Wendy K. Tam Cho* and Bruce E. Cain*

AI and Redistricting: Useful Tool for the Courts or Another Source of Obfuscation?

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Abstract: Redistricting is a politically fraught exercise. Recently, new technology has emerged that has the potential to improve the redistricting process by providing information to aid in judicial oversight. These scientific advances create the potential to improve societal governance but are also potentially manipulable by partisan interests. To avoid these negative externalities, we must thoughtfully design the processes, implement safeguards, and have clear policies that regulate and steer the emerging AI toward democratically favorable goals. We propose institutional changes toward these aims.

Keywords: redistricting, AI, expert witnesses, litigation

We are amid an unmistakable and enormous technological transformation. The recent proliferation of computing power has expanded the potential reach of technology, information, and computation into many realms of life, including politics and government. Our capacities to compile, organize, analyze, and disseminate information have increased dramatically and facilitated the creation of many tools that connect citizens and automate human tasks. Recent applications (e.g., facial recognition and recommender algorithms) have made it clear that the potential of technological innovations is extensive but also entails regulatory issues and privacy and ethical concerns.

While technological growth will surely continue, how it ultimately evolves and shapes society is less certain and will be determined, not by the new technologies themselves, but by how we adapt our societal institutions and structures to meet these innovations. For societal progress to advance alongside technological progress, this partnership must be *deliberately* forged. It will not

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***Corresponding authors: Wendy K. Tam Cho**, Departments of Political Science, Statistics, Mathematics, Computer Science, and Asian American Studies, The College of Law, and the National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign, Urbana, IL, USA, E-mail: wendycho@illinois.edu; and **Bruce E. Cain**, Department of Political Science and Bill Lane Center for the American West, Stanford University, Stanford, CA, USA, E-mail: bcain@stanford.edu

simply emerge with the technology. Accordingly, we must endeavor not only to create technological advances, but to conceptualize AI[1] in such a way that its inevitable existence favorably interacts with, and positively shapes, our democratic processes. These large-scale goals for AI are broad, sweeping, and quite frankly, overwhelming.

The pivotal path forward involves thoughtfully designing the processes that regulate how technology is applied in specific domains. In this paper, we discuss one particular use case: redistricting, an area in which (1) we possess expertise, both substantive as well as technical, and (2) until quite recently, algorithms were neither utilized nor available. In the past decade, statistical modeling and computing technology have been employed in the redistricting process in an unprecedented manner, providing the potential to understand and influence redistricting outcomes in fundamentally new ways. How the existence of this technology for redistricting ultimately affects governance will depend critically on the institutional guidelines and structures that modulate it.

1 The Evolution Towards Increased Redistricting Technical and Judicial Complexity

Since the Supreme Court ruled in *Baker v. Carr* (369 US 186 (1962)) that malapportionment was a justiciable issue, state and federal courts have been heavily involved in evaluating the legality of redistricting plans. From the outset, judges faced two fundamental challenges. The first was how to obtain sufficient technical expertise to determine the factual basis of competing claims. And the second was how to maintain judicial impartiality when deciding a case where the political consequences are known *a priori*. Redistricting presents a particularly thorny application because complex technology is used to help inform decision-making in an overtly political and high-stakes arena.

1 We use the term AI in an amorphous manner to refer to "technology" writ large (e.g. software, algorithms, statistical models, optimization heuristics, etc.). The term "artificial intelligence" was coined by John McCarthy in 1955 in a conference proposal to examine "the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." Since then, the term "AI" has evolved in ways that we are unable to clearly understand or characterize. Today, the term AI appears to be utilized broadly but without a seeming consensus as to its precise meaning.

1.1 The Technical Challenge

The initial focus after *Baker v. Carr* and *Reynolds v. Sims* (377 US 533 (1964)) was on representational inequality that resulted from a failure to adjust for population changes between censuses. Applying the "one-person, one-vote" rule to electoral districts at various levels of government raised contestable issues concerning the appropriate data (e.g., population versus voter registration) to consider as well as the allowable deviation from strict population equality across electoral districts. But once these criteria were settled, the calculations themselves were relatively straightforward and intuitive. The same could also be said of other formal criteria such as the number of municipality splits or mathematical incantations of geographic compactness measures. For these well-defined and easily comprehensible tasks, computers helpfully perform the simple computations more quickly and precisely than humans.

