UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

LEAGUE OF WOMEN VOTERS OF MICHIGAN, ROGER J. BRDAK, FREDERICK C. DURHAL, JR., JACK E. ELLIS, DONNA E. FARRIS, WILLIAM "BILL" J. GRASHA, ROSA L. HOLLIDAY, DIANA L. KETOLA, JON "JACK" G. LASALLE, RICHARD "DICK" W. LONG, LORENZO RIVERA and RASHIDA H. TLAIB,

Plaintiffs,

v.

RUTH JOHNSON, in her official capacity as Michigan Secretary of State,

Defendant.
_____/

Case No. 17-cv-14148

Hon. Eric L. Clay
Hon. Denise Page Hood
Hon. Gordon J. Quist

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

Defendant, Michigan Secretary of State Ruth Johnson ("Defendant" or "Secretary"), respectfully moves for an order precluding the use at trial by Plaintiffs of the Expert Report of Dr. Jowei Chen, as well as the simulated redistricting plans that form the basis for his report.

In support of her Motion, the Secretary relies on the accompanying Brief in Support, and the reasons set forth therein.

Pursuant to Local Rule 7.1, the undersigned states that there was a conference between the parties' counsel on December 3, 2018 in which counsel for the Secretary explained the nature of this motion and its legal basis and requested but did not obtain concurrence in the relief sought.

WHEREFORE, the Secretary respectfully requests that this Court grant her Motion and issue an order excluding from evidence Dr. Chen's expert report and his simulations. In the alternative, given the technical nature of the issues involved, the Secretary renews her request for the appointment of a Rule 706 expert in Java coding to review and render opinions to the Court on the issues raised by the Secretary.

Respectfully submitted,

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Dated: December 4, 2018

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DEFENDANT SECRETARY OF STATE RUTH JOHNSON'S BRIEF IN SUPPORT OF HER MOTION IN LIMINE TO EXCLUDE THE EXPERT REPORT OF DR. JOWEI CHEN

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CONCISE STATEMENT OF ISSUES PRESENTED

I. Plaintiffs' proposed expert, Dr. Chen, claimed that he created software directing a computer to draft "neutral" redistricting plans—i.e., plans drawn without partisan consideration. Dr. Chen deleted the instructions to his computer, preventing the Secretary from verifying that his instructions truly were "neutral." Under *Daubert*, should Dr. Chen's report and simulated redistricting plans be excluded?

II. Plaintiffs' proposed expert, Dr. Chen, admitted in his report and at deposition that he did not, in instructing his computer to draw simulated plans, follow certain elements of Michigan's traditional redistricting criteria as codified. He failed to control for the effects of these differences in criteria on his simulated redistricting plans and admitted at deposition that he did not consider whether they could provide an alternative explanation for differences between Michigan's Current Apportionment Plan and Dr. Chen's simulations. Because Dr. Chen's simulation instructions were miscalibrated and drew maps using different criteria than established by state law, should his report and simulated plans be excluded under *Daubert*?

MOST APPROPRIATE OR CONTROLLING AUTHORITY

I. INTRODUCTION

Plaintiffs challenge the constitutionality of using Michigan's Current Apportionment Plan (the "Enacted Plan") in the 2020 election. To support their challenge, Plaintiffs have served a proposed expert report and simulated redistricting plans prepared by Dr. Jowei Chen. Defendant, Secretary of State Ruth Johnson (the "Secretary"), now moves to exclude that report and those plans.

Dr. Chen claims that he created and used unique software (specific to this litigation) to generate 1,000 allegedly "non-partisan" redistricting plans for each of the Michigan House, Senate, and Congressional delegations. (ECF No. 129-50, PageID.4708 (the "Chen Report")). He claims he then compared these plans to the 2011 Enacted Plan and "found" that the Enacted Plan was more pro-Republican—i.e., more partisan—than his simulations. (*Id.*, PageID.4709-4710.) This, he claims, is evidence of partisan intent resulting in an "extreme" political gerrymander. (*Id.*)

The central premise underlying Dr. Chen's approach is that his simulation exercise was non-partisan—*i.e.*, that a computer cannot have intent to gerrymander. (*Id.*) But a computer will do only what it is told to do by the programmer. Thus, review of the programmer's instructions to the computer—the "source code"—is essential to verifying the claim that Dr. Chen's simulations are in fact "nonpartisan."

Dr. Chen, however, inexplicably claims that he deleted the instructions he gave to his computer. It further appears that he did so in the middle of the discovery period, *after* the Secretary requested a copy of those instructions.

If Dr. Chen added pro-Democrat instructions—e.g. that the computer only produce plans more favorable to the Democrats than the Enacted Plan—his results would not be "neutral," but instead, *pro-Democrat gerrymanders*. Good evidence suggests this is exactly what he did. Regardless, because his claim of neutrality cannot be tested, his test is not reliable under *Daubert* and should be excluded.

