No. 20-1474

In The Supreme Court of the United States

JOSEPH COLONE,

Petitioner,

v.

THE SUPERIOR COURT OF THE STATE OF CALIFORNIA, FOR THE COUNTY OF SAN FRANCISCO,

Respondent.

GITHUB, INC.,

Real Party in Interest.

On Petition For A Writ Of Certiorari To The Supreme Court Of The State Of California

BRIEF *AMICI CURIAE* OF LEGAL SCHOLARS AND SCIENTISTS IN SUPPORT OF PETITIONER

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INTEREST OF *AMICI CURIAE*[1]

Amici Curiae are legal scholars and scientists who study the use and impact of forensic evidence in criminal cases.[2] They are interested in ensuring robust constitutional protections in criminal proceedings, and in testing the reliability of forensic evidence used to support criminal investigations and convictions, including computer software-based technology like STRmix, used to present results concerning DNA evidence.

SUMMARY OF ARGUMENT

Petitioner sought postconviction relief, arguing that to assess whether his trial lawyers provided

[1] No counsel for a party authored this brief in whole or in part. Neither a party, nor its counsel, nor any other entity other than *amici curiae* and counsel has made a monetary contribution intended to fund the preparation or submission of this brief. Petitioner and Real Party in Interest were notified ten days prior to the due date of this brief of the intention to file. All parties have separately consented to the timely filing of this brief.

[2] *Amici* include: Kiel Brennan-Marquez (University of Connecticut School of Law); David Faigman (University of California Hastings College of the Law); Nita A. Farahany (Duke University School of Law); Hany Farid (University of California, Berkeley School of Information); Brandon Garrett (Duke University School of Law); Colin Miller (University of South Carolina School of Law); Alan B. Morrison (George Washington University Law School); Ann Murphy (Gonzaga University School of Law); Erin Murphy (NYU School of Law); Alex Nunn (University of Arkansas School of Law); D. Michael Risinger (Seton Hall University School of Law); Anna Roberts (St. John's University School of Law); Eileen A. Scallen (UCLA School of Law); J.H. Pate Skene (Duke University); and Barbara A. Spellman (University of Virginia School of Law).

ineffective assistance of counsel, he and the court would need to examine for the first time the reliability and validity of the novel STRmix probabilistic DNA test used to convict him.[3] App. of Ex. to Pet. for Writ of Mandate at 70, *Colone v. S.C. (GitHub)*, S265307 (Cal. Jan. 13, 2021) (Decl. of Maro Robbins). Petitioner applied for an out-of-state subpoena seeking production

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[3] A probabilistic genotyping software program ("PGSP") like STRmix is used to analyze complex DNA samples, such as those with multiple contributors and small sample sizes. *See United States v. Gissantaner*, 990 F.3d 457, 461-63 (6th Cir. 2021). "There is a substantial difference between testing DNA utilizing traditional DNA methods and analyzing low levels or complex mixtures of DNA relying on probabilistic genotyping software." *State v. Pickett*, 246 A.3d 279, 286 (N.J. Super. Ct. App. Div. 2021). The PGSPs "use mathematical models and simulations, subject to parameters programmed into the software to account for drop-in or drop-out effects and other issues to calculate a likelihood ratio." *Id*. at 287 (citations omitted). "[A]n algorithm embedded in a computer program" fills in gaps in the DNA and "the underlying source code carries out the calculations." Meghan J. Ryan, *Secret Conviction Programs*, 77 Wash. & Lee L. Rev. 269, 296-98 (2020). "[A]lgorithms compare the actual DNA data to different statistical models, weighing the probability that the data matches the model. (It does this by examining 100,000 different combinations of possible variables and how well each proposed variable might explain the DNA data.)[.] After all is said and done, if the program determines that the data supports a match between the evidence and the suspect's DNA, the program helps an analyst to calculate a 'likelihood ratio.' " Logan Koepke, *Should secret code convict?*, Medium (Mar. 24, 2016), https://medium.com/equal-future/should-secret-code-help-convict-7c864baffe15; *see also* Michael D. Coble & Jo-Anne Bright, *Probabilistic Genotyping Software: An Overview*, 38 Forensic Sci. Int'l: Genetics 219, 221 (2019) ("These models take the quantitative information from the DNA profile and calculate the probability of the peak heights given all the possible genotype combinations for the individual contributors.").