But, as the Supreme Court expanded into questions of political and racial fairness, the proper measurements became more complex and technical. For example, when the court made it clear that the US Constitution did not mandate proportional representation (see e.g., *Whitcomb v. Chavis* (403 US 124 (1971)), *White v. Regester* (412 US 755 (1973))), political scientists proposed more computationally complex standards such as symmetry measurements for the seats-votes curve (Grofman 1983). Similarly, the *Gingles* test (478 US 30 (1986)) for violations of Section 2 of the Voting Rights Act led to technical debates about the methods for assessing racially polarized voting, especially the theoretical foundations of the EI model (Cho 1998; King 1997).

The current round of redistricting, based on the 2020 census, has upped the technical ante much further with a slew of new methods for analyzing electoral maps, including the introduction of algorithms to produce a random sample from the set of all feasible constitutional redistricting plans (Cho and Liu 2021; Fifield et al. 2020; Herschlag et al. 2020), methods to assess local outliers (Chikina et al. 2017), as well as a set of other methods that randomly generate maps, though without particular theoretical guarantees for what is produced (Chen and Rodden 2015; DeFord, Duchin, and Solomon 2021). The complexity of the analysis has risen substantially, and these methods and computations are no longer simple or easy to understand for the public or for the courts.

Da mihi facta, dabo tibi ius—give me the facts, and I will give you the law. Various scholars have presented arguments for how these new technological innovations provide relevant facts and a useful path for contextualizing the different electoral maps that the courts are asked to evaluate. Whether the courts will accept that these technological advances are offering relevant facts to help answer legal

questions is not a simple question to answer since the sophistication of these algorithmic methods and models is typically beyond the comprehension of most judges. Instead, judges must rely on expert witnesses to attest to the mathematical validity of, the assumptions behind, and the inputs into, the algorithms. Accordingly, expert witnesses are behooved to exercise exceptional care in how they communicate the science that underlie these algorithms (Cho and Rubinstein-Salzedo 2019a, 2019b).

1.2 The Politicization Challenge

This leads to the second problem, politicization. When scholars are pulled into redistricting cases, they are hired by lawyers who advocate for one side of a particular case. Law firms, especially those whose practice area includes election law, generally align with a particular political party. They sometimes, but rarely, work both sides of the aisle even though one might reasonably believe *a priori* that Republicans and Democrats are equally prone to taking advantage of their majority status when drawing electoral maps. Aligning with one political party or one side is consistent with the role of an advocate. However, while scientific evidence may favor one side or the other in any given case, siding with one political party affects how science is communicated. When expert witnesses are hired by lawyers, their alignment with one side thrusts them into a position where the incentives differ from those that guide epistemological and value-free scientific inquiry.

The tensions and issues have given rise to a skepticism toward expert testimony that is captured by the aphorism: "There are three kinds of liars—liars, damned liars, and expert witness" (Meier 1986). These sentiments are not new. More than a century ago, Pound (1906) wrote that our legal system "turns witnesses, and especially expert witnesses, into partisans pure and simple." In 1848, Judge John Pitt Taylor described several classes of witnesses who should be viewed with suspicion, concluding that "[p]erhaps the testimony which least deserves credit with a jury is that of *skilled witnesses* … [I]t is often quite surprising to see with what facility, and to what extent, their views can be made to correspond with the wishes and interests of the parties who call them" (Taylor 1858). More recently, other scholars have recounted similar tensions in their varied experiences as expert witnesses (Engstrom and McDonald 2011; Kousser 1984; Leigh 1991; Ruse 1986).

Hence, although scientific advancement has the potential to loosen the grip that partisanship has held over the redistricting process, this realization is far from certain when scientific inquiry is mixed with politicized incentives. Scientific

advancement and the political arena are surely uneasy bedfellows. Accordingly, given the overtly political nature of redistricting, it is especially important for us to design our institutional structures in such a way as to maximize the potential of science and to minimize the likelihood that science becomes partisanship's latest victim.

