Being A Statistical Expert Witness

David J Corliss, PhD is the Principal Data Scientist at Grafham Analytics. He has served as a statistical expert witness in court cases on racial profiling and before legislative committees on human trafficking. His work in advocacy using statistics includes teaching an ASA traveling course on ethical issues in data and analytics, serving on the Committee on Scientific Freedom and Human Rights and communications chair for the Justice, Equity, Diversity, and Inclusion outreach group, and the steering committee of the Statistics section of the American Association for the Advancement of Science.

Being A Statistical Expert Witness: Qualifications, Opportunities, and Experiences

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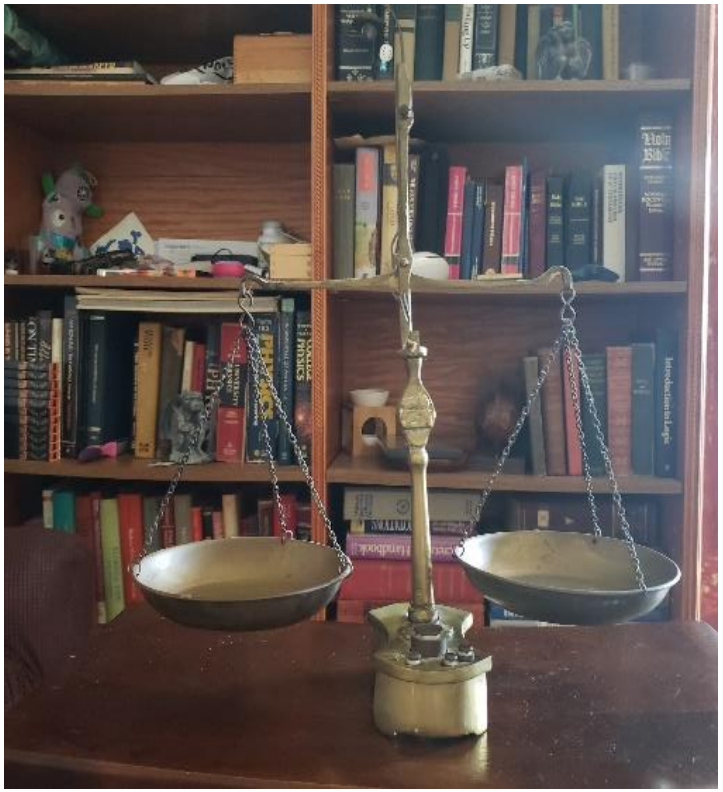
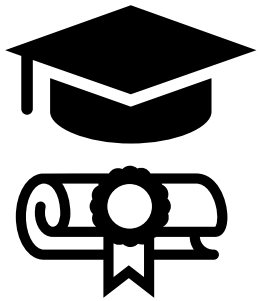
Statistical Expert Witnesses

An expert witness is a person with specialized knowledge, skills, education, or experience in a particular field who is called upon to provide their expertise in legal proceedings to assist the court with understanding complex technical or scientific issues

- Cornell Law School



Background: Academic Requirements



PhD in a scientific field preferred

Professional experience and peer-reviewed research in the particular subject where expertise is given

