UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

LEAGUE OF WOMEN VOTERS OF MICHIGAN, et al., Plaintiffs, v. RUTH JOHNSON, in her official Capacity as Michigan Secretary of State, et al., Defendants.	Case No. 2:17-cv-14148 Hon. Eric L. Clay Hon. Denise Page Hood Hon. Gordon J. Quist **VOTERS' RESPONSE TO DEFENDANT SECRETARY JOHNSON'S MOTION IN LIMINE TO EXCLUDE THE THE EXPERT REPORT OF DR. JOWEI CHEN**

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VOTERS' RESPONSE TO DEFENDANT SECRETARY JOHNSON'S MOTION IN LIMINE TO EXCLUDE THE EXPERT REPORT OF DR. JOWEI CHEN

Plaintiffs' expert, political scientist and University of Michigan professor Dr. Jowei Chen, submitted an expert report comparing each of the three challenged maps to one thousand simulated non-partisan maps, showing that each enacted map produced an extreme partisan outcome. He also used those simulated maps to identify individual districts that were partisan outliers. Dr. Chen wrote and testified extensively about the criteria he used to generate the computer algorithm that produced the simulated non-partisan districts. In addition, he produced to the Secretary the computer code used to create the simulations, and a near-final version of the underlying computer source code.

The Secretary falsely states that Dr. Chen "deleted" the final code. The Secretary further erroneously claims that Dr. Chen's maps were in some way "miscalibrated." In fact, Dr. Chen's maps take into account every single traditional districting criterion, and follow the very criteria used by the Michigan legislature, except for political bias. At best, the Secretary's critiques go to the weight of Dr. Chen's report and simulations, not their admissibility.

For these reasons, and for the reasons detailed in the attached brief, the Secretary's Motion in Limine to Exclude Dr. Chen's Expert Report should be denied.

Respectfully submitted,

Date: December 14, 2018

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Certificate of Service

I hereby certify that on December 14, 2018, I caused to have electronically filed the foregoing paper with the Clerk of the Court using the ECF system, which will send notification of such filing to all counsel of record in this matter.

Respectfully submitted,

/s/ Joseph H. Yeager, Jr.

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Issue Presented

Should Dr. Jowei Chen's expert report, and the simulated redistricting plans that form the basis for his report, be excluded under *Daubert* even though this case will be tried without a jury, the report and simulations are entirely reliable, and all of Secretary's arguments go to the weight of the report, not its admissibility?

Controlling or Most Appropriate Authorities

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VOTERS' BRIEF IN RESPONSE TO DEFENDANT SECRETARY JOHNSON'S MOTION IN LIMINE TO EXCLUDE THE EXPERT REPORT OF DR. JOWEI CHEN

I. Introduction

Plaintiffs' expert, political scientist and University of Michigan professor Dr. Jowei Chen, submitted an expert report comparing each of the three challenged maps to one thousand simulated non-partisan maps, showing that each enacted map produced an extreme partisan outcome. He also used those simulated maps to identify individual districts that were partisan outliers. He wrote and testified extensively about the criteria he used to generate the computer algorithm that produced the simulated non-partisan districts. In addition, he produced to the Secretary the final, executable computer code he used, as well as a near-final version of the underlying computer source code, upon which the final code was based. The only differences between the near-final version of the source code and the ultimate final version were cosmetic.

The Secretary incorrectly assumes that because the produced executable computer code, or the byte code, has a June 12, 2018 timestamp, Dr. Chen must have "deleted" the final source code, upon which the byte code is based. As Dr. Chen's declaration attached to this brief evidences, he did not "delete" the final source code. Rather, in mid-2017, before discovery commenced in this case, he had used the final source code as a starting point for gerrymandering research for other states, and the changes he made replaced the final Michigan source code. The Secretary also argues

that Dr. Chen incorrectly evaluates two re-districting criteria. These arguments are meritless for reasons detailed below, and to the extent that Court entertains them at all, they go to the weight of Dr. Chen's report, not its admissibility.

II. Relevant Factual Background

A. Dr. Chen Developed Computer Simulation Programming to Determine if the Enacted Plans were Gerrymandered.

Dr. Jowei Chen is an Associate Professor in the Department of Political Science at the University of Michigan, Ann Arbor. Dr. Chen is also a Faculty Associate at the Center for Political Studies of the Institute for Social Research at the University of Michigan as well as a Research Associate at the Spatial Social Science Laboratory at Stanford University. Dr. Chen is a leading political science expert regarding gerrymandering. His experience, research expertise, and publications are detailed in his curriculum vitae, Ex. 2, Chen Decl., Ex. A, and his expert report, Ex. 1, Chen Report.

