



# ANALYSIS & INFERENCE

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## EXPERIENCE

### **Analysis & Inference, Inc.**, Springfield, PA (2015 – present) – Statistical Consultant

Analysis and Inference, Inc. is a research and consulting firm specializing in statistics and its application in dispute resolution and litigation support. Dr. Huber's capabilities include data analysis, statistical modeling and simulation, sampling, monitoring, inference, regression, data visualization, spatial data, database design and auditing, quality control, decision analysis, process optimization, real estate analysis, geographic information systems, risk analysis, computer programming, and environmental statistics.

### **Quantitative Decisions**, Rosemont, PA (1997 – present) – Owner

QD provides services in statistical analysis, sampling, litigation support, software development, database design and auditing, geographic information systems, risk assessment, and environmental compliance both independently and collaborating with other consultants. Clients have ranged from US federal regulatory agencies to Fortune 10 companies, international quasi-nongovernmental organizations, research firms, non-profits, academic institutions, and small businesses.

### **S. S. Papadopoulos & Associates**, Washington, DC (1998 – present) – Associated Expert

SSPA has a recognized international practice in contaminant studies, environmental engineering, remediation, geochemistry, surface-water hydrology, geographic information systems (GIS), and software development. Dr. Huber complements this expertise with rigorous, defensible statistical assessments of data, optimizing data collection and decisions, statistical support for litigation, and evaluations of conceptual and numerical models applied to data about the environment, occupational health, and risk assessment.

### **Fiscal Associates, Inc.**, Newark, DE (2002 – 2014) – Advisor

Fiscal Associates engages in real estate and energy analysis. In an ongoing collaboration with FA, Dr. Huber was awarded a patent for travel time computation procedures and helped with successful extensions of other patents covering real estate analysis. He also supported the award-winning National Energy Independence Plan (NEIP) with statistical and mathematical analysis and editorial direction.

**X-Interchange, Inc.**, Kansas City, MO (2003 – 2008) – Director

XI provided creative solutions to infrastructure and environmental problems. It optimized remedial operations at contaminated sites, developed logistical solutions, and decommissioned industrial sites. Dr. Huber supplied quantitative economic analysis of potential projects and supported marketing and training activities.

**Haverford College**, Haverford, PA (2005 – 2006) – Visiting Associate Professor of Statistics

Haverford College is a highly ranked small liberal arts institution. Dr. Huber taught undergraduate courses in statistics and exploratory data analysis, supervised thesis work in stochastic differential equations, provided statistical support for undergraduate research and library staff, and trained students in mathematical problem solving.

**Directions Magazine, Inc.** (2000 – 2002) – Editor

Directionsmag.com is the oldest active source of geospatial information technology news and commentary. In the late 1990's, Dr. Huber had contributed a regular series of technical articles on geographic analysis and GIS software development, covering topics ranging from Fourier analysis to steganography. Upon the untimely demise of its founder, Scott Elliott, in 2000, Dr. Huber assumed the Editor's role, ran the magazine successfully for the next year, and helped hire a permanent replacement.

**Pennsylvania State University**, Malvern, PA (1997 – 2003) – Part-time lecturer

This branch of the Penn State University system focuses on graduate degree programs in engineering, information science, and business. Dr. Huber developed and taught innovative courses in geographic information systems and environmental statistics. He supervised Masters' thesis work in geographic information systems, soil sampling technologies, and analysis of groundwater contamination data.

**Dames & Moore, Inc.**, Willow Grove, PA and Sacramento, CA (1992 – 1997) – Senior Associate

Dames & Moore provided environmental and geotechnical engineering services to tens of thousands of clients in all sectors. It was a publicly owned engineering company of 3400 professionals in 110 offices worldwide. Coming to D&M through the acquisition of his company IDT, Dr. Huber engaged in project management, marketing, personnel development, and firm-wide technical support for statistics, information management, software development, and risk assessment. He created and led a successful GIS specialty group.

**Integrated Data Technologies, Inc.**, Philadelphia, PA (1986 – 1992) – Software developer / statistical consultant / co-owner

IDT published commercial software products and provided software development, database, and statistical consulting services. Dr. Huber provided technical management in all areas and led scientific visualization research funded by the Ben Franklin Partnership of Pennsylvania.

**St. Joseph's University**, Philadelphia, PA (1984 – 1986) – Assistant Professor of Mathematics  
Taught 17 semester-length courses in mathematics to undergraduates.