The Secretary additionally moves to exclude Dr. Chen's report because, even assuming Dr. Chen's instructions were *precisely* as he claims them to be (and the evidence suggests otherwise), those instructions contain key design flaws. Those flaws foreclose the kinds of conclusions Dr. Chen seeks to provide. Dr. Chen completely ignored key components of Michigan's traditional redistricting criteria in his simulation exercise. As a result, his simulations were drawn using one set of criteria (the anomalous "Chen Criteria") while Legislative map-drawers in 2011 worked from another set (the statutorily codified "Apol Criteria"). It is absurd to draw conclusions about "extreme partisan intent" based on comparisons of apples to oranges, and Dr. Chen's results should be excluded under *Daubert* for this reason as well.

II. FACTUAL SUMMARY

A. Dr. Chen's deletion of his instructions to the computer.

1. "Source Code" defined.

For context, the Secretary offers the following summary and definitions of relevant terms (taken from the 8th Edition of "Java Programming," since Dr. Chen used Java coding language to create his instructions to the computer):

> A computer program is a set of instructions that you write to tell a computer what to do….
>
> Using a programming language, programmers write a series of program statements, similar to English sentences, to carry out the tasks they want the program to perform. ...
>
> After the program statements are written, high-level language programmers use a computer program called a compiler or interpreter to translate their language statements into machine language. …
>
> Programming statements written in a high-level programming language are ***source code***. When you write a Java program, you first construct the source code using a text editor such as Notepad, or a development environment and source code editor …. The statements are saved in a file; then, the Java compiler converts the source code into a binary program of ***byte code***. A program called the Java interpreter then checks the byte code and communicates with the operating system …. [Joyce Farrell, JAVA Programming (8th ed., 2015), pp. 2-3, 11 (emphasis added).]

Stated more simply, "source code" is the human-readable language written by a programmer when they are creating instructions. "Byte code," conversely, is a

language comprised of 1s and 0s; it is created from the source code through a process called "compiling."[1] Unlike source code, byte code is not human readable.

2. Dr. Chen's academic work.

Dr. Chen is an associate professor at the University of Michigan. In a 2013 publication, Dr. Chen reported that he and Dr. Jonathan Rodden had "adapted a computer algorithm" to "allow us to draw thousands of alternative, nonpartisan redistricting plans and assess the partisan advantage built into each plan."[2]

As is commonly required of researchers when publishing work that relies on computer programs,[3] Dr. Chen posted the source code for his 2013 academic work to his University of Michigan website. Indeed, his website still *purports* to provide a link to this source code. But it does not. As of July 20, 2018, the "replication code" link on his website linked to a zip file that contained draft *maps* for Duval

[1] *See also Oracle America Inc. v. Google, Inc.*, 750 F.3d 1339, 1348 (Fed. Cir. 2014) (defining "source code").

[2] *See* Rodden & Chen, Don't Blame the Maps, NY Times, https://www.nytimes.com/2014/01/26/opinion/sunday/its-the-geography-stupid.html; *see also* Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislature, 8 Quarterly Journal of Political Science 239-269 (2013)).

[3] It is commonly a requirement in academia that researchers and authors provide source code, installation guides, and sample data sets so that their work may be peer-reviewed. See Editorial, *Does your code stand up to scrutiny?*, NATURE, March 6, 2018 (ECF No. 73-5)

County in Florida—*not* source code.[4] That same link on his university website *presently* leads to a "file not found" page.[5]

Since adapting this computer program in 2013, Dr. Chen has further adapted the program to run state-specific simulations for litigation purposes; these have been the basis for amicus briefs or testimony in support of plaintiffs in other redistricting cases, including in North Carolina, Pennsylvania, and Wisconsin. He has *never*, however, been required in these other proceedings to produce the source code for his programs; no other litigant's expert has opined on the validity, accuracy, or propriety of Dr. Chen's idiosyncratic source code. (Ex. 1, Chen Dep. 62:20-62:24.)

3. Dr. Chen's involvement in this case and the Secretary's initial requests for his source code.

Plaintiffs hired Dr. Chen on February 17, 2016, nearly two years before filing the Complaint. (ECF No. 121-6, PageID.3134.) He began preparing draft plans for this litigation shortly thereafter. (Ex. 1, Chen Dep, 40:22-23, 41:1-2.)

Following service by Plaintiffs of Dr. Chen's report on June 1, 2018—

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[4] See http://www-personal.umich.edu/~jowei/UnintentionalGerrymandering/ (last accessed July 20, 2018).