Before filing the Complaint in this case, Plaintiffs asked Dr. Chen to analyze "whether Michigan's current House, Senate and Congressional districting plans have the effect of producing an extreme partisan outcome that diverges from possible alternative maps." Ex. 2, Chen Decl. ¶ 9; Ex. 1, Chen Report at 2. "To answer this question, [Dr. Chen] developed computer simulation programming techniques that allow [him] to produce a large number of non-partisan districting plans that adhere to

traditional districting criteria." Ex. 2, Chen Decl. ¶ 9. Dr. Chen explains the following in his expert report:

> In conducting my academic research on legislative districting, partisan and racial gerrymandering, and electoral bias, I have developed various computer simulation programming techniques that allow me to produce a large number of non-partisan districting plans that adhere to traditional districting criteria using US Census geographies as building blocks. This simulation process is non-partisan in the sense that the computer ignores all partisan and racial considerations when drawing districts. Instead, the computer simulations are programmed to optimize districts with respect to various traditional districting goals, such as equalizing population, maximizing geographic compactness, and preserving county, municipal, and ward boundaries. By generating a large number of randomly drawn districting plans that closely follow and optimize on these traditional districting criteria, I am able to assess any enacted plan drawn by a state legislature and determine whether the enacted plan produces a partisan outcome that deviates from computer-simulated plans that follow traditional, partisan-neutral districting criteria.

Ex. 1, Chen Report at 2. Chen programmed the computer simulations to account for the following traditional, districting criteria: "1) Contiguity; 2) Equal population thresholds; 3) Minimizing county breaks; 4) Minimizing municipal breaks; and (as to some districts) 5) Geographic compactness." *Id.* at 3. Dr. Chen's "algorithm does not reject maps because they are favorable for Republicans or for Democrats." Ex. 2, Chen Decl. ¶ 23.

With respect to geographic compactness, Dr. Chen wrote his algorithm "to maximize compactness for all districts, in addition the other criteria" detailed above and in his report. *Id.* ¶ 24. Valuing compactness in this manner is a "traditional criterion in re-districting." *Id.* For example, Terry Marquardt, the map drawer of the

Michigan senate map at issue in this case, testified that compactness was a "goal" when map drawing. Ex. 3, Marquardt Dep. 111:24-112:8, 107:14-16 ("the configuration that was kind of the most compact is what we came up with there"). With respect to minimizing county and municipal breaks, Dr. Chen wrote his algorithm to "minimize the number" of such breaks. Ex. 4, Chen Dep. 78:22-25.

Ironically, the Secretary complains that Dr. Chen did not follow a particular subpart of the Michigan statute, MCL § 4.261(f) ("sub-section (f)"). Sec. Br.at 17 [Dkt. 147]. Yet the Secretary herself argues, as the Michigan Supreme Court has held, that the Apol statutory criteria may be changed by implication at any time. *Id.* at 13 n.9, 17; *LeRoux v. Sec'y of State*, 465 Mich. 594, 615 (2002). In *LeRoux*, the Michigan Supreme Court explained that the state legislature cannot bind future legislatures with statutory enactments; and therefore, the legislature may "repeal, amend, or ignore" any of the statutory Apol criteria when re-districting. *Id.*

The legislature made this change with respect to sub-section (f). *See* Ex. 5, List of Enacted Districts That Violate Sub-Section (F) ¶¶ 1-12. An analysis of the populations of cities, counties, and municipalities in Michigan, *see* Ex. 9, Table 8: Population and Housing Units, U.S. Census Bureau, 2010 Census, https://www.census.gov/prod/cen2010/cph-2-24.pdf, and Michigan's enacted House, Senate, and Congressional district plans, as created by MCL § 3.51-3.55 (congressional districts) and MCL § 4.2001-4.2006 (state legislative districts), reveals at

least twelve instances in which the enacted plans violate sub-section (f). *See* Ex. 5, List of Enacted Districts That Violate Sub-Section (F) ¶¶ 1-12.[1]

The legislature ignored the text of sub-section (f) in senate districts 22, 24, and 32, and house districts 17, 32, 63, 72, 86, 98, 99, 102, and 107. *Id.* Under *LeRoux*, because the legislature ignored sub-section (f) in drafting the enacted plans, this sub-section was effectively "repealed." *See LeRoux*, 465 Mich. at 615. The Secretary cannot reasonably hold Dr. Chen to different criteria than the legislature itself applied.

