

**A FOURTH AMENDMENT THEORY FOR
ARRESTEE DNA AND OTHER BIOMETRIC DATABASES**

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INTRODUCTION

Fifteen years ago, Louisiana adopted a law mandating that “[a] person who is arrested for a felony sex offense or other specified offense . . . shall have a DNA sample drawn or taken at the same time he is fingerprinted pursuant to the booking procedure.”¹ Today, at least twenty-eight states and the federal government have laws providing for DNA sampling before conviction (“DNA-BC”).² Most other countries with DNA databases also collect samples on arrest.³

These laws enjoyed a placid childhood, with surprisingly few constitutional challenges. Those idyllic days are over. After two federal courts of appeals cases upheld DNA-BC laws,⁴ two state supreme court opinions gutted similar ones.⁵ In response, the Chief Justice of the U.S. Supreme Court promptly stayed the judgment of Maryland’s highest court,

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1 La. Rev. Stat. Ann. § 15:609(A)(1) (1998).

2 *DNA Sample Collection from Arrestees*, NAT’L INST. OF JUSTICE (Dec. 7, 2012), <http://nij.gov/topics/forensics/evidence/dna/collection-from-arrestees.htm>.

3 See, e.g., GENETIC SUSPECTS: GLOBAL GOVERNANCE OF FORENSIC DNA PROFILING AND DATABASES 153–287 (Richard Hindmarsh & Barbara Prainsack eds., 2010) (discussing some international DNA collection procedures including procedures in Austria, the Netherlands, Norway, Portugal, and Australia).

4 *Haskell v. Harris*, 669 F.3d 1049, 1051 (9th Cir. 2012), *vacated, reh’g en banc granted*, 686 F.3d 1121 (9th Cir. 2012); *United States v. Mitchell*, 652 F.3d 387, 390 (3d Cir. 2011) (*en banc*), *cert. denied*, 132 S. Ct. 1741 (2012); *United States v. Pool*, 621 F.3d 1213, 1214 (9th Cir. 2010), *vacated as moot en banc*, 659 F.3d 761 (9th Cir. 2011).

5 *Mario W. v. Kaipio*, 281 P.3d 476, 483 (Ariz. 2012); *King v. State*, 42 A.3d 549, 552–53 (Md. 2012), *cert. granted sub nom. Maryland v. King*, 133 S. Ct. 594 (2012). For a review of earlier cases, see Corey Preston, Note, *Faulty Foundations: How the False Analogy to Routine Fingerprinting Undermines the Argument for Arrestee DNA Sampling*, 19 WM. & MARY BILL RTS. J. 475, 475–76 (2010). A more complete list of the cases can be found at D.H. Kaye, *The Constitutionality of DNA Collection Before Conviction: An Updated Scorecard*, FORENSIC SCI., STATISTICS & THE LAW (Mar. 30, 2013), <http://for-sci-law-now.blogspot.com/2012/11/the-constitutionality-of-dna-collection.html> [hereinafter Kaye, *Scorecard*].

stating that “there is a fair prospect” that the full Court will follow the “considered analysis” of the courts that have upheld the practice.⁶ A writ of certiorari followed, and *Maryland v. King* is on the docket.

This Article argues that whether it chooses to endorse, limit, or entirely disallow DNA-BC, the Court should reject the mode of analysis that all the lower courts have followed. These courts have forsaken the warrant requirement of the Fourth Amendment in favor of a direct form of balancing. This choice of doctrine has been made possible by the Supreme Court’s vacillation on whether and when the warrant requirement (subject to narrowly drawn, categorical exceptions) applies. It is not too late to repair this fracture in Fourth Amendment doctrine. This Article describes a more principled, “biometric exception” to the warrant requirement.⁷ This exception not only unifies the law on police acquisition of fingerprints, photographs, and, now, DNA profiles, but it also strikes a reasonable balance between individual interests in personal security and privacy and the government’s interests in personal identifiers that are valuable for law enforcement and other purposes.

After arguing for this categorical mode of analysis, I suggest that the proposed exception to collecting and storing DNA profiles before conviction supports at least some forms of DNA-BC. This conclusion is contestable, of course, but the analysis that leads to it generates a map of all the possible routes—and the obstacles along these routes—to a sound conclusion about the constitutionality of DNA sampling on arrest. The voyage also takes us into a large and often dimly understood realm of Fourth Amendment law with its three related balancing tests—totality, special-needs, and exception-defining balancing. And, it takes us into the heart of the analogy drawn by many prosecutors and courts between DNA profiling and fingerprinting.

The voyage proceeds in four stages. Part I describes the two major law enforcement uses of biometric records, which I call authentication and intelligence. Here, I argue that compulsory collection and recording of at least some of these identifiers during booking is justified to maintain a

⁶ *Maryland v. King*, 113 S. Ct. 1, 1 (2012) (order granting stay pending the disposition of the petition for a writ of certiorari).

⁷ For precursors of this proposal, see D.H. Kaye, *The Constitutionality of DNA Sampling on Arrest*, 10 CORNELL J.L. & PUB. POL’Y 455, 498–504 (2001) [hereinafter Kaye, *Arrest*]; D.H. Kaye, *Who Needs Special Needs? On the Constitutionality of Collecting DNA and Other Biometric Data from Arrestees*, 34 J.L. MED. & ETHICS 188, 192–95 (2006) [hereinafter Kaye, *Special Needs*]. Although the state noted this possible exception in its Petition for Writ of Certiorari at 13 n.5, *Maryland v. King*, 133 S. Ct. 594 (2012) (No. 12-207), neither it nor the United States chose to rely on it. Indeed, at oral argument the Deputy Solicitor General expressly disavowed “asking for a new exception.” Transcript of Oral Argument at 26, *King*, 133 S. Ct. 594 (No. 12-207).

enduring record of individual identity. Part II examines opinions on the use of these records not merely for biometric authentication, but for trawling databases for matches to crime-scene DNA samples. The rise of criminal intelligence databases has propelled some courts down different paths in a headlong rush that brings to mind Yogi Berra's advice about what to do when faced with a fork in the road—"Take it!"⁸ Parts II and III mark the locations of these forks and indicate why some of them should *not* be taken. Part IV discusses the content of the balancing that ultimately must determine the Fourth Amendment reasonableness of the criminal intelligence databases. It presents the case for a new exception to the warrant requirement and applies the exception to fingerprinting and DNA profiling. It shows that the similarities between the two types of biological data are greater than is generally appreciated and suggests that the biometric exception permits at least some systems of acquisition and use of both fingerprints and DNA profiles for criminal intelligence databases.

I. THE TWO FUNCTIONS OF BIOMETRIC DATABASES

A. *Authentication*

The Supreme Court has never explicitly approved of routine photographing, fingerprinting, or genotyping to establish and record the identities of prisoners. For the better part of the last century, however, most lower courts have accepted the propriety of taking and maintaining collections of photographs and fingerprints on the ground that the impact on individual liberty, reputation, and property is minor in comparison with the value of establishing the true identity of an individual.⁹ These biometric records can serve many purposes. By thwarting people from assuming false identities, they give jailers information about the dangerousness of the people they must confine; they supply prosecutors with information relevant to charging decisions and trial strategy; they facilitate prosecutions for the

⁸ YOGI BERRA, WHEN YOU COME TO A FORK IN THE ROAD, TAKE IT!: INSPIRATION AND WISDOM FROM ONE OF BASEBALL'S GREATEST HEROES (2001).

⁹ See Kaye, *Arrest*, *supra* note 7, at 485–86 (discussing the “true identity” exception). A leading case is *United States v. Kelly*, 55 F.2d 67 (2d Cir. 1932). According to Wayne A. Logan, *Policing Identity*, 92 B.U. L. REV. 1561, 1580 (2012), judicial attitudes suddenly shifted in the 1930s from a general refusal to allow the acquisition and retention of photographs and other identifying information to “a less critical and more accepting view.” My own review of the most significant appellate opinions from 1900–1932 indicates that a majority of courts upheld the practices of the police in these matters, although the power to retain records after an acquittal was not clear even under *Kelly*. D.H. Kaye, *The Judicial Reception of Acquiring Biometric Data on Arrest: Photographing, Sizing, and Fingerprinting Before 1933*, FORENSIC SCI., STATISTICS & THE LAW (Dec. 25, 2012), <http://for-sci-law-now.blogspot.com/2012/12/the-judicial-reception-of-acquiring.html>.

crime of escape, and they enable pretrial release and sentencing decisions to be based on an offender's actual record. In addition, they can assist in background checks of job applicants and in the identification of remains in mass disasters or more isolated cases of missing persons.

Arguments against permanent records to authenticate claims of identity are weak. To be sure, there is an American tradition that resists national identity cards, but fingerprints, visible bodily characteristics, and nucleotide base pairs are natural features whose production makes no significant demands on the individual. Likewise, a claim of a right to effect a break in one's social identity would be hard to maintain. Knowing other people's identities does not demean human dignity and worth, but rather is an important part of social interactions. There may be something appealing about frontier days, when determined men and women could bury their past and prove their worth with an assumed name in a new land, but this option is mostly the subject of nostalgia and movie-making.¹⁰

Because there is no right to a discontinuous identity, the case against persistent records of individual identity must rest on a claim that the acquisition, maintenance, or use of the records burdens some other rights or interests. If the acquisition of a biometric identifier is minimally invasive and the only use of the records is establishing actual identity, however, such claims are implausible if not vacuous. A database, used solely to discern a person's true identity when the individual is legitimately in custody, should be acceptable under a simple, if previously unarticulated, exception to the usual Fourth Amendment requirement of a warrant based on probable cause. It also can be justified under the more amorphous "special needs" or "administrative search" doctrine¹¹ invoked by many courts to support post-conviction DNA sampling.¹² Before elaborating on the appropriate legal analysis, however, it is important to distinguish a second use of databases—generating intelligence for criminal investigations. This use implicates different individual interests and requires further justification.

¹⁰ D.H. Kaye & Michael E. Smith, *DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage*, 2003 WIS. L. REV. 413, 447 (2003) (discussing "[t]emporal anonymity"). Cf. JOHN GRISHAM, *THE PARTNER* (1997) (depicting the travails of assuming a new identity). Anonymity for specific purposes, such as making donations or whistleblowing, may have greater value.

¹¹ See *infra* Part II.

¹² E.g., *United States v. Amerson*, 483 F.3d 73, 78 (2d Cir. 2007) (following earlier cases that applied the special-needs test to uphold the constitutionality of DNA database laws); *Green v. Berge*, 354 F.3d 675, 679 (7th Cir. 2004) (upholding a Wisconsin statute under the "special-needs" doctrine); *State v. Martin*, 955 A.2d 1144, 1150 (Vt. 2008) (discussing the "special-needs" doctrine and its use in previous cases).

B. Intelligence

A biometric database advances the objectives of the criminal justice system not only by enabling authentication of personal identity, but also by associating suspected or even unknown perpetrators to their crimes through physical traces such as fingerprints and DNA. Although the latter use of fingerprint databases predates electronic computers,¹³ the FBI's Integrated Automated Fingerprint Identification System ("IAFIS") contains digitalized images from over sixty-four million individuals.¹⁴ Parts of this database and various state fingerprint databases are routinely searched for criminal background checks and to yield short lists of possible matches to latent prints recovered from crime scenes. A conservative estimate for the annual number of "hits" between crime scene prints and the prints in databases is 50,000.¹⁵

DNA profiles are more easily searched for unequivocal matches to crime scene samples. By November 2012, the voracious national DNA database, fed by records from state and federal DNA typing laboratories, contained "over 10,043,800 offender profiles, 1,307,300 arrestee profiles and 461,900 forensic profiles" and had "produced over 195,600 hits assisting in more than 187,700 investigations."¹⁶ For both fingerprints and DNA, however, there are no statistics that show how much the database hits contributed to investigation or convictions,¹⁷ let alone the extent of their deterrent effect

¹³ Kenneth R. Moses et al., *Automated Fingerprint Identification System (AFIS)*, in THE FINGERPRINT SOURCEBOOK 6-1, 6-4 (Alan McRoberts & Debbie McRoberts eds., 2011), available at <https://www.ncjrs.gov/pdffiles1/nij/225320.pdf>. This history is discussed *infra* Part III.A.

¹⁴ *Id.* at 6-12.

¹⁵ The estimate is for 2005. *Id.* at 6-11.

¹⁶ *CODIS-NDIS Statistics*, FBI, <http://www.fbi.gov/about-us/lab/codis/ndis-statistics> (last updated Nov. 2012).

¹⁷ See JEREMIAH GOULKA ET AL., RAND CORP., CENTER ON QUALITY POLICING, TOWARD A COMPARISON OF DNA PROFILING AND DATABASES IN THE UNITED STATES AND ENGLAND 17 (2010) (explaining that data on whether a hit resulted in an offender being apprehended and prosecuted would help improve the criminal justice system); Frederick R. Bieber, *Turning Base Hits into Earned Runs: Improving the Effectiveness of Forensic DNA Data Bank Programs*, 34 J.L. MED. & ETHICS 222, 227 (2006) (noting the lack of data on the outcomes of the "hits"). But see H. Brevy Cannon, *First Cost-Benefit Analysis of DNA Profiling Vindicates 'CSI' Fans*, UVA TODAY (Jan. 10, 2013), <https://news.virginia.edu/content/first-cost-benefit-analysis-dna-profiling-vindicates-csi-fans> ("The first rigorous analysis of the crime-fighting power of DNA profiling finds substantial evidence of its effectiveness."); JOHN K. ROMAN ET AL., URBAN INSTITUTE, THE DNA FIELD EXPERIMENT: COST-EFFECTIVENESS ANALYSIS OF THE USE OF DNA IN THE INVESTIGATION OF HIGH-VOLUME CRIMES 147 (2008) ("Property crime cases where DNA evidence is processed had twice as many suspects identified, twice as many suspects arrested, and more than twice as many cases accepted for prosecution as compared to traditional investigation; DNA was at least five times as likely to result in a suspect identification compared to fingerprints; [s]uspects identified

on future offenders or offenses.¹⁸ The lack of definitive data on the benefits of arrestee databasing makes it difficult to judge the extent to which early acquisition of DNA samples saves lives and prevents crime. Although there have been many hits to arrestee DNA,¹⁹ we do not know how many of these arrestees later were convicted of a database-eligible crime anyway. Neither do we know the impact of the delay in waiting for such convictions. All we can say is that between arrests and trials, there will be some number of arrestees released pending trial who will commit additional crimes, and there will be some cases in which evidence about other DNA-related crimes will be destroyed or lost.

Unfortunately, in upholding convicted-offender DNA databases and, implicitly, fingerprint databases, several courts have elided authentication (true identity) and intelligence (identification of crime scene samples) uses of the databases by speaking of “identity” or “identification” in an undifferentiated sense.²⁰ This confusion seems to have originated in *Jones v. Murray*,²¹ the first court of appeals case to uphold the constitutionality of a DNA database. There, the Fourth Circuit reasoned that

when a suspect is arrested upon probable cause, his identification becomes a matter of legitimate state interest and he can hardly claim privacy in it. . . . [T]he identification of suspects is relevant not only to solving the crime for which the suspect is arrested, but also for maintaining a permanent record to solve other past and future crimes. This becomes readily apparent when we consider the universal approbation of “booking” procedures that are followed for every suspect arrested for a felony, whether or not the proof of a particular suspect’s crime will involve the use of fingerprint identification. Thus a tax evader is fingerprinted just the same as is a burglar. . . . As with fingerprinting,

by DNA had at least twice as many prior felony arrests and convictions as those identified by traditional investigation.”).

18 Some indications of specific deterrence can be found in interviews with convicted offenders. Barbara Prainsack, *Partners in Crime: The Use of Forensic DNA Technologies in Austria* 153, in GENETIC SUSPECTS, *supra* note 3, at 169–71. An observational “multiple clock” study of Florida data attempted to separate the effect of specific deterrence from incapacitation. The statistical analysis revealed only a small reduction in recidivism (within three years of release) for individuals convicted of certain crimes. AVINASH BHATI, URBAN INSTITUTE, QUANTIFYING THE SPECIFIC DETERRENT EFFECTS OF DNA DATABASES 34 (2010), available at <http://www.urban.org/url.cfm?ID=412058>. At best, however, this study measured only the marginal specific deterrent effect (after conviction and release) of being included in a database. It did not address the deterrent effect on first-time arrestees.

19 For example, Virginia reports a total of 790 hits to the arrestee database from its establishment in 2003 through October 31, 2012. Of these, 117 were associated with sexual assault cases. *DNA Databank Statistics*, VA. DEP’T OF FORENSIC SCI., <http://www.dfs.virginia.gov/statistics/index.cfm> (last updated Nov. 30, 2012).

20 E.g., *People v. Robinson*, 224 P.3d 55, 65 (Cal. 2010) (“[I]ndividuals in lawful custody cannot claim privacy in their identification.”).

21 962 F.2d 302 (4th Cir. 1992).

therefore, we find that the Fourth Amendment does not require an additional finding of individualized suspicion before blood can be taken from incarcerated felons for the purpose of identifying them.²²

The fallacy is that fingerprinting on arrest received “universal approbation” because it provided an excellent, permanent record of a person’s true identity—it was extremely valuable for authentication.²³ Until relatively recently, an arrestee’s fingerprints were not generally “a permanent record to solve past and future crimes.”²⁴ This separate intelligence function demanded huge computers and pattern-recognition software. Because there is no single “purpose of identifying” arrestees, a more precise analysis is necessary. Part II begins the task of describing the appropriate conceptual framework for assessing the constitutionality of “a permanent record” maintained either for authenticating an identity, for intelligence gathering, or for both purposes.

II. THE ANALYTICAL FRAMEWORK

A. *Classifying and Balancing*

The Fourth Amendment protects personal security²⁵ with two parallel clauses:

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.²⁶

The first clause bars unreasonable searches and seizures; the second requires that warrants be based on probable cause. But, the Amendment is

²² *Id.* at 306–07.

²³ *See infra* Part III.A (recounting this history).

²⁴ A number of courts, however, approved of the acquisition or use of arrestee photographs in investigations and trials. *See Shaffer v. United States*, 24 App. D.C. 417, 426 (D.C. Cir. 1904) (rejecting as “fanciful” the defendant’s objection to the use of his arrest photograph, in which he had no beard, to help a witness identify him at trial, when he had a beard, on the ground that the state had no right to photograph him for that purpose); *Mabry v. Kettering*, 117 S.W. 746, 747 (Ark. 1909) (holding that men charged with state crimes and held in a county jail were not entitled to an injunction to prevent their jailers from giving their photographs to federal officials “for the purpose of identifying appellants in the various localities where [federal] offenses are charged to have been committed”).

²⁵ Jed Rubenfeld, *The End of Privacy*, 61 STAN. L. REV. 101, 104 (2008) (arguing that the core value of the Fourth Amendment is the interest in personal security rather than the privacy of information).

²⁶ U.S. CONST. amend. IV.

silent on how the two clauses interact,²⁷ the historical record is “foggy,”²⁸ and the scholarly literature is divided.²⁹

Opinions of the Supreme Court reflect this ambiguity. At times, the Court has suggested that reasonableness can be determined by inquiring into the totality of the circumstances in each case.³⁰ More often, however, the Court determines reasonableness by invoking a general and “prevailing”³¹ rule that searches require warrants,³² then looking through a pragmatic collection of categorical exceptions to this stringent demand.³³

²⁷ Competing theories are described in Thomas K. Clancy, *The Framers' Intent: John Adams, His Era, and the Fourth Amendment*, 86 IND. L.J. 979, 1061 (2011) (rejecting the notion that the amendment was “designed solely to ban general warrants”) and Cynthia Lee, *Package Bombs, Footlockers, and Laptops: What the Disappearing Container Doctrine Can Tell Us About the Fourth Amendment*, 100 J. CRIM. L. & CRIMINOLOGY 1403, 1404 (2010) (arguing the tolerance of warrantless container searches demonstrates the “gradual embrace of the Separate Clauses or Reasonableness view of the Fourth Amendment”).

²⁸ TELFORD TAYLOR, *TWO STUDIES IN CONSTITUTIONAL INTERPRETATION* 24 (1969).

²⁹ See David H. Kaye, *Drawing Lines: Unrelated Probable Cause as a Prerequisite to Early DNA Collection*, 91 N.C. L. REV. ADDENDUM 1, 15–16 nn.71–72 (2012) [hereinafter Kaye, *Drawing Lines*] (citing some of the contentious writings).

³⁰ E.g., *Bell v. Wolfish*, 441 U.S. 520, 559 (1979) (“Courts must consider the scope of the particular intrusion, the manner in which it is conducted, the justification for initiating it, and the place in which it is conducted.”). Cf. *Wyoming v. Houghton*, 526 U.S. 295, 299–300 (1999) (“Where [historical] inquiry yields no answer, we must evaluate the search or seizure under traditional standards of reasonableness by assessing, on the one hand, the degree to which it intrudes upon an individual’s privacy and, on the other, the degree to which it is needed for the promotion of legitimate governmental interests.”); *Vernonia Sch. Dist. 47J v. Acton*, 515 U.S. 646, 652–53 (1995) (“At least . . . where there was no clear practice . . . at the time the constitutional provision was enacted, whether a particular search meets the reasonableness standard is judged by balancing its intrusion on the individual’s Fourth Amendment interests against its promotion of legitimate governmental interests.” (internal quotation marks omitted) (footnote omitted)). For a criticism of the theory of “constitutionalized common law,” see David A. Sklansky, *The Fourth Amendment and Common Law*, 100 COLUM. L. REV. 1739, 1808 (2000).

³¹ *United States v. Edwards*, 415 U.S. 800, 802 (1974).

³² E.g., *Kentucky v. King*, 131 S. Ct. 1849, 1856 (2011) (“It is a basic principle of Fourth Amendment law, we have often said, that searches and seizures inside a home without a warrant are presumptively unreasonable.” (internal quotation marks omitted)); *City of Ontario v. Quon*, 130 S. Ct. 2619, 2630 (2010) (“[A]s a general matter, warrantless searches are *per se* unreasonable under the Fourth Amendment” (internal quotation marks omitted)); *Arizona v. Gant*, 556 U.S. 332, 338 (2009) (“[S]earches conducted outside the judicial process, without prior approval by judge or magistrate, are *per se* unreasonable under the Fourth Amendment—subject only to a few specifically established and well-delineated exceptions.” (quoting *Katz v. United States*, 389 U.S. 347, 357 (1967))); *Mincey v. Arizona*, 437 U.S. 385, 390 (1978) (“The Fourth Amendment proscribes all unreasonable searches and seizures, and it is a cardinal principle that ‘searches conducted outside the judicial process, without prior approval by judge or magistrate, are *per se* unreasonable under the Fourth Amendment—subject only to a few specifically established and well-delineated exceptions.’”).

³³ On the development of this approach of classification rather than balancing, see, for example, Thomas Y. Davies, *The Supreme Court Giveth and the Supreme Court Taketh Away: The Century of Fourth Amendment “Search and Seizure” Doctrine*, 100 J. CRIM. L. &

For instance, in *Cupp v. Murphy*,³⁴ the Court held that scraping material from under an arrestee's fingernails without first securing a warrant was reasonable—but only because it fell into a previously accepted category of warrantless searches “incident to a valid arrest.”³⁵ This incident-to-arrest exception is based on the premise that arresting officers often need to act quickly to preserve evidence or to protect themselves.³⁶

Categorical exceptions are the result of a prior balancing of such factors as the feasibility or value of securing a warrant, the extent and nature of the invasion of privacy, the purpose of the search, and the likelihood that it will achieve its goal. But this pre-exception balancing occurs at the level of defining the rule rather than applying it to the facts of a specific case. In other words, the creation of exceptions to the warrant requirement is a species of standards-based reasoning that entails the balancing of a defined range of competing considerations.³⁷ Its purpose is to generate a framework of exceptions that do not permit direct appeals to the factors used to create the more specific rules.

Constraining courts to a rule-based system can provide greater accuracy and predictability in judicial decisionmaking than that which would flow from direct balancing in every case.³⁸ Of course, if all judges and lawyers were like Ronald Dworkin's Judge Hercules,³⁹ the rules for warrantless searches would be unnecessarily restrictive and unwise. Direct appeals to reasonableness would resolve the cases correctly. But, in the real world of

CRIMINOLOGY 933 (2010). Some of the ebb and flow, as it pertains to DNA database laws, is noted *infra* Part III.

³⁴ 412 U.S. 291 (1973).

³⁵ *Id.* at 295.