[5] See https://sites.lsa.umich.edu/jowei/, linking to http://www.umich.edu/~jowei/UnintentionalGerrymandering (last accessed November 14, 2018).

and once it was apparent that Plaintiffs intended to rely on Dr. Chen's simulations as drawn by his one-of-a-kind software program—the Secretary hired Dr. Yan Liu.

Dr. Liu is a Senior Research Programmer at the National Center for Supercomputing Applications and the Department of Geography and Geographic Information Science at the University of Illinois. The Secretary asked him to review and provide comment on Dr. Chen's report. (*See* Ex. 2, Liu Declaration, ¶ 7.) Dr. Liu requested that the Secretary provide him with a copy of Dr. Chen's code; the Secretary's counsel requested such code from Plaintiffs' counsel in June of 2018.

On or about June 12, 2018, Plaintiffs' counsel provided to the Secretary's counsel three *byte code* files for Dr. Chen's software. Consistent with the above definitions, these byte code files did not disclose Dr. Chen's instructions for his simulation software in a human readable format. (*See Id.*, ¶ 11.) The Secretary then specifically requested that Plaintiffs provide Dr. Chen's "source code"—not his byte code. Plaintiffs' counsel next provided to the Secretary a set of text files that contained "decompiled byte code."

As explained by Dr. Liu:

> Decompiled byte code is binary machine code that has been re-translated back into coding language. The re-translation process must guess at the original coding language and substitute values and terms to fill in its assumptions—it is thus highly imperfect. Though portions may be readable, most portions generally are not. Much is lost in translation. …

> I was surprised to receive decompiled bytecode. As a research programmer who frequently collaborates with others in drafting code, I would not share decompiled byte code and I would not expect my collaborators to understand my decompiled byte code. When we share code to review or to collaborate in drafting a program, we always share the actual source code. [*Id.*, ¶¶ 16, 18.]

The Secretary's counsel again requested source code from Plaintiffs' counsel, noting that the decompiled byte code was insufficient. (*See* Ex. 3, June 22, 2018 E-mail.) Plaintiffs' counsel ultimately refused to provide source code for Dr. Chen's report before the Secretary's report filing deadline. (*See* Ex. 4, June 29, 2018 E-mail.) This resulted in Dr. Liu including the following narrative in his report:

> If I had received a copy of Dr. Chen's source code and been able to review and analyze it as he had personally drafted it, I would have been able to critique additional flaws as to his methodology, including any flaws that may exist with respect to his implementation of Michigan's redistricting criteria in his simulations. [Liu Report, ECF No. 73-6, at p. 15; *see* Ex. 2, ¶ 19.]

4. The Secretary's pursuit of Dr. Chen's source code in formal discovery.

On June 12, 2018, the Secretary served her First Set of Interrogatories and Document Requests. (ECF No. 73-1.) In her discovery requests, the Secretary *formally* requested a copy of Dr. Chen's "source code." (*Id.*, Doc. Request No. 4.)

The "source code" for Dr. Chen's simulations apparently still existed when the Secretary served her discovery. As explained in Dr. Liu's attached declaration:

> It is possible from reviewing the .jar files (the files with names that end in ".jar") to tell when those files were

> compiled from the source code. This is because the .jar files, which are generated by the Java compiler and contain "Java Class" byte code, preserve the last modified date of the byte code, which is the compiling date. The .jar files provided by the Plaintiffs' counsel to the Secretary on June 12, 2018, and subsequently provided to me, showed a compiling date of June 12, 2018 for the byte code. This means that the source code used to generate the byte code existed as of June 12, 2018. One cannot compile byte code without source code. [Ex. 2, ¶ 13.]

Attached to Dr. Liu's declaration is a screenshot showing the June 12, 2018 compilation date of the referenced java class files. (*See id.*, ¶ 14, and Ex. A.)

On July 10, 2018 Plaintiffs served their Objections and Responses (ECF No. 73-2). Plaintiffs did not produce Dr. Chen's source code, instead stating that they "have previously produced computer data and code responsive to this Request." (*Id.*, PageID.1450.). This was in apparent reference to their previous productions of byte code and decompiled byte code, neither of which is the source code and neither of which reveals Dr. Chen's instructions to the computer.

On July 23, 2018, the Secretary filed a motion to compel. (ECF No. 73.) She also asked the Court, in the alternative, to appoint a Rule 706 expert to advise the Court on programming matters. (*Id.*) On August 17, 2018, the Court issued an Order (ECF No. 95) compelling Plaintiffs to produce Dr. Chen's source code "to the extent that such information exists." (The Court did not address the Secretary's request to appoint a Rule 706 expert.)