**Time Distribution Services**, New York, NY (1982) – Programmer  
Provided custom mainframe programming solutions to support the distribution arm of Time-Life, Inc.

**Oak Ridge National Laboratories**, Oak Ridge, TN (1978 and 1979) – Researcher in physics  
Developed quantum mechanical computer models for an experimental group in atomic spectroscopy and a theoretical group in dielectronic recombination.

## EDUCATION

**Columbia University in the City of New York**, (1978 – 1984). M.A., Ph.D., Mathematics.  
Research in the geometry of CR manifolds. Dissertation on Classification of Graded Semisimple Lie algebras.

**Haverford College**, Haverford, PA (1974 – 1978). B.A, double major in Philosophy and Mathematics, with High Honors. College mathematics prizes 1975, 1976, 1977. Phi Beta Kappa.

## REPRESENTATIVE PROJECTS

### Disparate Impact and Discrimination

**Alleged race discrimination in hiring.** Expert witness for defendant. Analysis of applicant flow data and spatial analysis of applicant pool data. Rebuttal report. Circuit Court of McDowell County, WV. (2020)

**Alleged race discrimination (Fair Housing Act).** Expert witness for defendant. Analysis of demographic data and criminal history data for relevance in rental housing decisions. Rebuttal testimony to support Defendant. US District Court for the District of Connecticut. (2020)

**Alleged race discrimination (Fair Housing Act).** Expert witness for defendant. Analysis of housing and demographic data to rebut claims that defendant's exercise of a deed covenant contributed to housing segregation. U.S. District Court Southern District of New York. (2019)

**Alleged age and race discrimination (Fair Housing Act).** Expert witness for defendant. Analysis of housing data, demographic data, and applicant data at affordable housing facilities. Rebuttal testimony to support Defendant. US District Court for the District of Columbia. (2018)

**Statistical modeling of rates of sexual assault complaints in US universities.** Analysis of survey data performed to support an ESPN investigation. (2018)

**Alleged discrimination against women (Title VII).** Consulting expert. Statistical analysis of employment decisions on behalf of defendant. US District Court for the Middle District of Pennsylvania, Harrisburg Division. (2016)

**Alleged age discrimination (ADEA).** Retained as expert witness for defendant. Data Analysis and expert report concerning disparate impact in an employee pool. US District Court for the Northern District of Iowa Central Division. (2016)

**Claim for overtime compensation (FLSA).** Retained as expert witness for defendant. Data collection, analysis, and graphical representation of work patterns and payment schedules. US Court for the Northern District of Florida. (2016)

**Allegations of housing discrimination (CT Commission on Human Rights and Opportunities).** Consulting expert for defendant. Collected and analyzed demographic and housing data to assess allegations of age discrimination in township zoning policies. (2016)

#### Other Litigation Support

**Cost overrun claim (plaintiff).** Cashman Dredging and Marine Contracting Co., LLC, and Weeks Marine, Inc., v. Massachusetts Clean Energy Center (plaintiff). Analysis of geotechnical engineering data. Rebuttal of defendant's statistical models and calculations. Expert report and deposition. Massachusetts Superior Court (2019).

**FCA (False Claims Act) Confidential client (defendant).** Statistical support to develop a defense against allegations of fraud in a radiological site cleanup (2018 - 2019).

**FCA. US *ex rel* Vatan v. QTC, et al. (plaintiff).** Quality assessment of reviews performed of Veterans' Administration medical files. C. District of CA (2019).

**Herceptin Marketing and Sales Practice Litigation (plaintiff).** Review and analysis of manufacturing quality control data in a class action. N. District of Oklahoma (2018).

**State of Oklahoma v. Tyson Foods et al. (defendant).** Critical evaluation of a multivariate principal components analysis (PCA) of 80 variables used to generate a “signature” of environmental contamination in the Illinois River Watershed. N. District of Oklahoma (2008).

**State of New Mexico, et al., v. General Electric, et al. (defendant).** On behalf of the US Department of Justice, discovered and testified to fundamental flaws in statistical and scientific estimates of natural resources damage. District of New Mexico (2002).

**Envirosafe Services of Ohio, Inc. (defendant).** Provided understandable explanations of statistical material produced by expert witnesses and developed independent opinions in a case centering around allegations of the misuse of statistical pollution monitoring tests. Julia R. Bates, *et al.* v. Envirosafe Services of Ohio, Inc. Lucas County Court of Common Pleas, OH (1998).