³⁶ Consequently, the exception does not justify DNA collection. In *Cupp*, defendant had placed his hands behind his back, then into his pockets, and a metallic sound, such as keys or change rattling, was heard. *Id.* at 296. “The rationale of *Chimel v. California*, 395 U.S. 752 (1969)], in these circumstances, justified the police in subjecting him to the very limited search necessary to preserve the highly evanescent evidence they found under his fingernails.” *Cupp*, 412 U.S. at 296. Recognizing that “[t]he Court’s search incident to arrest cases have been bottomed on different justifications,” the Department of Justice did not take the position, suggested by Justice Kennedy in the oral argument in *King*, that Maryland (and federal) law merely was implementing “a search incident to an arrest” that was “just like taking the pockets out and—and seeing what’s in the person’s overcoat and so forth.” Transcript of Oral Argument, *supra* note 7, at 26–27.

³⁷ On the distinction between rules and standards, see, for example, Pierre Schlag, *Rules and Standards*, 33 UCLA L. REV. 379 (1985). See also Kathleen M. Sullivan, *Foreword: The Justices of Rules and Standards*, 106 HARV. L. REV. 22 (1992).

³⁸ See, e.g., Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 611 (1992) (arguing that predictability will be enhanced if “precedent transforms standards into rules”).

³⁹ In Dworkin’s coherence theory of law, Hercules was an ideal judge endowed with infinite patience and resourcefulness. Ronald Dworkin, *Hard Cases*, 88 HARV. L. REV. 1057, 1083 (1975).

limited capacities and cognitive resources, and a hindsight bias that encourages courts to admit the fruits of successful searches,⁴⁰ confining discretion to a suitable set of well-defined but imperfect rules is superior to ad hoc, totality-of-the-circumstances balancing in every case.⁴¹ Therefore, regardless of the historical and textual arguments about the primacy of the warrant requirement, the requirement is justifiable on pragmatic grounds. It reflects the judgment that in classical search cases—physical invasions of “persons, houses, papers, and effects” of members of the general public to generate evidence of crime or recover contraband—the balance of individual and state interests favors the individual whose security should not depend on the unchecked power of the police. Rather, the police should have to establish, to the satisfaction of a neutral magistrate, that they have probable cause to justify subjecting individuals to the indignity, inconvenience, and interference with liberty or property incident to a search or seizure.⁴²

The task of the courts is not to re-evaluate this judgment, but merely to ascertain whether the case falls into this canonical category or instead involves a recognized set of circumstances captured in an exception to the warrant requirement. If the case falls outside of all the exceptions, then the court must deem the search unconstitutional—unless, of course, the court can establish a new, limited exception by applying the principles and standards governing the recognition of exceptions.⁴³

The next section examines how the lower courts have applied this framework—and departed from it—in DNA database cases. Importantly,

⁴⁰ But see Jeffrey J. Rachlinski et al., *Probable Cause, Probability, and Hindsight* 1–5 (Vanderbilt Univ. Law Sch. Public Law & Legal Theory Research Series, Paper No. 11-25, 2011), available at <http://ssrn.com/abstract=1877125> (finding that the hindsight bias influenced “judges’ assessments of the likely outcome of a search. . . but [it] does not influence their legal rulings”).

⁴¹ Cf. Richard A. Epstein, *The Risks of Risk/Utility*, 48 OHIO ST. L.J. 469, 469 (1987) (defending older common law tort rules over ad hoc balancing of risk and utility).

⁴² For a contemporary defense of the value of warrants, see Oren Bar-Gill & Barry Friedman, *Taking Warrants Seriously*, 106 NW. U. L. REV. 1609 (2012).

⁴³ If the scope of the exceptions is too large and their outcomes are too unpredictable, then the warrant requirement, as applied through a system of categorical exceptions, will not have the desired effect of protecting personal security from arbitrary police action. To avoid this situation, the destabilizing exceptions could be constricted by requiring warrants in all situations in which it is practical and useful to obtain them. See *id.* at 1657–63 (proposing revamping the warrant requirement in this manner). This modification of existing law is appealing, but it would have no impact on the constitutionality of warrantless data collection from all arrestees. Either acquisition of biometric data from arrestees who are legitimately in custody is reasonable across the board or it is not. Arrest warrants would be desirable to ensure that the detention is legitimate in the first instance, but once someone validly is in custody, all that the revamped warrant requirement advocated by Bar-Gill and Friedman demands is that the data collection be applied uniformly to well-defined classes of arrestees.

the sole established categorical exception that might justify taking DNA on arrest is the “special needs” exception. It triggers a balancing test for reasonableness, but it is still part of the framework of predefined exceptions to the warrant requirement and is not arbitrarily available. The courts, both federal and state, have split on whether DNA databases assembled after convictions (“DNA-AC”) are eligible for the special-needs exception.⁴⁴ To clarify the scope of the exception, I propose a “special interests” theory to show that the exception does not reach the warrantless acquisition of information for which there is a reasonable expectation of privacy solely to build a criminal intelligence database to identify the perpetrators of past or future crimes. It should apply, however, to databases that are strictly for authentication—and to those that serve both functions. Because fingerprint databases clearly are multipurpose in operation, they can be analyzed under the special needs exception, so construed. DNA databases, however, are closer to pure intelligence databases, making the applicability of the special-needs exception more problematic.

The DNA-BC (Before Conviction) cases have rejected special-needs balancing but arrived at the same endpoint by moving directly to totality-of-the-circumstances balancing.⁴⁵ Resort to this ad hoc balancing poisons the healthy framework of using defined exceptions. The next section shows that totality balancing is consistent with only a small number of anomalous Supreme Court cases. Yet if neither special-needs balancing nor totality balancing can be used to justify arrestee DNA sampling (when its sole purpose is to construct and operate a criminal-intelligence DNA database), it might seem that the minority of courts condemning DNA-BC are correct. This conclusion, however, is too hasty. Both fingerprint and DNA databases should be eligible for a biometric exception that the courts, in their zeal to balance directly, have overlooked.⁴⁶ Before describing and applying this exception, an exposition of the debate in the DNA-BC cases over the grounds for balancing is in order.

B. The Conflict over Special-Needs and Direct Balancing in the Arrestee Cases

1. A Preliminary Point

The cases on arrestee DNA sampling agree on one preliminary matter—penetrating the surface of the body to extract a blood sample or reaching

⁴⁴ See *infra* Part II.B.2.

⁴⁵ See *infra* Part II.B.

⁴⁶ David H. Kaye, *On the “Considered Analysis” of Collecting DNA Before Conviction*, 60 UCLA L. REV. DISCOURSE 104 (2013) [hereinafter Kaye, *Considered Analysis*] (describing the leading cases).

inside the cheek to scrape away epithelial cells is a search of the person. Indeed, two Supreme Court opinions clearly support this consensus.⁴⁷ However, there is a plausible argument that taking cells for DNA analysis by having an arrestee spit into a cup or place his fingers on a sticky pad would not be a search,⁴⁸ and some courts have held that the process of recording fingerprints (as distinguished from detaining a person for this purpose) does not amount to a search of the person.⁴⁹ Furthermore, case law holds that collecting the samples from items or bodily material that the person in custody has discarded or shed is not a search or seizure.⁵⁰ However, I shall not pursue these arguments for upholding external or surreptitious DNA sampling here. Elsewhere, I have given reasons to conclude that removing

⁴⁷ See *Cupp v. Murphy*, 412 U.S. 291 (1973) (scraping material from under a fingernail); *Schmerber v. California*, 384 U.S. 757 (1966) (extracting blood for alcohol testing). Cf. *Skinner v. Ry. Labor Execs.' Ass'n*, 489 U.S. 602 (1989) (collecting urine for alcohol and drug testing is not a physical intrusion but is still considered a search because of the manner of collection and the information content). Several courts have used the term "seizure" to describe the act of acquiring the cells from an individual who already is detained, but this is difficult to reconcile with the normal definition of a Fourth Amendment seizure. See Kaye, *Considered Analysis*, *supra* note 46, at 111 (defining a seizure as "depr[ivation] of the possession of property or prevent[ing] an individual from moving away").

⁴⁸ Kaye, *Arrest*, *supra* note 7, at 480 (discussing critically the emphasis on bodily integrity in the case law); Justin A. Alfano, Note, *Look What Katz Leaves Out: Why DNA Collection Challenges the Scope of the Fourth Amendment*, 33 HOFSTRA L. REV. 1017, 1030–33 (2005) (discussing technological advances in DNA collection that may render the "intrusiveness paradigm irrelevant"). But see *In re Grand Jury Proceedings Involving Vickers*, 38 F. Supp. 2d 159, 165 (D.N.H. 1998) ("[A] grand jury subpoena compelling a citizen to provide saliva samples does implicate his or her Fourth Amendment rights."); *United States v. Nicolosi*, 885 F. Supp. 50, 56 (E.D.N.Y. 1995) (holding the collection of a saliva sample to be a search or seizure under the Fourth Amendment).

⁴⁹ E.g., *In re Grand Jury Proceedings Involving Vickers*, 38 F. Supp. 2d at 165 ("Fourth Amendment rights are not implicated by the grand jury's request for fingerprints."); *Rowe v. Burton*, 884 F. Supp. 1372, 1381–82 (D. Alaska 1994) (concluding that the requirement to appear for fingerprinting as part of sex offender registration is a seizure, but fingerprinting itself is probably not a search); *Doe v. Poritz*, 662 A.2d 367, 386 n.8 (N.J. 1995) ("[B]ecause plaintiff has no reasonable expectation of privacy in his fingerprints [or] photograph . . . the requirement to provide such information . . . does not constitute a search.").

⁵⁰ When no bodily invasion occurs—when DNA is shed or deposited naturally, or even acquired by deceit—courts have not perceived the reasonable expectation of privacy that defines a search under *Katz v. United States*, 389 U.S. 347 (1967). E.g., *Williamson v. State*, 993 A.2d 626, 630, 641 (Md. 2010) (retrieving a McDonald's cup after a detainee ate dinner did not require a warrant); *State v. Athan*, 158 P.3d 27, 31 (Wash. 2007) (affirming conviction of a suspect who had not been arrested but tricked into mailing a letter with his saliva on the envelope to the police); see also Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413, 436–40 (2001) (discussing police acquisition of DNA from inadvertently abandoned cells). But see *United States v. Davis*, 690 F.3d 226 (4th Cir. 2012) (treating a laboratory analysis of a lawfully acquired sample as a search).

cells from the exterior of the body is still a search,⁵¹ and the shed-DNA approach is not terribly practical for building a large arrestee database.⁵²

Of course, merely classifying DNA sampling and fingerprinting of arrestees as searches does not make them constitutionally unreasonable. Most courts have upheld DNA-BC after balancing individual and state interests,⁵³ but several give no reason for their balancing test (beyond the fact that some form of balancing has been used in other DNA database cases or in other contexts, or that the parties did not question it).⁵⁴

2. *Choosing Between Special-Needs and Direct Balancing*

At this point, the leading DNA-BC case is *United States v. Mitchell*.⁵⁵ A federal grand jury indicted Ruben Mitchell in 2009 for possession of cocaine with intent to distribute.⁵⁶ The government sought a DNA sample at the initial appearance, but Mitchell objected on constitutional grounds.⁵⁷ The district court declared that the federal law providing for pretrial DNA collection and inclusion in the national database was unconstitutional.⁵⁸ The Third Circuit granted an interlocutory appeal and also skipped over a normal three-judge panel to hear the case en banc.⁵⁹ Over the objections of nearly a third of the court, it reversed.⁶⁰

The district court had applied the direct balancing test to strike down the law.⁶¹ The court of appeals applied the same test to uphold it.⁶² Neither court successfully justified the choice of the test in the first place. The district court discussed the conflicting views expressed in convicted-offender cases with respect to the doctrinal basis for balancing.⁶³ In “special-needs and administrative-search cases”⁶⁴

51 Kaye, *Arrest*, *supra* note 7, at 480–81 (noting the importance of the nature of the information obtained from the cells).

52 D.H. Kaye, *Science Fiction and Shed DNA*, 101 NW. U. L. REV. COLLOQUY 62, 62–63 (2006) [hereinafter, Kaye, *Science Fiction*] (questioning the ability of already backlogged labs and burdened police forces to compile a large database from shed DNA).

53 See Kaye, *Scorecard*, *supra* note 5 (collecting cases).

54 See Kaye, *Considered Analysis*, *supra* note 46, at 114–17 (criticizing the limited analysis in three such cases).

55 652 F.3d 387, 390 (3d Cir. 2011) (en banc).

56 *Id.* at 389.

57 *United States v. Mitchell*, 681 F. Supp. 2d 597, 599 (W.D. Pa. 2009).

58 *Id.* at 611 (declaring that 42 U.S.C. § 14135a(a)(1)(A) violates the Fourth Amendment).

59 *Mitchell*, 652 F.3d at 391.

60 *Id.* at 416.

61 *Mitchell*, 681 F. Supp. 2d at 606–10.

62 *Mitchell*, 652 F.3d at 403 (“[W]e . . . apply the totality of the circumstances test to the present challenge to the latest iteration of the DNA Act.”).

63 See *Mitchell*, 681 F. Supp. 2d at 601 (describing the division within the federal circuits on “special-needs” and “totality” balancing) (citations omitted).

64 *Ashcroft v. al-Kidd*, 131 S. Ct. 2074, 2080–81 (2011).

A judicial warrant and probable cause are not needed where the search or seizure is justified by “special needs, beyond the normal need for law enforcement,” such as the need to deter drug use in public schools . . . or the need to assure that railroad employees engaged in train operations are not under the influence of drugs or alcohol . . . and where the search or seizure is in execution of an administrative warrant authorizing, for example, an inspection of fire-damaged premises to determine the cause . . . or an inspection of residential premises to assure compliance with a housing code.⁶⁵

Police agencies also can conduct such warrantless, suspicionless searches, as in (1) stops for questioning or observation at a fixed Border Patrol checkpoint,⁶⁶ a sobriety checkpoint,⁶⁷ or a checkpoint to question drivers about a recent hit-and-run accident;⁶⁸ (2) inspections and seizures for the purpose of inventorying and preserving an arrestee’s possessions;⁶⁹ (3) random “shakedown” searches of prison cells;⁷⁰ and (4) even visual anal or vaginal examinations of pretrial detainees.⁷¹ In these kinds of cases, the court must first identify the special need for the administrative or other search and then ensure that the government’s interests in searching outweigh the individual interests in being free from the intrusion.

Quoting from a dissenting opinion in an en banc Ninth Circuit DNA-AC case, the *Mitchell* district court decided that the special-needs exception could not apply because “[t]he unequivocal purpose of the searches

⁶⁵ *Id.* at 2081 (citations omitted).

⁶⁶ *United States v. Martinez-Fuerte*, 428 U.S. 543, 545–50, 566–67 (1976) (approving warrantless searches at a permanent Border Patrol checkpoint near the U.S.-Mexico border).

⁶⁷ *Mich. Dep’t of State Police v. Sitz*, 496 U.S. 444, 455 (1990) (“[T]he balance of the State’s interest in preventing drunken driving, the to which this system can reasonably be said to advance that interest, and the degree of intrusion upon individual motorists who are briefly stopped, weights in favor of the state program. We therefore hold that it is consistent with the Fourth Amendment.”).

⁶⁸ *Illinois v. Lidster*, 540 U.S. 419, 426–27 (2004) (noting the minimal interference to the public and the grave public concern involved with assisting police in their criminal investigation and suggesting practical considerations of limited police resources and community hostility to traffic delays will restrain proliferation of such investigations).

⁶⁹ *Illinois v. LaFayette*, 462 U.S. 640, 646 (1983) (“A range of governmental interests supports an inventory process.”); *cf.* *Colorado v. Bertine*, 479 U.S. 367, 372 (1987) (upholding an extensive inventory search of an impounded car and its contents as an instance of “police caretaking procedures designed to secure and protect vehicles and their contents within police custody”).

⁷⁰ *Hudson v. Palmer*, 468 U.S. 517, 526 (1984) (declaring sweepingly that “the Fourth Amendment proscription against unreasonable searches does not apply within the confines of the prison cell”).

⁷¹ *Bell v. Wolfish*, 441 U.S. 520, 558–60 (1979) (describing searches deemed “not unreasonable” after “[b]alancing the significant and legitimate security interests of the [detention facility] against the privacy interests of the [detainees]”); *cf.* *Griffin v. Wisconsin*, 483 U.S. 868, 872 (1987) (holding as constitutional a warrantless search of probationer’s home with “reasonable grounds”).

performed pursuant to the DNA Act is to generate the sort of ordinary investigatory evidence used by law enforcement officials for everyday law enforcement purposes.”⁷² The Third Circuit agreed, observing that it (and most other circuits) already had rejected the special-needs exception in favor of direct balancing in DNA-AC cases.⁷³ But rather than identify any principled basis for departing from the warrant requirement, the Third Circuit blandly—but dangerously—presented totality balancing as applying to Fourth Amendment cases without limit. It wrote that balancing is “the key principle of the Fourth Amendment” and is “the general Fourth Amendment approach.”⁷⁴ So much for the extended (though not unbroken) line of Supreme Court cases spanning many decades and expressing “the basic rule of Fourth Amendment jurisprudence” that warrantless searches not subject to categorical exceptions are “per se unreasonable.”⁷⁵

Unfortunately, even efforts such as the district court’s, to distinguish between “ordinary investigatory evidence” and other kinds of investigatory evidence, are frustratingly inconclusive. Consider *Illinois v. Lidster*.⁷⁶ Just after midnight on a Saturday, a vehicle struck and killed a seventy-year-old bicyclist. The motorist drove off without identifying himself. About one week later, local police established a midnight highway checkpoint where the fatal collision occurred. Police cars with flashing lights forced traffic to stop so that an officer could ask the occupants whether they had seen anything happen there the previous weekend and distribute a flyer seeking assistance in the investigation. As Robert Lidster approached the checkpoint in his minivan, he swerved, nearly hitting an officer who later smelled alcohol on Lidster’s breath. “Lidster was tried and convicted in Illinois state court of driving under the influence of alcohol.”⁷⁷

The trial court rejected Lidster’s claim that the checkpoint stop violated the Fourth Amendment. An Illinois appellate court and the Illinois Supreme Court determined that the warrantless, suspicionless law enforcement checkpoint did not advance a special need and therefore was

⁷² United States v. Mitchell, 681 F. Supp. 2d 597, 604 (W.D. Pa. 2009) (quoting United States v. Kincade, 379 F.3d 813, 855–56 (9th Cir. 2004) (Reinhardt, J., dissenting)).

⁷³ United States v. Mitchell, 652 F.3d 387, 403 (3d Cir. 2011) (adopting the totality-of-circumstances test as the appropriate mode of analysis).

⁷⁴ *Id.* (internal quotation marks omitted). Misreading *Pennsylvania v. Mimms*, 434 U.S. 106 (1977), the Ninth Circuit leapt to the same conclusion in *Haskell v. Harris*, 669 F.3d 1049 (9th Cir. 2012), *reh’g en banc granted and opinions vacated*, 686 F.3d 1121 (9th Cir. 2012). See Kaye, *Drawing Lines*, *supra* note 29.

⁷⁵ United States v. Ross, 456 U.S. 798, 824–25 (1982).

⁷⁶ 540 U.S. 419 (2004).

⁷⁷ *Id.* at 422.

unconstitutional.⁷⁸ The United States Supreme Court unanimously reversed, reasoning that stopping all drivers at a particular time and place to learn the identity of the perpetrator of the unsolved crime was an “information-seeking kind of stop”⁷⁹ within the scope of the special-needs exception.⁸⁰ One can read the case—as the Second Circuit has⁸¹—to imply that an information-seeking kind of database also is subject to special-needs balancing. As in *Lidster*, the police are asking a subset of the public for information that could help them in unsolved cases with no clear “suspicion, or lack of suspicion, of the relevant individual.”⁸²

Alternatively, one can distinguish *Lidster* from DNA-BC on the ground that the police in *Lidster* were not seeking to gather evidence on Lidster himself.⁸³ In contrast, the criminal-intelligence rationale for DNA-BC is that a database trawl might link the very arrestee who must submit to DNA sampling to a past crime or implicate him in a future one. But this merely illustrates that phrases like “crime control,”⁸⁴ “evidence of ordinary criminal wrongdoing,”⁸⁵ “everyday law enforcement purposes,”⁸⁶ and “ordinary investigatory evidence”⁸⁷ are not sure boundary markers. *Lidster* makes it plain that some law enforcement investigative practices are special-needs, and many lower courts have held that as long as the police are not seeking evidence of a suspect’s involvement in a specific crime that is still under investigation, they are engaging in a special-needs search.⁸⁸ Indeed, in

⁷⁸ *Id.* at 422–23.

⁷⁹ *Id.* at 424.

⁸⁰ Justice Stevens, Souter, and Ginsburg dissented as to the disposition of the case. They suggested that “the outcome of the multifactor test . . . is by no means clear on the facts” and they therefore would have remanded to the state courts to consider the outcome of the balancing test in the first instance. *Id.* at 429.

⁸¹ *United States v. Amerson*, 483 F.3d 73, 83 (2d Cir. 2007) (finding that the collection of DNA samples to create a DNA index qualifies as a special need).

⁸² *Illinois v. Lidster*, 540 U.S. 419, 425 (2004).

⁸³ *See id.* at 423 (“The police expected the information elicited to help them apprehend, not the vehicle’s occupants, but other individuals.”).

⁸⁴ *Indianapolis v. Edmond*, 531 U.S. 32, 41 (2000).

⁸⁵ *Id.*

⁸⁶ *United States v. Kincade*, 379 F.3d 813, 855 (9th Cir. 2004) (Reinhardt, J., dissenting).

⁸⁷ *Id.*

⁸⁸ *E.g.*, *Nicholas v. Goord*, 430 F.3d 652, 668–69 (2d Cir. 2005) (“[W]e find it crucial that the state, in collecting DNA samples, is not trying to determine that a particular individual has engaged in some wrongdoing” (internal quotation marks omitted)); *People v. Garvin*, 847 N.E.2d 82, 91 (Ill. 2006) (determining that a DNA sample “does not, on its own, show the commission of a crime” and so is distinct “from the normal need for law enforcement”); *Petitioner F v. Brown*, 306 S.W.3d 80, 89–90 (Ky. 2010) (finding that the government’s DNA sample collecting was not “for the immediate and sole purpose of collecting incriminating evidence” and thus it “fulfill[ed] a special need” (internal quotation marks omitted)); *State v. O’Hagen*, 914 A.2d 267, 279 (N.J. 2007) (determining that a special need was present because of the impracticality of requiring individualized suspicion before obtaining a DNA sample of a convicted felon and because

upholding the detainee provisions of the federal database law, the U.S. District Court for the Western District of New York applied the Second Circuit's no-specific-investigation rationale.⁸⁹

To evaluate whether the special-needs exception extends to the intelligence function of DNA databases, we need something more revealing than the verbal formulae used to describe the types of searches embraced as "special" or "administrative" in the past. We need an understanding of why the category exists. The evocative phrase "special needs" first appeared in 1985, in *New Jersey v. T.L.O.*⁹⁰ A high school teacher brought two students she had found smoking in the lavatory to the principal's office. The assistant vice-principal searched the purse of one of the two, who denied the accusation, and discovered cigarettes and marijuana. Citing an apparently disparate array of cases that permitted searches without warrants or probable cause, the Court sought to "strike the balance between the schoolchild's legitimate expectations of privacy and the school's equally legitimate need to maintain an environment in which learning can take place."⁹¹ To this end, it dismissed "[t]he warrant requirement, in particular, [as] unsuited to the school environment [because it] would unduly interfere with the maintenance of the swift and informal disciplinary procedures needed in the schools," and it reduced "the level of suspicion of illicit activity needed to justify a search"⁹² from probable cause to reasonable suspicion "under all the circumstances."⁹³

The majority opinion, written by Justice White, contained passages that could be read to say that direct balancing is permissible in almost any kind of case.⁹⁴ Seeking to cabin the resort to balancing, Justice Blackmun

the testing was not for the immediate investigation of a specific crime); *State v. Martin*, 955 A.2d 1144, 1153 (Vt. 2008) (upholding DNA sampling because the goals of the program were "beyond the normal goals of law enforcement"); *State v. Olivas*, 856 P.2d 1076, 1085 (Wash. 1993) (en banc) (finding that the "drawing of blood from convicted felons to establish a DNA bank for use in future prosecution of recidivist acts does not violate the Fourth Amendment" because it is a deterrent and thus not "normal" law enforcement).