of the STRmix source code from GitHub, the cloud computing system where STRmix's source code was saved. *Id*. at 71. The application was supported by a DNA expert declaration stating: "It is not possible to assess or confront STRmix's conclusions without a particularized understanding of the analysis it performs, and that understanding cannot be obtained without a review of the software's source code." *Id.* at 71.

The Texas court granted Colone's application for an out-of-state subpoena because the production of the STRmix source code was "material and necessary for the administration of justice." App. of Ex. to Pet. for Writ of Mandate at 191, *Colone v. S.C. (GitHub)*, S265307 (Cal. Jan. 13, 2021) (Order granting Out-of-State Subpoena). While other courts have ordered the release of Probabilistic Genotype Software Program ("PGSP") source code in criminal trials (*see*, *e.g.*, *Pickett*, 246 A.3d at 311), GitHub successfully challenged enforcement of that subpoena in California court, claiming that the Stored Communications Act ("SCA") forbade anyone other than the government from requesting or receiving such information.

Petitioner explains why, as a matter of federal privilege law, the SCA cannot be read to imply an unqualified statutory privilege against disclosure of Internet data to non-governmental litigants. We do not repeat those arguments.

Instead, we offer another reason the SCA cannot, in Petitioner's case, be read this way: to do so would deprive a criminal defendant seeking postconviction

relief from obtaining material evidence bearing on the accuracy of the novel DNA technology used to convict him. Precluding Petitioner from obtaining information crucial to assessing the fairness of his criminal trial would violate the Due Process Clause of the Fourteenth Amendment. It would also impair his ability to obtain remedies for companion fair trial rights, such as Sixth Amendment and due process rights concerning effective assistance of counsel at criminal trials.[4] *See Strickland v. Washington*, 466 U.S. 668, 684-85 (1984) ("The Constitution guarantees a fair trial through the Due Process Clauses, but it defines the basic elements of a fair trial largely through the several provisions of the Sixth Amendment, including the Counsel Clause: 'In all criminal prosecutions, the accused shall enjoy the right to . . . have the Assistance of Counsel for his defense.'") (quoting U.S. Const. amend. VI.); *see also Bonin v. Vasquez*, 999 F.2d 425, 431 (9th Cir. 1993) ("[T]o examine whether counsel's performance was egregious enough to amount to a [Sixth Amendment violation], it is necessary to develop a record concerning . . . the proceedings in question. It is impossible to develop the requisite record on direct appeal. . . ."); *see generally Wardius v. Oregon*, 412 U.S. 470, 474-75 (1973).

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[4] This Court has been presented with other constitutional challenges to the SCA. *See* Petition for Writ of Certiorari, *Facebook, Inc. v. Superior Court*, 140 S. Ct. 2761 (2020) (No. 19-1006). In *Facebook*, the opposition to the cert petition pointed to several procedural flaws – none of those exist here. *See* Brief in Opposition to Petition for Writ of Certiorari for Lee Sullivan, *Facebook*, 140 S. Ct. 2761 (No. 19-1006).

Access to postconviction DNA testing has exonerated hundreds of individuals in the U.S. alone,[5] and courts have recognized constitutional rights and discovery rights to access such evidence for purposes of DNA testing. Equally important is access to the technology on which the testing itself is based. When, as here, the DNA test at issue is founded on probabilistic assessments made by computer algorithms and code, courts and counsel must be allowed to examine the reliability and accuracy of that code to ensure the fundamental fairness of the criminal proceeding and any resulting conviction.