1.3 Judging Political Cases

In the US system of checks and balances, courts are tasked with the role of stepping in when legislatures overstep their bounds. In election law cases, even without technical challenges, judges face additional obstacles to overcome in their role as impartial referees. When judges decide politically sensitive cases, there is some evidence that their decisions are influenced by their personal partisan loyalties or how they were elected or nominated. These factors can affect how they perceive the legal merits of an election law case. *Bush v. Gore* arose from the hotly contested 2000 US Presidential election and provides a case in point. Because the justices' votes (both in Florida's state Supreme Court and the US Supreme Court) aligned with their assumed partisan preferences, suspicions were piqued that the judicial decision-making in the case was partisan and outcome-driven rather than an impartial application of legal principles. More generally, the case fueled skepticism that judicial determination in cases with political outcomes is objective.

Similar judicial decision-making patterns have been observed in legal cases involving voting rights and redistricting. Cox and Miles (2008) found that the likelihood that a federal judge will vote for the plaintiff in a Section 2 Voting Rights case is highly correlated with the party of the President who nominated the judge. Judges nominated by Democrats were found to be significantly more likely than judges nominated by Republicans to vote for the plaintiff. McKenzie (2012) examined partisanship patterns in federal court judicial decisions on redistricting cases from 1981 to 2007. He found that while the decisions did not align perfectly with the partisan bent of the federal judges, they were also not divorced from these predispositions. In these cases, judges appeared to be exercising "constrained partisanship." When the facts and redistricting law were clear, the judges were better able to refrain from unbridled partisanship, but when there was some ambiguity, partisan leanings strongly influenced case outcomes.

These studies examined the federal court system where judges are not elected, but instead, nominated by the President and confirmed by the Senate. Since federal judges are nominated and not elected, they are generally regarded as less partisan than judges in the state court system, where nine out of ten state court judges are elected to office (Schotland 2007). In a study of redistricting cases at the

state court level, Wilhelm, Pennington, and Petrie (2022) similarly find that party loyalty affects judicial redistricting decisions, particularly when the litigation involves partisan gerrymandering claims. They also find that Republican majority plans prompt a more partisan judicial response than Democratic majority plans. Finally, they find that judicial selection systems condition the impact of party loyalty on voting. Hence, whether at the federal or the state level, these politically charged cases, at least on their face, appear to present strong challenges to the political impartiality of judges.

While one cannot prevent a partisan judge from deciding a case based on political preference, and while there is evidence that partisan preferences play a nontrivial role in the judicial determination of cases with political outcomes, this relationship is not iron clad. These studies indicate that there are pathways for institutionally constraining partisan judicial behavior. How judges perceive the facts affects how they rule on the law. If the facts and the law are clear, the likelihood that judges behave within their ideal appointed roles as impartial arbiters increases. *Da mihi facta, dabo tibi ius*. How then do we best ensure that the facts are provided accurately, without partisan bias?

2 Public Trust in Science Undergirds Democratic Governance

The functional aim of AI must be to modulate judicial bias by providing clear scientific evidence of possibilities and choices taken in redistricting cases. One might assume that technological innovation in helping us assess electoral maps can only be a positive development. However, as we are beginning to realize with all technology, such naivete is unwise. Instead, we must be vigilant and sufficiently wary that the unregulated expansion of AI in this overtly political field does not exacerbate political polarization and tensions, worsen representation, or serve to only validate partisan intentions.

Any type of technological advancement for redistricting analysis should constrain partisanship, not become a tool for partisans. If misused or maliciously used, AI can contribute to an already worrying democratic decline. This decline would be even more devastating than no technological advancement at all because validating gerrymandered maps under the guise of science is more problematic than raw, open partisanship. In the latter case, at least it is known that the behavior is fueled simply by partisan fervor, and we understand how and why that would be problematic. In the former case, we have hidden the true underlying partisan motivations, and have now justified that behavior as originating from

some "scientific" and objective appeal. Previously, we viewed the wolves as they were, but now we allow them to roam free as partisan wolves dressed in the scientist sheep's clothing.

We argue that the court system needs to adopt a new approach for how AI capabilities and evidence are used in the courtroom and to implement policies that foster objective legal decision-making and the implementation of judicially manageable standards that lie above the partisan fray. In particular, we need to thoughtfully shape the processes, implement safeguards, and have clear policies that regulate and steer the emerging AI toward democratically favorable goals. We must evaluate the risks of AI and manage the opportunities with proactive vision. At a time when partisanship in the political system as whole, as well as in the judiciary specifically, is seemingly on the rise, considering structural reforms to aid the court system in navigating these issues is imperative.