As Dr. Chen's report details, after running the programs he developed for this case, he found that each of the Michigan enacted plans produced extreme partisan results when compared to the computer-simulated plans. *See, e.g.*, Ex. 1, Chen Report at 56. Specifically, each of the three enacted plans creates more Republican districts than every single one of the 1,000 computer-simulated districting plans created for Michigan's House, Senate, and Congressional delegation. *Id.*

Dr. Chen began working on these computer simulations in or around February 2016. Ex. 6, Pls.' Discovery Responses at 15 [Dkt. 121-6]. To create these computer simulations, Dr. Chen used Java computer code editing software. Ex. 2, Chen Decl. ¶ 9. University of Michigan computer science Professor Charles Severance explains that "[a]n individual may utilize Java to write source code, which is a file of readable

[1] Because determining which enacted districts violate sub-section (f) may be cumbersome, Plaintiffs respectfully offer to detail that analysis during any oral argument for this motion, or during trial, if the Court would find such an analysis helpful.

code that is used to describe what the developer wants the program to accomplish." Ex. 7, Severance Decl. ¶ 10. Source code (.java file) is translatable into byte code (.jar or .class file), which consists of binary executable code, through a compiler. *Id.* "Byte code can be translated back into source code through a process known as decompiling. Once it has been translated back, it is referred to as decompiled byte code." *Id.*

Throughout 2016 and 2017, Dr. Chen wrote the Java source code that generated the simulated districts for the State of Michigan and described in his expert report. Ex. 2, Chen Decl. ¶ 11. As Dr. Chen refined his simulation algorithm, he would edit the source code. *Id.* "When you make changes to a Java source code and save those changes to the computer hard drive, the updated code replaces the previous version of the source code." Ex. 7, Severance Decl. ¶ 12. As Dr. Chen explained during his deposition and again in the declaration attached to this brief, the editing software does not "'autosave,' in that it does not store separate versions of the Java [source] code under different file names after edits are made." Ex. 2, Chen Decl. ¶ 11; *see* Ex. 4, Chen Dep. 54:18-55:10. Nonetheless, Dr. Chen "would often save a version of the Java [source] code separate from the working Java [source] code when [he] made significant changes to the working Java code." Ex. 2, Chen Decl. ¶ 11; *see* Ex. 4, Chen Dep. 54:5-7 ("I only save code when there is a structural or substantial change made.").

The final draft of the source code that Dr. Chen saved was in 2017 or earlier because he had "finished making significant changes to it." Ex. 2, Chen Decl. ¶ 12. Dr. Chen explained at his deposition and in the declaration attached to this brief that although he "may have continued to make cosmetic changes to the Java [source] code," he "did not make any significant changes." *Id.*

"The cosmetic changes included deleting functions that were unnecessary because, for example, they were redundancy checks [Dr. Chen] had earlier included to verify that the algorithm was functioning as intended." *Id.*; *see* Ex. 4, Chen Dep. 55:11-57:7 (explaining that "redundancy checks" were "subtracted" from the source code). It was Dr. Chen's understanding that "redundancy checks slow down the program computation process so once [he] verified that the algorithm was indeed functioning, [he] omitted those redundancy checks before using the program to run a large number of simulated districts and maps." Ex. 2, Chen Decl. ¶ 13. As part of the cosmetic changes Dr. Chen may have made to the Java code, he recalls that he did not change any "output limitations," as Dr. Liu characterizes them, "concerning the permissible number of county or MCD breaks." Ex. 2, Chen Decl. ¶ 15. Rather, Dr. Chen recalls having already written source code that "sought to reduce the number of county breaks under a particular numerical, target threshold." *Id.* Similarly, with respect to analyzing district compactness, Dr. Chen attests that while he "originally programmed multiple methods for analyzing district compactness," in the final

version of the source code he "only kept the most computationally efficient method of analyzing compactness." *Id.* ¶ 13.

The final source code (.java file), which Dr. Chen used to generate the simulated districts, was complete by mid-2017 or earlier. *Id.* Once the source code was complete, Dr. Chen compiled it into the final byte code (.jar files). Ex. 2, Chen Decl. ¶ 16. He saved a copy of the final .jar files, which he used to create the simulations in his report. *Id.* Although he saved the .jar files, copies of which were later produced to the Secretary, he did not separately save a copy of the final source code, from which the final .jar files are derived. Contrary to the Secretary's allegations, Dr. Chen did not "delete" the final source code that was used to generate the simulated districts. *Id.* ¶ 20. In mid-2017 or earlier, after he saved the final .jar files used for the Michigan simulations, Dr. Chen recalls using the source code (.java files), "from which the .jar files are based, as a starting point to create new Java [source] code with different parameters to run simulated districts for research regarding other states." *Id.* The changes he made to the source code to account for the different parameters needed for this other research replaced the source code in the final Michigan .java files such that they no longer exist. *Id.*; *see* Ex. 7, Severance Decl. ¶ 12.

B. Dr. Chen Produced Multiple Forms of His Computer Algorithm, Upon Which His Expert Report is Based.

Although a copy of the final source code used to generate the simulated districts no longer existed after mid-2017 or earlier, Dr. Chen had saved the final byte code (.jar files). On June 13, 2018, Dr. Chen provided a copy of the final .jar files, which he used to create the simulations in his report, to Plaintiffs' counsel, Ex. 2, Chen Decl. ¶ 18, who then produced them to the Secretary's counsel later that day, *see* Ex. 8, June 13, 2018, Email Confirmation.