Plaintiffs' counsel advised the Secretary that Dr. Chen had not preserved his final source code used to compile his software and run his simulations. (Despite the fact that the final source code was used as recently as June 12, 2018 to create the byte code file the Plaintiffs sent to the Secretary.) Instead, Plaintiffs provided only a "draft" source code file, which Plaintiffs represented was the "closest" version of the code to the compiled version that Dr. Chen could locate. (*See* Ex. 5, August 11, 2018 E-mail.) The sequence of events is important:

- Dr. Chen was retained by Plaintiffs in February of 2016.
- Dr. Chen drafted source code and compiled it sometime well before June 1, 2018 (the date his report was served on the Secretary). He then purportedly used that source code to draw 3,000 plans, which formed the basis of his June 1, 2018 report.[6]
- On June 12, 2018, Dr. Chen created a new copy of his byte code which Plaintiffs then provided to the Secretary. Compiling a copy of his final byte code would have required the final source code.
- On June 12, 2018, the Secretary served on Plaintiffs a request for Dr. Chen's source code.
- On August 11, 2018, Plaintiffs advised the Secretary that the source code—despite being used on June 12, 2018 to create a compiled version of the byte code—does not exist, and that they can only provide a "draft."

[6] As explained by Dr. Liu, Dr. Chen's simulation software appears to take a very long time to produce a single map. The draft code file provided by Plaintiffs includes "an instruction directing the computer to terminate the simulation if a map is not produced after 40 days." (Ex. 2, ¶¶ 24-25.) In several attempts to run Dr. Chen's compiled byte code file and produce a single plan, Dr. Liu was unable to do so "even after 10 days with relatively powerful personal computers." (*Id.*)

As explained by Dr. Liu, this failure to preserve source code is inexplicable:

> Eclipse and other code drafting tools[7] typically prompt a user to save all changes to their source code before exiting the tool. A user would have to affirmatively decide not to save their changes for the changes not to be preserved in the ordinary course. It is programming 101 to save the source code file, and incredible that a programmer that has spent considerable time and energy in drafting code—especially code that will be used to generate thousands of maps over the course of months for use in litigation—would not save the final version of the source code that was compiled into the byte code. [Ex. 2, ¶¶ 27-28 (emphasis added).]

Dr. Liu's characterization of saving final source code as being "programming 101" is supported in basic Java programming guides available to the public at large. One such guide, for example, advises: "*Remember to save your code often. Eclipse will save for you automatically every time you run a program*, but it's a good idea to save after every few lines of code."[8]

As explained above, Dr. Chen must have had his final source code when the byte code file was created on June 12, 2018. If it is true that Dr. Chen's source code no longer existed as of August 2018, then the code was deleted while discovery (including expert discovery) in this matter was ongoing.

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[7] Dr. Chen testified at deposition that he primarily used Eclipse—a Java code drafting tool—in creating his source code. (See Ex. 1, Chen Dep. 65:5-65:7.)

[8] Bryson Payne, Learn Java the Easy Way: A Hands-On Introduction to Programming, p. 47 (2017) (emphasis added).

5. The "draft" source code does not reveal Dr. Chen's instructions to his computer.

In providing the "draft" version of the code, Plaintiffs did not specify what commands or lines of code Dr. Chen might have added (or deleted) before running his simulations; Plaintiffs offered that the issue could be probed at deposition.

At his September 7, 2018 deposition, Dr. Chen repeatedly confirmed that he did not retain the final version of his source code. (Ex. 1, Chen Dep. 52:8-52:27; 54:4-54:17.) He explained that he did not save every change to his code file before compiling it, and repeatedly stated that his code was not automatically backed up. (*Id.*) He could not recall all of the changes he had made to the draft version before the final version, but asserted that such changes were only "cosmetic" and would not have altered the drawing of the simulated maps. (*Id.*, Chen Dep. 55:11-57:25.)

Dr. Chen's testimony—that his "draft code" only differs "cosmetically" from the final source code—is demonstrably untrue. As further explained by Dr. Liu:

> By comparing the decompiled byte code and the "draft" source code for each of Dr. Chen's three programs (i.e., his programs for the Michigan House, Michigan Senate, and Congress), I can tell that at least 10 functions ("Java class methods") present in the draft source code files were modified or deleted prior to compiling in each set. I cannot, however, tell in every instance which functions were deleted or changed … because, as explained above, decompiled byte code is very difficult or impossible to read in most instances. ...

> I can, however, tell that the decompiled byte code dramatically differs with respect to the instructions for how the simulation process should seek to achieve compactness in both the State Senate and State House simulations. Dr. Chen also appears to have changed (compared to the "draft" code) the output limitations in his State House simulation concerning the permissible number of county breaks, and he appears to have changed the output limitations concerning the permissible number of MCD breaks in both the State Senate and State House Plans. These new instructions, not present in the draft source code provided by Plaintiffs, would have altered how the plans were drawn and thus cannot reasonably be characterized as being "cosmetic."
>
> Any one or even all of the multiple changed functions identified in my review could have a significant impact on the rendering of plans. So too could there be still other changed functions that I was unable to identify from the decompiled byte code. A function does not need to be long or complex to have a significant effect on the output. Without final source code, however, I am not able to determine the effect of the functions that Dr. Chen deleted, modified, or potentially added to his source code between the "draft" version supplied and the final version actually compiled and used. [Ex. 2, ¶¶ 29-31.]

