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 its use in business articles and then, to a lesser extents in articles on the arts, including television. In The New

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280 Id. at 2.
281 Id.
282 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.
283 The author recorded all the mentions of the term “DNA” over a period of one year in both newspapers. The papers were selected because they were both papers with a national circulation and with arguably different, though probably overlapping, readerships.

Though the use of the term was by journalists, the premise underlying this study is that a journalist would use the kind of metaphor to explain something that is less well understood or grounded that would be within their audience’s comprehension. Thus, a journalist would likely not use a quantum physics metaphor to explain anything other than as an image of impenetrable complexity.

284 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.
285 Sports -22; business/marketing -18 and the arts – 10. There was lesser use in articles on politics (5), in book reviews (3) and in personal articles (2)
York Times, the use of DNA occurred most frequently in business articles, then arts articles and to a lesser extent sports articles.\textsuperscript{286} Whatever the subject matter of the articles, the thing sought to be better understood or grounded – the target domain – was almost always behavior of some kind.\textsuperscript{287} In articles about business, it was the behavior of a company;\textsuperscript{288} in articles about music or the arts, it was the behavior of a band;\textsuperscript{289} an artist\textsuperscript{290} or an author; and, in articles about sports, it was an individual’s\textsuperscript{291} or team’s\textsuperscript{292} behavior. More specifically, the use of a DNA metaphor virtually always sought to explain a aspect of the group’s or individual’s identity. Sometimes, the reference was a direct one – 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.\textsuperscript{293}

Or:

Pie-making is in the DNA of Melissa and Emily Elsen. Their grandmother baked pies for their mother’s restaurant in Hecla, S.D., and it was from her that they learned their craft.\textsuperscript{294} Sometimes, the DNA metaphor explains why a particular group acted the way it did:

Texas agreed to stay in the Big 12 this week in part after getting assurances that it retains local media rights, including the possibility of a Longhorns network. "We have discussed the concept of a channel with them. We're not in business

\textsuperscript{286} Business/marketing – 20; the arts – 19 and sports – 9. \\
\textsuperscript{287} 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. \\
\textsuperscript{288} http://www.nytimes.com/2010/01/13/business/global/13saab.html?emc=tnt&tntemail0=y (last visited 2/26/12). \\
\textsuperscript{289} http://www.nytimes.com/2010/01/16/arts/music/16vampire.html?emc=tnt&tntemail0=y (last visited 2/26/12). \\
\textsuperscript{290} http://www.nytimes.com/2010/02/26/movies/26yellow.html?emc=tnt&tntemail0=y (last visited 2/26/12). \\
\textsuperscript{291} http://www.usatoday.com/sports/football/nfl/colts/2010-12-08-peyton-slump_N.htm (last visited 2/26/12). \\
\textsuperscript{292} http://www.usatoday.com/sports/baseball/ml/cubs/2010-08-17-baseball-chicago-cubs-lou-piniella-wrigley-field_N.htm (last visited 2/26/12). \\
\textsuperscript{293} http://www.usatoday.com/sports/baseball/ml/cubs/2010-08-17-baseball-chicago-cubs-lou-piniella-wrigley-field_N.htm (last visited 2/26/12). \\
together," Castiglione said. "That's not it at all. I don't want to give you that impression. "We've been studying it. They've been studying it. ... We'd both like to be aggressive, and that part of our DNA to be aggressive."\textsuperscript{295}

Other times, the reference is to accumulated behavior 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..”\textsuperscript{296}

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.\textsuperscript{297}

And, occasionally, the DNA metaphor is 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.\textsuperscript{298}

As is apparent from the above, the metaphorical uses of DNA to capture an aspect of identity are capturing core aspects of identity, not simply a transitory or passing feature of identity. Lakoff and Johnson call such aspects of metaphorical use “entailments,” which bring even more depth to the metaphorical reference.\textsuperscript{299}

The entailments that come with the use of the DNA metaphor in public discourse to capture aspects of identity are all of a piece. They involve permanence:

\textsuperscript{295}http://www.nytimes.com/2010/04/16/movies/16tribeca.html?emc=tnt&tntemail0=y (last visited 2/26/12).
\textsuperscript{297}http://www.nytimes.com/2010/05/13/business/media/13saban.html?emc=tnt&tntemail0=y (last visited 2/26/12).
\textsuperscript{298}http://www.nytimes.com/2010/05/24/sports/soccer/24sfrica.html?emc=tnt&tntemail0=y (last visited 2/26/12).
\textsuperscript{299}Supra note 168 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.
So why would he stop now in what could be the final days of his tenure? “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.300

**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.301

**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.302

**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.303

Or, most ironically:

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,

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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.304

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."305

In his biography of the late Steve Jobs, Walter Isaacson quoted a one-time Jobs girlfriend as saying in a comment about Jobs and Daniel Kottke, “Kottke was in the middle. ‘Daniel didn’t have that DNA of ruthlessness, so he was a bit flipped by Steve [Jobs] behavior,’ according to Brennan.”306 Later, Isaacson quotes Jobs as saying, “It’s in Apple’s DNA that technology alone is not enough.”307

In the language of Lakoff and Johnson, these entailments – permanence, immutability, inevitability, intimacy – reverberate within the core-identity DNA metaphor.308 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 use of the DNA metaphor tells us more about what society thinks about DNA.

That DNA is about core identity in the minds of those who use DNA metaphors to explain behavior and identity reinforces the sense that society views DNA as involving core identity. If writers, reviewers, journalists and senators are using DNA metaphors in the public discourse to help their readers and listeners understand behavior and identity, it presumes that the core-identity DNA metaphor is a familiar one shared by their readers and listeners.

306Walter Issacson, ...
307 Id. at .... Isaacson himself uses the DNA metaphor on several occasions, e.g., ....
308 Lahoff at 144.
It also suggests that the societal sense of the role of DNA as a defining part of one’s identity is a much more profound sense than society’s 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 an approximately six-month period, 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.³⁰⁹

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.”³¹⁰

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.”³¹¹

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. 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.

³⁰⁹ There were 98 uses in *The New York Times* and 59 uses in *USA Today*.
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 towards 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.

**VI. 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 first 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 her 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 one quite different from those 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 and harvest the DNA.\textsuperscript{312}

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.

\textsuperscript{312} This requirement, as yet unsupported by case law, is partially supported by the Standard 16-2.2 of the ABA Criminal Justice Standard 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 only issue 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.