⁸⁹ *United States v. Thomas*, No. 10-CR-6172 CJS, 2011 WL 1627321 (W.D.N.Y. Apr. 27, 2011), *appeal pending*.

⁹⁰ 469 U.S. 325, 332 n.2 (1985) (describing the "middle position" of the "majority of courts" to have been that "the Fourth Amendment applies to searches conducted by school authorities, but the special needs of the school environment require assessment of the legality of such searches against a standard less exacting than that of probable cause").

⁹¹ *Id.* at 340.

⁹² *Id.*

⁹³ *Id.* at 341 ("[T]he legality of a search of a student should depend simply on the reasonableness, under all the circumstances, of the search.").

⁹⁴ *Id.* at 337, 340, 341.

expanded on the phrase “special needs” in a concurring opinion.⁹⁵ He observed that “we have used such a balancing test, rather than strictly applying the Fourth Amendment’s Warrant and Probable-Cause Clause, only when we were confronted with a special law enforcement need for greater flexibility.”⁹⁶ The reason for something “special,” Justice Blackmun explained, is that “the Amendment does not leave the reasonableness of most searches to the judgment of courts or government officers; the framers of the Amendment balanced the interests involved and decided that a search is reasonable only if supported by a judicial warrant based on probable cause.”⁹⁷ Only when venturing outside the realm of “most searches” should the Court strike its own balance. The boundary between ordinary searches (for which the framers had done the balancing) and the special situations (that justified contemporary balancing) is to be found in “those exceptional circumstances in which special needs, beyond the normal need for law enforcement, make the warrant and probable-cause requirement impracticable.”⁹⁸ Then and only then “is a court entitled to substitute its balancing of interests for that of the [f]ramers.”⁹⁹

Justice Blackmun’s effort to confine “the balancing test” to a defined category of cases¹⁰⁰ is an improvement over the majority’s generalities, but it goes too far. It would have been more apt to speak of special interests rather than special needs. A court should *never* “substitute its balancing of interests for that of the [f]ramers.”¹⁰¹ Rather, a special interest creates a special need—because that interest was not factored into the original balancing. Therefore, the court should be allowed to do its own balancing in one bounded category of cases—those in which the interests differ in type from

95 *Id.* at 332 n.2 (Blackmun, J., concurring) (“[T]he special needs of the school environment require assessment of the legality of such searches against a standard less exacting than that of probable cause.”).

96 *New Jersey v. T.L.O.*, 496 U.S. 325, 351 (1985) (internal quotation marks omitted).

97 *Id.* (quoting *United States v. Place*, 462 U.S. 696, 722 (1983) (Blackmun, J., concurring)).

98 *Id.*

99 *Id.*

100 *Id.* at 352.

101 *Id.* at 351. One can object that Justice Blackmun’s reference to an original balancing performed by the Framers is bad history. See Thomas Y. Davies, *Recovering the Original Fourth Amendment*, 98 MICH. L. REV. 547, 551 (1999) (contending that the Fourth Amendment was originally understood only to set warrant standards); David E. Steinberg, *The Uses and Misuses of Fourth Amendment History*, 10 U. PA. J. CONST. L. 581, 584 (2008) (“[N]either the warrant preference rule nor the global reasonableness requirement receive support from Fourth Amendment history.”). The history is the subject of continuing debate. See Bar-Gill & Friedman, *supra* note 42, at 1613; see also authorities cited, *supra* note 29. But even if this view is correct, the concept of prior balancing producing a warrant requirement subject to categorical exceptions (one of which entails balancing) has pragmatic value in the administration of search and seizure law. See *supra* Part I.

the canonical ones for which warrants and probable cause are necessary.¹⁰² These exceptional cases are usually, but not always, distinct from the ones that merely enforce the criminal law. In *T.L.O.*, maintaining order in the schools added an interest that is not present in a classic search of a person, property, or papers for evidence of violations of the criminal or revenue laws. The balance previously struck and crystalized in the form of the warrant requirement and its exceptions is appropriate for searches whose sole function is to produce evidence of an individual's criminal conduct to be used in enforcing the law prohibiting that conduct. But it does not necessarily fit a different set of interests. To avoid a wooden and inappropriate form of Fourth Amendment analysis in this class of cases—but only in this class of cases—a court needs to return to first principles in judging reasonableness.

Moreover, contrary to Justice Blackmun's formulation, the class of special-interest cases is not coextensive with those for which warrants and probable cause are impractical. Practicality is important in the balancing stage of a true special-interest case. Impracticality indicates that the balance favors the government. For example, a sobriety checkpoint furthers the special interest of removing impaired drivers from the roads regardless of subsequent criminal proceedings. This justifies special-interest balancing—because in addition to the normal interest in catching and punishing criminals, the state has an immediate interest in clearing the roads of dangerous drivers.¹⁰³ That a warrant based on individualized suspicion makes it impossible to operate the checkpoint helps show that the program is constitutionally reasonable—that the balance favors the government—but it does not help in defining the class of cases for which reasonableness balancing is appropriate.

¹⁰² This was not Justice Blackmun's understanding of the "special needs" phrase that he coined to unify a variegated set of cases and to prevent them from eviscerating the warrant requirement. His conception of special needs explicitly encompassed "a special law enforcement need for greater flexibility" as exemplified in the "limited 'stop and frisk' upon less than probable cause" allowed in *Terry v. Ohio*. *T.L.O.*, 469 U.S. at 351–52 (citing *Terry v. Ohio*, 392 U.S. 1, 19–21, 23–24 (1968)). Nonetheless, the requirement of an interest beyond that of acquiring evidence against the target of the search is more consistent with his emphasis on the Framer's original balancing. The Ninth Circuit employed this idea in *Friedman v. Boucher*, 580 F.3d 847 (9th Cir. 2009), which condemned the forced acquisition of a detainee's DNA that was not authorized by statute. The *Friedman* panel wrote that "the 'special needs' exception applies only to non-law enforcement purposes." *Id.* at 853. Unfortunately, this reformulation is too restrictive. It is clear that the special-needs category encompasses some law enforcement purposes, as in *Lidster*.

¹⁰³ See *Mich. Dep't of State Police v. Sitz*, 496 U.S. 444 (1990); *Indianapolis v. Edmond*, 531 U.S. 32, 39 (2000) (describing the roadblocks in *Sitz* as "clearly aimed at reducing the immediate hazard posed by the presence of drunk drivers on the highways").

The difficulty with the articulation of the special-needs exception as proposed in *T.L.O.* and extended since then is that it exceeds the set of special-interests cases for which Justice Blackmun provided the rationale for balancing. It also includes cases that merely involve the usual sets of individual and government interests in criminal investigations. In these cases, impracticality can be a reason to create an exception to the warrant or probable cause requirements, as the Court has done for searches incident to arrest, but it is not a reason to balance the same set of individual and government interests any differently than the framers did. Likewise, when the state's intrusion is a lesser invasion of the interests of the affected individuals, as in the case of a limited stop-and-frisk rather than a full-blown arrest or search, a categorical exception to the warrant requirement is appropriate. Again, these exceptions reflect a balancing process, but they are not themselves instances of special-interests balancing, and describing them as special-needs cases creates confusion.¹⁰⁴

Given the logic that underlies the special-needs exception, the intelligence-gathering function should not be considered a special need. It might be a wonderful way to catch criminals and to deter individuals from certain crimes. It could constitute a lesser intrusion on individual interests. It may be applied uniformly, without arbitrariness and abuse of power. These are all good reasons to recognize a biometric exception to the Warrant Clause as the defining feature of reasonableness as discussed in Part IV, but they involve no major¹⁰⁵ special interests beyond those that produce the general rule against searches without warrants and probable cause.¹⁰⁶

¹⁰⁴ For other efforts to impose more structure on the sprawling special-needs exception, see, for example, Eve Brensike Primus, *Disentangling Administrative Searches*, 111 COLUM. L. REV. 254, 257 (2011); Stephen J. Schulhofer, *On the Fourth Amendment Rights of the Law-Abiding Public*, 1989 SUP. CT. REV. 87, 162–63 (1989).

¹⁰⁵ Using a criminal intelligence database to check whether an arrestee is implicated in any unsolved crimes can further at least one special interest: making a fully informed determination as to whether or not an arrestee should be released before trial (and, if so, under what special conditions). See *infra* Part IV.B. The uncertain law governing mixed-motive special-needs cases is discussed in Part III.

¹⁰⁶ Cf. Ric Simmons, *Searching for Terrorists: Why Public Safety Is Not a Special Need*, 59 DUKE L.J. 843, 870 (2010) (remarking in passing that characterizing “taking [of] DNA samples as a ‘special need beyond the normal need for law enforcement’ . . . [is] a logically impossible task because the DNA database being assembled [is] used for traditional law enforcement purposes” (internal quotation omitted)). The conclusion is perhaps less clear than this. One might say that the special-needs exception comes into play *only* when “police, and even administrative enforcement personnel, conduct searches for the primary purpose of obtaining evidence for use in criminal or other enforcement proceedings.” *O’Connor v. Ortega*, 480 U.S. 709, 721 (1987) (O’Connor, J., plurality opinion). Taking DNA from a convicted offender and retaining the resulting profile indefinitely puts the offender on notice that he might be exposed in any future crimes. The specific-deterrence interest applies even when the evidence-seeking one does not. Removing DNA profiles from the database for lack of conviction, however, attenuates this special interest.

Yet, in *Mitchell* and other DNA database cases, courts have balanced under another name—the “Totality of the Circumstances Analysis.”¹⁰⁷ The actual balancing in totality cases is no different from that in special-interest cases—the court weighs the nature and furtherance of the government interests against the intrusion on the interests protected by the Fourth Amendment.¹⁰⁸ The difference is what triggers the balancing. Special-needs balancing, as we have seen, should require the presence of a non-law enforcement interest or a special kind of law enforcement interest. Totality balancing is just a reversion to the philosophy of balancing whenever it suits the court—the very approach that Justice Blackmun decried in *T.L.O.*, that Justice Brennan, dissenting in that case, derided as dangerous and incoherent,¹⁰⁹ and that Justice Kagan recently described as atypical “free-form balancing.”¹¹⁰

Totality balancing became popular in DNA-AC cases following the Supreme Court’s decision in *United States v. Knights*.¹¹¹ Convicted of a drug offense, Mark James Knights was sentenced to summary probation “on the condition: that Knights would ‘[s]ubmit his . . . person, property, place of residence, vehicle, personal effects, to search at anytime, with or without a search warrant, warrant of arrest or reasonable cause by any probation officer or law enforcement officer.’”¹¹² A detective, with ample reason to suspect that Knights was involved in acts of vandalism and arson against the Pacific Gas & Electric Company, entered Knight’s apartment without a warrant. There, he found “a detonation cord, ammunition, liquid chemicals, instruction manuals on chemistry and electrical circuitry, bolt cutters, telephone pole-climbing spurs, drug paraphernalia, and a brass padlock stamped ‘PG&E.’”¹¹³ Before trial for conspiracy and weapons violations, Knights moved to suppress these items. The district court granted the motion, and the Ninth Circuit affirmed. These courts relied on

¹⁰⁷ *United States v. Mitchell*, 681 F. Supp. 2d 597, 606 (W.D. Pa. 2009).

¹⁰⁸ The Third Circuit has called the totality-of-the-circumstances test “more rigorous,” but it did not identify the source or nature of the extra rigor. *United States v. Sczubelek*, 402 F.3d 175, 184 (3d Cir. 2005). Second Circuit opinions describe special-needs balancing as “more rigorous,” but all they mean by this is that the government must demonstrate the existence of a special interest to reach the balancing stage. See *United States v. Amerson*, 483 F.3d 73, 79 n.6 (2d Cir. 2007).

¹⁰⁹ *New Jersey v. T.L.O.*, 469 U.S. 325, 358 (1985) (Brennan, J., dissenting) (“Use of such a ‘balancing test’ to determine the standard for evaluating the validity of a full-scale search represents a sizable innovation in Fourth Amendment analysis [that] finds support neither in precedent nor in policy and portends a dangerous weakening of the purpose of the Fourth Amendment to protect the privacy and security of our citizens.”); *id.* at 369 (“[T]hese ‘balancing tests’ amount to . . . doctrinally destructive nihilism.”).

¹¹⁰ Transcript of Oral Argument, *supra* note 7, at 25.

¹¹¹ 534 U.S. 112 (2001).

¹¹² *Id.* at 114.

¹¹³ *Id.* at 115.

*Griffin v. Wisconsin*¹¹⁴ in which the Supreme Court had upheld warrantless searches of probationers as justified under the special-needs exception because they related to the operation of a state's system for supervised release of offenders.¹¹⁵ In *Knights*, however, the search of the probationer's apartment was not intended to advance this special interest, and no other exception to the warrant requirement applied. Therefore, the lower courts held that the search was per se unreasonable.

The Supreme Court reversed unanimously. Chief Justice Rehnquist, who had no sympathy for the established exception-based-warrant-requirement approach,¹¹⁶ wrote a brief opinion for the Court stating that "the search of *Knights* was reasonable under our general Fourth Amendment approach of 'examining the totality of the circumstances,' with the probation search condition being a salient circumstance."¹¹⁷ The phrase "totality of the circumstances" did not come from any case in which the Court had substituted direct balancing for the better established exception-based approach. It came from the Chief Justice's opinion several years earlier, in *Ohio v. Robinette*.¹¹⁸ *Robinette* concerned the voluntariness of a defendant's consent to a search.¹¹⁹ Determinations of consent to a search or seizure,¹²⁰ probable cause,¹²¹ reasonable suspicion,¹²² exigent circumstances,¹²³ and excessive force¹²⁴ are fact-intensive questions that turn

¹¹⁴ 483 U.S. 868 (1987).

¹¹⁵ *Id.* at 876–77.

¹¹⁶ *E.g.*, *Robbins v. California*, 453 U.S. 420, 438 (1981) (Rehnquist, J., dissenting) (rejecting "judicially created preference" for warrants).

¹¹⁷ *United States v. Knights*, 534 U.S. 112, 118 (2001) (citation omitted).

¹¹⁸ 519 U.S. 33 (1996).

¹¹⁹ *Id.* at 35.

¹²⁰ *E.g.*, *Florida v. Bostick*, 501 U.S. 429, 439 (1991) ("[T]o determine whether a particular encounter constitutes a seizure, a court must consider all the circumstances surrounding the encounter to determine whether the police conduct would have communicated to a reasonable person that the person was not free to decline the officers' requests or otherwise terminate the encounter.").

¹²¹ *E.g.*, *Maryland v. Pringle*, 540 U.S. 366, 371 (2003) ("The probable-cause standard is incapable of precise definition . . . because it deals with probabilities and depends on the totality of the circumstances."); *Illinois v. Gates*, 462 U.S. 213, 232 (1983) ("[P]robable cause is a fluid concept—turning on the assessment of probabilities in particular factual contexts—not readily, or even usefully, reduced to a neat set of legal rules.").

¹²² *E.g.*, *United States v. Arvizu*, 534 U.S. 266, 273 (2002) (discussing how courts "must look at the 'totality of the circumstances' of each case to see whether the detaining officer has a 'particularized and objective basis' for suspecting legal wrongdoing"); *United States v. Cortez*, 449 U.S. 411, 417 (1981) (explaining that to judge "what cause is sufficient to authorize police to stop a person . . . the totality of the circumstances—the whole picture—must be taken into account").

¹²³ *E.g.*, *Illinois v. McArthur*, 531 U.S. 326, 331 (2001) (keeping an individual suspected of having marijuana in a trailer from entering the trailer alone while officers applied for a search warrant was reasonable under "the circumstances of the case before us"). *But see Michigan v. Summers*, 452 U.S. 692, 705 (1981) (adopting a rule that "a warrant to search

on the circumstances of the case. In these kinds of cases, a court must consider all the factual circumstances—the totality of the circumstances—but it does not normally weigh two sets of interests.¹²⁵ Ripping the phrase out of context to describe or justify ad hoc balancing of interests, as the Chief Justice did in *Knights*, is unpersuasive and destabilizing.

Four short years later, Justice Thomas picked up the ball that the Chief Justice tossed in *Knights*. Writing for the Court in *Samson v. California*,¹²⁶ Thomas applied the same direct balancing test as if it were the “general Fourth Amendment approach”¹²⁷ to permit a warrantless, suspicionless search of a parolee that uncovered methamphetamine in his pocket.¹²⁸ As in *Knights*, it would have been difficult to rationalize the search in terms of the state’s special interest in supervising released prisoners, and the majority in *Samson* did not even try.

All this was too much for Justices Stevens, Souter, and Breyer. Although they had expressed no qualms about *Knights*’ adoption of direct balancing as the mode of analysis, and they did not contest it in *Samson*, they did attack the outcome of the direct balancing test. They challenged this result by emphasizing that the *Samson* Court was the first to approve of suspicionless searching on the whim of a solitary police officer. The police officer in *Knights* had reasonable suspicion, if not probable cause. The officer in *Samson* had nothing. In effect, the dissent maintained that neither special-needs nor totality balancing should permit such searches.

Knights and *Samson* sit poised to devour any Fourth Amendment cases founded on normal categorizing. “Unlike the special needs doctrine, *Knights* provides no threshold test to decide when balancing can

for contraband founded on probable cause implicitly carries with it the limited authority to detain the occupants of the premises while a proper search is conducted” (footnote omitted)).

¹²⁴ E.g., *Scott v. Harris*, 550 U.S. 372, 383 (2007) (“Although respondent’s attempt to craft an easy-to-apply legal test in the Fourth Amendment context is admirable, in the end we must still slosh our way through the factbound morass of reasonableness.”).

¹²⁵ In *Los Angeles County v. Rettele*, 550 U.S. 609, 613–14 (2007) (per curiam), the Court referred to *Summers*, 452 U.S. at 692, as “weighing whether the search in [that case] was reasonable” in view of the balance between the “incremental intrusion on personal liberty” and the government’s interests in safely and efficaciously searching pursuant to a warrant. But the real balancing in *Summers* occurred at the level of deciding that it can be constitutionally reasonable to “detain the occupants of the premises while a proper search [for contraband] is conducted.” *Summers*, 452 U.S. at 705. Even though this right to detain the occupants during a search may be implicit in the warrant, as *Summers* held, whether a particular detention is unreasonably long or abusive turns on the circumstances of the case.

¹²⁶ 547 U.S. 843 (2006).

¹²⁷ *Id.* at 852 n.3.

¹²⁸ *Id.* at 855 (“California’s supervisory system is drawn to meet its needs and is reasonable, taking into account a parolee’s substantially diminished expectation of privacy.”).

appropriately replace the warrant and probable cause requirements.”¹²⁹ Nonetheless, it is possible that few such cases will be drawn into their sphere. Despite the aggressive pronouncements in *Knights* and *Samson* (and now *Mitchell* and other DNA-BC cases) that a direct resort to balancing is the general rule, it remains an anomaly in Fourth Amendment jurisprudence. Except for the two P’s—probationers and parolees—the Court proceeds with business as usual, which is to say categorical analysis of the need for a warrant.¹³⁰ Thus, in *Arizona v. Gant*,¹³¹ Justice Stevens wrote for the Court, without a backwards glance to *Knights* and *Samson*, that

[c]onsistent with our precedent, our analysis begins, as it should in every case addressing the reasonableness of a warrantless search, with the basic rule that “searches conducted outside the judicial process, without prior approval by judge or magistrate, are *per se* unreasonable under the Fourth Amendment—subject only to a few specifically established and well-delineated exceptions.”¹³²

A year later, in *City of Ontario v. Quon*,¹³³ every Justice subscribed to this proposition. The next Term, in *Kentucky v. King*,¹³⁴ every Justice embraced the basic rule. It would be best to acknowledge explicitly that the analytical framework of *Knights* and *Samson* is inconsistent with precedent and to

¹²⁹ Antoine McNamara, Note, *The “Special Needs” of Prison, Probation, and Parole*, 82 N.Y.U. L. REV. 209, 240 (2007).

¹³⁰ Various commentators seem to regard the *per se* rule as moribund. E.g., Orin S. Kerr, *The Mosaic Theory of the Fourth Amendment*, 111 MICH. L. REV. 311, 318 (2012) (“Reasonableness now is understood as requiring a balancing of interests . . .”); Cynthia Lee, *Reasonableness with Teeth: the Future of Fourth Amendment Reasonableness Analysis*, 81 MISS. L.J. 1133, 1135 (2012) (“Instead of interpreting the Fourth Amendment as expressing a preference for warrants, the modern Court reads the text of the Fourth Amendment as simply requiring reasonableness.”); William W. Greenlaugh & Mark J. Yost, *In Defense of the “Per Se” Rule: Justice Stewart’s Struggle to Preserve the Fourth Amendment’s Warrant Clause*, 31 AM. CRIM. L. REV. 1013, 1019 (1994) (“[T]he Court has all but rejected the ‘per se’ rule and strengthened its embrace of the ‘reasonableness’ approach.”). Professor Lee adds, however, that “[i]ronically, even though today’s Court does not accord the warrant preference view the premier status it once held, the Court still applies it in the bulk of its cases.” *Id.* at 1146. This pattern is less ironic when one recognizes that the Court understandably employs a balancing approach in (1) establishing categorical exceptions to the warrant or probable cause requirements, (2) applying the special-needs exception to cases involving special interests, and (3) determining whether the method of effecting a search or seizure is unreasonable. Outside of these situations (and the two probationer-parolee cases), the Court continues to use the categorical framework to ascertain the reasonableness of searches undertaken to acquire evidence in criminal cases.

¹³¹ 556 U.S. 332 (2009).

¹³² *Id.* at 338 (quoting *Katz v. United States*, 389 U.S. 347, 357 (1967) and applying the incident-to-arrest exception instead of direct balancing).

¹³³ 130 S. Ct. 2619, 2629 (2010) (quoting *Katz* and applying the special-needs exception).

¹³⁴ 131 S. Ct. 1849, 1853–54 (2011) (analyzing the reasonableness of a search of a home from the standpoint of a well-defined exception to the warrant requirement (for exigent circumstances) rather than via a direct inquiry into what might seem reasonable).

defend the outcomes, if at all, on different grounds.¹³⁵ This more forthright approach would confine direct balancing to the two P's (or better, eliminate it entirely).

The availability of totality balancing prompted an exchange among the Ninth Circuit judges on the panel in *United States v. Pool*.¹³⁶ The two judges who were willing to uphold DNA-BC (at least after an indictment) offered no opinion on “whether the DNA collection provision could meet the special needs test because our precedent directs us to apply the totality of the circumstances test.”¹³⁷ With that standard in place, they deemed the federal detainee law constitutional.¹³⁸ Despite the circuit's previous use of the sweeping and inaccurate language of *Samson* and *Knights* about the universality of direct balancing,¹³⁹ the dissenting judge sought to confine totality balancing to the two P's. She emphasized that “[t]he Supreme Court has upheld searches as a condition of release under [the totality] test only after an individual has been convicted of a crime and hence has a lowered privacy interest.”¹⁴⁰

¹³⁵ One could maintain (none too convincingly) that the departure from the normal framework was suitable because “those people” consented to the conditions of their supervised release or because they are out of prison as an act of grace that does not include the normal freedom from unreasonable searches and seizures. See *Samson v. California*, 547 U.S. 843, 863–64 (2006) (Stevens, J., dissenting); Transcript of Oral Argument, *supra* 7, at 11 (Sotomayor, J.). For critical discussion of these theories, see McNamara, *supra* note 129.

¹³⁶ *United States v. Pool*, 621 F.3d 1213 (9th Cir. 2010), *vacated as moot*, 659 F.3d 761 (9th Cir. 2011) (en banc).

¹³⁷ *Pool*, 621 F.3d at 1218.

¹³⁸ *Id.* at 1220–23.

¹³⁹ *United States v. Kriesel*, 508 F.3d 941, 947 (9th Cir. 2007) (“Taking our cue from *Samson*, we reaffirm that ‘the touchstone of the Fourth Amendment is reasonableness,’ and adopt the ‘general Fourth Amendment approach,’ which ‘examin[es] the totality of the circumstances to determine whether a search is reasonable.’” (citations omitted)).