6. Evidence suggests that Dr. Chen instructed the computer to output pro-Democrat plans rather than neutral plans.

One or more of these functions added by Dr. Chen—and then concealed by his purported failure to save his source code—may have been an instruction to the computer to only output those simulations that were more favorable to Democrats than the Enacted Plan. This would make his simulation results not a set of non-

partisan, "neutral" plans, but a *counterfeit set of pro-Democrat gerrymanders*. Three pieces of evidence suggest that this is exactly what happened:

First: There are commands in Dr. Chen's *draft* source code that are similar to this type of "output" limitation. That is, as Dr. Liu explains:

> From the draft source code, it is apparent that Dr. Chen did not allow for his simulations to produce plans that would be similar to the Enacted Plan. Dr. Chen included, for example, a command that his program should *only* output those simulated plans that had fewer county breaks[9] than the Enacted Plan. This assured that his simulations would never be like the Enacted Plan. [Ex. 2, ¶ 23.]

This is troubling in and of itself, since it is the differences between the Enacted Plan and Dr. Chen's simulations that form the basis for his conclusions about "extreme" partisan intent. But further, the existence of an output limitation instruction (i.e., an instruction that tells the computer "only output plans with 10 or fewer county breaks") suggests that Dr. Chen had the programming capability to include others (e.g., "only output plans that would elect more Democrats.")

Second: There is no reason that following Dr. Chen's version of Michigan's statutory redistricting criteria should result *exclusively* in simulating plans that are better for Democrats.[10] Nonetheless, Dr. Chen says that *every single one* of his

[9] Michigan law does not require that a plan must minimize county breaks to be "permissible." *LeRoux v. Sec'y*, 465 Mich. 594, 615 (2002).

[10] There is no reason, e.g., that a more compact map, or one that has fewer county breaks, or one that shifts fewer townships between counties, should in every instance

simulations is better for Democrats (i.e., would elect more Democrats statewide using prior election data)—not just *some* or *most*. And that is further true across all three simulation sets.

There is a simple way to test the reasonableness of this type of absolute, no-exception correlation shown in Dr. Chen's plans. If adhering to non-partisan criteria *necessarily* results in a more Democrat-favorable plan (as Dr. Chen's simulations universally suggest), it should not be possible to draw a plan with more pro-Republican outcomes then the Enacted Plan that also meets Dr. Chen's simulations on satisfying his neutral criteria. But it is possible.

The Secretary requested that Jeff Timmer—one of the Legislature's technicians responsible for drafting the Enacted Plan in 2011—draft such a plan using the Congressional map. Mr. Timmer (working without optimization software) did so in the plan attached to his Declaration, at Exhibit 6 (the "Timmer Plan").[11] The Timmer Plan has 10 county breaks (the *same* as Dr. Chen's simulations), 9 municipal boundary splits including Detroit (*fewer* than Dr. Chen's simulations), is

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favor Democrats more than the Enacted Plan. Compactness in particular does not favor Democrats; if anything, because Democrat-leaning voters in Michigan are highly concentrated in Wayne County, more compact plans generally *concentrate* and "naturally pack" Democratic voters into fewer districts, reducing their remaining seat share statewide.

[11] The underlying shape files for the Timmer Plan have been provided to Plaintiffs.

comparably compact to Dr. Chen's simulations, and—using historical election data—would elect 10 Republicans and 4 Democrats. (*See* Ex. 6 and Ex. A thereto.) (Dr. Chen reports that the Enacted Plan would elect 9 Republicans and 5 Democrats using the same 2006-2010 election data. *See* ECF No. 129-50, PageID.4722.)

If Mr. Timmer could draw a 10 Republican / 4 Democrat plan, Dr. Chen's computer simulations should have been able to do so as well (unless Dr. Chen did something when drafting his source code to *foreclose* such an output).