[5] *See*, *e.g.*, 2020 Annual Report, Nat'l Registry of Exonerations 7 (2020), https://www.law.umich.edu/special/exoneration/Documents/2021AnnualReport.pdf (noting 532 DNA exonerations between 1989 and 2020); David Woltz, *Innocence Commissions and the Future of Post-Conviction Review*, 52 Ariz. L. Rev. 1027, 1028-29 (2010) ("Since 1989, over two hundred fifty Americans have been exonerated of serious crimes because subsequent evidence demonstrated their actual innocence. These exonerations, made possible largely because of new DNA technology, constitute the most dramatic story in American criminal law in the last two decades."); Kathy Swedlow, *Don't Believe Everything You Read: A Review of Modern "Post-Conviction" DNA Testing Statutes*, 38 Cal. W. L. Rev. 355, 355 (2002) ("Since 1993, over one hundred individuals have been exonerated through the use of post[ ]conviction DNA testing, and more individuals are being exonerated daily. . . . Due in large part to these exonerations, over two dozen different jurisdictions around the United States have enacted statutes to allow convicted prisoners access to DNA testing.").

ARGUMENT

I. The Stored Communications Act should not be read to deprive Petitioner of the source code underlying the STRmix DNA test, because that would violate Petitioner's Due Process rights.

"A statute must be construed, if fairly possible, so as to avoid not only the conclusion that it is unconstitutional, but also grave doubts upon that score." *United States v. Jin Fuey Moy*, 241 U.S. 394, 401 (1916); *see also Edward J. Bartolo Corp. v. Florida Gulf Coast Bldg. & Constr. Trades Council*, 485 U.S. 568, 575 (1988) ("[T]he elementary rule is that every reasonable construction must be resorted to, in order to save a statute from unconstitutionality."); *Off. of Sen. Dayton v. Hanson*, 550 U.S. 511, 514 (2007) (applying to an as-applied challenge "our established practice of interpreting statutes to avoid constitutional difficulties"). Here, construing the SCA to encompass a lopsided right which gives only the government access to digital evidence, where that evidence implicates the fundamental fairness of a criminal proceeding, would put the statute on a collision course with the Constitution.

The "core" of habeas relief is "the discovery of evidence that has a material bearing on [a] conviction." *Dist. Att'y v. Osborne*, 557 U.S. 52, 78 (2009) (Alito, J., concurring). Where a State provides a mechanism for postconviction relief, "the procedures [it] employ[s] must comport with the demands of the Due Process Clause by providing litigants with fair opportunity to

assert their state-created rights."[6] *Id*. at 89-90 (Stevens, J., dissenting) (citing *Evitts v. Lucey*, 469 U.S. 387, 393 (1985)); *see also Skinner v. Switzer*, 562 U.S. 521, 536-37 (2011) (Thomas, J., dissenting) (quoting *Frank v. Mangum*, 237 U.S. 309, 327 (1915) ("[A]lthough a State is not required to provide procedures for postconviction review, it seems clear that when state collateral review procedures are provided for, they too are part of the 'process of law under which [a prisoner] is held in custody by the State.' As this Court has explained, when considering whether the State has provided all the process that is due in depriving an individual of life, liberty, or property, we must look at both pre- and post-deprivation process."). The *Osborne* case involved

[6] Both Texas and California provide for discovery in postconviction proceedings. Cal. Penal Code § 1054.9(d) (Deering 2021) (California right to motioned-for "access to physical evidence for the purpose of examination" in postconviction proceedings); Cal. Penal Code § 1405 (Deering 2021) (California procedures for postconviction DNA testing); Tex. Code Crim. Proc. Ann. art. 11.071 § 9(a) (West 2021) (Texas capital case postconviction procedures declaring that "the court may require affidavits, depositions, interrogatories, and evidentiary hearings and may use personal recollection"); *Ex Parte Simpson*, 136 S.W.3d 660, 668 (Tex. Crim. App. 2004) ("The legislative framework of [Texas Code of Criminal Procedure] article 11.071 contemplates that the habeas judge is 'Johnny-on-the-Spot.' He is the collector of the evidence, the organizer of the materials, the decisionmaker as to what live testimony may be necessary, the factfinder who resolves disputed factual issues, the judge who applies the law to the facts, enters specific findings of fact and conclusions of law, and may make a specific recommendation to grant or deny relief."); Tex. Code Crim. Proc. Ann. art. 64.01 (West 2021) (Texas procedures for postconviction DNA testing). To interpret the SCA to preclude these state created rights to discovery would interfere with and undermine those rights.