Before Dr. Chen provided these .jar files to Plaintiff's counsel, he renamed them to mark them as "CONFIDENTIAL INFORMATION," pursuant to the protective order in this case. Ex. 2, Chen Decl. ¶ 17. "It is part of [Dr. Chen's] normal practice to rename .jar files by re-running them through a Java compiler." *Id.* "It is also part of [Dr. Chen's] normal practice to re-run .jar files through a compiler for the purpose of checking errors and/or code optimization." *Id.* Accordingly, Dr. Chen recalls re-running the final version of the .jar files through a compiler just before producing them on June 13, 2018. *See id.* "Every time you re-compile byte code, the re-compiled byte code is timestamped to reflect the date and time it was re-compiled." Ex. 7, Severance Decl. ¶ 14. Accordingly, the date stamp on the final .jar files that were produced to the Secretary correspond to the date and time they were re-compiled from the final .jar files—June 12, 2018. Significantly, "[r]e-compiling byte

code does not change the underlying algorithm in the source code upon which the byte code is based." *Id.*

Dr. Chen did not produce these .jar files by compiling his final source code because as explained above, the final source code was no longer in existence after approximately mid-2017 as it had been replaced with source code used for other research projects.

In addition to providing the final .jar files, Plaintiffs also produced Dr. Chen's decompiled final byte code, or, in other words, his final .jar files which had been translated back into source code. *See* Ex. 7, Severance Decl. ¶ 10. Although "[d]ecompiled byte code is not as easy to read as source code, . . . if significant expertise and resources are devoted to understanding the decompiled byte code, it can be done." *Id.* ¶ 15. On August 11, 2018, Plaintiffs also provided the Secretary the near-final source code that Dr. Chen had saved in 2017 or earlier, and from which the final source code only differed cosmetically. *See* Ex. 2, Chen Decl. ¶ 12.

C. The Secretary Makes False Assumptions About Dr. Chen's Computer Programming.

The Secretary's brief and Dr. Liu's attached declaration make several false assumptions about Dr. Chen's computer programming.

First, as detailed above, Dr. Chen unequivocally did not "delete" the final source code, from which the final byte code is derived, and upon which the expert report is based. The Secretary incorrectly assumes that the final source code was

deleted during the discovery process in this case. Sec. Br.at 10. In fact, around mid-2017, the final Michigan source code was used as a template, or "starting point," for simulations Dr. Chen was developing for other states. Ex. 2, Chen Decl. ¶ 20. Consistent with Dr. Chen's understanding of Java editing software, computer science Professor Charles Severance confirms that every time one edits source code, the updated code replaces the previous version of the source code. Ex. 7, Severance Decl. ¶ 12. Accordingly, the final source code was not deleted during discovery—or at any other time.

Second, source code was not used to generate the byte code files that were produced to the Secretary, and which have an internal date of June 12, 2018. *Cf.* Sec. Br.at 8; Liu Decl. ¶ 13 [Dkt. 147-2]. The Secretary falsely assumes that "Dr. Chen must have had his final source code when the byte code file was created on June 12, 2018." Sec. Br.at 10. Rather, Dr. Chen took the final byte code that he had compiled by mid-2017, and simply re-compiled it to re-name the files to include "CONFIDENTIAL INFORMATION" in the titles. Ex. 2, Chen Decl. ¶ 17.

Third, insofar as the Secretary claims that the byte code that Plaintiffs produced took several days to run on "personal computers," Sec. Br.at 9, Liu Decl. ¶¶ 24-25, this fact, even if true, is entirely irrelevant. Dr. Chen "used a high-capacity server computer to run th[e] simulations" described in his report. Ex. 2, Chen Decl. ¶ 14. To run the byte code, the Secretary should have similarly used a high-capacity server, and not "personal computers." *Cf.* Liu Decl. ¶¶ 24-25.

Fourth, the Secretary incorrectly states that Plaintiffs did not specify the changes made to the draft source code, which Plaintiffs produced to the Secretary, before it became the final source code. In fact, Dr. Chen testified during his deposition that only cosmetic changes were made. Ex. 4, Chen Dep. 55:11-57:7. The redundancy checks were originally integrated into the algorithm ensure that the algorithm was processing the input criteria correctly. Ex. 2, Chen Decl. ¶ 12. The fact that Dr. Liu "can tell that at least 10 functions . . . present in the draft source code files were modified or deleted" is entirely consistent with what Dr. Chen has already testified to—redundancy checks were omitted in the final source code. Liu Decl. ¶ 29. Notably, although Dr. Liu claims that it "appears" that the final computer code differs with respect to instructions for analyzing compactness and county and MCD breaks, he fails to identify any specific line of code or specific instruction concerning these topics that allegedly changed the substance of the simulations. *See id.* ¶ 30. If Dr. Liu had actually compiled the near-final source code, and then run the resulting byte code, he could have compared those outputs to the simulations included in Dr. Chen's report to verify that, indeed, no substantial changes were made to the final source code.