¹⁴⁰ *Pool*, 621 F.3d at 1235 (Schroeder, J., dissenting); see also *id.* at 1237 (finding that no “exception under the ‘totality of the circumstances’ approach applies because Pool, as a pretrial defendant, does not have the reduced privacy interests of the convicted felons in *Kincade* or *Kriesel*”). As McNamara, *supra* note 129, observed, other Ninth Circuit judges have interpreted *Knights* as creating an implicit threshold requirement: Balancing is allowed only because of the probationer’s ‘diminished expectation of privacy.’ E.g., *United States v.* , 379 F.3d 813, 832 (9th Cir. 2004) (en banc) (plurality opinion) (“*Knights* . . . affirmed the . . . possibility that conditional releasees’ diminished expectations of privacy may be sufficient to justify the judicial assessment of a parole or probation search’s reasonableness outside the strictures of special needs analysis.”).

Id. at 240 n.204. In a subsequent Ninth Circuit case upholding California’s DNA-BC law, a dissenting opinion of Judge Fletcher not only maintained that totality balancing was unavailable, but that Supreme Court cases on fingerprinting established that the California law infringed the Fourth Amendment. This claim rests on an obvious misreading of the fingerprint cases. See *Haskell v. Harris*, 669 F.3d 1049, 1065–66 (9th Cir. 2012) (Fletcher, J., dissenting).

This observation begs the question of why the Court's putatively "general Fourth Amendment approach" should apply just to this specific category of people. True, the Court spoke of the diminished expectations of privacy in *Knights* and *Samson* as arising from notice to a parolee or probationer that he would be at risk of warrantless or suspicionless searches. But the Court referred to a lowered privacy interest only as a part of the totality of circumstances to be considered in judging reasonableness.¹⁴¹ The Court did not present it as the reason to switch to totality balancing. Changing a factor considered in totality balancing to the threshold requirement for undertaking that balancing "would not render the approach any more principled."¹⁴² Why should the judgment that some groups are notified that they have fewer protections, or that they are liable to other intrusions (to further some special governmental interest), subject them to indiscriminate totality balancing?¹⁴³ Furthermore, it leaves open the argument that direct balancing is appropriate for arrestees because they too have a "lowered privacy interest," as shown by the historic practice of forcing them to provide the state with their fingerprints and photographs.¹⁴⁴ It is not so easy to chain *Knights* and *Samson* to the two P's.

In sum, neither totality balancing nor special-needs balancing offers the best mode of analyzing the intelligence-gathering function of biometric database systems. Direct balancing repudiates the normal method of analysis—classifying practices via reasonably well-defined exceptions to the warrant requirement. To be sure, the boundaries of the special-needs exception are not well marked, but no special interest justifies sheltering the collection of biometric data for generating evidence in criminal cases with that exception.

Fortunately, there are better ways to analyze fingerprinting and DNA sampling on arrest. In the final Parts of this Article, I examine two possible ways to uphold these practices. Part III discusses what I call the two-step shuffle and the unexplored territory of multiple needs. It is a branch of special-needs analysis that deserves renewed attention and revision in the Supreme Court. Specifically, I suggest that multipurpose search regimes should be eligible for special-needs balancing. Part IV looks into the

141 See *Samson v. California*, 547 U.S. 843, 848–49 (2006) (recapitulating *Knights*' reasoning); *id.* at 852 (relying in the course of its balancing on the conclusion that "parolees . . . have severely diminished expectations of privacy by virtue of their status alone").

142 McNamara, *supra* note 129, at 240 n.204.

143 Cf. Paul M. Monteleoni, Note, *DNA Databases, Universality, and the Fourth Amendment*, 82 N.Y.U. L. REV. 247, 269–70 (2007) ("[A] diminished privacy interest is a conclusory finding, and its use to justify an exception to the warrant requirement is thus circular.").

144 E.g., *Anderson v. Commonwealth*, 650 S.E.2d 702, 704–05 (Va. 2007) (analogizing DNA testing to the historic practice of fingerprinting).

balancing itself and presents a new categorical exception for certain types of biometric data.

III. THE TWO-STEP SHUFFLE AND MULTIPLE-NEEDS ANALYSIS

A. *Fingerprint Databases for Authentication and Intelligence*

The earliest widespread use of fingerprints in the criminal justice system was authentication—verifying or establishing the identity of a prisoner.¹⁴⁵ Initially, the fingerprint cards supplemented a set of body measurements devised by Alphonse Bertillon, a clerk in the Prefecture of Police in Paris, France, and adopted there in 1882. “Bertillon’s anthropometric method measured height, reach (middle finger to middle finger of outstretched arms), trunk, length of head, width of head, length of right ear, width of right ear, length of left foot, length of left middle finger, length of left little finger, and length of left forearm.”¹⁴⁶ By 1894, all new arrestees in England and Bengal “were measured and fingerprinted.”¹⁴⁷ In 1897, after a workable system for classifying fingerprints was developed, “the government of India sanctioned the sole use of fingerprints as a means of identification for prisoners,”¹⁴⁸ avoiding the laborious task of measuring body parts.

In 1902, Bertillon went through his fingerprint cards from prisoners until he found one that contained an inked print that seemed to match the photograph of a bloody print on a piece of broken glass found at the scene of a murder.¹⁴⁹ Thus was born the use of fingerprint records as an intelligence database. In 1924, the FBI established its Identification Division “to provide a central repository of criminal identification data for law enforcement agencies throughout the United States.”¹⁵⁰ From an original 810,188 records, the FBI’s criminal file grew to about fifteen million individuals by the early 1960s.¹⁵¹ Despite refinements in the classification system, manual searching was becoming impracticable. Automated

¹⁴⁵ Jeffery G. Barnes, *History*, in THE FINGERPRINT SOURCEBOOK 1-10 (Alan McRoberts & Debbie McRoberts eds., 2011), available at <https://www.ncjrs.gov/pdffiles1/nij/225321.pdf>. Prior to this development, fingerprints were used as evidence in a few criminal cases. *Id.* at 1-8 (referring to an exoneration in 1880); *id.* at 1-9 to 1-10 (referring to “the first homicide solved by fingerprint evidence” in 1892).

¹⁴⁶ *Id.* at 1-12.

¹⁴⁷ *Id.* at 1-14.

¹⁴⁸ *Id.*

¹⁴⁹ *Id.* at 1-15 to 1-16 (quoting Charles R. Kingston & Paul L. Kirk, *Historical Development and Evaluation of the “12 Point Rule” in Fingerprint Identification*, 20 INT. CRIM. POLICE REV. 62 (1965)); SIMON COLE, SUSPECT IDENTITIES: A HISTORY OF FINGERPRINTING AND CRIMINAL IDENTIFICATION 170–71 (2001).

¹⁵⁰ Moses et al., *supra* note 13, at 6–4.

¹⁵¹ *Id.*

fingerprint identification systems capable of trawling large databases of digitalized images for possible matches to latent prints from crime scenes emerged in the 1970s.¹⁵² These systems scored successes in the 1980s¹⁵³ and underwent “frenzied expansion” in the 1990s.¹⁵⁴ Today, the FBI’s criminal file houses the fingerprints and criminal histories of more than seventy million people.¹⁵⁵

I rehearse this history to suggest that using fingerprint databases to discover suspects is not exactly a second-generation technology. The potential intelligence function of fingerprint databases was known from the outset of arrestee fingerprinting in America. Despite the possibility that the fingerprint card collections would generate evidence for unrelated prosecutions, as Bertillon’s 1902 trawl did, early courts generally brushed aside due process challenges to photographing and fingerprinting arrestees.¹⁵⁶ Presumably, today’s courts would uphold arrestee fingerprinting against a Fourth Amendment challenge either as too minor an intrusion on Fourth Amendment interests to create a reasonable expectation of privacy and hence to constitute a “search or seizure”¹⁵⁷ or as constituting a reasonable search under the special-needs exception.¹⁵⁸

Yet, these conclusions are not self-evident. Fingerprints are not as visible to the public as physical appearance, handwriting, or voice,¹⁵⁹ and they might contain a quantum of information that could be used for purposes other than identification.¹⁶⁰ Expelling them from the realm of the Fourth Amendment therefore seems too harsh. And, although the special-needs

¹⁵² *Id.* at 6-6 to 6-7.

¹⁵³ *Id.* at 6-7 to 6-8.

¹⁵⁴ *Id.* at 6-8.

¹⁵⁵ *Integrated Automated Fingerprint Identification System*, FBI, http://www.fbi.gov/about-us/cjis/fingerprints_biometrics/iafis/iafis, (last visited Jan. 19, 2013).

¹⁵⁶ See sources cited *supra* notes 9, 24.

¹⁵⁷ See, e.g., *In re Grand Jury Proceedings Involving Vickers*, 38 F. Supp. 2d 159, 165 (D.N.H. 1998) (holding that fingerprinting and hair sampling are not searches); *Palmer v. State*, 679 N.E.2d 887, 891 (Ind. 1997) (holding that taking fingerprints at trial was not an unreasonable seizure); *Rowe v. Burton*, 884 F. Supp. 1372, 1381, 1384 (D. Alaska 1994) (holding that requiring sex offenders to appear for fingerprinting and sex offender registration is an unreasonable seizure, but that fingerprinting itself is not a search).

¹⁵⁸ See, e.g., *United States v. Laub Baking Co.*, 283 F. Supp. 217, 222–25 (N.D. Ohio 1968) (distinguishing the identification uses of fingerprints from evidentiary uses and holding that the identification use promotes a legitimate governmental interest that renders the fingerprinting of those formally charged with crimes not a search).

¹⁵⁹ See, e.g., *United States v. Mara*, 410 U.S. 19, 21 (1973) (no reasonable expectation of privacy implicated in being forced to provide a handwriting sample); *United States v. Dionisio*, 410 U.S. 1, 14–15 (1973) (no reasonable expectation of privacy implicated in being forced to provide a voice sample).

¹⁶⁰ See *infra* Part IV.

exception works well for a database system for authentication, how does that justify its application to a database for intelligence purposes?¹⁶¹

It is tempting to answer this last question by invoking the doctrine that once the government has acquired information legitimately, it may use it freely without again triggering the Fourth Amendment.¹⁶² For instance, once police, proceeding within the scope of a valid search warrant, learn that a suspect has a pair of size twelve Bruno Magli shoes in his closet, they may use this fact to tie the suspect to later crimes in which size twelve Bruno Magli shoeprints are discovered. Thus, courts have held that repeating a database trawl requires no further Fourth Amendment justification¹⁶³ and that acquiring a DNA profile pursuant to a court order in one case allows it to be reused in an independent investigation without a new court order.¹⁶⁴ Likewise, it is clear that police may use the information gleaned for a “special purpose” in a criminal case against the searched individual. For instance, the police may make an inventory of the possessions of detainees in accordance with a “standardized procedure” that advances “a range of governmental interests,”¹⁶⁵ and drugs discovered in such a special-needs search are admissible in a trial for illegal possession.¹⁶⁶ Similarly, it might

¹⁶¹ Compare Harold J. Krent, *Of Diaries and Data Banks: Use Restrictions Under the Fourth Amendment*, 74 TEX. L. REV. 49, 94–95 (1995) (arguing that, for fingerprinting, the governmental interest in identifying criminal suspects outweighs any privacy concerns), with Simmons, *supra* note 106, at 849 (advocating a doctrinal change that would forbid the state from making any criminal evidentiary use of the fruits of special-needs searches).

¹⁶² See, e.g., Jack M. Balkin, Essay, *The Constitution in the National Surveillance State*, 93 MINN. L. REV. 1, 20 (2008) (“The Fourth Amendment does not require governments to discard any information they have already lawfully collected.”).

¹⁶³ See *Boroian v. Mueller*, 616 F.3d 60, 62 (1st Cir. 2010) (holding that retrawling even after a sentence is completed is not a new search). For a defense of this result, see David H. Kaye, *DNA Database Trawls and the Definition of a Search in Boroian v. Mueller*, 97 VA. L. REV. IN BRIEF 41, 49 (2011).

¹⁶⁴ See, e.g., *Wilson v. State*, 752 A.2d 1250, 1268–69 (Md. Ct. Spec. App. 2000) (holding that fresh court authorization is not required before the police may use a sample validly collected for a different purpose); *People v. King*, 663 N.Y.S.2d 610, 614 (N.Y. App. Div. 1997) (“[O]nce a person’s blood sample has been obtained lawfully, he can no longer assert either privacy claims or unreasonable search and seizure arguments with respect to the use of that sample.”).

¹⁶⁵ See *Illinois v. Lafayette*, 462 U.S. 640, 646 (1983) (“[I]t is entirely proper for police to remove and list or inventory property found on the person or in the possession of an arrested person who is to be jailed. A range of governmental interests supports an inventory process.”); see also *id.* at 647 (“[S]tandardized inventory procedures are appropriate to serve legitimate governmental interests . . .”).

¹⁶⁶ *Id.* at 642–43. In *Lafayette*, Chief Justice Rehnquist referred to an “inventory search” as “a well-defined exception to the warrant requirement,” *id.* at 643, but the case plainly falls within the rubric of “special needs” announced two years later in *New Jersey v. T.L.O.*, 469 U.S. 325, 333 n.2 (1985), for the Court proceeded to balance “intrusion on the individual’s Fourth Amendment interests against . . . promotion of legitimate governmental interests.” *Lafayette*, 462 U.S. at 644 (quoting *Delaware v. Prouse*, 440 U.S. 648, 654 (1979) (internal quotation marks omitted)).

seem that once the state has stored a fingerprint for authentication in the event of later arrests or has run a fingerprint through an AFIS database to authenticate identity, it also may check it against latent prints from unsolved crimes. The argument proceeds in two quick steps. First, the state may collect the sample without a warrant to meet the special interest in authentication. Second, having legitimately acquired the sample, the state may use it for investigation.

Two Supreme Court cases stand in the way of this two-step shuffle. In *City of Indianapolis v. Edmond*,¹⁶⁷ the Court declined to apply the special-needs exception to a program in which police used dogs to sniff for drugs in vehicles pulled over in groups at fixed roadblocks.¹⁶⁸ Distinguishing sharply between “highway safety interests and the general interest in crime control,”¹⁶⁹ the majority reasoned that “[b]ecause the primary purpose of the Indianapolis narcotics checkpoint program is to uncover evidence of ordinary criminal wrongdoing, the program contravenes the Fourth Amendment.”¹⁷⁰ Likewise, in *Ferguson v. City of Charleston*, the Court invalidated a program in which a state university hospital tested urine samples from pregnant women for cocaine and reported positive results to the police to convince the women to participate in substance-abuse counseling in lieu of criminal prosecution.¹⁷¹ Again, the majority of the Court emphasized “the relevant primary purpose”¹⁷²—which was said to be “the arrest and prosecution of drug-abusing mothers.”¹⁷³

These cases can block the first step of the shuffle. They purport to prevent the state from relying on the special-needs exception for a “program whose primary purpose [is] to detect evidence of ordinary criminal wrongdoing”¹⁷⁴ or whose “immediate objective [is] to generate evidence for law enforcement purposes”¹⁷⁵ But whether these words are an insurmountable obstacle to fingerprint intelligence databases is questionable. Neither *Ferguson* nor *Edmond* required the Court to distinguish between a primary and a secondary motive, or to respond to two

¹⁶⁷ 531 U.S. 32 (2000).

¹⁶⁸ *Id.* at 44.

¹⁶⁹ *Id.* at 40.

¹⁷⁰ *Id.* at 41–42. Six Justices subscribed to this view. Justice O'Connor wrote the majority opinion. Chief Justice Rehnquist's dissenting opinion, which was joined, in part, by Justices Scalia and Thomas, argues against “a new non-law enforcement primary purpose test lifted from a distinct area of Fourth Amendment jurisprudence relating to the searches of homes and businesses.” *Id.* at 53 (Rehnquist, C.J., dissenting).

¹⁷¹ 532 U.S. 67, 75–76 (2001).

¹⁷² *Id.* at 81.

¹⁷³ *Id.* at 82 (quoting *Ferguson v. City of Charleston*, 186 F.3d 469, 484 (4th. Cir. 2009) (Blake, J., dissenting in part)).

¹⁷⁴ *City of Indianapolis v. Edmond*, 531 U.S. 32, 41 (2000).

¹⁷⁵ *Ferguson*, 532 U.S. at 83.

motives of equal importance. Despite the Court's use of the words "primary" and "secondary," neither *Ferguson* nor *Edmond* was a mixed-motive case. Both were single-motive cases involving single-purpose programs. As a result, the "primary purpose" language is dicta.

Because this aspect of the cases has generally gone unnoticed, it may be helpful to elaborate slightly. In *Ferguson*, the state hospital adopted a cocaine testing program that relied on the criminal law not to punish women, but to induce them to comply with drug abuse programs.¹⁷⁶ Nevertheless, the state hospital established the testing program in consultation with the police department for the express purpose of obtaining evidence for criminal cases.¹⁷⁷ Consequently, the Court was able to say that the *sole* immediate purpose of the program was to generate evidence against cocaine users for criminal prosecutions.¹⁷⁸ This, in turn, permitted the final conclusion: A program that has as its *only* immediate goal subjecting individuals to the criminal law involves no special needs.

Discerning the primacy of the general crime-control purpose in *Edmond* was even easier, for this was the *only* purpose the city proffered.¹⁷⁹ How the Court would have handled a more complicated system therefore remained unsettled. The majority was clear on this, stating that it was not considering "whether the State may establish a checkpoint program with the primary purpose of checking licenses or driver sobriety and a secondary purpose of interdicting narcotics."¹⁸⁰ The city could have accomplished this by initially establishing roadblocks strictly to check for intoxicated drivers. After employing this program for a decent interval, it could have added a dog-sniff in parallel with the sobriety check. The sobriety checkpoint would have been consistent with ample precedent allowing such stops for special needs.¹⁸¹ The interdiction-by-dog step would not have been a search. The Court already had held,¹⁸² and all the Justices in *Edmond* agreed,¹⁸³ that dog-sniffing for drugs does not rise to the level of a search. The *Edmond* majority specifically chose to "express no view on the question whether police may expand the scope of a license or sobriety checkpoint seizure in order to detect the presence of drugs in a stopped car."¹⁸⁴

¹⁷⁶ *Id.* at 83 ("[T]he threat of law enforcement intervention . . . provided the necessary 'leverage' to make the [p]olicy effective." (internal quotation marks omitted)).

¹⁷⁷ *Id.* at 82–83.

¹⁷⁸ *Id.* at 82–84.

¹⁷⁹ *Edmond*, 531 U.S. at 47 n.2.

¹⁸⁰ *Id.*

¹⁸¹ *E.g.*, *Mich. Dep't. of State Police v. Sitz*, 496 U.S. 444, 455 (1990).

¹⁸² *United States v. Place*, 462 U.S. 696, 706–07 (1983).

¹⁸³ *Edmond*, 531 U.S. at 40 (citing *Place*, 462 U.S. at 707); *id.* at 48, 52 (Rehnquist, C.J. dissenting).

¹⁸⁴ *Id.* at 47 n.2.

Mixed-motive or primary-purpose analysis is a major headache in many areas of the law, including torts, criminal law, and employment discrimination.¹⁸⁵ The analysis of purpose in constitutional adjudication is notoriously slippery.¹⁸⁶ It is not surprising that *Edmond* and *Ferguson* offer no guidance on how to handle a case in which the legislature or agency adopting a program of warrantless searches has simultaneously mixed motives—both normal law enforcement *and* other interests. Although the Court's discomfort with pretextual special-needs searching is understandable,¹⁸⁷ it is a little odd to consider motive at all in special-needs cases. How is it that the balance of interests permits dispensing with warrants or individualized suspicion when non-law enforcement interests alone are pursued, but not when both law enforcement and non-law enforcement interests reinforce each other?

Arrestee fingerprinting seems to present the situation that *Edmond* and *Ferguson* do not quite reach. Historically, authentication was the dominant reason for collecting prints; searching for matches to latent prints was secondary.¹⁸⁸ Given the confluence of good reasons to acquire prints, even today—when the authentication and intelligence functions of fingerprint databases are equally clear—the special-needs exception should apply. Courts should be able to balance the full set of government interests against the individual's Fourth Amendment interests to gauge reasonableness. The

185 See, e.g., Russell D. Covey, *The Unbearable Lightness of Batson: Mixed Motives and Discrimination in Jury Selection*, 66 MD. L. REV. 279 (2007) (distinguishing among several approaches to the problem of mixed motives in various areas and arguing against “mixed-motive analysis” as a defense to racially motivated peremptory challenges to jurors); David Crump, *Overruling Crawford v. Washington: Why and How*, 88 NOTRE DAME L. REV. 115, 134 (2012) (complaining that the primary-purpose test for determining whether a statement is “testimonial” and hence subject to the Confrontation Clause is indeterminate); Sandra F. Sperino, *Discrimination Statutes, The Common Law, and Proximate Cause*, 2013 U. ILL. L. REV. 1 (arguing that tort concepts of proximate cause should not be used in mixed-motive statutory discrimination cases).

186 The domains in which the Court considers whether legislation is motivated by an impermissible purpose are catalogued in Richard H. Fallon, Jr., *Foreword: Implementing the Constitution*, 111 HARV. L. REV. 54, 70–73 (1997). On the history of judicial methods for inferring motive, see Caleb Nelson, *Judicial Review of Legislative Purpose*, 83 N.Y.U. L. REV. 1784 (2008).

187 When a search or seizure is not conducted pursuant to a program that dispenses with individualized suspicion, or when such suspicion is present, the Court abjures all inquiry into motive and pretext. *Ashcroft v. Al-Kidd*, 131 S. Ct. 2074, 2082 (2011).

188 Simon A. Cole, *Fingerprint Identification and the Criminal Justice System: Historical Lessons for the DNA Debate*, in *DNA AND THE CRIMINAL JUSTICE SYSTEM: THE TECHNOLOGY OF JUSTICE* 63, 73 (David Lazer ed., 2004).

result, as indicated in the discussion of such interests in Part IV, would be for courts to sustain current fingerprinting practices.¹⁸⁹

B. DNA Databases for Authentication and Intelligence

The legislative history of existing arrestee DNA databases resembles the monochromatic evidence of motive in *Edmond* and *Ferguson*. Realistically, the overwhelming legislative purpose of arrestee sampling, given that fingerprinting already is in place, has been intelligence. Therefore, it seems difficult to use the two-step shuffle to justify DNA sampling on arrest.

Nonetheless, states can rebrand arrestee DNA profiling as a component of a multi-modal authentication system using fingerprints, photographs, iris scans, and who knows what else.¹⁹⁰ The cost and ease of DNA testing will continue to drop.¹⁹¹ Although fingerprints are superior to DNA for authentication when it is important to distinguish between monozygotic (identical) twins,¹⁹² computerized DNA profiles are easier to search for matching records without expert human assistance than are AFIS databases. Officials might want to store both fingerprint and DNA data for authentication, just as they once stored both anthropometric and fingerprint data. Indeed, in *Maryland v. King*, all fifty states argued in an amicus brief that “like photograph and palm print databases, forensic identification DNA databases are not superfluous to fingerprints even for record keeping purposes. DNA profiles can and do resolve conflicts in fingerprint and criminal history data, allowing states to recognize incorrect entries.”¹⁹³ Although this rationale seems like an afterthought, a state that has not adopted an arrestee DNA requirement could create a legislative

¹⁸⁹ See Krent, *supra* note 161 (arguing that it would be reasonable to create a fingerprint database for use in future investigations since the law enforcement interests outweigh the suspects’ privacy interests).

¹⁹⁰ Brief of California et al. as Amici Curiae Supporting Petitioner at 16, *Maryland v. King*, 133 S. Ct. 1 (2012) (No. 12-207) [hereinafter States’ Amicus Brief]; *Next Generation Identification*, FBI, http://www.fbi.gov/about-us/cjis/fingerprints_biometrics/ngi (last visited Feb. 11, 2013).

¹⁹¹ Only twelve years ago, DNA identification seemed so slow, expensive, and limited in the range of cases to which it would apply, that it could not match the power and ease of fingerprinting. See COLIN BEAVAN, *FINGERPRINTS: THE ORIGINS OF CRIME DETECTION AND THE MURDER CASE THAT LAUNCHED FORENSIC SCIENCE* 202 (2001) (arguing that fingerprinting is more useful than DNA analysis).

¹⁹² Differences between monozygotic twins probably can be detected in DNA samples, but the genetic or epigenetic features that might be useful change during the individuals’ lifetimes. See C.T. Li et al., *Epigenetics and Its New Progress in Monozygotic Twins*, 25 *FA YI XUE ZA ZHI* 212 (2009); Daniel Schlieper et al., *Discrimination of Monozygotic Twins (and Clones) on the DNA Level*, 1239 *INT’L CONGRESS SERIES* 857, 858 (2003) (suggesting a method to use DNA analysis to distinguish between monozygotic twins based on B lymphocytes).