a request for postconviction DNA testing, and this Court, while declining to recognize a freestanding right to such testing, recognized a procedural due process right to access DNA tests. 557 U.S. at 67-68. Similarly, in *Skinner*, this Court recognized a constitutional right to access DNA testing under Section 1983. 562 U.S. at 534. Throughout, this Court has emphasized how probative and important DNA tests can be. Thus, Chief Justice Roberts began *Osborne* by noting, "DNA testing has an unparalleled ability both to exonerate the wrongly convicted and to identify the guilty." 557 U.S. at 55.

A postconviction procedure violates due process if it "'offends some principle of justice so rooted in the traditions and conscience of our people as to be ranked as fundamental,' or 'transgresses any recognized principle of fundamental fairness in operation.'" *Osborne*, 557 U.S. at 69 (quoting *Medina v. California*, 505 U.S. 437, 446, 448 (1992)).

This Court has "been particularly suspicious of state trial rules which provide nonreciprocal benefits to the State when the lack of reciprocity interferes with the defendant's ability to secure a fair trial." *Wardius*, 412 U.S. at 474 n.6. "The very integrity of the judicial system and public confidence in the system depend on full disclosure of all the facts, within the framework of the rules of evidence. To ensure that justice is done, it is imperative to the function of courts that compulsory process be available for the production of evidence needed either by the prosecution or by the defense." *Taylor v. Illinois*, 484 U.S. 400, 409 (1988) (quotations

and citation omitted); *cf. Pennsylvania v. Ritchie*, 480 U.S. 39, 58 (1987) ("Given that the Pennsylvania Legislature contemplated some use of [Child and Youth Services] records in judicial proceedings, we cannot conclude that the statute prevents all disclosure in criminal prosecutions. In the absence of any apparent state policy to the contrary, we therefore have no reason to believe that relevant information would not be disclosed when a court of competent jurisdiction determines that the information is 'material' to the defense of the accused.").

This Court has, for example, held that "the Due Process Clause of the Fourteenth Amendment forbids enforcement of alibi rules unless reciprocal discovery rights are given to criminal defendants. Since the Oregon statute [in this case] did not provide for reciprocal discovery, it was error" to enforce it and prevent the defendant "from introducing any evidence to support his alibi defense as a sanction for his failure to comply with [the one-sided] notice-of-alibi rule[.]" *Wardius*, 412 U.S. at 471-72. In so ruling, this Court noted that "in the absence of a strong showing of state interests to the contrary, discovery must be a two-way street. The State may not insist that trials be run as a 'search for truth' so far as defense witnesses are concerned, while maintaining 'poker game' secrecy for its own witnesses." *Id.* at 475; *see also Weatherford v. Bursey*, 429 U.S. 545, 562 (1977) (Marshall, J., dissenting) (quoting *Wardius*, 412 U.S. at 474) (due process "speak[s] to the balance of forces between the accused and his accuser."). After all, this Court reasoned, the prosecutor

already has a "number of tactical advantages" "[b]esides greater financial and staff resources with which to investigate and scientifically analyze evidence." *Wardius*, 412 U.S. at 475 n.9 (quotations and citation omitted). "First, he begins his investigation shortly after the crime has been committed when physical evidence is more likely to be found and when witnesses are more apt to remember events. Only after the prosecutor has gathered sufficient evidence is the defendant informed of the charges against him; by the time the defendant or his attorney begins any investigation into the facts of the case, the trail is not only cold, but a diligent prosecutor will have removed much of the evidence from the field. In addition to the advantage of timing, the prosecutor may compel people, including the defendant, to cooperate." *Id*. (quotations and citation omitted).