2.1 Expert Witnesses

In idealized form, the primary goal of science is to discover truth. Scientific ventures may have mediate aims to provide information that can be used to guide policy and democratic decision-making. If a scientific venture has some application that involves other actors, then an added critical goal is to communicate science well so that the science may be understood and applied properly in the domain of interest. If these goals are shaped or altered when scientists are called upon in legal cases, not only does this degrade the scientific venture, but it harms society as well.

Consider the legal context of criminal trials. In criminal cases, District Attorneys and Public Defenders have a particular job. The importance of their job and their role does not change based on the guilt or innocence of their client. The lawyers are advocates, and so are necessarily focused on a particular outcome. The expert witnesses, on the other hand, are scientists, not advocates. In their proper role as scientists, these experts are not predisposed toward a particular outcome, but are engaged simply in epistemic pursuit. While the legal and scientific realms intersect here, the legal and scientific aims are guided by different epistemological foundations. In the best interest of justice, the two arenas must maintain their distinctions.

An expert in DNA testing may be called upon to testify in a criminal case because we want and need experts to help us understand the science and to help us apply it appropriately in the legal case. Experts may be called upon by both the prosecution and the defense since both sides may want to delve into the nuanced aspects of the scientific application. This scenario is common and unproblematic,

in theory. In practice, suppose that a particular scientist always appears to present incriminating evidence against black defendants but never appears to present incriminating evidence against a white defendant. Suppose further that this was true of virtually all expert witnesses, for all criminal cases. Some expert witnesses work exclusively to prosecute black defendants while other expert witnesses work exclusively to prosecute white defendants. These same experts also sometimes appear on the defense side, but then those who work to prosecute black defendants only defend white defendants and those who work to prosecute white defendants only defend black defendants. Without knowing anything about the case, the guilt or innocence of a particular defendant, and assuming that the science presented is sound, this pattern is nevertheless troubling. The pattern *strongly* implicates that science is being commandeered in the courtroom, used selectively at best, and employed in favor of a particular outcome. Even were these implications false, the pattern *itself* remains problematic because it strikes at the heart of public trust in science.

When science is believed to be defined by the value-free ideal that endorses epistemological aims, it promotes public trust in science as a source of policy-relevant information, which in turn, propels us toward the ideal of democratic governance rooted in scientifically informed policy.[2] However, when science is used or viewed as a tool to generate a particular outcome or when science is politicized, it is no longer effective or objective, but simply serves political aims. These short-term political gains garnered from the misuse of science to obtain a victory in a particular legal case are ultimately overshadowed by the long-term societal harm for all of us.

Is the science of redistricting moving us toward the democratic ideals by which we wish to govern society? Let us put aside, for the moment, the content of the expert witness testimony and its scientific soundness. These are important issues, but ones that we leave for discussion in another time and venue. Here, we note that, in redistricting cases, expert witnesses who testify in multiple court cases commonly and strongly favor one partisan side. This is true for expert witnesses who testify in favor of Republican clients as well as for experts who testify in favor of Democratic clients. Each group of experts is strongly ensconced with one

2 The value-free ideal is contested by various philosophers. Harding (1992), for instance, advocates for "socially situated knowledge." Longino (1996) similarly makes the case for "contextual empiricism." Both argue that objectivity has not been operationalized in a way such that the scientific method can systematically identify and eliminate the social values, interests, and agendas within the scientific community. Instead, social movements, for instance, help scientists to have a more expansive view of the world which helps them uncover their own biases toward knowledge and observation. Full engagement with this debate is beyond the scope of our immediate article, but we come back to these ideas in the final discussion.

political side. These observed "partisan tendencies" hold true regardless of whether that political party is on the prosecution or the defense. As in criminal cases, that expert witnesses for redistricting litigation serve only one partisan interest is *prima facie* evidence of partisanship invading and compromising science. If science is value-free, then scientists should not present evidence only for a particular partisan outcome. Whether this pattern is perpetuated by lawyers or by scientists is immaterial. The very existence of this pattern is detrimental to society.