Finally, the Secretary's insinuation that Dr. Chen may have inserted an "instruction to the computer to only output those simulations that were more favorable to Democrats than the Enacted Plan" is false and unjustified. Sec. Br.at 12. Simply because Dr. Chen drafted source code which minimized the number of county

breaks is not problematic itself. In fact, limiting county breaks is a traditional districting criterion that the state legislators purposefully failed to take fully into account in order to achieve a pro-Republican gerrymander. Thus, the Secretary and Dr. Liu erroneously take issue with the fact that Dr. Chen programmed his algorithm to minimize the number of county breaks.

Dr. Liu and the Secretary also make the baseless leap that because Dr. Chen's program limited county breaks, he ensured that only pro-Democrat gerrymanders could result. Sec. Br.at 13; Liu Decl. ¶ 23. Dr. Chen testified in detail about all of the criteria he used to develop his algorithm. *See generally* Ex. 4, Chen Dep. 50-280. He detailed this criteria in his expert report as well. *See generally* Ex. 1, Chen Report. A pro-Democrat gerrymander was not a criterion. Dr. Chen does not deny that if his algorithm was run enough times, it might result in a plan in which 9 or more Republicans were elected. *See* Ex. 2, Chen Decl. ¶ 22. Rather, he found that after his programs were run 1,000 times each, none of those simulated districts produced the same politically biased plan that the Secretary has now asked Jeffery Timmer to intentionally create. *Id.* Unsurprisingly, this is because Dr. Chen's algorithm excludes the partisan instruction that Timmer used in creating his plan. *See id.*

It appears that the Secretary misunderstands the fundamental nature of Dr. Chen's algorithm. The algorithm produces random districting results that take into account neutral, traditional, districting criteria. As Dr. Chen explained during his deposition:

> the algorithm is . . . not going to arrive at the exact same plan every single time. . . there is a randomness to the process. Which is why the plans are going to be a little different from one another, and that's why, when—even when you pursue a specific goal like minimizing county breaks or minimizing municipal breaks, you're not always going to arrive at the exact same plan every single time because of the randomness inherent in the computer simulation process. . . It's not dictating the districts be drawn with particular boundaries, so much as it's saying draw random districts, but when you're drawing these random districts pursue certain criteria.

Ex. 4, Chen Dep. 82:1-23. Therefore, although it may be possible that a single random plan in which nine or more Republicans were elected may result if the algorithm was run one million times, that does not change the force of Dr. Chen's findings—that after the neutral algorithm was run 1,000 times, none of the simulation results included such a plan.

III. Gatekeeping is Generally Inapplicable For Bench Trials

The Secretary argues that *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 479 (1993), requires the Court to act as gatekeeper to exclude improper evidence. However, it is well settled that "[t]he 'gatekeeper' doctrine was designed to protect juries and is largely irrelevant in the context of a bench trial." *Deal v. Hamilton County Board of Education*, 392 F.3d 840, 852 (6th Cir. 2004), *cert den.* 546 U.S. 936 (2005); *see Daubert*, 509 U.S. 592-93 (district courts act as gatekeepers to protect juries from misleading or unreliable testimony). "[T]he very reason for suspending the Rules of Evidence in [suppression] hearings in the first place," the Sixth Circuit emphasized, "is to allow the impartial judge, who is less prone to persuasion by misleading expert

testimony than a jury, to weigh the competing evidence offered by the parties." *United States v. Stepp*, 680 F.3d 651, 669 (6th Cir. 2012) (citing *Deal*, 392 F.3d at 852).

Even more recently, a court in this District denied the Secretary's *Daubert* motion in another voting rights case, holding that because the matter would proceed to a bench trial, "[t]he proper course of action . . . is to admit the [expert testimony] and then afford it whatever weight the Court deems appropriate." *Michigan State A. Philip Randolph Inst. v. Johnson*, No. 16-CV-11844, 2018 WL 1180886, at *2 (E.D. Mich. Mar. 7, 2018); *see Ne. Ohio Coal. for the Homeless v. Husted*, Case No. 2:06-cv-896, 2016 WL 1047130, at *1 (S.D. Ohio Mar. 16, 2016) (citing *Deal*, 392 F.3d at 852) (exercising discretion to consider what amount of weight to give an expert opinion after the bench trial, explaining that "[i]n the context of a bench trial . . . *Daubert* and its progeny are largely irrelevant").

This case will be heard before a panel of three judges, who collectively have many years of experience adjudicating and weighing the merits of expert testimony. Accordingly, *Daubert* does not apply. "The proper course of action," is to "admit [Dr. Chen's report and the simulated districts upon which it is based] and then afford [them] whatever weight the Court deems appropriate." *Michigan State*, 2018 WL 1180886, at *2.