The SCA, if read to endorse only governmental access and to preclude defense access necessary to ensure fundamental fairness of a criminal proceeding, would violate the Constitution.

II. Access to the source code underlying Probabilistic Genotyping Software Programs like STRmix is necessary to ensure fundamental fairness of Petitioner's conviction.

The ability to review forensic evidence is critical to analyzing the constitutional fairness of criminal convictions.

Often used at trial, forensic evidence – particularly DNA and fingerprint evidence – has tremendous power to persuade, regardless of accuracy. *See*, *e.g.*, Brandon L. Garrett & Gregory Mitchell, *Forensics, and Fallibility, Comparing the Views of Lawyers and Judges*, 119 W. Va. L. Rev. 621, 636 (2016) ("[O]ur results suggest that most jurors will enter the courtroom with a default view that both DNA and fingerprinting evidence are at least somewhat reliable, if not nearly infallible."); J.J. Koehler, *Fingerprint error rates and proficiency tests: What they are and why they matter*, 59 Hastings L. J. 1077, 1078 (2008) (noting the lack of scientific validation of fingerprint identification methods); I. Dror, D. Charlton & A.E. Péron, *Contextual information renders experts vulnerable to making erroneous identifications*, 156 Forensic Sci. Int'l 74, 77 (2006) ("Our study shows that it is possible to alter identification decisions on the same fingerprint, solely by presenting it in a different context.").

Yet, as this Court has recognized, "[s]erious deficiencies have been found in the forensic evidence used in criminal trials." *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 319 (2009). These errors can lead to overturned convictions. According to "[o]ne study of cases in which exonerating evidence resulted in the overturning of criminal convictions," "invalid forensic testimony contributed to the convictions in 60% of the cases." *Id.*; *see also % Exonerations by Contributing Factor*, Nat'l Registry of Exoneration, https://law.umich.edu/special/exoneration/Pages/ExonerationsContribFactorsByCrime.aspx (last visited May 9, 2021) (noting that

nearly a quarter of exonerations involved false or misleading forensic evidence); Erin Murphy, *The New Forensics: Criminal Justice, False Certainty, and the Second Generation of Scientific Evidence*, 95 Calif. L. Rev. 721, 724 (2007) ("[O]ne study found that defective scientific evidence contributed to over one-half of wrongfully obtained convictions."); Michael J. Saks et al., *Forensic bitemark identification: weak foundations, exaggerated claims*, 3 J. of L. & the Biosciences 538, 541 (2016) ("Studies of wrongful convictions based on DNA exonerations have found the forensic sciences to be second only to eyewitness errors as a source of false or misleading evidence contributing to erroneous convictions.").

"Since the late 1980s," DNA evidence "has become a staple of law-enforcement investigations." *United States v. Gissantaner*, 990 F.3d 457, 460 (6th Cir. 2021). But DNA evidence, too, can produce faulty results (*see Osborne*, 557 U.S. at 80-81 (Alito, J., concurring) (noting the many limitations of the testing and circumstances causing unreliable or inconclusive results)) – particularly when the evidence is analyzed through PGSPs, like the one used here. *See* Katherine Kwong, *The Algorithm Says You Did It: The Use of Black-Box Algorithms to Analyze Complex DNA Evidence*, 31 Harv. J. L. & Tech. 275, 275-76 (2017).