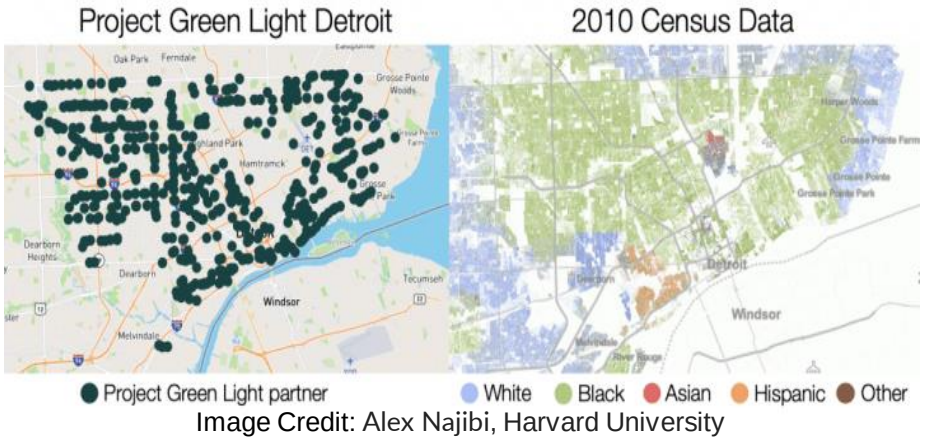


Image Credit: Alex Najibi, Harvard University

=> Design content for a non-statistical audience

Background: The Experience Paradox

Un ragazzo chiamato Bi - CC BY-SA 2.0

Can't be retained as an expert without experience

Can't get experience as a witness without being an expert

Image Credit: flazingo_photos - CC BY-SA 2.0

=> Gain experience through other channels – assist an established expert, publish on issues in the area of expertise, and legislative advocacy

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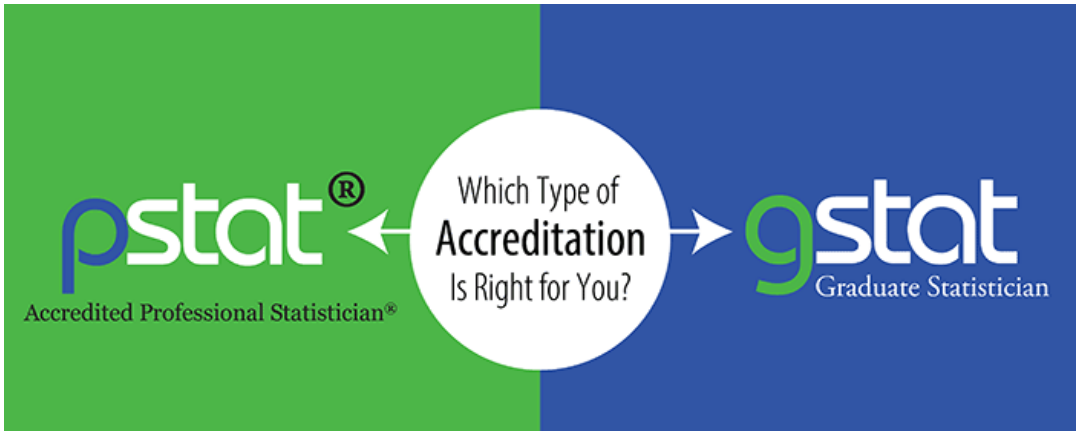
Background: ASA Certification



- PSTAT is an advanced accreditation for statistical professionals based on their portfolio, denoting a high level of accomplishment and adherence to ethical standards
- GStat is an entry level of accreditation that can be preparatory for full PStat® accreditation and is based educational criteria

Opportunities: Expert Panel

- Volunteer at a conference
- Develop a relationship with conference organizers
- Look for an opportunity to present on a panel

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Opportunities: Expert Consultant