IV. Even if the Gatekeeping Standard Applies Pre-Trial, Dr. Chen's Report Satisfies Rule 702

Even if the Court were to apply the *Daubert* gatekeeping standard pre-trial, Dr. Chen's expert report satisfies Federal Rule of Evidence 702 because it is reliable, based on sufficient facts and data, was prepared using reliable principles and methods, and provides valuable information to the Court.

A. Standard of Review

Pursuant to Federal Rule of Evidence 702:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Fed. R. Evid. 702. Thus, expert testimony may only be admitted into evidence if: (1) the witness qualifies as an expert; (2) the methodology by which the expert reaches his or her conclusions is sufficiently reliable; and (3) the expert's testimony will assist the trier of fact to understand the evidence or determine a fact in issue. *Id.; Daubert,* 509 U.S. at 589-91.

Daubert and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), require a two-step inquiry that involves an analysis of the "relevance and the reliability" of an expert's opinion. *Greenwell v. Boatwright,* 184 F.3d 492, 496 (6th Cir. 1999). The relevance step of the inquiry is designed to ensure that "there is a 'fit' between the testimony and the

issue to be resolved by the trial." *Id.* (citing *United States v. Bonds,* 12 F.3d 540, 555 (6th Cir. 1993)). The reliability step focuses on the "methodology and principles" that form the basis for the testimony. *Id.* A trial court must inquire as to whether the methodology underlying the proffered expert testimony is valid and whether the methodology may be properly applied to the facts at issue in a particular case. *Daubert,* 509 U.S. at 592-93. The Secretary's Motion only challenges the reliability of Dr. Chen's analysis, not its relevance. Sec. Br.at 20-25.

Daubert sets forth five factors the Court may consider to determine reliability: (1) whether the expert's technique or theory can be and has been tested, (2) whether the technique or theory has been subjected to peer review and publication, (3) the known or potential rate of error of the technique when applied, (4) the existence and maintenance of standards and controls, and (5) whether the technique or theory is generally accepted in the scientific community. *Daubert,* 509 U.S. at 593-94. The Court's inquiry under *Daubert* is flexible. *Id.* at 594. These factors are not a definitive test or checklist but are merely instructive. *Id.* at 593; *Kumho,* 526 U.S. at 150.

B. Dr. Chen's Report and Simulations Rely on Traditional Districting Criteria.

The Secretary erroneously argues that Dr. Chen's analysis is unreliable because he did not use the Apol criteria. Dr. Chen did not miscalibrate the non-partisan variables when drafting the program that ran the non-partisan simulations. *Cf.* Sec. Br.at 20. The Secretary specifically claims that Dr. Chen's criteria differed from the

statutory requirements with respect to compactness and sub-section (f). Critically, as described on page 4 of this brief, the Michigan legislature disregarded sub-section(f) of the Apol criteria when it enacted the three challenged plans. *See LeRoux*, 465 Mich. at 615; Ex. 5, List of Enacted Districts That Violate Sub-Section (F) ¶¶ 1-12 (detailing all of the districts where sub-section (f) was violated in the enacted plans). Dr. Chen's task was not to see if he could duplicate the enacted maps, but rather, he was tasked with following the same districting criteria as the legislature, with the exception of partisan bias. Dr. Chen was asked to analyze how, if at all, the enacted maps were affected by partisanship. Therefore, consistent with the legislature's map-drawing, Dr. Chen also did not need to follow sub-section (f) when programming his algorithm.

The Secretary's claim that Dr. Chen's "computer had *vastly* more choices in constructing district lines than the 2011 map drawers" is entirely misleading. Sec. Br.at 21 (emphasis original). It is true that because Dr. Chen did not program a partisan gerrymander into his algorithm (unlike the Michigan map drawers), his computer may have had more non-partisan choices in constructing district lines. Insofar as the Secretary implies, however, that Dr. Chen's simulations differ from the enacted plans because the 2011 map drawers followed sub-section (f) of the Apol statute, that implication is false because the map drawers themselves did not follow sub-section (f). *See* Ex. 5, List of Enacted Districts That Violate Sub-Section (F) ¶¶ 1-12.

The Secretary also claims that Dr. Chen's simulations differ from the enacted plans because he overly "emphasize[d] compactness." *See* Sec. Br.at 21-22. Specifically, the Secretary argues that Dr. Chen's report is unreliable because he did not explicitly analyze whether the enacted plans had "worse compactness scores" because the map drawers did not "emphasize compactness" in the way that he did. *Id.* However, Dr. Chen's report and simulations are certainly reliable because the manner in which he valued compactness is consistent with traditional districting considerations. Ex. 2, Chen Decl. ¶ 24. He did not emphasize compactness at the expense of any of the other four criteria he programmed into this algorithm. *See id.*; *see generally* Ex. 1, Chen Report.