As the ABA's Criminal Justice Standards on DNA Evidence approved by the ABA House of Delegates in

2006 make clear,[7] even with traditional DNA testing, a "prosecutor should be required . . . to make available to the defense" "the laboratory case file and case notes," "reports of all proficiency examinations of each testifying expert and each person involved in the testing," "the chain of custody documents," and "all raw electronic data produced during testing." Criminal Justice Standards on DNA Evidence 4.1(a) (ABA 2007); *see generally* Brandon L. Garrett, *Judging Innocence*, 108 Colum. L. Rev. 55, 63 (2008) (highlighting the importance of access to postconviction DNA evidence).

Likewise, in its landmark report, the President's Council of Advisors on Science and Technology ("PCAST") has cautioned that PGSP methods[8] "require careful scrutiny to determine (1) whether the methods are scientifically valid, including defining the limitations on their reliability (that is, the circumstances in which they may yield unreliable results) and (2) whether the software correctly implements the methods. This is particularly important because the programs employ different mathematical algorithms and can yield different results for the same mixture

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[7] The ABA Criminal Justice Standards have frequently been cited by this Court for nearly 40 years. *See* Martin Marcus, *The Making of the ABA Criminal Justice Standards: Forty Years of Excellence*, 23 Crim. Justice 15 (ABA 2009).

[8] "A [PGSP] is comprised of software, or software and hardware, with analytical and statistical functions that entail complex formulae and algorithms." Scientific Working Group on DNA Analysis Methods, Guidelines for the Validation of Probabilistic Genotyping Systems 2 (June 2015), https://docs.wixstatic.com/ugd/4344b0_22776006b67c4a32a5ffc04fe3b56515.pdf.

profile." President's Council of Advisors on Science and Technology, Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods 79 (2016), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf ("PCAST Report").[9]

Thus, PGSPs like STRmix require closer attention and another layer of review because of their use of complex algorithmic software. *Gissantaner*, 990 F.3d at 461 ("The idea [behind PGSPs] is to combine the tools of DNA science, statistics, and computer programming to mitigate the risks from subjective assessments of multi-person DNA samples. The software in the end helps to measure the probability that a mixture of

[9] The "Report to the President: Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods" was prepared by PCAST in September 2016. PCAST was an advisory group of the Nation's leading scientists and engineers, appointed by the President to augment the science and technology advice available to him from inside the White House and from cabinet departments and other Federal agencies. PCAST Report at iv. To prepare its report on forensic science in criminal courts, PCAST enlisted the help of a PCAST working group, composed of professors and prominent members of industry, and PCAST senior advisors, composed of federal judges, law professors, and statisticians who provided "guidance on factual matters relating to the interaction between science and the law." PCAST Report at vii-ix. The PCAST Report "included an extensive literature review, was also informed by inputs from forensic researchers at the Federal Bureau of Investigation Laboratory and the National Institute of Standards and Technology as well as from many other forensic scientists and practitioners, judges, prosecutors, defense attorneys, academic researchers, criminal-justice-reform advocates, and representatives of Federal agencies." PCAST Report at x.

DNA includes a given individual's DNA."); *see also DNA Fingerprinting: An Introduction* 262 (Lorne T. Kirby ed., 1993) ("As any technology becomes more discriminating and precise, it is essential that the quality of the analytical data be more closely monitored."). Forensic DNA typing examines variations, or "alleles," at a few locations ("loci"). Each person possesses two alleles at each location, one from each parent; there are few allele possibilities at each location, so any two people are almost certain to have alleles in common at some tested locations. When a sample contains little of a person's DNA, testing often fails to detect all of their alleles. In mixtures with multiple contributors, missing and shared alleles create an added challenge: determining which alleles belong to whom. PGSPs fill in the gaps by relying on complex algorithms to estimate each individual's percentage DNA contribution and possible alleles, and to calculate a statistic or likelihood ratio based on comparing any uploaded reference DNA profile to the program's interpretation. *See State v. Pickett*, 246 A.3d at 286-87. Reliability therefore depends on data quality, analyst judgment, individual laboratory equipment – and the software algorithm. *See generally* Brief of *Amici Curiae* Drs. Mats Heimdahl and Jeanna Matthews, *State v. Pickett*, 246 A.3d 279 (N.J. Super. Ct. App. Div. 2021) (No. A-004207-19T2). Importantly, reliability also may be compromised when an algorithm is applied to DNA samples that differ from assumptions incorporated into the algorithm's source code. *See id*.