¹⁹³ States’ Amicus Brief, *supra* note 190, at 19.

history indicative of multiple purposes, and states with laws in place could amend them to provide explicitly for *both* authentication and intelligence uses of the identification profiles.

To be sure, a court aggressively enforcing a primary-purpose test for special-needs balancing might dismiss this legislative strategy as ineffectual. Rather than pursue the questionable and elusive primary-purpose test, however, I shall move to the final issue in assessing the constitutionality of including arrestee data in biometric databases. In the end, the issue is balancing. The route to this balancing could be the direct (and doubtful) step of totality balancing that the Court took in *Knights* and *Samson* for offenders on supervised release. It could be the special-needs exception for the pursuit of “normal” law enforcement interests (also doubtful for a database with a pure intelligence function but defensible for a database with a mixed function). Or, as discussed below, it could be the exception-creating balancing long associated with the warrant requirement.

IV. BALANCING AND THE BIOMETRIC EXCEPTION

The courts that have balanced the interests of the state and the arrested individual, whether under the totality-of-the-circumstances or the special-needs rubric, have generally agreed on the constitutionality of DNA collection before conviction.¹⁹⁴ The range of interests considered in this mélange of cases varies, as does the willingness of each judge to give much weight to various factors. To avoid repetition and inordinate detail on each balancing test, I shall present and assess the more significant interests in the context of the pre-exception balancing that have led the Supreme Court to recognize certain exceptions to the general rule that a search requires a warrant and probable cause. The balancing analysis would be quite similar under the label of “special needs” or “totality of the circumstances.” I begin with the government’s interest in gathering biometric data, then proceed to

¹⁹⁴ Six of these ten courts have found that the scales tip in favor of DNA-BC. See Kaye, *Scorecard*, *supra* note 5. However, dissenting judges in some of these cases sharply criticized the majorities’ evaluation of the balance of interests. See, e.g., *Haskell v. Harris*, 669 F.3d 1049, 1073 (9th Cir. 2012) (Fletcher, J., dissenting) (“[I]f DNA is taken from arrestees . . . for the purposes of identification, that taking is permissible. However, if it is taken solely for the purposes of investigation, that taking is a seizure in violation of the Fourth Amendment.”), *vacated and reh’g en banc granted*, 686 F.3d 1121 (9th Cir. 2012); *United States v. Mitchell*, 652 F.3d 387, 416 (3d Cir. 2011) (en banc) (Rendell, J., dissenting) (“[T]he majority gives short shrift to an arrestee’s and pretrial detainee’s expectation of privacy in his DNA, reducing it to an interest in identity only, and overstates the significance of the Government’s interest in collecting evidence to solve crimes.”); *United States v. Pool*, 621 F.3d 1213, 1234, 1238 (9th Cir. 2010) (Schroeder, J. dissenting) (dismissing the government’s professed interests as “meaningless” or inapposite prior to a conviction), *vacated as moot*, 659 F.3d 761 (9th Cir. 2011) (en banc).

the individual's interests in not revealing the data. The analysis supports a unified and circumscribed biometric exception that permits the government to acquire fingerprints and DNA before any conviction.

A. The Authentication Interest: True Identity

As discussed in Part I, the state has substantial interests in knowing who is who. These include deciding whether an individual is a flight risk, providing prosecutors with criminal history information before trial, deciding the conditions under which a detainee should be housed, notifying next of kin in the event of the death or serious illness of an arrestee, supplying judges or jurors with relevant information during the guilt or sentencing phases of a criminal trial, and giving employers and others data on whom they might hire for sensitive positions.¹⁹⁵ Authentication, as we saw, was the principal, original motivation for taking bodily measurements, and soon thereafter, fingerprints of arrestees.¹⁹⁶

At first blush, it might seem as if the same cannot be said of DNA samples. Dismissing the government's analogy of DNA sampling to fingerprint collection as "pure folly," the *United States v. Mitchell* district court wrote

[F]ingerprints already provide an unequivocal, and in some respects, a better record of personal identity than forensic DNA typing. Monozygotic twins, for example, can be distinguished by their fingerprints, but not by their DNA. . . . The only reasonable use of DNA is investigative, it is not an identification science[,] it is an information science. The identification issue in this instance is a red herring, as there is no compelling reason to require a DNA sample in order to "identify" an arrestee.¹⁹⁷

The Maryland Court of Appeals took the same position in *King v. State*, when it insisted that "identification is not what King's DNA sample was used for or needed [for] . . . Solving cold cases . . . was the only State interest served by the collection of his DNA."¹⁹⁸

This is a fair point with respect to the status quo, but an interest need not be "compelling" to be cognizable. Several circuits have noted that a determined criminal can alter his appearance and fingerprints to disguise his identity.¹⁹⁹ The Constitution does not lock the state into a single system

¹⁹⁵ See *supra* Part I.A.

¹⁹⁶ See *supra* Part III.

¹⁹⁷ 681 F. Supp. 2d 597, 608–09 (footnote omitted).

¹⁹⁸ 42 A.3d 549, 578 (Md. 2012), *cert. granted sub nom.* Maryland v. King, 133 S. Ct. 594 (2012).

¹⁹⁹ *Mitchell*, 652 F.3d at 414; *Jones v. Murray*, 962 F.2d 302, 307 (4th Cir. 1992). The *King* court responded by leaving the door to DNA sampling open for "conceivable, albeit somewhat unlikely, scenarios where an arrestee may have altered his or her fingerprints

for authentication. Given the inherent limitations of identifiers like driver's licenses, a more secure system for establishing personal identity would involve multiple modes of on-the-spot biometric authentication. Police already are experimenting with portable fingerprint scanners to "cut through nonsense on the street when suspects try to stall cops by using a seemingly endless string of aliases" and "to identify the dead at homicide and accident scenes."²⁰⁰ But "lights-out" AFIS searches do not yet work for latent prints.²⁰¹ In the not-so-distant future, portable devices for STR analysis should be operational.²⁰² At that point, *Mitchell's* red herring could be replaced by a different kettle of fish.²⁰³ Including DNA profiling in a combination of biometrics for authentication might or might not be a good use of resources,²⁰⁴ but this is not something a court should decide. The marginal benefit of DNA profiling is not compelling, but neither is it zero. DNA profiling and fingerprinting are not mutually exclusive.

B. The Intelligence Interest During and After the Pretrial Period

Courts are quick to describe the government's interests in using DNA databases to associate individuals with crime scene samples as "undeniably compelling" if not "monumental."²⁰⁵ Killers who left piles of bodies behind

or facial features (making difficult or doubtful identification through comparison to earlier fingerprints or photographs on record)." *King*, 42 A.3d at 580.

²⁰⁰ Rocco Parascandola, *NYPD Gets High-Tech Upgrade with New Portable Fingerprint Scanner*, N.Y. DAILY NEWS, Sept. 18, 2010, <http://www.nydailynews.com/new-york/nypd-high-tech-upgrade-new-portable-fingerprint-scanner-article-1.441512>.

²⁰¹ A "lights-out" search is one that involves no human interpretation. Moses, *supra* note 14, at 6-10 n.4, 6-20.

²⁰² See, e.g., Brief of Amicus Curiae National District Attorneys Association in Support of Petitioner at 20, *Maryland v. King*, 133 S. Ct. 594 (2012) (No. 12-207) ("Three companies have produced and are beginning to market Rapid DNA machines . . ."); Andrew J. Hopwood et al., *Integrated Microfluidic System for Rapid Forensic DNA Analysis: Sample Collection to DNA Profile*, 82 ANALYTICAL CHEMISTRY 6991 (2010) (describing an instrument that could conduct STR DNA analysis in a police station); Cedric Hurth et al., *An Automated Instrument for Human STR Identification: Design, Characterization, and Experimental Validation*, 31 ELECTROPHORESIS 3510 (2010) (describing a small instrument for performing DNA analysis cheaply and quickly).

²⁰³ Much of the questioning at the oral argument in *King* was devoted to this possibility. See David H. Kaye, *The Oral Argument in Maryland v. King—Part II, FORENSIC SCI., STATISTICS, AND THE LAW* (Mar. 3, 2013), http://for-sci-law-now.blogspot.com/2013/03/the-oral-argument-in-maryland-v-king_3.html.

²⁰⁴ See Brief of Amici Curiae 14 Scholars of Forensic Evidence in Support of Respondent, *Maryland v. King*, 133 S. Ct. 594 (2012) (No. 12-207) (arguing in part that DNA-BC is ineffective and undesirable).

²⁰⁵ *United States v. Pool*, 621 F.3d 1213, 1222 (9th Cir. 2011) (quoting *United States v. Kriesel*, 508 F.3d 941, 949 (9th Cir. 2007)), *vacated as moot*, 659 F.3d 761 (9th Cir. 2011) (en banc). During the oral argument in *King*, Justice Alito declared that "this is perhaps the most important criminal procedure case that this Court has heard in decades. . . . [T]his is what is at stake: Lots of murders, lots of rapes that can be—that can be solved

them and eluded investigators for decades have been apprehended as a result of database trawls.²⁰⁶ DNA evidence now produces revelations in crimes for which it was once thought to be useless.²⁰⁷ In one case, a dead mosquito in a stolen car led police to the suspected thief.²⁰⁸ In the fingerprinting arena, “cold hits” began as early as 1902.²⁰⁹ Today, they are ubiquitous,²¹⁰ and the FBI gives a Latent Hit of the Year award to one lucky examiner and posts a video about it on its website.²¹¹

Merely praising the power of high-tech fingerprint and DNA databases to help police crack tough cases, however, does not define the precise value of arrestee sampling. The more focused question is the government’s interests in collecting a DNA sample soon after an arrest “rather than after a person’s conviction”²¹² or possibly not at all (for systems that retain the arrest records with or without conviction). With regard to promptly linking an arrestee to an unsolved case, the *Pool* panel reasoned that “the government’s interests remain substantial” because

There is usually a lengthy period of time between an initial determination of probable cause and a person’s trial (and even more time before a conviction becomes final after an unsuccessful appeal). During this period of time, the government has an interest in determining whether the individual may be released pending trial without endangering society and ensuring that he or she complies with the conditions of his or her release. The collection of a DNA sample allows the government to ensure that the defendant did not commit

using this new technology that involves a very minimal intrusion on personal privacy.” Transcript of Oral Argument, *supra* note 7, at 35.

206 E.g., ANN RULE, GREEN RIVER, RUNNING RED: THE REAL STORY OF THE GREEN RIVER KILLER—AMERICA’S DEADLIEST SERIAL MURDERER 343, 360 (2004); Andrew Blankstein & Joel Rubin, *Grim Sleeper Suspect’s Photos of Women Released*, L.A. TIMES, Dec. 17, 2010, available at <http://articles.latimes.com/2010/dec/17/local/la-me-grim-sleeper-20101217>; Ruben Vives, *San Francisco Police Link ‘Night Stalker’ Richard Ramirez to Girl’s 1984 Slaying*, L.A. TIMES, Oct. 23, 2009, available at <http://articles.latimes.com/2009/oct/23/local/me-richard-ramirez23>. See *supra* Part I.C.

207 E.g., Shaila K. Dewan, *As Police Extend Use of DNA, A Smudge Could Trap a Thief*, N.Y. TIMES, May 26, 2004, at A1; Charlie Jannetto, *DNA Solves Wider Range of Crimes*, ARIZ. REPUBLIC, July 27, 2008, at B1.

208 *Mosquito Helps Police in Stolen Car Investigation*, TELEGRAPH, Dec. 22, 2008, available at <http://www.telegraph.co.uk/news/worldnews/europe/finland/3902862/Mosquito-helps-police-in-stolen-car-investigation.html>.

209 See *supra* Part III.A.

210 See *supra* Part I.B.

211 *Latent Hit of the Year Award Videos*, FBI, http://www.fbi.gov/about-us/cjis/fingerprints_biometrics/iafis/iafis_latent_hit_of_the_year (last visited July 15, 2011).

212 *United States v. Pool*, 621 F.3d 1213, 1223 (9th Cir. 2011), *vacated as moot*, 659 F.3d 761 (9th Cir. 2011) (en banc).

some other crime and discourages a defendant from violating any condition of his or her pretrial release.²¹³

Still more can be said. During the sometimes lengthy time required for case completion, “witnesses can become unavailable or their memories can fade, evidence can be lost, and the statute of limitations can run. Law enforcement could be . . . investigating innocent persons . . .”²¹⁴ Victims of crimes that could have been solved earlier may have to wait additional years for closure.²¹⁵ Exonerations could be delayed.²¹⁶

Furthermore, even arrestees who are not successfully charged, or defendants who ultimately are acquitted, can be dangerous. Even if they eventually end up in a convicted-offender database, how many people might they kill, rape, or rob in the interim? Although it would be unfair to tarnish all arrestees with this broad a brush,²¹⁷ there are disturbing anecdotes. The man indicted in Los Angeles’s “Grim Sleeper” crimes could have been apprehended years earlier—and an untold number of rapes and murders prevented—had his arrests prompted DNA profiling.²¹⁸ Advocates of arrestee DNA sampling have produced scores of other examples of preventable major crimes.²¹⁹ Although systematic research would be far

213 *Id.* The Third Circuit refuses to count the detection and deterrence of violations of pretrial release as a legitimate government interest on the curious ground that “[a]ny such interest is outweighed by the presumption of innocence.” *United States v. Mitchell*, 652 F.3d 387, 415 n.25 (3d Cir. 2011). Normally, the presumption of innocence in Anglo-American law is simply “a rule applicable at trial that the burden of proof is on the prosecution to prove the guilt of the defendant beyond reasonable doubt.” ANDREW C. STUMER, *THE PRESUMPTION OF INNOCENCE: EVIDENTIAL AND HUMAN RIGHTS PERSPECTIVES* xxxviii (2010). Thus, the Supreme Court wrote in *Bell v. Wolfish*, that the presumption of innocence “has no application to a determination of the rights of a pretrial detainee during confinement before his trial has ever begun.” 441 U.S. 520, 533 (1979). The European Court of Human Rights has adopted a more expansive view, but the addition of a “second, broader facet,” has been criticized as a “vaporous euphemism for fairness.” STUMER, *supra*, at xxxix (quoting Patrick Healy, *Proof and Policy: No Golden Threads*, 1987 CRIM. L. REV. 355, 365).

214 Appellee’s Brief at 41, *Haskell v. Brown*, No. 10-10-15152 (9th Cir. Mar. 18, 2010).

215 *Id.*

216 See Lawrence Mower & Doug McMurdo, *Las Vegas Police Reveal DNA Error Put Wrong Man in Prison*, LAS VEGAS REVIEW-JOURNAL, July 8, 2011, available at <http://www.lvrj.com/news/dna-related-error-led-to-wrongful-conviction-in-2001-case-125160484.html> (DNA database hit producing an exoneration that would not have occurred otherwise).

217 See *United States v. Mitchell*, 681 F. Supp. 2d 597, 606 (W.D. Pa. 2009) (invoking “the moral polestar of our criminal justice system—the presumption of innocence”).

218 Gillian Flaccus, *‘Grim Sleeper’ Suspect Had 4-Decade Arrest Record*, WASH. TIMES, July 10, 2010, available at <http://www.washingtontimes.com/news/2010/jul/10/grim-sleeper-suspect-had-4-decade-arrest-record>.

219 See, e.g., 151 CONG. REC. S13756, (daily ed. Dec. 16, 2005) (statement of Sen. Kyl) (“We know from real life examples that an all-arrestee database can prevent many future offenses. In March of this year, the City of Chicago produced a case study of eight serial killers in that city who would have been caught after their first offense—rather than after their fourth or tenth—if an all-arrestee database had been in place.”); States’ Amicus

better than the advocacy reports,²²⁰ it is hard to deny that arrestee fingerprinting and DNA profiling and databasing (especially if the record remains in the database after an acquittal or dismissal) advances—to some degree—a compelling government interest.

C. *A Lesser Intrusion*

Courts usually say two things about the interests of convicted offenders or arrestees in avoiding fingerprinting or DNA profiling—that these interests are of minor weight,²²¹ and that an arrest or conviction diminishes them even further.²²² Below, I argue that the former statement is correct and that it should prompt the adoption of a categorical exception to the warrant requirement for biometric data such as fingerprints and DNA profiles. As a description of the weight of the affected individuals' interest, however, the latter statement betrays a basic confusion. Prisoners do not lose the right to keep officials out of their living quarters *because* they enter prison with a diminished interest in privacy. Rather, they have a diminished expectation because the state has excellent reasons to inspect their cells.²²³ Arrestees do not lose any right to keep their fingerprint patterns to themselves *because* they have a reduced interest in secrecy. Rather, they have a reduced expectation because the state has strong reasons to acquire their prints. The language of diminished or reduced expectations is not the premise of an argument. It is the conclusion.²²⁴ The phrase does not mean that anyone starts out with a weaker interest. It means that the arrested or convicted individual's interests do not prevail. To ascertain whether this conclusion is correct, we need to give due weight to the interests that everyone has in being free from unwanted intrusions. I therefore examine these interests and then show how they support an exception for biometric data.

Brief, *supra* note 190; Ashby Jones, *Arrested and Swabbed: DNA Tests Challenged*, WALL ST. J., Aug. 11, 2011, at A3 (listing similar reports). But see *supra* note 19 (describing a limitation in these studies).

²²⁰ See *supra* Part I.B.

²²¹ E.g., *United States v. Sczubelek*, 402 F.3d 175, 177 (3d Cir. 2005) (“The government’s interest in building a DNA database for identification purposes . . . outweighs the minimal intrusion into a criminal offender’s diminished expectation of privacy.”).

²²² E.g., *id.* at 177; *People v. Garvin*, 847 N.E.2d 82, 92 (Ill. 2006).

²²³ See, e.g., *Jones v. Murray*, 962 F.2d 302, 311 (4th Cir. 1992) (Murnaghan, J., concurring in part and dissenting in part).

²²⁴ See *United States v. Mitchell*, 652 F.3d 387, 412 (3d Cir. 2011) (en banc) (“[B]ecause DNA profiles developed pursuant to the DNA Act function as ‘genetic fingerprints’ used only for identification purposes, arrestees and pretrial detainees have reduced privacy interests in the information derived from a DNA sample.”).

1. *Freedom of Movement and Physical Intrusion*

Bodies are special. They are the mind's interface with and gateway to the physical universe. Fourth Amendment law respects individual claims to control entry into the body and to direct its movements.²²⁵ Detention of the body is a seizure of the person, and entry into it a search.²²⁶ However, the interest in freedom of movement is largely beside the point when the individual already is legitimately in custody.²²⁷ A statute might authorize the use of force to hold a person still if the individual resists physically,²²⁸ but the principal seizure of the person lies in the detention of the arrested or convicted individual.²²⁹ This detention is neither more nor less of an infringement of liberty of motion because the state seeks to obtain a fingerprint or a DNA sample during the period when it has legal custody of the individual.²³⁰ As for the intrusiveness of collecting the information, fingerprinting requires no entry into the body, and courts are virtually unanimous in regarding "the collection of biological samples [for routine DNA profiling as] only a minimal intrusion on one's personal physical integrity."²³¹ In short, with respect to bodily integrity, the analogy between

²²⁵ For a detailed discussion of the Court's cases on what constitutes entry into the body, see Kaye, *Arrest*, *supra* note 7, at 476–81.

²²⁶ See *United States v. Dionisio*, 410 U.S. 1, 8 (1973).

²²⁷ See, e.g., *United States v. Kelly*, 55 F.2d 67, 68 (2d Cir. 1932) (observing that a search of a person and seizure of evidence has long been allowed after a lawful arrest). When the individual is not in custody, this factor has more bearing on the classification. See *Skinner v. Ry. Labor Execs.' Ass'n*, 489 U.S. 602, 618 (1989) (indicating that any limitation of a person's freedom of movement necessary to conducting a search must be considered in assessing the intrusiveness of the search).

²²⁸ See David H. Kaye, *Forceful DNA Collection from Recalcitrant Prisoners*, DOUBLE HELIX LAW (Apr. 17, 2011, 9:20 AM), <http://www.personal.psu.edu/dhk3/blogs/DoubleHelixLaw/2011/04/forceful-dna-collection-from-recalcitrant-prisoners.html>.

²²⁹ Cf. *Pennsylvania v. Mimms*, 434 U.S. 106, 111 (1977) (ordering a driver who has already been stopped to exit the car is a "de minimis" interference with freedom of movement). Even if resort to reasonable force is a separate Fourth Amendment seizure, it is a permissible means of executing a search. See, e.g., *Carr v. State*, 728 N.E.2d 125, 128–29 (Ind. 2000) (forcibly anesthetizing a suspect who would not comply with an order for taking dental impressions was reasonable under the Fourth Amendment); *People v. Buza*, 129 Cal. Rptr. 3d 753, 756 (Cal. Ct. App. 2011), *rev. granted*, 262 P.3d 854 (Cal. 2011) (noting the issuance of an order permitting police to use "reasonable force . . . to bring defendant . . . into compliance").

²³⁰ Cf. *Illinois v. Caballes*, 543 U.S. 405, 409 (2005) (holding that the use of a drug-sniffing dog on a car that was legitimately stopped for a traffic offense does not constitute a Fourth Amendment "search").

²³¹ *Green v. Berge*, 354 F.3d 675, 677 (7th Cir. 2004); see also, e.g., *Rise v. Oregon*, 59 F.3d 1556, 1560 (9th Cir. 1995) ("That the gathering of DNA information requires the drawing of blood rather than inking and rolling a person's fingertips does not elevate the intrusion upon the plaintiffs' Fourth Amendment interests to a level beyond minimal. The Supreme Court has noted repeatedly that the drawing of blood constitutes only a minimally intrusive search." (footnote omitted)); *State v. O'Hagen*, 914 A.2d 267, 280

fingerprinting and DNA sampling is strong. Neither procedure seriously impacts this pair of interests.

2. *Secrecy and Privacy for Purely Identifying Information*

There are many things we would like to keep secret. With the possible exception of any living saints, many disclosures of information about individuals can be harmful to them. Certainly, most criminals would rather not be caught. They would not want a fingerprint or DNA sample to lead police to suspect their involvement in a crime. By itself, the discovery that an individual is (or merely might be) responsible for or involved in a crime does not infringe a legitimate interest, let alone an interest that the Fourth Amendment respects.²³² A bare desire to keep fingerprints or DNA base pairs secret deserves *no* weight in the constitutional calculus. There is something more to be said for a desire to hide one's true identity and start anew, but not enough to produce a significant interest in keeping purely identifying data used only for authentication out of government records.²³³

A different use of purely identifying data deserves greater attention. An arrestee could complain that forging the link to the crime scene invades the distinct interest in keeping one's whereabouts secret. A concern with spatial privacy seems to sit more comfortably within the Fourth Amendment than the desire for freedom from prosecution. In *United States v. Karo*,²³⁴ for example, the Supreme Court held that planting a beeper in a container of ether and tracking the container's movements through houses and other locations constituted a search.²³⁵ A database trawl of an arrestee's fingerprint or DNA profile might produce a match to a print or DNA sample found in the bedroom of a murdered woman, which in turn, might lead to the discovery that the arrestee was having an affair with her.

Nonetheless, database trawling differs from the investigatory technique in *Karo*, and the Supreme Court never has viewed the Fourth Amendment as protecting mere information about a person's locations. "Staking out" a suspect's residence and "tailing" him gives the police a record of the

(N.J. 2007) ("We harbor no doubt that the taking of a buccal cheek swab is a very minor physical intrusion upon the person."). The situation for DNA and fingerprints is therefore quite different from that for drug testing of urine, for which "the process of collecting the sample . . . may in some cases involve visual or aural monitoring of the act of urination, [which] itself implicates privacy interests." *Skinner v. Ry. Labor Execs.' Ass'n*, 489 U.S. 602, 617 (1989).

²³² See, e.g., *Rakas v. Illinois*, 439 U.S. 128, 143 n.12 (1978) ("Obviously, however, a 'legitimate' expectation of privacy by definition means more than a subjective expectation of not being discovered.").

²³³ See *supra* Part I.A (rejecting as implausible the claim to a discontinuous identity).

²³⁴ 468 U.S. 705 (1984).