Third: Dr. Chen's results are *absurdly* and *uniformly* convenient for Plaintiffs. According to Dr. Chen, using statewide election data, Democrats would be expected to win between *1 and 4* additional Congressional seats, between *1 and 6* additional Senate seats, and between *1 and 8* additional House seats if any one of his "neutral" simulations were to be adopted in place of the Enacted Plan. (See ECF No. 129-50, Chen Report, PageID.4722, 4734, 4747.) This begs the question: why is the *minimum* number of Democrat seats to be "gained" by substitution of a simulation, *for each of the three legislative bodies*, in each case, exactly 1? That is an *incredible* coincidence. Not a single simulated plan has the *same* number of Democrat seats as the Enacted Plan, and not a single set starts off two or three seats *better*—instead, each set contains plans that are only *one seat off* from the Enacted Plan. (See *id.*) This result has all the hallmarks of being engineered—i.e., it suggests that Dr. Chen included a direction in his source code that the computer only output those plans that

are at least one seat better for Democrats than the Enacted Plan (similar to the other output limitations he included on county and municipal breaks).

Analysis of the source code could have divulged if that were the case. But Dr. Chen claims to have deleted precisely what someone *would* delete if they were trying to hide the insertion of partisan influence: the final source code.

B. Dr. Chen's "traditional criteria" in his code differ from Michigan's *actual* traditional criteria.

Even assuming Dr. Chen did not engineer a *partisan* result, he still engineered a fundamentally flawed result because he applied incorrect redistricting criteria.

Michigan's traditional redistricting criteria are based on the Michigan Constitution. They were developed by the Michigan Supreme Court in 1982 and are known as the "Apol Criteria," named after the former director of elections, Bernard J. Apol (who drew apportionment plans for the Michigan Supreme Court in that year). *See In re Apportionment of State Legislature—1982*, 321 N.W.2d 565, 583 (Mich. 1982). The application of the Apol Criteria to State House and Senate districts was codified in 1996. Mich. Comp. Laws § 4.261. Congressional redistricting follows largely the same standards, and is also codified. Mich. Comp. Laws § 3.63. Legislative staff who prepared the Enacted Plan in 2011 all testified in deposition that their goal was to follow the Apol Criteria.

Dr. Chen testified at deposition that he did not independently review or understand the codified Apol Criteria. He applied traditional criteria as instructed

by Plaintiffs' counsel. (Ex. 1, Chen Dep. 144:15-144:20.) Either way, his formulation was plainly wrong, and not just in nominal ways. On the left, below, are the *actual* Apol Criteria, as codified; on the right is *Dr. Chen's* formulation (the "Chen Criteria") as described in his report and as elaborated upon in his deposition:

Apol Criteria as set by Michigan law and as applied by map drawers in 2011	**Chen Criteria as dictated by Plaintiffs' Counsel**
Contiguity (Mich. Comp. Laws §§ 3.63(c)(i), 4.261(c).)	Contiguity (ECF No. 129-50, Chen Report, p. 60.)
Population not exceeding 105% and not less than 95% of ideal (Mich. Comp. Laws § 4.261(d)); equal population for Congress (Mich. Comp. Laws § 3.63(a).)	Population not exceeding 105% and not less than 95% of ideal; equal population for Congress. (Chen Report, p. 61-62.)
Preservation of county lines (Mich. Comp. Laws §§ 3.63(c)(ii), 4.261(e).)	Preservation of county lines (Chen Report, p. 62-63).
If county lines must be broken, the fewest whole cities or townships shall be shifted, and in choosing between two cities or townships to shift, the city or township with lesser population shall be shifted. (Mich. Comp. Laws § 4.261(f).)	**Not followed.** (Ex. 1, Chen Dep., 103:12-106:5.)
Preservation of municipal lines. (Mich. Comp. Laws § 3.63(c)(iv), 4.261(g).)	Preservation of municipal lines (Chen Report, p. 63-64.)
When more than one district is drawn within a city or township, district lines shall be drawn to achieve the maximum compactness possible within a population range of 98% to 102% of ideal (Mich. Comp. Laws §§ 3.63(c)(vi), 4.261(i).)	**Compactness is to be maximized in all cases, not just cities and townships with more than one district.** (Chen Report, p. 63; Chen Dep. 144:15-144:20.)
The statutory criteria are guidance only and non-mandatory. *LeRoux v. Sec'y*, 465 Mich. 594, 615 (2002).	**Criteria are mandatory** (Chen Report, p. 59.)

As applied in 2011 and codified at Mich. Comp. Laws § 4.261(f), the Apol Criteria severely limit the discretion of map-drawers in shifting populations between

counties. Dr. Chen's simulations ignored these rules. Similarly, Dr. Chen emphasized compactness in all circumstances. Because counties and townships are generally square and Michigan cities take all manner of shapes, compactness is often at odds with minimizing municipal breaks (and shifting the fewest and smallest whole townships or cities as well). Dr. Chen's simulations over-emphasized compactness in a way that the actual map drawers, following Apol Criteria, did not.