Connect with an organization that needs an expert

Perform a statistical analysis and write a report

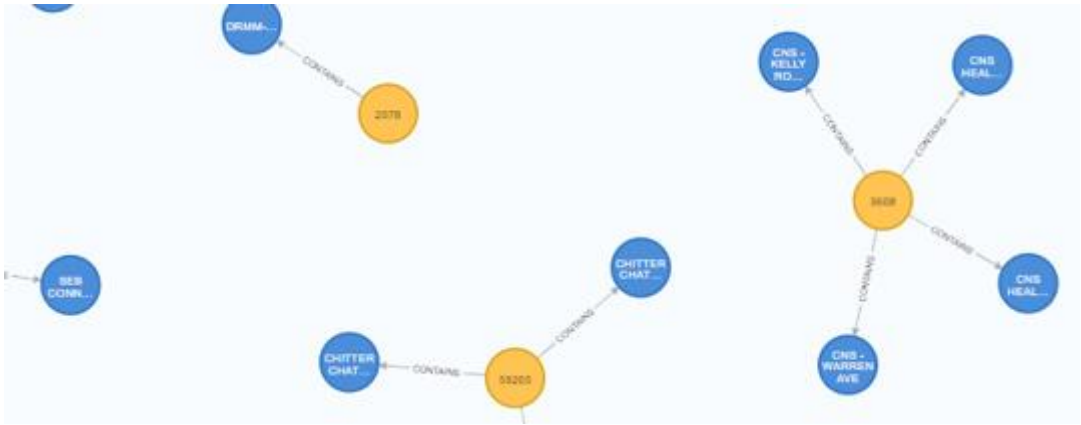

Image Credit: David Corliss / Grafham Analytics, Brandon Harrison / WiT

=> Being paid for your work as an expert is an important milestone

Opportunities: Legislative Expert Testimony

United States Census Bureau Director (and 2021 ASA President) Robert Santos testifies before Congress

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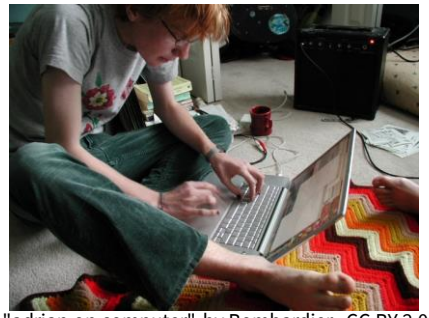
Opportunities: Expert Analysis - Legal



"adrian on computer" by Bombardier -CC BY 2.0

Most work as a statistical expert for court cases does not involve testifying in court

Table 5: Statistical Hypothesis Testing - Null Hypothesis = Traffic Stops Were Random

Race / Ethnicity	Count of Traffic Stops	% of Traffic Stops	% Estimated Driving Population	Odds Ratio	p-value	Odds against happening by chance
White Non-Hispanic	5	10.0%	41.4%	24%	2.53E-05	39,494
BIPOC	22	44.0%	17.7%	248%	3.22E-05	31,085

However, the statistical analysis is still subject to legal requirements and practices

=> A statistical expert witness works *for the court*, not for any party in the case

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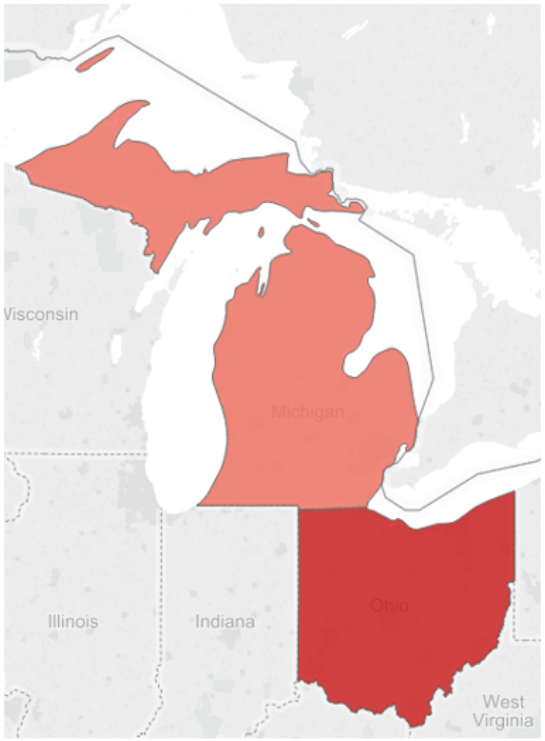
Experiences: Statistical Expert for Legislation

Needs some work

Michigan
17.9 Victims per 1M
5.5 out of 12 recommended policies

Better – could be improved

Ohio
22.0 Victims per 1M
9 out of 12 recommended policies
legislative actions



Ohio performs better than surrounding states but more is needed: Strengthening Safe Harbor laws, implement more training requirements