²³⁵ *Id.* at 719.

individual's movements, but that does not make these time-honored practices "searches" that trigger Fourth Amendment protections. Only when the government has committed a trespass to a chattel²³⁶ or entered—physically or technologically—spaces cloaked in a reasonable expectation of privacy has the Court treated the gathering of intelligence about the locations of people or objects as a search.²³⁷ Just because police investigations establish that individuals visited certain places at certain times does not mean that they implicate a reasonable expectation of privacy. It is one thing to place a television monitor in a bedroom, as in Orwell's *1984*, or to track the movements of a private car every minute of every day, as in *United States v. Jones*.²³⁸ It is another to discover trace evidence that might have come from an intruder at one moment in time in a bedroom or a car.

Significantly, the Court never has recognized the impact of trace evidence on momentary spatial privacy as sufficient to constitute a search, let alone as the basis for a weighty interest.²³⁹ In *United States v. Edwards*,²⁴⁰ the Court, in dealing with paint chips removed from the clothing of an arrestee, observed that there was no "doubt that clothing or other belongings may be seized upon arrival of the accused at the place of detention and later subjected to laboratory analysis or that the test results are admissible at

²³⁶ *United States v. Jones*, 132 S. Ct. 945, 950 (2012) ("[F]or most of our history the Fourth Amendment was understood to embody a particular concern for government trespass upon the areas . . . it enumerates.").

²³⁷ *See, e.g.*, *Florida v. Jardines*, No. 11-564, 2013 WL 1196577 (U.S. Mar. 26, 2013) (holding that taking a dog, trained to alert to drugs, onto the porch of a house to see if drugs are inside is a search); *Kyllo v. United States*, 533 U.S. 27, 29, 34 (2001) (holding that thermal-imaging of a home from a public street to detect relative amounts of heat within the home constitutes a search because it can reveal legal and illegal activities within the house that would not otherwise have been discovered without entering the premises); *Karo*, 468 U.S. at 714 (holding that monitoring a beeper as it moves through a private residence constitutes a search).

²³⁸ 132 S. Ct. at 948 (noting that the car was tracked for twenty-eight days).

²³⁹ Four Justices in *Jones* regarded "long-term monitoring of . . . a person's movements on public streets" as infringing a reasonable expectation of spatial privacy. *Id.* at 958 (Alito, J., concurring). The plurality emphasized that "relatively short-term monitoring of a person's movements on public streets accords with expectations of privacy that our society has recognized as reasonable." *Id.* at 964. Justice Sotomayor agreed that it was proper to "ask whether people reasonably expect that their movements will be recorded and aggregated in a manner that enables the Government to ascertain, more or less at will, their political and religious beliefs, sexual habits, and so on" in deciding whether "a reasonable societal expectation of privacy" exists for long-term GPS monitoring of a vehicle. *Id.* at 954 (Sotomayor, J., concurring). For further discussion of this privacy-in-the-aggregate theory, *see* Kerr, *supra* note 130.

²⁴⁰ 415 U.S. 800 (1974).

trial.”²⁴¹ That the laboratory analyses could implicate spatial privacy was of no constitutional moment.²⁴²

Thus, the various claims for keeping secret purely identifying information that could link an individual to a crime scene are weak. The Court recognized as much in *Davis v. Mississippi*,²⁴³ its leading case on fingerprinting. A woman in Meridian, Mississippi, reported that “a Negro youth” broke into her home and raped her. Police, “without warrants, took at least 24 Negro youths,” including Davis, “to police headquarters where they were questioned briefly, fingerprinted, and released without charge.”²⁴⁴ After Davis’s fingerprints were discovered to match those lifted from the windowsill, he was indicted, tried, and convicted.²⁴⁵ His objection to the admission of the fingerprint evidence was overruled, and the Mississippi Supreme Court affirmed the conviction on the theory that fingerprint evidence is so reliable that the Fourth Amendment exclusionary rule does not apply to this evidence.²⁴⁶ The U.S. Supreme Court reversed. The Court held that the Fourth Amendment requires the exclusion of evidence that is the fruit of an unreasonable search or seizure, regardless of how reliable that evidence may be.²⁴⁷

The Court did not state or imply that the acquisition of the prints and their subsequent analysis made the procedure unconstitutional. Reasoning that Davis was detained without a warrant and without probable cause, and that he was not merely fingerprinted but interrogated, the Court concluded that the resulting fingerprints were inadmissible.²⁴⁸ The Court’s view of fingerprinting itself was positive. After establishing that “[d]etentions for the sole purpose of obtaining fingerprints are . . . subject to the constraints of the Fourth Amendment,”²⁴⁹ Justice Brennan, writing for the majority of the Court, added that

²⁴¹ *Id.* at 803–04.

²⁴² One might argue that databases will increase the number of cases in which trace evidence implicates spatial privacy to the point where the Court should rethink its Fourth Amendment jurisprudence. *Cf. Jones*, 132 S. Ct. at 964 (Alito, J., concurring) (describing how long-term technological monitoring is more problematic under the Fourth Amendment than is short-term monitoring). But larger databases are also more productive ones, thus fortifying the government’s claim that the databases advance vital interests.

²⁴³ 394 U.S. 721 (1969).

²⁴⁴ *Id.* at 722.

²⁴⁵ *Id.* at 723.

²⁴⁶ *Id.* at 723–24.

²⁴⁷ *Id.* at 724; *see also* *Hayes v. Florida*, 470 U.S. 811, 813–14 (1985) (applying *Davis* to fingerprints acquired by bringing a suspect to the police station without a warrant or probable cause).

²⁴⁸ *Davis*, 394 U.S. at 726–28.

²⁴⁹ *Id.* at 721.

Detention for fingerprinting may constitute a much less serious intrusion upon personal security than other types of police searches and detentions. Fingerprinting involves none of the probing into an individual's private life and thoughts that marks an interrogation or search. Nor can fingerprint detention be employed repeatedly to harass any individual, since the police need only one set of each person's prints. Furthermore, fingerprinting is an inherently more reliable and effective crime-solving tool than eyewitness identifications or confessions Finally, because there is no danger of destruction of fingerprints, the limited detention need not come unexpectedly or at an inconvenient time.²⁵⁰

In this way, the Court opened the door to the possibility that "the requirements of the Fourth Amendment could be met by narrowly circumscribed procedures for obtaining, during the course of a criminal investigation, the fingerprints of individuals for whom there is no probable cause to arrest."²⁵¹ Of course, the *Davis* dictum, now implemented in procedures for ordering suspects to submit to DNA sampling for identification,²⁵² still requires at least some individualized suspicion and judicial review—but only because of the compelled appearance of the suspect. When the appearance occurs pursuant to grand jury subpoena, neither the compulsion to be present²⁵³ nor the cooperation necessary to acquire a voice exemplar²⁵⁴ or a handwriting sample²⁵⁵ is considered a search or seizure. When the appearance is the result of a valid arrest, based on probable cause—as it is for arrestee fingerprinting and DNA sampling—the only Fourth Amendment barrier recognized in *Davis* dissolves.²⁵⁶

²⁵⁰ *Id.*

²⁵¹ *Id.* at 728.

²⁵² See, e.g., *In re Nontestimonial Identification Order Directed to R.H.*, 762 A.2d 1239, 1240 (Vt. 2000) (upholding as constitutional "a nontestimonial identification order that required [a suspect] to submit to the collection of cheek epithelial cells" on a showing of reasonable suspicion); Imwinkelried & Kaye, *supra* note 50, at 421–22 (describing statutes and court rules requiring suspects to supply physical evidence on a showing of reasonable suspicion that are "broad enough to apply to DNA samples").

²⁵³ *United States v. Dionisio*, 410 U.S. 1, 8 (1973) ("[A] subpoena to appear before a grand jury is not a 'seizure' in the Fourth Amendment sense . . .").

²⁵⁴ See *id.* at 15 ("[N]either the summons to appear before the grand jury nor its directive to make a voice recording infringed upon any interest protected by the Fourth Amendment . . .").

²⁵⁵ See *United States v. Mara*, 410 U.S. 19, 22 (1973) ("The specific and narrowly drawn directive requiring the witness to furnish a specimen of his handwriting violated no legitimate Fourth Amendment interest." (footnote omitted)).

²⁵⁶ The Court made this crystal clear in *Cupp v. Murphy*, 412 U.S. 291, 294–95 (1973) (noting that the respondent's detention was constitutional because the police had probable cause, and thus "[t]he vice of the detention in *Davis* is therefore absent"), and *Dionisio*, 410 U.S. at 11 ("[I]n *Davis* it was the initial seizure—the lawless dragnet detention—that violated the Fourth and Fourteenth Amendments, not the taking of the fingerprints *Davis* is plainly inapposite to a case where the initial restraint does not itself infringe the Fourth Amendment."). In *Haskell v. Harris*, 669 F.3d 1049 (9th Cir.

The Court's cases on biometric data thus reveal a perception that the noninvasive acquisition and analysis of purely biometric information carries with it a greatly diminished expectation of privacy.²⁵⁷ The intrusion on Fourth Amendment interests is significantly less than in the usual types of searches and seizures.

D. *The Biometric Exception Defined*

Combining the lesser intrusion associated with biometric searches with the government's substantial authentication and intelligence interests in having the biometric data makes the case for the biometric exception complete. It should be reasonable under the Fourth Amendment to acquire, analyze, store, and trawl biometric data without a warrant and without individualized suspicion when five conditions hold: (1) the person legitimately is detained (or the data are acquired without confining the individual); (2) the process of collecting the data is not physically or mentally invasive; (3) collection proceeds according to rules that prevent arbitrary selection of individuals; (4) the biometric data are used only to establish or authenticate the true identity of a given individual or to link individuals to crime scenes; and (5) the authentication or intelligence-gathering system is valid, reliable, and effective.

Condition (1) ensures that the interest in freedom of movement is not compromised. Condition (2) precludes intimate bodily invasions. Condition (3) removes one of the reasons for interposing a judicial magistrate between the police and the target of a search or seizure.²⁵⁸

2012), however, Judge Fletcher read *Davis* and a related case, *Hayes v. Florida*, 470 U.S. 811 (1985), for the proposition that “fingerprints may not be taken from an arrestee solely for an investigative purpose, absent a warrant or reasonable suspicion that the fingerprints would help solve the crime for which he was taken into custody.” *Id.* at 1066 (Fletcher, J., dissenting), *reh'g en banc granted and opinions vacated*, 686 F.3d 1121 (9th Cir. 2012). This characterization overlooks both the facts and the reasoning of the Court's opinions. See Kaye, *Drawing Lines*, *supra* note 29, at 17.

²⁵⁷ See Kaye, *Drawing Lines*, *supra* note 29 at 15–17; see also Kaye, *Arrest*, *supra* note 7, at 473–76.

²⁵⁸ If non-intimate biometric measurements are taken on all individuals who are detained for a given offense, and if individualized evidence is not needed to justify acquiring the biometric information, then, a judicial magistrate is not required to review the police officer's judgment on a case-by-case basis. In special-needs cases with these features, the Court has dispensed with the warrant process. See Kaye, *Arrest*, *supra* note 7 at 483–507. Outside of the special-needs area, the Supreme Court has been insensitive to bad faith or pretextual searches and seizures that are objectively justifiable. See *Kentucky v. King*, 131 S. Ct. 1849, 1856–59 (2011) (using an objective standard even when examining police-created exigent circumstances); *Ashcroft v. al-Kidd*, 131 S. Ct. 2074, 2083 (2011) (holding that “special-needs and administrative-inspection cases are unusual in their concern for pretext,” and that in all other cases, “the law demands that we look to whether the arrest is objectively justified, rather than to the motive of the arresting officer”); *Atwater v. City*

Conditions (4) and (5) indicate that the government's interest in acting is substantial. When these circumstances are satisfied, harms to individuals (outside of the prospect of criminal prosecution based on adequate evidence) and the benefits of judicial review are minor or atypical; hence, the balance between individual privacy and government interests routinely points to the reasonableness of the collection and use of the identifying data either to authenticate a person's identity or to obtain investigative leads. A categorical exception to the warrant requirement therefore is appropriate.²⁵⁹

However, even if the categorical exception for biometric data acquisition and use offers the least dangerous and most logical route to upholding a law enforcement database system, it is not a Proceed-Directly-to-Go card for AFIS or CODIS databases. For the exception to apply to these systems, the information content of fingerprints and DNA samples and profiles must be effectively limited to indicia of identity. Only then will the interests that individuals have in withholding the information be tissue thin. If the biometric data were used to infer thought processes or to uncover socially sensitive information, then condition (4) would not hold. To the extent that a biometric database houses such sensitive information, its existence poses a risk that it will be used for something other than authentication and developing leads to investigate.

Opponents of DNA-BC maintain that whereas ordinary fingerprints can reveal nothing but randomness in the uterine environment, DNA profiles may prove to contain individual health-related information, and DNA samples already do.²⁶⁰ In fact, some critics claim that the DNA variations

of *Lago Vista*, 532 U.S. 318, 346–47 (2001) (explaining that courts do not typically evaluate the police officer's subjective judgment at the time of the arrest and instead apply an objective reasonableness standard); *Whren v. United States*, 517 U.S. 806, 813 (1996) ("Subjective intentions play no role in ordinary, probable-cause Fourth Amendment analysis.").

²⁵⁹ In opposition to this proposal, it has been said that

the Court has not created a new exception to the Fourth Amendment in decades, and would likely do so now with great hesitation. The Supreme Court has never approved a suspicionless search involving bodily intrusion for a law enforcement purpose, and to do so here would be a substantial departure from traditional Fourth Amendment principles.

Sandra J. Carnahan, *The Supreme Court's Primary Purpose Test: A Roadblock to the National Law Enforcement DNA Database*, 83 NEB. L. REV. 1, 35 (2004) (footnote omitted). But regardless of whether the Court would hesitate or seize on the exception described here, the proposal is faithful to traditional Fourth Amendment principles. It is responsive to the interest in freedom from bodily intrusion. The biometric information itself also is not severely threatening to individual interests in informational privacy. A clear and candid exception is less of a departure from traditional Fourth Amendment principles than is naked totality balancing, and it is more direct than special-needs balancing for intelligence databases.

²⁶⁰ *E.g.*, *Haskell v. Harris*, 669 F.3d 1049, 1079 (9th Cir. 2012) (Fletcher, J., dissenting) ("[U]nlike DNA, a fingerprint says nothing about the person's health, their propensity

used for identification already are “medically relevant,” being “predictive of medically important genes” and “disrupt[ing] the way that genes are supposed to work, thereby causing disease.”²⁶¹

On this view, it would seem that fingerprinting qualifies for the biometric exception, but DNA sampling does not. But Part V shows that this view is oversimplified. It explains that DNA identification profiles are not known to include disease-causing mutations or to be currently useful to police, employers, or insurers who, it is said, might want genetic test results from the DNA of suspected or convicted offenders. Conceivably, however, determined officials could mine both fingerprints and DNA for more sensitive information than they do now. Under the biometric exception, the crucial question for both fingerprint and DNA databases then becomes whether courts should trust the government to extract only the identifying information. The answer, as discussed below, depends on the inherent or legally mandated safeguards in the system.

V. THE BIOMETRIC EXCEPTION APPLIED

A. Fingerprints

The perception that fingerprints are nothing more than random marks for differentiating among individuals is cultural, not scientific.²⁶² Friction ridge skin develops in the fetus in response to genetics (largely determining the overall ridge or pattern classification) and chaotic stresses (producing minutiae in the path followed by particular ridges).²⁶³ Therefore, some features are similar between siblings, especially identical twins, whereas the details of minutiae are random.²⁶⁴ A serious medical literature exists on correlations between abnormal features in friction ridge skin and

for particular disease, their race and gender characteristics, and perhaps even their propensity for certain conduct.” (quoting *United States v. Kincade*, 379 F.3d 813, 842 n.3 (9th Cir. 2004) (en banc) (Gould, J. concurring))); *Barry Steinhardt, Privacy and Forensic DNA Data Banks*, in *DNA AND THE CRIMINAL JUSTICE SYSTEM: THE TECHNOLOGY OF JUSTICE* 173, 173 (David Lazer ed., 2004).

²⁶¹ Adam Schwartz, Senior Staff Counsel, ACLU of Illinois, Address at the Symposium on Familial DNA Searching, Center on Wrongful Convictions, Northwestern University School of Law: DNA Familial Testing: Civil Liberties and Civil Rights Concerns, at 2 (Mar. 3, 2011), available at <http://www.aclu-il.org/wp-content/uploads/2011/03/Speech-DNA-familial-testing.pdf>.

²⁶² See Cole, *SUSPECT IDENTITIES*, *supra* note 149, at 117–18; COLE, *Fingerprint Identification*, *supra* note 188, at 77.

²⁶³ R. Austin Hicklin, *Anatomy of Friction Ridge Skin*, in 2 *ENCYCLOPEDIA OF BIOMETRICS* 23, 26 (Stan Z. Li ed., 2009).

²⁶⁴ *Id.* at 27; see also Sarah B. Holt, *Quantitative Genetics of Fingerprint Patterns*, 17 *BRIT. MED. BULL.* 247 (1961).

schizophrenia,²⁶⁵ Alzheimer's,²⁶⁶ chromosome abnormalities,²⁶⁷ diabetes,²⁶⁸ leukemia,²⁶⁹ thalassemia,²⁷⁰ and other diseases or conditions.²⁷¹ This is not to say that finger or palm prints are valid indicators of any of these conditions, especially by themselves,²⁷² but it does mean that medical researchers can find correlations between different traits that are influenced by common causes such as a disturbance in embryonic development.²⁷³

Nevertheless, that fingerprint data from arrestees can have genetic and medical significance does not make it a meaningful threat to privacy. The correlations may be so weak and nonspecific as to make the features worthless predictors of clinical conditions or predispositions. Moreover, conditions such as major birth defects may be apparent to police and the public in any event. The specter of a fingerprint database being used to determine the medical status or predispositions of arrestees is just that—an apparition with little substance. Fingerprinting on arrest satisfies the biometric exception to the warrant requirement.

B. DNA Profiles

The situation for a database of DNA profiles is more complex but roughly similar. For practical purposes, “the DNA profile derived from the defendant’s blood sample establishes only a record of the defendant’s

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- ²⁶⁵ E.g., Brendan D. Kelly et al., *Neurological Soft Signs and Dermatoglyphic Anomalies in Twins with Schizophrenia*, 19 EUR. PSYCH. 159, 161 (2004); Araceli Rosa et al., *Further Evidence that Congenital Dermatoglyphic Abnormalities Are Associated with Psychosis: A Twin Study*, 28 SCHIZOPHRENIA BULL. 697, 697 (2002); C.J. van Oel et al., *Differentiating Between Low And High Susceptibility To Schizophrenia In Twins: The Significance of Dermatoglyphic Indices in Relation to Other Determinants of Brain Development*, 52 SCHIZOPHRENIA RES. 181, 190–91 (2001).
- ²⁶⁶ E.g., Herman J. Weinreb, *Fingerprint Patterns in Alzheimer's Disease*, 42 ARCHIVES OF NEUROLOGY 50 (1985).
- ²⁶⁷ E.g., Terry Reed, *Review: Dermatoglyphics in Medicine—Problems and Use in Suspected Chromosome Abnormalities*, 8 AM. J. MED. GENETICS 411, 418–24 (1981).
- ²⁶⁸ See, e.g., Henry S. Kahn et al., *A Fingerprint Marker from Early Gestation Associated with Diabetes in Middle Age: The Dutch Hunger Winter Families Study*, 38 INT'L J. EPIDEMIOLOGY 101 (2009).
- ²⁶⁹ Mario Joseph Bukelo et al., *Palmar Dermatoglyphics in Children with Acute Lymphoblastic Leukemia—A Preliminary Investigation*, 18 J. FORENSIC LEGAL MED. 115 (2011).
- ²⁷⁰ Asena C. Dogramaci et al., *Dermatoglyphs in Patients with Beta-Thalassemia Major and Their Thalassemia Carrier Parents*, 33 COLLEGIUM ANTROPOLOGICUM 607 (2009).
- ²⁷¹ See e.g., Emily S. Todd et al., *Characterization of Dermatoglyphics in PHOX2B-confirmed Congenital Central Hypoventilation Syndrome*, 118 PEDIATRICS e408 (2006).
- ²⁷² See, e.g., Reed, *supra* note 267; Julian Verbov, *Clinical Significance and Genetics of Epidermal Ridges—A Review of Dermatoglyphics*, 54 J. INVESTIGATIVE DERMATOLOGY 261 (1970).
- ²⁷³ See, e.g., Blanka A. Schaumann & John M. Opitz, *Clinical Aspects of Dermatoglyphics*, 27 BIRTH DEFECTS: ORIGINAL ARTICLES SERIES 193 (1991).

identity”²⁷⁴—at least, for now, and with the caveat that this record is inherited and therefore can be used for parentage testing when the profiles of possible parents also are known. This section explains these conclusions. It introduces the terminology and basic ideas about the nature and operation of human genes, describes what is known about the locations and properties of the DNA sequences used in Combined DNA Index System (“CODIS”) databases, and notes the limitations on this knowledge.

1. *The Genetics of CODIS Profiles*²⁷⁵

A CODIS profile is basically a set of thirteen pairs of arbitrary numbers.²⁷⁶ Each pair comes from a particular location (a “locus”) on the pair of chromosomes that we normally inherit from our two parents. The numbers stand for the number of back-to-back copies of short DNA sequences called short tandem repeats (“STRs”). STRs resemble freight trains with different numbers of box cars—the more box cars, the longer the STR train. Each different number of box-car-like repeats is called an “allele.” The D5S818 locus, for example, is a place on chromosome 5 where people have an ATAG repeat. The most common such alleles are 11, 12, and 13; they make up over 85% of the alleles found in most major population groups in America.²⁷⁷ A man with eleven repeats on one copy of chromosome 5 and thirteen repeats on his other copy would have the type (11, 13)—meaning that he inherited the sequence (ATAG)₁₁ from one

²⁷⁴ *People v. Robinson*, 224 P.3d 55, 65 (Cal. 2010) (quoting *United States v. Kincade*, 379 F.3d 813, 837 (9th Cir. 2004) (en banc) (plurality opinion)).

²⁷⁵ Most of the material in this section is drawn without further attribution from the Brief of Genetics, Genomics, and Forensic Science Researchers as Amici Curiae in Support of Neither Party, *Maryland v. King*, 133 S. Ct. 1 (2012) [hereinafter *Scientists’ Brief*], *cert. granted*, No. 12-207, (U.S. Dec. 28, 2012), written by the author of this article, Hank Greely, and “physicians, human geneticists, statistical geneticists, molecular biologists, or other researchers in human genetics or forensic science” who include “members of the Institute of Medicine, of committees of the National Academy of Sciences and the National Institutes of Health, and [of] the editorial boards of numerous genetics journals.” *Id.* at 1. For more detail on the biology and biochemistry of genes, see, for example, JOCELYN E. KREBS ET AL., *LEWIN’S ESSENTIAL GENES* (3d ed. 2013), and JAMES D. WATSON ET AL., *MOLECULAR BIOLOGY OF THE GENE* (6th ed. 2008). Nontechnical presentations tailored to forensic genetics include DAVID H. KAYE, *THE DOUBLE HELIX AND THE LAW OF EVIDENCE* (2010), and David H. Kaye & George Sensabaugh, *Reference Guide on DNA Identification Evidence*, in *REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* 129, 129–210 (3d ed. 2011).

²⁷⁶ To cope with the growing size of the national DNA database (NDIS) and to achieve more compatibility with the databases of other countries, the FBI is considering adding more components to the profiles. Douglas R. Hares, Letter to the Editor, *Expanding the CODIS Core Loci in the United States*, 6 *FORENSIC SCI. INT’L: GENETICS* e52, e52 (2012).

²⁷⁷ John M. Butler et al., *Allele Frequencies for 15 Autosomal STR Loci on U.S. Caucasian, African American, and Hispanic Populations*, 48 *J. FORENSIC SCI.* 1 (2003).

parent and (ATAG)₁₃ from the other parent.²⁷⁸ All the CODIS STRs have repeat units like ATAG, that are four “letters” (nucleotide bases) long, making them “tetranucleotide repeats,” or “tetramers.” The complete set of twenty-six numbers specifying how many tetramers are present at each locus is the man’s CODIS profile.

For each locus, there is a range of repeat numbers observed in any population. These variations (“polymorphisms”) result from the fact that the molecule that copies DNA prior to cell division sometimes skips a repeat unit or replicates the same unit twice.²⁷⁹ In particular, a sperm or egg cell can have a different number of repeats at a locus than the father or mother inherited from their parents. This cell can result in a child with a novel number of repeats. This does not happen frequently, but over the generations, these new alleles can spread through the population. How quickly and to what extent a new allele establishes itself depends on the reproductive fitness of the individuals who carry it. If an allele is deleterious, natural selection tends to prevent it from spreading and becoming a permanent or major part of the population’s gene pool. The CODIS loci were selected from the many STRs scattered across the human genome in part because they have common alleles in all the major U.S. population groups and were not known to have any substantial disease associations in these populations. That is, they represent common, normal human variation.