"Big data algorithms are becoming more common in the criminal justice system: they are used to provide more effective allocation of police resources, to notify police of potentially dangerous individuals at specific locations, to guide efforts to intervene with individuals before they engage in criminal activity, to advise judges making decisions about pre-trial detention, and to provide guidance to judges at sentencing." Ric Simmons, *Big Data and Procedural Justice: Legitimizing Algorithms in the Criminal Justice System*, 15 Ohio St. J. Crim. L. 573, 573 (2018). Indeed, "[o]ur world runs on big data, algorithms and artificial intelligence (AI), as social networks suggest whom to befriend, algorithms trade our stocks, and even romance is no longer a statistics-free zone. . . . Predictive policing and algorithmic justice are part of the larger shift towards [this] 'algorithmic governance.'" Ales Zavrsnik, *Algorithmic Justice: Algorithms and Big Data in Criminal Justice Settings*, Eur. J. of Criminology 1, 2 (2019).

"Databases and algorithms are human artefacts. 'Models are opinions embedded in mathematics [and] reflect goals and ideology.'" *Id*. at 8 (citation omitted). "On a general level, there are at least two challenges in algorithmic design and application. First, compiling a database and creating algorithms for prediction always require decisions that are made by humans. . . . Second, algorithms may also take an unpredictable path in reaching their objectives despite the good intentions of their creators." *Id*. Thus, "an algorithm will only appear trustworthy if its calculations are

transparent and comprehensible to the person being affected." Simmons, *supra*, at 578.

It is important to examine the algorithms that underlie criminal convictions, because "big data technologies can violate constitutional protections, produce a false sense of security and be exploited for commercial gain." Zavrsnik, *supra*, at 4. STRmix and other PGSPs should be no exception to this.[10]

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[10] In issuing the subpoena in this case, the Texas Court has already determined that the STRmix source code is "material and necessary for the administration of justice" here, and to Petitioner's postconviction claim of ineffective assistance of counsel. App. of Ex. to Pet. for Writ of Mandate at 191, *Colone v. S.C. (GitHub)*, S265307 (Cal. Jan. 13, 2021) (Order granting Out-of-State Subpoena); *cf. Pickett*, 246 A.3d at 284 (when "the State chooses to utilize an expert who relies on novel probabilistic genotyping software to render DNA testimony, then defendant is entitled to access, under an appropriate protective order, to the software's source code and supporting software development and related documentation" "to challenge the reliability of the software and science underlying that expert's testimony at a *Frye* hearing"). Source code can provide information that other forms of examination of PGSP software such as black box testing cannot. Steven M. Bellovin et al., *Seeking the Source: Criminal Defendants' Constitutional Right to Source Code*, 17 Ohio State Tech. L. J. 1, 38-39 (2021) (discussing a calculation error in likelihood ratio coding of a forensic tool only discovered after source code examination, and noting that "deviation from good coding practices, . . . can indicate underlying software defects" and that "[i]t is extremely difficult to detect such [indicators] without access to source code."); PCAST Report at 79 (cautioning that PGSPs should be independently evaluated to ensure their methods are scientifically valid, and that the software itself correctly implements those methods). Particularly in a capital case such as this, due process requires that a defendant be allowed to examine the algorithm underlying his conviction. *Cf. Clemons*