Statistical analysis of the effectiveness of proposed anti human trafficking legislation, presented to the Ohio Senate Judiciary Committee in 2022

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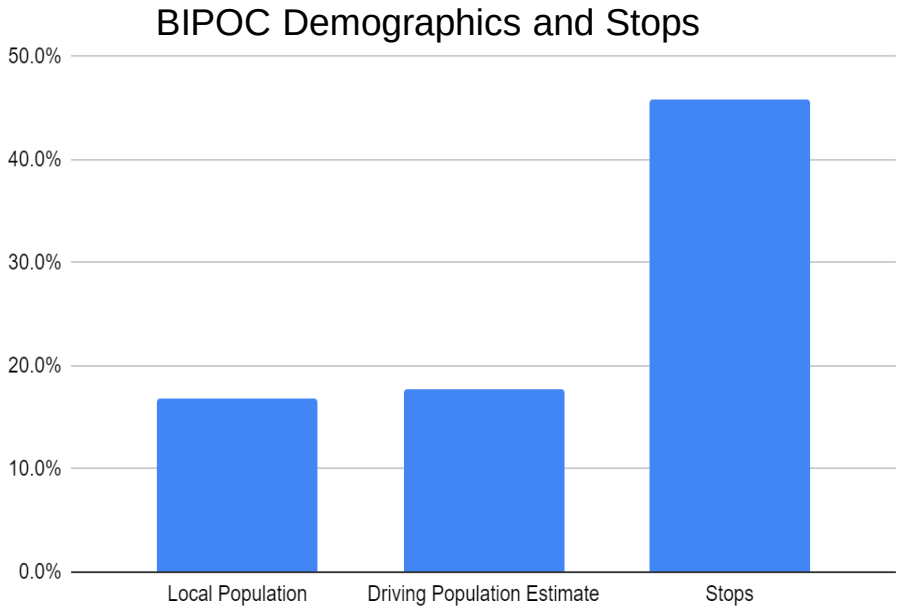
Experiences: Statistical Analysis for a Legal Case

Table 2: Demographics of the Driving Population (DPE)

Municipality	Total Population	% White Non-Hispanic	Number White Non-Hispanic	% BIPOC	Number BIPOC	% Hispanic	Number Hispanic
Springfield	155,931	28.9%	45,064	23.6%	36,800	47.5%	74,067
Chicopee	47,598	69.4%	33,033	8.2%	3,903	22.4%	10,662
Longmeadow	13,792	85.0%	11,723	9.7%	1,338	5.3%	731
Holyoke	27,288	42.0%	11,461	4.7%	1,283	53.3%	14,544
Total	244,609	41.4%	101,281	17.7%	43,323	40.9%	100,005



Demographic Totals Compared to Traffic Stops

Statistical analysis of racial demographics of the driving population and comparison to traffic stops

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Experiences: Court Testimony in a Legal Case

Table 5: Statistical Hypothesis Testing - Null Hypothesis = Traffic Stops Were Random

Race / Ethnicity	Population	Population Probability	Number of Traffic Stops	Race / Ethnicity Count	Test Value	Odds against happening by chance
BIPOC	Residents	0.427	7	6	0.024312	1 in 41.1
BIPOC	Drivers (DPE)	0.245	7	6	0.001143	1 in 875
Hispanic	Residents	0.156	7	2	0.218867	1 in 4.57
Hispanic	Drivers (DPE)	0.127	7	2	0.171750	1 in 5.82

Suffolk County Massachusetts Superior Court – Hypothesis Testing of Randomness in Traffic Stops

Court testimony in this case focused on the small number ot records provided in discovery, with cross-examination questioning the inclusion of individual records

Best Practices for Expert Witnesses

1. State all information clearly and succinctly
2. Rely on well-established methods supported by use in court cases and be well-informed of the methods strengths and weaknesses
3. Clearly state where testimony is scientific fact or expert informed opinion
4. Practice explaining your analysis to a non-technical audience
5. Review your findings and presentation with the attorney and follow their instructions

Questions?

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