3 Restructuring Institutions to Foster Public Trust and Societal Progress

In redistricting cases, there are partisan actors (lawyers) and non-partisan actors (judges and expert witnesses). While the latter are nominally non-partisan, various pressures may erode their capacity to perform their role neutrally. If these tendencies are not kept in check, judicial involvement in redistricting cases risks the appearance of further politicization, as the Supreme Court feared in the pre-*Baker v. Carr* era. Altering some of the practices and institutional structures that undermine sincere efforts at impartiality will help mitigate the danger of politics intruding further into the legal realm. There are two basic design approaches for offsetting bias that have been used for centuries by governments, businesses, and religious organizations. The first is to balance adversarial interests. The second is some type of randomization mechanism. Both approaches may be combined to form reinforcing mitigation layers intended toward a common and positive aim.

In the realm of redistricting, the most recent example of this dual strategy is in the design of the Independent Redistricting Commission (IRC). While the selection procedures for members of an IRC are frequently mocked as being convoluted, and the results have not always been controversy-free, the existence of IRCs appears to have reduced perceived partisanship in the resulting electoral maps. The precise rules for the composition of an IRC vary by state and often require specific representation by party/race/gender, random selection, the right of opposing parties to strike some nominees, vetting by judges or a nonpolitical agency, and multiple levels of approval. Once the IRC is created, its actions abide by various rules. No one rule or set of rules guarantees success, but the institutional design appears to engender greater public trust in the outcome than a redistricting map that is created by the majority party of the lower state house.

This type of new institutional design may also be helpful in navigating the introduction of increasingly sophisticated technology in a legal but political space.

First, however, it is important to address claims about the validity of algorithms from legal dispute. Whether an algorithm is scientifically and theoretically valid is a matter that should be peer reviewed before it is accepted by any court. This decision should never fall to the court. To be sure, there are a plethora of unresolvable issues about value tradeoffs between the competing claims of different groups that are not purely scientific judgments, but the purely scientific claims must be vetted by the relevant scientific community, which may involve multiple academic disciplines. Hence, our first two recommendations:

(1) Any AI method should be fully vetted by the relevant scientific community and published by high quality refereed journals. For an interdisciplinary application like redistricting, this requires vetting by multiple disciplines. The courts need to be nuanced in its understanding of expertise.
(2) As a second layer to ensure scientific validity, the National Academy of Sciences should convene a panel of highly qualified technical scholars with various specializations to review the relevant scholarship, and certify any algorithms proposed to be used in redistricting litigation.

Next is the matter of the expert witnesses. Plaintiffs and defendants in redistricting cases could continue to retain their "hired gun" expert witnesses. This preserves the adversarial mode of presenting both sides of the dispute to the judges and allowing the full airing of alternative claims. Nevertheless, this adversarial model would be improved by embedding it in a hybrid system of experts where one set of experts is aligned with lawyers while another set is aligned with the court. This would provide an additional source of expertise from academic experts who are ostensibly less inclined toward partisan behavior. Although Rule of Evidence 706 allows courts to appoint their own experts, this process is not generally utilized in redistricting cases. The rise of technical evidence and the partisan pattern of expert witness testimony in redistricting cases, however, behooves judges to avail themselves of these potential resources, both to assist them in their decision-making and to engender public perceptions of judicial impartiality.

The composition of, and procedural rules for a court-aligned set of experts must be designed to minimize partisan behavior. Toward this end, we propose:

(1) The Court system should create a pool of nominally nonpartisan experts that is aligned with the courts and whose role would be to validate scientific claims and provide technical assistance to judges in adjudicating redistricting cases. These experts could be an extension of the current role of the Redistricting Court Master.
(2) The process of selecting individuals for the pool should be renewed with each new round of redistricting and perhaps performed by the same panel that reviews the algorithms and other technical methods. There is a mechanism

whereby other experts, political parties, or lawyers are able to object to or possibly strike controversial choices from consideration.
(3) The court-aligned expert pool would be reviewed after every redistricting round by a bipartisan panel of judges.
(4) Individuals who are considered for inclusion in the pool of court-aligned experts must have a high level of technical expertise in a relevant field. The set of individuals in the pool should have broad expertise across relevant technical and non-technical disciplines.
(5) The court-aligned vetted pool of qualified experts would be assigned by random selection to a particular case.
(6) To the extent possible, the court-aligned experts would be shielded from the details of case, ideally consulting just on technical matters without knowledge of the particular circumstances of the legal case.
(7) Procedural rules are designed to encourage compromise and consensus within the pool of experts.
(8) If the court rules that a new map must be devised, the court could attempt to arbitrate between the two adversarial parties in the manner of the New Jersey Commission and try to induce them into a compromise. If this process is unsuccessful, the court could consult a Court Master with input from the expert pool to aid in fashioning a remedial plan.