Dr. Chen's conclusion that the Enacted Plan is a partisan outlier is based on the fact that it falls outside of the range of outcomes reached in his simulations. (Ex. 1, Chen. Dep. 152:24-152:27.) But since he used different, anomalous criteria when drawing his plans, *of course* the Enacted Plan is different. Dr. Chen set up his simulation so the Enacted Plan would *necessarily* fall outside of his results (*e.g.*, by instructing the simulation not to output maps with the same number of county breaks, as noted above), but he also set up his simulation to work from an materially different set of instructions than those actually used in 2011 (i.e., the Apol Criteria). Dr. Chen's report does not address whether the Enacted Plan would still "fail" his idiosyncratic test if he had used the correct criteria from the start.

III. ARGUMENT

A. Standard of Review

This Court has broad discretion in deciding whether to admit or exclude expert testimony. *See Nelson v. Tennessee Gas Pipeline Co.*, 243 F.3d 244, 249 (6th Cir.

2001) (quoting *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999)). This discretion, however, must be guided by Fed. R. Evid. 702, which provides:

> A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:
>
> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
>
> (b) the testimony is based on sufficient facts or data;
>
> (c) the testimony is the product of reliable principles and methods; and
>
> (d) the expert has reliably applied the principles and methods to the facts of the case.

Rule 702 reflects the trial court's "task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand." *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 597 (1993).

In addition to ensuring that the witness is qualified to give an expert opinion, the court's "gate-keeping" obligation "entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue." *Id.* at 592-93. The Court should consider the following criteria:

> The testability of the expert's hypotheses (whether they can be or have been tested), whether the expert's methodology has been subjected to peer review, the rate of error associated with the methodology, and whether the methodology is generally accepted within the scientific

> community. [*King v. Enter. Rent-A-Car Co.*, 231 F.R.D. 255, 267 (E.D. Mich. 2004) (citations omitted).]

Ultimately, *Daubert* requires that "any and all scientific testimony or evidence admitted [must be] not only relevant, but reliable." *Daubert*, 509 U.S. at 589.

The burden of demonstrating the admissibility of expert testimony rests squarely on the party offering it. *Muzzey v. Kerr-McGee Chemical Corp.*, 921 F. Supp. 511, 518 (N.D. Ill. 1996). Plaintiffs cannot carry this burden as to Dr. Chen.

B. Dr. Chen's report and simulations should be excluded.

Dr. Chen's report is not the product of reliable principles and methods, nor is it the product of reliable application of tested principles and methods to the facts of this case. Fed. R. Evid. 702(c), (d).

1. Dr. Chen's failure to use the Apol Criteria prevents him from performing reliable causation analysis with respect to the shape of the Enacted Plan.

Dr. Chen's approach is constructed around the suggestion that his computer simulation experiment controls for non-partisan variables in the redistricting process, and thus allows him to isolate partisan intent as the cause for the shape of the Enacted Plan. (ECF No. 129-50, PageID.4709-4710.)

The first problem is that Dr. Chen miscalibrated those non-partisan variables when he gave his computer instructions as to how to draw redistricting plans. That is, he used the anomalous Chen Criteria. As a result, his simulation sets in fact tell us nothing about what *could have* or *should have* resulted if the Apol Criteria were

applied in a neutral, nonpartisan manner. Instead, his simulation only tells us what results from the optimization of the (demonstrably incorrect) Chen Criteria.

Most crucially, the actual Apol Criteria include a directive that extremely limits the discretion of the map drawers: in choosing between two municipalities to shift, the map drawer must shift the fewest whole municipalities necessary, and in choosing between two municipalities to shift, must only shift the municipality with the lesser population. Mich. Comp. Laws § 4.261(f). Dr. Chen's simulations were drawn without this limitation, and thus his computer had *vastly* more choices in constructing district lines than the 2011 map drawers. Which particular city or township is shifted in each case can have significant impacts on the political outcomes in the impacted districts; Dr. Chen wholly ignored these impacts.

Since Dr. Chen starts from an incorrectly drawn set of plans, any conclusions he makes about why the Enacted Plan does or does not depart from those simulated plans are fundamentally flawed. When asked in his deposition whether he had considered that the Enacted Plan might fall outside of his simulations because of an alternative explanation—e.g., that the map-drawers did not emphasize compactness in the same (incorrect way) as Dr. Chen—Dr. Chen stated that he "would have no basis for saying that it [was possible] or [was not possible]…." (Chen. Dep. 152:24-152:7.) Stated otherwise, he did not study whether a simulation series that did not

emphasize compactness would have been on par with the Enacted Plan and thus shown it to be the result of purely neutral considerations. (*Id.*, 149:12-149:24.)

An expert's failure in a causation analysis to control for or test for reasonable alternative explanations warrants the exclusion of his or her testimony. *See Nelson*, 243 F.3d at 253; *see, also Wills v. Amerada Hess Corp.*, 379 F.3d 32, 50 (2d Cir. 2004) (affirming trial court's exclusion of expert report that failed to control for or analyze impact of behavioral variables on causation of cancer).