The Secretary cites *Nelson v. Tennessee Gas Pipeline Co.*, 243 F.3d 244 (6th Cir. 2001). In *Nelson*, the Sixth Circuit excluded an expert's testimony because he concluded, without showing a temporal relationship between exposure and symptoms, that the plaintiffs must have been exposed to a chemical at a level that could have caused health impairments simply because they lived and worked in an area in which the chemical was present. *Nelson*, 243 F.2d at 253 (critiquing expert's conclusion because it was "[w]ithout any factual basis"). Here, Dr. Chen had a significant factual basis to conclude that each of the Michigan enacted plans was a partisan outlier, and statistically likely the result of a partisan gerrymander. *See generally* Ex. 1, Chen Report. *Cf. Wills v. Amerada Hess Corp.*, 379 F.3d 32, 50 (2nd Cir. 2004) (holding that expert report failed to account for key lifestyle variables, including

decedent's smoking habit and alcohol consumption, when concluding that decedent's cancer was caused by exposure to toxic chemicals).

To the extent that the Court entertains either of the Secretary's arguments about sub-section (f) or compactness, these arguments go to the weight of Dr. Chen's report, not its admissibility. This case is analogous to *In re Scrap Metal Antitrust Litigation*, 527 F.3d 517 (6th Cir. 2008), in which the Sixth Circuit affirmed the district court's ruling that the defendant's attacks on the underlying data employed by the plaintiff's expert went to the weight of the expert's testimony, not its admissibility. *Id.* at 529-32. As in *In re Scrap Metal*, the Secretary here takes issue with the "factual basis" of Dr. Chen's report and simulations, and his "understanding" of the statutory criteria. *Id.* at 531. Dr. Chen has "offered a foundation for how and why he analyzed the data as he did." *Id.* Accordingly, the Secretary's concerns about the manner in which Dr. Chen understood and therefore programmed the statutory criteria "goes to the weight of the evidence, not to its admissibility." *Id.*

Insofar as the Secretary takes issue with the principles and methods Dr. Chen employed (*i.e.*, the efficiency gap and the mean-median vote test), Plaintiffs address those critiques in their response brief to the Secretary's Motion in Limine to Exclude Testimony Concerning Various Proffered Gerrymandering Metrics, filed herewith.

C. Dr. Chen Provided Multiple Means for the Secretary to Verify the Application of His Methodology.

Dr. Chen provided the near-final source code and the final byte code that the Secretary could have used to verify the application of Dr. Chen's methodology. Therefore, Dr. Chen's results are capable of being tested. The Secretary could have tested the veracity of Dr. Chen's simulated districts by compiling the near-final source code, running the resulting byte code, and comparing those simulation outputs to the simulation outputs in Dr. Chen's expert report. Dr. Liu testified that although he compiled the near-final source code, he simply gave up verifying Dr. Chen's results after the code did not "produce an output in six hours." Ex. 10, Liu Dep. 14:5-15:11. Significantly, the code did not malfunction in any way when Dr. Liu was running it, *id.* ("it didn't quit abnormally"), rather, he simply ceased running the code on his personal computer, *id.*; *see also* Liu Decl. ¶¶ 24-25. Instead of running the resulting code on a server as Dr. Chen did, the Secretary loudly protests that she has been "rob[bed]" of the "chance to prove the invalidity of Dr. Chen's simulations." Sec. Br.at 23. Simply stating this does not make it so. Dr. Chen preserved and produced the details necessary to test his results. The Secretary could have not only used the source code and already compiled byte code produced by Plaintiffs, but she also could have instructed her expert, Dr. Liu, to draft a source code that incorporates the criteria that Dr. Chen testified he included in his algorithm. Through any of these means, the Secretary could have reconstructed Dr. Chen's methodology. *Cf. LVL*

XIII Brands, Inc. v. Louis Vuitton Malletier S.A., 209 F. Supp. 3d 612, 645 (S.D.N.Y. 2016).

The Secretary erroneously attempts to analogize this case to *LVL XIII Brands*, where the court excluded the expert's report because he did not retain any information underlying his opinion. Sec. Br.at 24 (citing *LVL XIII Brands*, 209 F. Supp. 3d at 644). In *LVL XIII Brands*, the expert at issue wrote his report based on review of data he retrieved from social media and press coverage. *LVL XIII Brands*, 209 F. Supp. 3d at 644. However, not only did the expert not retain copies of the posts he analyzed, he also did not "retain a list of search terms he used" or "collect his results in a chart or table." *Id.* (expert produced copies of only 12 posts of the over 100,000 he reviewed and testified that it would "not [be] possible" to replace the precise variables he used to construct his searches). In stark contrast, here, Dr. Chen retained and produced the final byte code that was used to generate the simulations in his expert report, as well as the near-final source code. Moreover, Dr. Chen not only retained, but also testified extensively about the criteria he used to build his algorithm. He has never stated that it would be impossible to reconstruct his algorithm even had he not already supplied it. The fact that the Secretary is aware of all of the criteria Dr. Chen used, and has possession of the near-final source code as well as the final byte code, allows the Secretary to test and assess his methodology.