Genes are DNA sequences that are “expressed” as proteins or as ribonucleic acid (“RNA”), a single-stranded molecule that is similar to DNA. In the first major step of the expression of proteins, the sequence information in “exons” and “introns” is copied into “precursor messenger RNA” (“pre-mRNA”). In the second major step, this pre-mRNA is modified at its ends, and parts that were copied from the “introns” of the gene are cut away (“spliced”). This processing of the pre-mRNA reduces the size of the transcript (often dramatically), protects it from being degraded, and facilitates its transportation from the cell nucleus to structures known as “ribosomes.” In the third step, the mature mRNA, having moved to the ribosomes, is “translated” into a protein product. Because the sequence information in the gene’s exons determines the mRNA sequence, and the mRNA sequence determines the structure of the protein, the gene is said to “encode” the protein.

In addition to the exons and introns, the gene has untranslated regions (“UTRs”) before the first exon and after the last one. These UTRs contain

278 (ATAG)_n denotes *n* ATAG repeats. For instance, (ATAG)₅ is (ATAG)(ATAG)(ATAG)(ATAG)(ATAG).

279 KREBS ET AL., *supra* note 275, at 24 (describing the result as “slippery sequence[s]”).

regulatory information about initiating and sometimes terminating transcription as well as splicing. Genes often are defined as the sequence from the leading UTR, through the exons and introns, and ending with the trailing UTR.²⁸⁰ Outside this region, in the “intergenic” spaces between genes, are “promoters,” “silencers,” and “enhancers” that help turn genes on and off or modulate the quantity of the proteins or RNAs that the genes encode. In addition, the intergenic DNA includes apparently nonfunctional gene fragments, pseudogenes, and transposable elements that can move from one place in the genome to another (usually leaving the original copy behind).

STRs can be located inside—or outside—of genes and intergenic regulatory elements. Because only three-letter “words” comprise the genetic code that translates mRNA to protein, even a difference of a single four-letter tetramer within an exon could have a dramatic effect on the structure of the protein product. What consequence, if any, this difference would have on the health or other traits of an individual is a further question,²⁸¹ but not one that need be resolved here, for the CODIS loci all lie outside of exons. Thus, they are not transcribed into stable mRNA (nor are they known to be transcribed into smaller RNAs that regulate transcription and translation). They also lie outside of UTRs and promoters. And, they are not known to interfere with silencers or enhancers.²⁸² Although this is not the end of the story, and there are other mechanisms by which the CODIS STRs could regulate gene expression or be coincidental markers for diseases or traits, these facts exclude several obvious ways in which the CODIS alleles could be the basis for inferring a person’s present or future health.

2. “Considerable Current Debate?”

Judicial and other ink has been spent trying to make it appear that CODIS STRs have some deep biological function that surely will turn them into a source of highly personal and sensitive medical information. Judges in the Ninth Circuit have suggested that the accidental repeat units “contain useful genetic programming material.”²⁸³ Four judges in *United States v. Kincade* worried that “extensive information can, or potentially could, be

²⁸⁰ See, e.g., *id.* at 97–98. The ideal definition of a gene is the subject of vigorous debate.

²⁸¹ Less disruptive triplet STRs within some of these regions are known to cause diseases, as are some triplet STRs found within UTRs and promoters. The total lengths of these triplet expansions lie well above the length range for CODIS STR polymorphisms. See, e.g., Albert R. La Spada & J. Paul Taylor, *Repeat Expansion Disease: Progress and Puzzles in Disease Pathogenesis*, 11 NATURE REV. GENETICS 247 (2010).

²⁸² However, the locations of all these regulatory elements have yet to be ascertained.

²⁸³ *United States v. Kincade*, 379 F.3d 813, 818 n.6 (9th Cir. 2004) (en banc) (plurality opinion).

gleaned from . . . even the ‘junk’ DNA currently used.”²⁸⁴ These judges chastised the majority of the en banc court in this DNA-AC case for not recognizing that “[t]he DNA ‘fingerprint’ entered into CODIS likely has the potential to reveal information about an individual’s ‘genetic defects, predispositions to diseases, and perhaps even sexual orientation.’”²⁸⁵ These judges also accepted at face value the prediction “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.”²⁸⁶ A similar perception apparently underlies the district court’s claim in *United States v. Mitchell* that “even though the taking of a sample may not be unreasonably intrusive, the search of the sample is quite intrusive, severely affecting Mitchell’s expectation of privacy in his most intimate matters.”²⁸⁷ The Maryland Court of Appeals in *King* was more circumspect, only claiming that there is “considerable current debate as to whether these ‘non-coding’ or ‘junk’ DNA provide no predictive genetic information.”²⁸⁸

However, the “considerable current debate” has more to do with projections for the future than with any current reality. That debate consists of a flurry of law review essays written six or seven years ago.²⁸⁹ First, Professor Elizabeth Joh wrote in 2006 that DNA samples might be used to lock people up on the basis of tests for a “crime gene,”²⁹⁰ that “markers now thought to be meaningless may be (and have been) found to contain predictive medical information,”²⁹¹ that all military personnel were having their DNA placed in a CODIS database,²⁹² and that shed or “abandoned” DNA “is a backdoor to population-wide data banking.”²⁹³ Second, I wrote a

²⁸⁴ *Id.* at 842 (Gould, J., concurring).

²⁸⁵ *Id.* at 850 (Reinhardt, J., dissenting).

²⁸⁶ *Id.*

²⁸⁷ *United States v. Mitchell*, 681 F. Supp. 2d 597, 609 (W.D. Pa. 2009); *see also* *People v. Buza*, 129 Cal. Rptr. 3d 753 (Cal. Ct. App. 2011), *rev. granted*, 262 P.3d 854 (Cal. 2011).

²⁸⁸ *King v. State*, 42 A.3d 549, 560 n.17 (Md. 2012), *cert. granted sub nom. Maryland v. King*, 133 S. Ct. 594 (2012).

²⁸⁹ The treatise, 4 David L. Faigman et al., *MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY* § 31:4, at 124 (2012), refers to “continued debates,” although it cites no scholarship continuing the debate after 2007.

²⁹⁰ Elizabeth E. Joh, *Reclaiming “Abandoned” DNA: The Fourth Amendment and Genetic Privacy*, 100 NW. U. L. REV. 857, 876–77 (2006).

²⁹¹ *Id.* at 870.

²⁹² *Id.* at 879. In reality, the only way the military samples can be analyzed in a criminal investigation is pursuant to court order in “an investigation or prosecution of a felony, or any sexual offense, for which no other source of DNA information is reasonably available.” 10 U.S.C. § 1565a (2006). The only way military samples can get into a federal database is through convictions (and as of January 2006, arrests) of specific soldiers for “qualifying military offense[s].” 10 U.S.C. § 1565.

²⁹³ Joh, *supra* note 290, at 874.

short corrective essay dismissing these scenarios as “science fiction.”²⁹⁴ With regard to health predictions from the CODIS profiles, I argued that the news articles on “junk DNA” that Professor Joh cited did not support her position that CODIS STRs were or were about to become valuable in clinical medicine or genetic counseling.

This exchange caught the eye of a professor of criminology, Simon Cole. In an essay on “Junk DNA”²⁹⁵ maintaining that the previous essays were oversimplified, Professor Cole rediscovered a point I had emphasized years earlier—that even if a particular allele does not cause a genetic disease or influence an observable trait, it could be associated with one.²⁹⁶ Going far beyond this theoretical possibility, however, Professor Cole insisted that “some forensic STRs *are* already predictive . . . of disease, and more may ultimately turn out to be.”²⁹⁷

Professor Cole’s treatment of the genetics literature prompted a fourth essay in this series.²⁹⁸ In an analysis of the underlying relationships that might permit predictions to be made, I tried to show that no CODIS locus had been shown to be a useful predictor of health status and that even with our advancing understanding of the mechanisms of gene expression and regulation, it was unlikely that police, database administrators, employers, or insurers soon would be able to look at a CODIS profile and make a reasonable prediction about the individual’s present or future health.²⁹⁹ At that point, the “academic debate”³⁰⁰ closed with a whimper.³⁰¹

294 Kaye, *Science Fiction*, *supra* note 62, at 62–63. For a more extended assessment of the prospects for finding a crime gene, see David H. Kaye, *Behavioral Genetics Research and Criminal DNA Databases*, 69 LAW & CONTEMP. PROBS. 259 (2006) [hereinafter Kaye, *Behavioral Genetics Research*].

295 Simon A. Cole, *Is the “Junk” DNA Designation Bunk?*, 102 NW. U. L. REV. COLLOQUY 54, 61–62 (2007).

296 David H. Kaye, *Two Fallacies About DNA Data Banks for Law Enforcement*, 67 BROOK. L. REV. 179, 187 (2001) (“[S]ome noncoding loci can indicate or predict disease states, and all loci, coding and noncoding alike, can be used for parentage testing.”).

297 Cole, *supra* note 295, at 59 (emphasis changed from original).

298 David H. Kaye, *Please, Let’s Bury the Junk: The CODIS Loci and the Revelation of Private Information*, 102 NW. U. L. REV. COLLOQUY 70 (2007).

299 *Id.* at 72–79. Professor Cole’s impression to the contrary, it seems, was based on misreading words such as “linkage” and “loss of heterozygosity” in John M. Butler, *Genetics and Genomics of Core Short Tandem Repeat Loci Used in Human Identity Testing*, 51 J. FORENSIC SCI. 253, 260 (2006); see also Schwartz, *supra* note 261, at 9 n.2 (misconstruing the same article). The article’s author, a chemist at the National Institute of Standards and Technology, describes the entire debate as “really a non-issue,” JOHN M. BUTLER, ADVANCED TOPICS IN FORENSIC DNA TYPING 226 (2011), prompted by “a misunderstanding by Simon Cole over some of the things I had written in a review article on STR markers.” *Id.* at 228.

300 King v. State, 42 A.3d 549, 560 n.17 (Md. 2012), *cert. granted sub nom.* Maryland v. King, No. 12-207 (U.S. Nov. 9, 2012).

3. Into the Unknown

Today, after some twenty years of research using CODIS loci and other STRs as possible markers for disease-causing variations in genes, no correlations that would allow valid predictions from the identification profiles have emerged. To be sure, there have been a few reports of some associations in some families or populations, but these associations have not been consistently replicated and shown to be applicable to the populations represented in U.S. databases.³⁰² To the contrary, the most recent published review concludes:

The . . . standard and recommended CODIS panels of STR loci . . . continue to be of limited significance for assessing phenotypes. . . . Several . . . overlay predicted sites for genomic regulation, but there is no evidence that any particular repeat [is] indicative of phenotype. The utility of the CODIS profile itself, even in light of the significance of various epigenetic effects and roles of noncoding RNAs, is limited to identification purposes at this time.³⁰³

But “at this time” does not mean “for all time,” and some advocates and legal scholars believe that recent discoveries regarding the complex system of gene regulation sound a death knell³⁰⁴—or at least a note of caution³⁰⁵—

301 See Simon A. Cole, *Coming Clean About “Junk DNA,”* 102 NW. L. REV. COLLOQUY 107, 107 (2007) (“I agree that the recent exchange . . . has probably beaten the ‘junk DNA’ horse past the point of expiration. One thing we all agree upon is that the potential privacy violations engendered by the storage of forensic DNA profiles in law enforcement databases is a ‘distraction’ . . . from the potential privacy issues posed by the storage of DNA samples in law enforcement and other government repositories.”); David H. Kaye, *Mopping Up After Coming Clean About “Junk DNA,”* Nov. 27, 2007 [hereinafter *Mopping Up*], available at http://papers.ssrn.com/abstract_id=1032094.

302 Scientists’ Brief, *supra* note 275, at 23–24; see also *infra* text accompanying note 309. The reader of only law review notes and treatises would not know this. See, e.g., Faigman et al., *supra* note 289; H. Brendan Burke, Note, *A “Special Need” for Change: Fourth Amendment Problems and Solutions Regarding DNA Databanking*, 34 STETSON L. REV. 161, 165 (2004) (“[J]unk DNA police use can also predict the subject’s susceptibility to diabetes.”); Ashley Eiler, Note, *Arrested Development: Reforming the Federal All-Arrestee DNA Collection Statute to Comply with the Fourth Amendment*, 79 GEO. WASH. L. REV. 1201, 1211 (2011) (“[J]unk DNA is increasingly considered to contain predictive medical and behavioral information.”); Jill C. Schaefer, Note, *Profiling at the Cellular Level: The Future of the New York State DNA Databanks*, 14 ALB. L.J. SCI. & TECH. 559, 577–78 (2004) (“A few years ago British scientists were able to find markers of susceptibility of type-one diabetes from Junk DNA.”).

303 Sara H. Katsanis & Jennifer K. Wagner, *Characterization of the Standard and Recommended CODIS Markers*, 58 J. FORENSIC SCI. S169 (2013).

304 *New Research on “Junk” DNA Raises Questions on Eve of Crucial Court Hearing*, ELEC. FRONTIER FOUND. (Sept. 11, 2012), <https://www.eff.org/deeplinks/2012/09/new-research-on-junk-dna-raises-questions> (“[R]esearch . . . confirms for the first time that over 80% of our DNA that was once thought to have no function, actually plays a critical role in controlling how our cells, tissue and organs behave . . . [T]he ENCODE research reinforces the points we’ve made multiple times before—that DNA—whether it is in the form of a full genetic sample or an extracted profile—can reveal an extraordinary

for continued assurances that CODIS profiles are not powerfully predictive. Caution about the future is wise, as the chicken discovered when the farmer who invariably had fed her every morning arrived the next day to wring her neck.³⁰⁶ A deeper understanding of gene regulation could show how some CODIS alleles actually do alter levels of gene activity so as to cause a disease. In fact, a few STRs in the introns of genes³⁰⁷ have been shown to regulate splicing and hence to alter mRNA transcripts.³⁰⁸ Only one of these is a CODIS locus (TH01), and efforts to associate the lengths of the TH01 STRs with diseases have produced inconsistent results and no useful disease predictions. Some researchers report no associations with any alleles in the TH01 STR locus. Some report positive associations with one allele. Some report negative associations with one allele. No two sets of researchers report associations with the same alleles.³⁰⁹ Still, future discoveries about

amount of private information about you, including familial relationships, medical history, predisposition for disease, and possibly even behavioral tendencies and sexual orientation.” (internal citations omitted)).

305 Natalie Ram, *Fortuity and Forensic Familial Identification*, 63 STAN. L. REV. 751, 759–60 (2011) (hypothesizing, with no analysis, that the CODIS STRs could be regulatory).

306 BERTRAND RUSSELL, *THE PROBLEMS OF PHILOSOPHY* 63 (1912) (“[M]ore refined views as to the uniformity of nature would have been useful to the chicken.”).

307 At least five CODIS loci reside in introns.

308 By altering splicing, an STR locus could influence levels of output or relative amounts of alternative forms of a transcript. See Scientists’ Brief, *supra* note 275, at 20; see also Joshua D. Groman et al., *Variation in a Repeat Sequence Determines Whether a Common Variant of the Cystic Fibrosis Transmembrane Conductance Regulator Gene Is Pathogenic or Benign*, 74 AM. J. HUM. GENETICS 176, 179 (2004) (relating variable penetrance of a TTTT sequence in intron 8 of the CFTR gene to longer (12 or 13 as opposed to 11) adjacent TG repeats; however, given that the disease phenotype requires a severe mutation on the other CFTR gene, even if the TG STR were among the CODIS alleles, a database record could not be used to predict the presence of the genetic disease). CODIS loci also might cause disease if they are transcribed to a kind of noncoding RNA that affects the quantity of a protein expressed in a cell. No such transcription has been observed. Scientists’ Brief, *supra*, at 19.

309 See E. Burgert et al., *No Association Between the Tyrosine Hydroxylase Microsatellite Marker HUMTH01 and Schizophrenia or Bipolar I Disorder*, 8 PSYCHIATRIC GENETICS 45 (1998) (finding no statistically significant association with the 10-repeat allele in a French sample from Alsace); Renata Jacewicz et al., *Association of the Tyrosine Hydroxylase Gene Polymorphism with Schizophrenia in the Population of Central Poland*, 42 PSYCHIATRIA POLSKA 583 (2008) (tentatively reporting a minor positive association with the 7-repeat allele and a minor negative one with the 9.3-repeat allele); Erik G. Jönsson et al., *Failure to Replicate an Association Between a Rare Allele of a Tyrosine Hydroxylase Gene Microsatellite and Schizophrenia*, 248 EUR. ARCH. PSYCHIATRY & CLINICAL NEUROSCIENCE 61, 62 (1998) (“[A] significant difference in overall tyrosine hydroxylase allele distribution was found between psychotic patients and control subjects.”); A. Kurumaji et al., *An Association of the Polymorphic Repeat of Tetranucleotide (TCAT) in the First Intron of the Human Tyrosine Hydroxylase Gene with Schizophrenia in a Japanese Sample*, 108 J. NEURAL TRANSM. 489, 491 (2001) (discovering no statistically significant associations for males in a Japanese sample and reduced incidence of the (6, 9) type in females); Rolando Meloni et al., *A Rare Allele of a Microsatellite Located in the Tyrosine Hydroxylase Gene Found in Schizophrenic Patients*, 318 COMPTES RENDU DE

STRs, together with more refined diagnostic classifications based on molecular methods, might lead to clinically meaningful predictions or diagnoses. Certainly, the previous decades of failure to find consistent associations between CODIS loci and disease status are not a logically conclusive argument.

It should be equally clear, however, that decisions of constitutional (or legislative) magnitude should not be based on the impression that *all* DNA sequence data will prove to be biologically significant and clinically applicable.³¹⁰ Contrary to impressions generated by “hyperbolic” media reports that 80% of the genome has been shown to be functional, no scientific publications state “that 100% or even 80% of the genome makes organs function, stimulates tissue growth, turns normal cells into cancerous ones, makes us tall or short, fat or skinny, gay or straight.”³¹¹ Furthermore, parts of the human genome could be replaced with a random sequence of DNA with no observable consequences.³¹² In addition, the lack of detectable selection pressure on the CODIS loci is reassuring.³¹³ Finally, considering the interactions of multiple genes and environmental factors, it is a safe bet

L'ACADÉMIE DES SCIENCES SÉRIE III 803, 806–07 (1995) (demonstrating that in French and Tunisian samples, a 10-repeat allele was seen in 5% and 9% of chronic schizophrenic patients, respectively, and in no unaffected control subjects).

310 Neither should they be made on the basis of assurances that simply because CODIS STRs are intergenic, they contain absolutely no information about any and all traits. That claim would be oversimplified. See Kaye, *supra* note 296 and accompanying text.

311 Scientists' Brief, *supra* note 275, at 31. On the sorry state of the science journalism, see, e.g., John Timmer, *Most of What You Read Was Wrong: How Press Releases Rewrote Scientific History*, ARS TECHNICA (Sept. 10, 2012), <http://arstechnica.com/staff/2012/09/most-of-what-you-read-was-wrong-how-press-releases-rewrote-scientific-history> (last visited Dec. 16, 2012).

312 See Sean R. Eddy, *The C-value Paradox, Junk DNA and ENCODE*, 22 CURRENT BIOLOGY R898, R899 (2012). In an affidavit, Professor Erin Murphy argued that there is a serious privacy issue with profiles because “[n]o serious scientists have argued, much less proven, for instance, that human beings could be reproduced without their ‘junk’ DNA without any consequences.” Declaration of Erin Murphy in Support of Plaintiffs' Reply Brief re: Motion for Preliminary Injunction at ¶12, *Haskell v. Brown*, 677 F. Supp. 2d 1187 (N.D. Cal. 2009) (No. C 09-4779 CRB) [hereinafter Declaration of Erin Murphy]. In fact, it has been shown that very complex organisms can reproduce with major chunks of noncoding DNA deleted. Marcelo A. Nóbrega et al., *Megabase Deletions of Gene Deserts Result in Viable Mice*, 431 NATURE 988, 988 (2004). Forty years ago, “serious scientists” knew that “centromeric heterochromatin which represents a long tandem repeat of a short untranscribable sequence can be lost or duplicated without deleterious consequences.” Susuno Ohno, *So Much “Junk” DNA in Our Genome*, 23 BROOKHAVEN SYMPOSIA IN BIOLOGY 366, 367 (1972) (internal citations omitted). Serious scientists do not ask whether all noncoding DNA can be deleted with no ill effects. They ask “how much junk, how much func?” Cristian I. Castillo-Davis, *The Evolution of Noncoding DNA: How Much Junk, How Much Func?*, 21 TRENDS IN GENETICS 533, 533 (2005).

313 See Scientists' Brief, *supra* note 275, at 17.

that no one will be able to deduce sexual orientation from either a fingerprint pattern or a CODIS profile.

4. What Is the Question?

The Scientists' Brief in *King* describes debates over the percentage of the genome that is “junk” and how much evolutionary “treasure” may be buried in intergenic regions as beguiling to biologists but “orthogonal” to the legal issues.³¹⁴ From a Fourth Amendment perspective, the important question is not whether there are *any* noncoding DNA sequences that do something interesting or that have evolutionary significance. There are.³¹⁵ The question is not whether there are other classes of STRs and still other types of DNA sequences that are known to regulate gene expression. There are.³¹⁶ Moving to the relevant sequences—the CODIS loci used for identification—the question is not whether these STRs are used to study the genetics of diseases or other traits. They are.³¹⁷ And, the question is not whether some traits are associated with the STRs. Ordinary ABO blood groups and serum proteins—the forerunners of modern DNA methods of identification³¹⁸—are phenotypes, and a local database of these phenotypes would not be

³¹⁴ *Id.* at 26.

³¹⁵ See, e.g., Ryan D. Walters et al., *InvAluable Junk: The Cellular Impact and Function of Alu and B2 RNAs*, 61 INT'L UNION BIOCHEMISTRY & MOLECULAR BIOLOGY LIFE 831, 831 (2009).

³¹⁶ As previously noted, DNA sequences are transcribed to various noncoding RNAs. The line of research has generated considerable excitement. See Alex S. Flynt & Eric C. Lai, *Biological Principles of MicroRNA-mediated Regulation: Shared Themes Amid Diversity*, 9 NATURE REV. GENETICS 831, 831 (2008) (“[S]ubsequent explosion of miRNA research in the current decade has yielded breathtaking advances in our understanding of the mechanism and biology of miRNA control”); Helge Grosshans & Witold Filipowicz, *Molecular Biology: The Expanding World of Small RNAs*, 451 NATURE 414, 414 (2008) (“[N]ew classes of small RNAs continue to be discovered”); John S. Mattick, *RNA Regulation: A New Genetics?*, 5 NATURE REV. GENETICS 316, 317 (2004) (“This framework might allow us to understand the true basis of the evolution and development programming of complex organisms, and the basis of individual and species diversity.”); Tim R. Mercer et al., *Long Non-coding RNAs: Insights into Functions*, 10 NATURE REV. GENETICS 155, 155 (2009) (“[T]he discovery of new classes of regulatory non-coding RNAs . . . suggests that RNA has continued to evolve and expand alongside proteins and DNA.”).

³¹⁷ E.g., Dongfeng Gu et al., *Evidence of Multiple Causal Sites Affecting Weight in the IGF2-INS-TH Region of Human Chromosome 11*, 110 HUMAN GENETICS 173 (2002) (using TH01 and other markers to study the relationship of a gene complex to obesity and height); Simona Neri, *Mismatch Repair System and Aging: Microsatellite Instability in Peripheral Blood Cells From Differently Aged Participants*, 60A J. GERONTOLOGY: BIOLOGICAL SCI. 285 (2005) (studying differences in the frequencies of STR alleles at five loci by age).

³¹⁸ See KAYE, *supra* note 275, at 6–7.

objectionable merely because it catalogues an expressed (rather than a predicted) physical or chemical trait.³¹⁹

The important question about the profiles recorded in a DNA database is the actual risk that the STR length polymorphisms will become more than marginally invasive of the informational privacy of an arrestee.³²⁰ The records are effective for their intended use of identification, but will they have adverse side effects on constitutionally protected privacy? The Scientists' Brief observes that

even if some length differences of some of these STRs prevented or increased transcription of regulatory RNAs, it would not necessarily follow that they are "essential biological instructions for growth and survival of an organism," and therefore "sensitive and private." They might have no effect at all because there are alternative paths to the same outcomes, or the affected traits might be no more significant than, say, the thickness of the eyebrows or the width of the nose. One must ask whether the length variations of the particular STRs actually convey meaningful information, and they seem to contain less trait-related information than a photograph of an arrestee.³²¹

If this is correct, the CODIS profiles contain the same kind of information as dermal fingerprints.