4 Discussion

Redistricting is a politically fraught exercise. As such, it is inherently controversial. Quite likely, redistricting cases will continue to be referred to the court system to adjudicate and new technology targeted at these redistricting cases will continue to emerge every decade. This technology can be used to improve the redistricting process, but a favorable outcome is not assured. If these tools are used by partisans simply for partisan gain, then these technological advances will undercut the legitimacy of American democracy further. Inaccurate information and the ability to obfuscate with ostensibly neutral scientific tools will not lend itself to impartial judicial decision-making.

Scientists are essential in producing the scientifically informed policy that we desire to undergird society and our democratic institutions. We echo the sentiments of W. E. B. Du Bois (1898, 16–17) from over a century ago:

> Students must be careful to insist that science as such—be it physics, chemistry, psychology, or sociology—has but one simple aim: the discovery of truth. Its results lie open for the use of all men—merchants, physicians, men of letters, and philanthropists, but the aim of science

> itself is simple truth. Any attempt to give it a double aim, to make social reform the immediate instead of the mediate object of a search for truth, will inevitably tend to defeat both objects … Only by such rigid adherence to the truth object of the scholar, can statesman and philanthropists of all shades of belief be put into possession of a reliable body of truth which may guide their efforts to the best and largest success.

We realize, however, that the road to this ideal for science is not smooth. First, there is no escaping that human society is imperfect and punctuated with long histories of injustice, prompting others to argue that the value-free science must be combined with ethical and political considerations to make policy (Douglas 2009; Longino 1996). Here, again, however, we side with Du Bois (1912, 81) in saying

> I have great sympathy with those amiable souls, who, knowing this to be true, believe that present policy demands silence or even glossing over the plain facts. I say I have sympathy with such folk, but I am compelled to remember that in the great past the inexorable decrees of truth have held as strongly against the flatterer and the so-called optimist as against the pessimist and the liar.

Second, even if scientists adhered unwaveringly to the value-free ideal, the scientific venture is a process that is necessarily and painstakingly slow. Despite best efforts, success is not immediately achieved. Yet, the ills of society are frequently on a different timeline. The timeline for scientific determination may sometimes be at odds with societal exigencies, and sometimes we must settle for knowledge that is still evolving or design our institutions to cope with this uncertainty.

In the field of redistricting, we must recognize the incurable imperfection and problematic setting of scientific inquiry in a highly politicized arena. This realization must compel us to safeguard our democracy by thoughtfully redesigning our institutional structures. We must ensure that our redistricting procedures protect the court from being drawn too deeply into the political fray. Allowing the courts to be politicized further in redistricting matters will likely exacerbate judicial confirmation controversies and further delegitimize the courts' rulings in other matters. At a time when respect for American democracy is declining, we must identify pathways for defusing partisan pressures that erode confidence in the American court system and public trust in science. To proactively preserve judicial integrity, we must design new institutional structures to help the courts obtain more reliable, competent, and objective assistance.

Technological progress can never be stopped, but careful regulation is essential for ensuring that it improves society. The indispensable ingredient for success is not the existence of the technology itself but how humans design and oversee the processes we use for managing technological innovation. As AI applications have become more common and performant, ethical concerns,

algorithmic bias, data privacy, and transparency issues have raised calls for regulatory safeguards (Acemoglu 2021). Existing tort law already requires that a company avoid negligent use of AI for decision-making or providing information that may result in public harm (Galaaso and Luo 2019). Likewise, employment, labor, and civil rights law imply that when AI is used for hiring or termination decisions, the companies could face liability for these human resource decisions. AI regulation is necessary not only for ensuring the proliferation of innovation but also for limiting the negative externalities of these tools. We are at a critical juncture in the redistricting sphere. Even if value-free science is an unattainable in its purest form, we must, at least, for the good of society, design our institutional structures to incentivize the value-free science that fosters public trust and an impartial judiciary.

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