Even assuming *arguendo* that Dr. Chen's final byte code and near-final source code did not reflect his underlying calculations, this case is more analogous to another

district court case in this Circuit, *Smith v. Pfizer Inc.*, 714 F. Supp. 2d 845 (M.D. Tenn. 2010). In *Smith*, the plaintiff argued that it was impossible to recreate the defendants' expert's calculations because her underlying data no longer existed. *Id.* at 850. The court rejected this argument, explaining the following:

> But the defendants point out that [the expert] used a commercially available program, called QScan, to search and analyze the AERS data. After downloading the voluminous source data for a search, she created a summary spreadsheet and deleted the source data. Her searches were reproducible in QScan. Furthermore, the parties stipulated in February 2009 that their respective experts were capable of recreating each other's AERS searches. Because the plaintiffs could have simply recreated [the defendants' expert's] searches, this provides no basis to exclude her testimony.

Id. Similarly, in this case, Dr. Chen has identified every single criterion that was built into his algorithm, and he has identified which computer software program he used to develop and run his algorithm—Java. Dr. Liu, who purportedly has at least the same level of expertise in Java as Dr. Chen, could have simply recreated Dr. Chen's algorithm.

Furthermore, the Secretary falsely states that she is "simply required to take Dr. Chen at his word that he gave only 'neutral' instructions." Sec. Br.at 25. In fact, as the Secretary describes in her own brief, Dr. Chen identified specific, measurable criteria that he incorporated in the "instructions" or source code he wrote for generating the simulated districts.

V. Rule 706 Expert is Unnecessary

The Secretary alternatively requests that the Court appoint a Rule 706 expert in Java coding to review and render opinions to the Court on the issues raised by the Secretary. "The decision to appoint an expert under Federal Rule of Evidence 706 rests solely in the Court's discretion, informed by such factors as the complexity of the matters to be determined and the fact-finder's need for a neutral, expert view." *Peterson v. Burris*, No. 14-CV-13000, 2015 WL 7755402, at *2 (E.D. Mich. Dec. 2, 2015). "Such appointment is rare, and should only be exercised in exceptional cases." *Id.* A recent survey of trial judges conducted through the Federal Judicial Center revealed that use of court-appointed experts under Rule 706 is relatively infrequent and that most judges "view the appointment of an expert as an extraordinary activity that is appropriate only in rare instances." Joe S. Cecil & Thomas E. Willging, *Court-Appointed Experts: Defining the Role of Experts Appointed Under Federal Rule of Evidence 706,* 4-5 (Fed. Jud. Center 1993). While acknowledging that use of Rule 706 should be reserved for exceptional cases in which the ordinary adversary process does not suffice, the authors concluded that "Rule 706 remains an important alternative source of authority to deal with some of the most demanding evidentiary issues that arise in federal courts." *Id.* at 95.

This case does not present "demanding evidentiary issues" that requires a Rule 706 expert. *See id.* The Secretary initially requested a Rule 706 expert to address two questions: (1) "If a computer programmer wanted to analyze all methods and

processes of a computer program to understand the precise manner by which that program generated its output, would that computer programmer be aided by (and/or would the computer programmer *require*) a review of the actual source code?," and (2) Further, is the bytecode or decompiled version of the code provided by Plaintiffs here sufficient for Defendant to analyze Dr. Chen's Code, or should Plaintiffs be able an required to provide source code?" Sec. Motion to Compel at 13 [Dkt. 73].

As for the first question, a Rule 706 expert is unnecessary because as Dr. Severance's declaration explains, although it may require significant expertise and resources, a computer programmer can "understand decompiled byte code." Ex. 7, Severance Decl. ¶ 15. Furthermore, the first question is moot because Plaintiffs produced the near-final version of the source code which the Secretary could have compiled and run in order to compare its results to Dr. Chen's results in his report. The second question posed by the Secretary is moot for the same reason. This case is not one of the rare circumstances that requires a Rule 706 expert.

VI. Conclusion

For the reasons set forth above, Plaintiffs respectfully request that the Court deny the Secretary's Motion in Limine to Exclude Dr. Chen's Expert Report.

Date: December 14, 2018

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Certificate of Service

I hereby certify that on December 14, 2018, I caused to have electronically filed the foregoing paper with the Clerk of the Court using the ECF system, which will send notification of such filing to all counsel of record in this matter.

Respectfully submitted,

/s/ Joseph H. Yeager, Jr.