By comparing plans drawn using two different sets of instructions, Dr. Chen compares apples to oranges. Under *Daubert*, his methodology is unreliable and his report and simulations should both be excluded.

2. Dr. Chen's failure to preserve his source code prevents confirmation that he applied his methodology in a reliable manner.

"[A] key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested." *Daubert*, 509 U.S. at 593. This is because "[s]cientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry." *Id*. (citation omitted). As the *Daubert* Court noted, "[t]he statements constituting a scientific explanation must be capable of empirical test." *Id*. (citation omitted). Thus, the cornerstone of scientific knowledge "is its

falsifiability, or refutability, or testability." *Id*. (citation omitted). Accordingly, the mere presentation of an "experts' qualifications, their conclusions, and their assurances of reliability" is "not enough" under *Daubert*. *Daubert v. Merrell Dow Pharmaceuticals, Inc*., 43 F.3d 1311, 1319 (9th Cir. 1995) ("*Daubert II*").

As noted above, Dr. Chen's software is unique to this case. Even if it were not, no litigant's expert has ever opined on the validity or appropriateness of his source code in other matters. And though the Secretary retained an expert to do that in this case, Dr. Chen's purported "deletion" of his final source code robs the Secretary of the chance to prove the invalidity of Dr. Chen's simulations.

The failure to preserve and produce details of the methodology underlying an expert's opinions warrants exclusion because, in the absence of such evidence, the expert's results are not capable of being falsified, refuted, or tested. *Am. & Foreign Ins. Co. v. General Elec. Co.,* 45 F.3d 135, 138 (6th Cir. 1995) (upholding exclusion of expert testimony where, among other things, there was "a real question about how [the expert] conducted his tests" because "[t]he raw data was not preserved[.]"); *see LVL XIII Brands, Inc. v. Louis Vuitton Malletier S.A*., 209 F. Supp. 3d 612 (S.D.N.Y. 2016) (finding that a methodology did "not come close to withstanding scrutiny under *Daubert*" where "[f]irst, and most significant, [the] methodology had not been—and, for multiple reasons, cannot be—tested or challenged in any objective sense"); *Innis Arden Golf Club v. Pitney Bowes, Inc*., 629 F. Supp. 2d 175, 190 (D.

Conn. 2009) ("[T]he Defendants could not attempt to validate [the expert's] methods even if he could specifically say what he considered. . . . [E]ven if he more fully explained his methodology, his results could not be replicated or verified because the underlying data is not available. With this hallmark of reliability lacking, [the expert's] testimony is inadmissible . . . ."); *Cabrera v. Cordis Corp.*, 134 F.3d 1418, 1422 (9th Cir. 1998) (excluding blood testing developed by proffered expert because the expert "had no documentation of even his own development of the test, as his records were destroyed in an earthquake," and thus could not "point to some objective sources . . . to show that [he] followed the scientific method . . . .").

This is particularly true where "it is impossible to reconstruct" the expert's methodology. *LVL XIII Brands*, 209 F. Supp. 3d at 645. In *LVL XIII Brands*, the expert testified that he relied on data compiled from various social media and Google searches, but he did not retain a list of the search terms he used, his "hit" results, or the sites he reviewed. *Id.* at 644. Accordingly, it was "impossible to replicate the pool of documents he relied upon in the exact manner that he did the first time." *Id.* at 645 (internal punctuation omitted). The court determined that such failures were fatal, holding that the expert's "elementary" failure to preserve his methodology "makes it impossible for a court or adversary to test—or a jury to assess—[that] methodology . . . for veracity and reliability." *Id.* "For th[at] reason alone, exclusion of [the expert's] conclusions [wa]s mandatory under *Daubert*." *Id.*

Dr. Chen's source code is not commonly available; his methodology is further idiosyncratic and not widely accepted. Analysis of his source code is therefore critical. Like the expert in *LVL XIII Brands*, Dr. Chen's failure to preserve his methodology renders it impossible for the Secretary's expert or the trier of fact to test or otherwise assess Dr. Chen's conclusions. Instead, we are simply required to take Dr. Chen at his word that he gave only "neutral" instructions, which is "not enough" under *Daubert*. *Daubert II*, 43 F.3d at 1319.

IV. CONCLUSION

WHEREFORE, the Secretary requests that the Court issue an order excluding from introduction at trial in this matter Dr. Chen's expert report and simulations. In the alternative, the Secretary renews her request for the appointment of a Rule 706 expert in Java coding to review and render opinions to the Court on the issues raised by the Secretary above.

Respectfully submitted,

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Dated: December 4, 2018

CERTIFICATE OF SERVICE

I hereby certify that on December 4, 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.

/s/ Ryan M. Shannon

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