Yet, there is one clear difference between CODIS profiles and other biometric identifiers. The STRs, like the rest of the genome, are inherited according to Mendel's laws. An arrestee's profile could be compared with those of a putative mother and father to test whether the arrestee is their biological child. In addition, pairs of profiles in the database could be examined to see if two people might be related in a few ways (as parent and child or as siblings). Although such kinship testing in a large database would be inaccurate—it would miss many true relationships and would include many false ones³²²—it probably works better than drawing inferences

³¹⁹ Laws like Rhode Island's, which forbids the use of "DNA samples for purposes of obtaining information about "physical characteristics," R.I. GEN. LAWS § 12-1.5-10(5) (2010), are overly restrictive.

³²⁰ *Cf.* United States v. Pool, 621 F.3d, 1213 1230 n.3 (9th Cir. 2010) (Lucero, J., concurring) (pointing out that the critical inquiry about a CODIS profile is whether it "categorically differs from the information already contained in the booking photo lineups on the bookshelf of virtually every police station in the country").

³²¹ Scientists' Brief, *supra* note 275, at 29–30; *see also* Mark Benecke, *Coding or Non-coding?, That is the Question*, 3 EUR. MOLECULAR BIOLOGY ORG. REP. 498, 500 (2002) ("[A]n old black-and-white mugshot . . . reveals a lot more about the person's physical, social and maybe even mental state than the anonymous patterns in genetic fingerprints.").

³²² James M. Curran & John S. Buckleton, *Effectiveness of Familial Searches*, 84 SCI. & JUST. 164 (2008); Jianye Ge et al., *Comparisons of Familial DNA Database Searching Policies*, 56 J. FORENSIC SCI. 1448 (2011); Steven P. Myers et al., *Searching for First-Degree Familial Relationships in California's Offender DNA Database: Validation of a Likelihood Ratio-Based Approach*, 5 FORENSIC SCI. INT'L: GENETICS 493 (2011).

from the inherited parts of fingerprints.³²³ The fact that alleles are inherited implies that they supply (typically weak)³²⁴ information about genetic relationships between individuals in the database. It also means that the profiles contain even noisier information about bio-geographic origins in that CODIS profiles are weakly correlated to ancestry³²⁵ and hence to socially perceived race or ethnicity.³²⁶

These considerations undermine simplistic analogies between fingerprints and CODIS loci,³²⁷ but they do not make the noncoding, nonregulatory, nontranscribed, and nonconserved DNA identification loci highly toxic to personal privacy. The profiles are not well suited to inferring bio-geographical history, let alone social race—and police would almost always have better, nongenetic information about the apparent race of an arrested individual.³²⁸ Certainly, the limited information that CODIS loci now supply does not begin to approach that of the hormones indicative of pregnancy or diabetes, which were part of the “host of private medical facts” that, together with “visual or aural monitoring of the act of urination,” prompted the Court to hold in *Skinner v. Railway Labor Executives’ Association*³²⁹ that compulsory urine sampling interfered with reasonable expectations of privacy. Like fingerprints and photographs, CODIS STR profiles should fall within the biometric exception.

C. DNA Samples

DNA identification profiles represent a trivial fraction of the more than three billion base pairs in the human genome. DNA samples contain the full genome, and in most database systems, the state retains these samples

³²³ On the constitutionality of this practice as applied to partial matches between crime scene and database profiles, see David H. Kaye, *The Genealogy Detectives: A Constitutional Analysis of “Familial Searching”*, 51 AM. CRIM. L. REV. No. 1 (forthcoming 2013), available at <http://ssrn.com/abstract=2043091>.

³²⁴ They could, of course, be used to test whether two profiles come from identical twins.

³²⁵ Referring to a larger set of STR loci than the thirteen core CODIS loci, Richard S. Cooper et al., *Race and Genomics*, 348 NEW ENG. J. MED. 1166, 1167 (2003), noted that “The success of microsatellite loci in classifying persons according to continental group depends in part on the cumulative effect of minor differences in the frequencies of common alleles and in part on the effect of population-specific alleles. In neither case is it apparent that such differences have relevance for traits that are important to health. Most population-specific microsatellite alleles are unlikely to be functional; rather, like a last name, they merely help to verify the geographic origin of a person’s ancestry.”

³²⁶ See, e.g., Jennifer B. Listman et al., *Identification of Population Substructure Among Jews Using STR Markers and Dependence on Reference Populations Included*, 11 BMC GENETICS No. 48 (2010), available at <http://www.biomedcentral.com/content/pdf/1471-2156-11-48.pdf>.

³²⁷ See Kaye, *Bury the Junk*, *supra* note 298, at 80.

³²⁸ Scientists’ Brief, *supra* note 275, at 36 n.27.

³²⁹ 489 U.S. 602, 617 (1989).

even after it generates the profiles. Impressed with the potential information in the entire genome, plaintiffs challenging California's arrestee DNA law in *Haskell v. Brown*³³⁰ went beyond the "But it's not junk!" response to the fingerprinting analogy. They argued "that DNA is different because it is 'something of mine which is very personal,' 'the building blocks of our existence,' and implicates 'our personhood'"³³¹ This vision of the genetic material as determinative of each person's essential nature and fate pervades popular culture. Influenced by metaphors of DNA as a "future diary"³³² or "the entire blueprint for an individual's life,"³³³ and of each chromosome as a "chapter in the book of life,"³³⁴ we have come to regard ourselves as puppets dancing on the strings of our DNA.³³⁵ The district court in *Haskell* found such expressions of genetic essentialism "emotionally stirring, but not legally compelling."³³⁶

A more measured argument about the information that could be extracted from DNA samples (as opposed to the identification profiles) relies on the correct premise that our genes (along with other things) have a great deal to do with a wide range of physical and mental traits. To recognize the importance of genes in conjunction with internal and external environments is not to succumb to genetic determinism. Some genes determine some traits almost regardless of the external environment. Blood and tissue types, or fingerprint ridge counts, are examples. Certain alleles at other single loci cause debilitating or fatal diseases in a wide range of environments. That is why these rare diseases are called genetic. Genes are involved in the metabolism of drugs, and some success has been achieved in tailoring drug prescriptions to individual genomes.³³⁷ Combinations of large numbers of genes, acting together in particular environments, influence susceptibility to common diseases and highly variable features such as

330 677 F. Supp. 2d 1187 (N.D. Cal. 2009), *aff'd sub nom.*, *Haskell v. Harris*, 669 F.3d 1049 (9th Cir. 2012).

331 *Haskell v. Brown*, 677 F. Supp. 2d 1187, 1198 (N.D. Cal. 2009).

332 George J. Annas, *Privacy Rules for DNA Databanks: Protecting Coded 'Future Diaries'*, 270 J. AM. MED. ASS'N 2346, 2346 (1993).

333 Declaration of Erin Murphy, *supra* note 312, ¶10.

334 See Nicholas Wade, *Life Is Pared to Basics; Complex Issues Arise*, N.Y. TIMES, Dec. 14, 1999, at F3 (reporting the concern expressed by a medical ethicist that "when biologists sequenced the first human chromosome last month, they called it 'the first chapter in the book of life, as if life is chromosomes'").

335 See generally DOROTHY NELKIN & M. SUSAN LINDEE, *THE DNA MYSTIQUE: THE GENE AS A CULTURAL ICON* (1995).

336 *Haskell v. Brown*, 677 F. Supp. 2d at 1198.

337 VOGEL AND MOTULSKY'S HUMAN GENETICS: PROBLEMS AND APPROACHES 644 (Michael R. Speicher et al. eds., 4th ed. 2010).

height.³³⁸ These are polygenetic systems of quantitative trait loci that are far more difficult to elucidate than the simple Mendelian genetic disorders.³³⁹ Thus, the “personalized medicine” promised by the Human Genome Project is progressing,³⁴⁰ but it has been slow to materialize.³⁴¹

The privacy implications—with respect to law enforcement DNA databanks—of our growing knowledge of genomics are not as clear cut as frenzied references to “over four thousand types of genetic conditions and diseases” and “genetic markers for traits including aggression, sexual orientation, substance addiction, and criminal tendencies”³⁴² might suggest. Many of the diseases resulting from highly penetrant genes will have manifested themselves long before an arrest. It is hard to imagine why database custodians would want to test DNA for such conditions, and “crime genes” never will be found.³⁴³ But in seeking to restore a sense of balance, I am also quibbling. There is no doubt that the physical samples (as distinguished from the records in the databases) contain a “host of private medical facts.”³⁴⁴ Genetic tests could identify carriers of recessive diseases such as cystic fibrosis,³⁴⁵ sickle cell anemia,³⁴⁶ and Tay-Sachs disease.³⁴⁷ They can detect alleles that are protective or predisposing for presymptomatic

³³⁸ See, e.g., Neil J. Risch, *Searching for Genetic Determinants in the New Millennium*, 405 NATURE 847, 850 (2000) (“[N]umerous genes of smaller effect . . . are likely to underlie most common, familial traits and diseases in humans.”).

³³⁹ *Id.*

³⁴⁰ Margaret A. Hamburg & Francis S. Collins, *The Path to Personalized Medicine*, 363 NEW ENGL. J. MED. 301, 301 (2010) (“Researchers have discovered hundreds of genes that harbor variations contributing to human illness, identified genetic variability in patients’ responses to dozens of treatments, and begun to target the molecular causes of some diseases. In addition, scientists are developing and using diagnostic tests based on genetics or other molecular mechanisms to better predict patients’ responses to targeted therapy.”).

³⁴¹ It could be that common diseases simply do not have common variants that can be detected in genome-wide association studies. At the genetic level, every person’s predisposition to common diseases could relate to very rare alleles at various loci. See VOGEL AND MOTULSKY’S HUMAN GENETICS, *supra* note 337, at 643; Nicholas Wade, *A Dissenting Voice as the Genome Is Sifted to Fight Disease*, N.Y. TIMES, Sept. 16, 2008, at F3.

³⁴² *United States v. Mitchell*, 681 F. Supp. 2d 597, 608 (W.D. Pa. 2009).

³⁴³ See Kaye, *Behavioral Genetics Research*, *supra* note 294, at 268–69 (arguing that behavior is affected by many genes, each with limited effect).

³⁴⁴ *Skinner v. Ry. Labor Execs. Ass’n*, 489 U.S. 602, 617 (1989).

³⁴⁵ See U.S. Nat’l Library of Med., *Cystic Fibrosis*, GENETICS HOME REFERENCE, <http://ghr.nlm.nih.gov/condition/cystic-fibrosis> (last reviewed Aug. 2012) (explaining that cystic fibrosis is caused by a single, recessive gene, although other genes may exacerbate the problem).

³⁴⁶ See U.S. Nat’l Library of Med., *Sickle Cell Disease*, GENETICS HOME REFERENCE, <http://ghr.nlm.nih.gov/condition/sickle-cell-disease> (last visited Aug. 2012) (explaining that sickle cell disease is caused by a single, recessive gene).

³⁴⁷ See U.S. Nat’l Library of Med., *Tay-Sachs Disease*, GENETICS HOME REFERENCE, <http://ghr.nlm.nih.gov/condition/tay-sachs-disease> (last visited Oct. 2012) (explaining that Tay-Sachs disease is caused by a single, recessive gene).

individuals, such as those of the ApoE gene that is a risk factor in many cases of Alzheimer disease.³⁴⁸

Whether the existence of such genetic tests defeats the application of the biometric exception should depend on an assessment of the incentives and disincentives for police to perform genetic tests at socially and medically significant loci. (Indeed, valid privacy concerns are not limited to DNA tests, for a range of biomarkers in biological evidence and samples *could* be used in diagnostic testing for major diseases.)³⁴⁹ Existing database statutes limit the use of the samples to identifying the individuals whose DNA is recovered from crime scenes or victims.³⁵⁰ Thus, the government laboratories that generate identification profiles from arrestee samples are not equipped to test for the plethora of health-related loci; moreover, devices to automate the profiling—and that are incapable of analyzing other loci—are under development.³⁵¹ However, a laboratory worker interested in the health status of an arrestee could smuggle a portion of the sample for testing at another laboratory, and inexpensive, portable devices for disease-related loci also could become available in the future.

But what would motivate police to undertake or facilitate surreptitious genetic testing at 4000 disease-related or other loci? It is not as if there is a market for this information. And, even if employers and insurance companies were anxious to use genetic testing in hiring or underwriting (notwithstanding state and federal laws enacted to prevent perceived or anticipated “genetic discrimination”),³⁵² there are less dangerous ways to acquire information or samples than enlisting police officials in this illegal

348 See U.S. Nat'l Library of Med., *Alzheimer Disease*, GENETIC HOME REFERENCE, <http://ghr.nlm.nih.gov/condition/alzheimer-disease> (last reviewed Dec. 2008) (describing the ApoE gene as a risk factor for late-onset Alzheimer disease). Indeed, “[p]eople carrying certain mutations in any of three genes—the presenilin genes *PSEN1* and *PSEN2* and the gene for the amyloid- β precursor protein *APP*—can be told with certainty that they will contract the disease (if they live long enough).” David Cyranoski, *Alzheimer’s Disease Genes Aid the Search for Preventive Drugs*, NATURE, July 22, 2011, <http://www.nature.com/news/2011/110722/full/news.2011.433.html>.

349 See, e.g., Susan Gaidos, *A Spitting Image of Health: How Saliva Can Help Doctors Diagnose Disease*, SCI. NEWS, Nov. 19, 2011, at 26 (describing biomarkers in saliva for “diseases such as breast cancer, type 2 diabetes and Alzheimer’s”).

350 Kaye, *Behavioral Genetics Research*, *supra* note 294, at 275. Existing database statutes permit certain forms of statistical research with anonymized profiles—not samples. *Id.* at 275–76.

351 See, e.g., Carmen R. Reedy et al., *A Modular Microfluidic System for Deoxyribonucleic Acid Identification by Short Tandem Repeat Analysis*, 687 ANALYTICA CHIMICA ACTA 150, 150 (2011) (describing one such device that analyzes nine STR loci); see also *supra* note 202.

352 See, e.g., Cole, *supra* note 295, at 55 (describing concerns expressed in Tania Simoncelli & Barry Steinhardt, *California’s Proposition 69: A Dangerous Precedent for Criminal DNA Databases*, 33 J.L. MED. & ETHICS 279, 288 (2005)); Mark A. Rothstein, *GINA, the ADA, and Genetic Discrimination in Employment*, 36 J.L. MED. & ETHICS 837, 837–38 (2008) (discussing federal protections against genetic discrimination and their shortcomings).

effort.³⁵³ Perhaps an individual officer or laboratory worker with a grudge against an arrestee would seek satisfaction by trying to acquire medically-relevant genetic information, but such cases are likely to be quite rare.³⁵⁴

Then too, there is the possibility that the law will change to allow the samples to be used for nefarious purposes. Abuses that have been suggested include testing ancestry-informative loci “to round up individuals of a certain ethnic descent” for World War II style internment camps,³⁵⁵ conducting research to identify genotypes associated with criminality,³⁵⁶ and expanding the databases to incorporate “genetic profiles for violence, aggression, or introversion and then focusing an investigation on those individuals whose profiles match that of the unknown suspect, as described by a witness or evidenced through a crime.”³⁵⁷

Justice Holmes famously responded to the argument that the government might misuse the power to tax with the assurance that “[t]he power to tax is not the power to destroy while this Court sits.”³⁵⁸ Likewise, the *Pool* majority responded to the fears about “function creep”³⁵⁹ as follows:

[B]eyond the fact that the DNA Act itself provides protections against such misuse, our job is limited to resolving the constitutionality of the program before us, as it is designed and as it has been implemented. In our system of government, courts base decisions not on dramatic Hollywood fantasies . . . but on concretely particularized facts developed in the cauldron of the adversary process and reduced to an assessable record. If . . . and when, some future program permits the parade of horrors the DNA Act’s opponents fear—unregulated disclosure of CODIS profiles to private parties, genetic discrimination, state-sponsored

³⁵³ The *Mitchell* court paid particular attention to administrative and statutory “safeguards to prevent the improper use of DNA samples” and “the safeguards attendant to DNA collection and analysis.” *United States v. Mitchell*, 652 F.3d 387, 399, 407 (3d Cir. 2011) (en banc).

³⁵⁴ Cf. *Illinois v. Lidster*, 540 U.S. 419, 426 (2004) (“we do not believe that an *Edmond*-type rule is needed to prevent an unreasonable proliferation of police checkpoints. Practical considerations—namely, limited police resources and community hostility to related traffic tieups—seem likely to inhibit any such proliferation.”); *Whalen v. Roe*, 429 U.S. 589, 601–02 (1977) (rejecting as speculative arguments about unauthorized disclosure of records of drug prescriptions in a law enforcement database maintained by the state department of health).

³⁵⁵ *Cole*, *supra* note 295, at 55.

³⁵⁶ See Kaye, *Behavioral Genetics Research*, *supra* note 294, at 260 (collecting objections to research into “crime genes” and the like).

³⁵⁷ John D. Biancamano, *Arresting DNA: The Evolving Nature of DNA Collection Statutes and Their Fourth Amendment Justifications*, 70 OHIO ST. L.J. 619, 622 n.10 (2009).

³⁵⁸ *Panhandle Oil Co. v. Mississippi ex rel. Knox*, 277 U.S. 218, 223 (1928).

³⁵⁹ Barbara Prainsack, *Key Issues in DNA Profiling and Databasing: Implications for Governance*, in GENETIC SUSPECTS, *supra* note 3, at 15, 28–32.

eugenics . . . —we have every confidence that courts will respond appropriately.³⁶⁰

In short, if the motivation to scan an arrestee's health-related and ancestry-informative loci is slight, if the means to do so are not readily available, and if the mechanisms for detecting and punishing abuse are effective, then the retention of samples should not defeat the biometric exception for DNA databanks.

Furthermore, comprehensive and indefinite sample retention is not essential to DNA databases.³⁶¹ A laboratory can destroy the samples after generating the identifying profiles. Eliminating the sample repository leaves a system that comes close to the collection and storage of fingerprint images. To be sure, some risk of diverting the DNA samples from arrestees would remain even though the samples are in the hands of the police for only a short interval. No system is foolproof. Thus, the analogy to fingerprinting, even with sample destruction, is not perfect. But neither is it "pure folly."³⁶² With no samples retained, DNA sampling on arrest should fall within the biometric exception described here.

CONCLUSION

The constitutionality of DNA sampling on arrest has divided the courts. This Article has traced the possible routes to a resolution of the issue. These routes do not proceed in a simple, straight line. The first fork in the road was whether to regard the procedure for acquiring information as a "search" within the meaning of the Fourth Amendment. I did not explore this question deeply, but took the view that data acquisition triggers the Amendment's protection. On this assumption, the second fork was whether to move directly to a reasonableness balancing. We saw that the Justices have been conflicted (or divided) on this, but the dominant mode of analysis remains classifying rather than balancing. That is, the search is subject to the warrant requirement as modified by a finite number of categorical exceptions. One of these exceptions, "special needs," is unique because it entails balancing (at a programmatic level), but it is still part of the classificatory framework for analysis. The third fork (assuming one

³⁶⁰ United States v. Pool, 621 F.3d 1213, 1222 (9th Cir. 2010) (quoting United States v. Kincade, 379 F.3d 813, 837–38 (9th Cir. 2004) (en banc) (plurality opinion) (footnotes omitted)). The Third Circuit sidestepped arguments about sample retention, stating that "to the extent that Mitchell submits that the potential future indefinite retention of his sample implicates privacy concerns, that issue is not before us now." United States v. Mitchell, 652 F.3d 387, 412 (3d Cir. 2011) (en banc).

³⁶¹ On the limited value of sample retention, see Kaye, *Behavioral Genetics Research*, *supra* note 294, at 270–73.

³⁶² United States v. Mitchell, 681 F. Supp. 2d 597, 608 (W.D. Pa. 2009).

adheres to classifying rather than direct totality balancing), is eligibility for the special-needs balancing. I argued that a biometric database used solely for criminal intelligence is ineligible. If the database is used for both authentication and intelligence, however, I suggested that special-needs balancing ought to be available.

But a court (especially the Supreme Court) need not take the second and third forks. It should evaluate biometric databases under a hitherto unarticulated exception to the warrant requirement. If such an exception applies, it circumvents all the problems we encountered: the hazards in abandoning the warrant rule in favor of totality balancing; the ambiguity in determining whether the intelligence function is itself a special need; and the two-step shuffle if it is not. The appropriate exception should permit warrantless acquisition and use of biometric data when the information is acquired with minimal impact on freedom of movement and bodily integrity, and is limited to establishing and authenticating an individual's identity and to linking individuals to identifying marks or material from crime scenes.

Fingerprinting more clearly falls within this exception than does DNA profiling. But the difference is narrower than some courts have assumed (and wider than others have realized). Both fingerprints and CODIS profiles might contain disease-related information, but to date, neither police, database administrators, insurers, nor employers can infer much of anything about the present and future health status of an arrestee from either a CODIS record or a fingerprint. CODIS records could have more to say about relatedness and ancestry than do fingerprints, and retained DNA samples certainly are a rich source of information on all these matters. Thus, it may take greater effort to confine DNA acquisition and databasing to the authentication and criminal intelligence functions of biometric identifiers, but a properly administered system for establishing and trawling DNA databases should fall within this exception for biometric data.

Recognizing a new exception to the warrant requirement of the Fourth Amendment may seem radical. However, the exceptions are not ancient specimens of an extinct species frozen in Devonian amber. They are living creations whose structures continue to evolve and whose number is not fixed. Although new exceptions are not created lightly,³⁶³ there are powerful crime-control and other law enforcement reasons for a state to maintain fingerprint and DNA databases for arrestees, the databases can be structured to respect most individual privacy interests, they can be administered fairly, and they can be accommodated with a specific and limited exception to the warrant requirement. Consequently, it is neither heretical nor Quixotic to

363 See, e.g., *Mincey v. Arizona*, 437 U.S. 385, 390–91 (1978).

ask whether such an exception should be recognized.³⁶⁴ Like a brief stop and frisk, the acquisition of the biometric data is a lesser intrusion on Fourth Amendment interests than are ordinary searches of personal property and dwellings. Therefore, the balance of interests that normally mandates probable cause and a warrant does not apply. As in *Terry v. Ohio*,³⁶⁵ which allows less intrusive, warrantless searches on reasonable suspicion, a mechanical application of the Warrant Clause would not be appropriate. Indeed, when biometric data are useful purely for individual identification, the normal demand for a warrant pursuant to probable cause is not an integral part of the reasonableness that the Fourth Amendment requires.

This conclusion simplifies the constitutional question. With the biometric exception in place, the issue becomes whether a particular fingerprint or DNA database has sufficient protections to ensure that the samples and data are used strictly for identification.³⁶⁶ Although the wisdom of taking DNA before conviction is debatable,³⁶⁷ the practice is within the zone of permissible legislative experimentation.³⁶⁸

³⁶⁴ Kaye, *Arrest*, *supra* note 7, at 498–99.

³⁶⁵ 392 U.S. 1, 27 (1968).

³⁶⁶ *Cf. Whalen v. Roe*, 429 U.S. 589 (1977) (upholding the constitutionality of a database and repository of prescriptions for certain dangerous drugs in which the state had (1) a “statutory or regulatory duty to avoid unwarranted disclosures,” *id.* at 605, (2) physical measures to ensure security, *id.* at 594, and (3) a history of operation that had not been marked by breaches of confidentiality, *id.* at 601 n.27).

³⁶⁷ Whether a database that is limited to authentication and criminal intelligence gathering *should* include arrestees is a complex question. This legislative issue involves not only the interests in crime-control and individual liberties, but also the costs of collecting and analyzing the additional samples and policing the system to reduce the risk of abuse. In addition, it raises concerns about the disparate impact of DNA databases on racial and ethnic minorities who are overrepresented in the population of arrestees. *See Kaye, Arrest*, *supra* note 7, at 508 n.231.

³⁶⁸ *Cf. Whalen*, 429 U.S. at 597 (“[I]ndividual States have broad latitude in experimenting with possible solutions to problems of vital local concern.”).