STRmix was first admitted in a United States court in December 2015. Meghan J. Ryan, *Secret Conviction Programs*, 77 Wash. & Lee L. Rev. 269, 296-98 (2020). STRmix and its competitor probabilistic genotyping programs have come under scrutiny around the world; flaws in their code and testing protocols have in some cases even led to revision of expert declarations and overturning of convictions. *See*, *e.g.*, Rebecca Wexler, *Convicted by Code*, Slate (Oct. 6, 2015), https://slate.com/technology/2015/10/defendants-should-be-able-to-inspect-software-code-used-in-forensics.html ("Coding errors have been found to alter DNA likelihood ratios by a factor of 10, causing prosecutors in Australia to replace 24 expert witness statements in criminal cases."); *Summary of Miscodes*, STRmix, https://strmix.com/news/summary-of-miscodes (last visited May 9, 2021) (identifying 14 miscodes in the history of STRmix, none of which outright changed an inclusion to an exclusion or established a false inclusion, but

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v. Mississippi, 494 U.S. 738, 746 (1990) ("Capital sentencing proceedings must of course satisfy the dictates of the Due Process Clause. . . ."); *Woodson v. North Carolina*, 428 U.S. 280, 305 (1976) (plurality opinion) (reiterating the truism that "the penalty of death is qualitatively different from a sentence of imprisonment, however long. Death, in its finality, differs more from life imprisonment than a 100-year prison term differs from one of only a year or two."); *Eddings v. Oklahoma*, 455 U.S. 104, 117-18 (1982) (O'Connor, J., concurring) ("Because sentences of death are qualitatively different from prison sentences, this Court has gone to extraordinary measures to ensure that the prisoner sentenced to be executed is afforded process that will guarantee, as much as is humanly possible, that the sentence was not imposed out of whim, passion, prejudice, or mistake." (internal quotations and citation omitted)).

many of which altered the likelihood ratio); Stephanie J. Lacambra et al., *Opening the Black Box: Defendants' Rights to Confront Forensic Software*, The Champion, May 2018 at 28, 32 (PGSPs tended to overestimate the likelihood of guilt due to a secret function within the software program); Alan Feurer, *Hasidic Man Convicted of Beating Black Student Gets Verdict Overturned*, N.Y. Times (Oct. 10, 2018) (conviction based on this analysis overturned).

As recently as this year, the New Jersey Superior Court's Appellate Division ordered the release of the source code for a competing genotyping program (TrueAllele) to defense lawyers and the trial court to help determine the admissibility and reliability of expert testimony about the genotyping results in the case. *State v. Pickett*, 246 A.3d at 301 (so long as a criminal defendant makes a particularized showing of need for proprietary source code and related information for use at a *Frye* hearing challenging an expert witness who relies on PGSPs to render DNA testimony, the defendant may access that source code under a protective order to challenge the reliability of the software and science underlying that expert testimony). The court explained that "[w]ithout access to the source code – the raw materials of the software programming – a defendant's right to present a complete defense, by meaningful cross-examination at the appropriate juncture, may be substantially compromised." *Id*. at 299. The need to "[a]llow[ ] independent access to" "the source code for that technology" is "obvious," where "[a]n accused individual's liberty is at stake" and "if it should

turn out there are source code errors that might affect [the software's] reliability, the time to discover that information is now, as part of the judge's gatekeeping role. Reliability must be resolved at the *Frye* hearing rather than in post[ ]conviction relief proceedings." *Id*. at 300-01.

"Courts must endeavor to understand new technology – here, probabilistic genotyping – and allow the defense a meaningful opportunity to examine it." *Id.* at 311. Indeed, "[w]ithout scrutinizing its software's source code – a human-made set of instructions that may contain bugs, glitches, and defects – in the context of an adversarial system, no finding that it properly implements the underlying science could realistically be made. Consequently, affording meaningful examination of the source code, which compels the critical independent analysis necessary for a judge to make a threshold determination as to reliability at a *Frye* hearing, is imperative." *Id*.

Access is equally necessary to determine the reliability and constitutionality of Petitioner's conviction and the Stored Communications Act should not be read to raise constitutional doubts by denying Petitioner access to the vital information that he sought.

CONCLUSION

For these reasons, and those set forth in the Petition, this Court should grant certiorari.

Dated: May 20, 2021

Respectfully submitted,

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