## Geostatistics

**West Lake Landfill (MO) waste mapping.** Provided strategic and technical advice for the geostatistical estimation of waste volumes based on landfill borings. (2017)

**Mohawk Chemicals (CA) groundwater investigation.** Three-dimensional geostatistical analysis and visualization of geological strata based on cone penetrometer test (CPT) data. (2000)

**Fresh Kills mapping.** Geostatistical estimation of thickness of a confining layer of glaciolacustrine clay underlying New York City's Fresh Kills landfill (based on borelog data), to determine potential risks from release of leachate. (1997)

**Quality control process for hazardous waste remediation.** Application of geostatistical techniques to develop measurement and decision procedures to monitor and maintain the integrity of physical stabilization of sludge in a heterogeneous disposal pond with radioactive layers. BP Chemicals (1995).

**Three-dimensional mapping of a layered aquifer system.** Geostatistical analysis of downhole gamma borelogs and mapping of interfaces between water-bearing units beneath the DuPont Chambers Works facility, New Jersey (1993).

## Market Analysis

**Confidential client.** Developed statistical methods to estimate detailed transactions in a national market for healthcare products. Literature search. Identified and secured additional sources of data to improve the estimates. Implemented the statistical procedures in **R** software. Wrote user and technical documentation and provided training for users. (2016)

**(Large hospital—confidential client.)** Created statistical models of supply and demand for primary medical services within the region served by a hospital and its competitors. Accounting explicitly for spatial relationships, such as the time and cost of travel, these models provided essential information for identifying communities that would experience changes in service resulting from a proposed hospital move. (2011)

## Big Data

**Confidential client.** Developed statistical methods and wrote software for estimating, tracking, and forecasting the US market for over 400 companion animal medical products at national, state, and regional levels based on daily uploads of individual transactions by veterinary hospitals. (2015 – 2018).

**Federal Communications Commission.** Led the statistical analysis underpinning the first National Broadband Map created by the FCC. Performed literature review, identified relevant variables from several thousand covering demographic, infrastructure, geographic, and topographic information. Developed and tested logistic regression models, then applied them to predict availability and speed of broadband services at 8.3 million Census blocks throughout the United States. (2009)

### Sampling and Monitoring

**ConocoPhillips** Redesigned the groundwater monitoring program at a large refinery and shepherded it through the process of regulatory approval. Ponca City, OK (2004).

**(International manufacturer—confidential client).** Designed and supervised sampling of the soils, sediments, water, and groundwater in and around Cuautla, Mexico. Managed the data and mapping elements of the study. Performed statistical analysis of the results. As principal author of the resulting investigation report and risk assessment, presented and explained the results to Federal regulatory authorities. Provided additional statistical analysis of medical data collected from town residents (2001 – 3).

**(National retail chain—confidential client).** Created a formal sampling plan to evaluate the efficacy of a lead cleanup program at a recycling facility in rural Iowa, using sample compositing to minimize the costs of cleanup and demonstrating its success (1993).

### Regulatory Compliance

**Multiple clients, including DuPont, Ciba-Geigy, American Cyanamid, and Exxon.** Through FOIA, obtained and analyzed New Jersey's databases of 15,000 regulated industrial facilities to identify those that would be most affected by proposed changes in environmental regulations. Assisted clients in public meetings to make the state aware of these consequences and to suggest more equitable formulas to determine permit fees (1989 – 1992).

### Statistical Review

**United States Environmental Protection Agency.** One of three peer reviewers responsible for a comprehensive assessment and critical review of the *Statistical Analysis of Groundwater Monitoring. Data at RCRA Facilities—Unified Guidance* (2005).

### Database Design and Management

**CC:Control.** Designed and led the development of a comprehensive relational database used at 100 sites to manage, statistically analyze, and visualize large groundwater monitoring datasets. It included robust outlier detection, quality control procedures, and innovative graphical displays of time series (1990 – 1995).

### Data Visualization and Communication

**(Confidential client).** Designed and prepared graphics to analyze and understand a large database of groundwater monitoring measurements made at one thousand Long Island gas stations. Provided strategies for storing, managing, and mapping all data with a GIS (2010).

**Mohawk Chemicals, Mountain View, CA.** Mapping and three-dimensional visualization of contamination and geological structures. Designed statistical programs to sample soils, soil gas, groundwater, and geotechnical parameters. Created visualizations of integrated datasets and presented them to state regulatory agencies (1999).

**Trane, Lacrosse, WI.** Performed innovative exploratory analysis of monitoring and sampling data to identify hidden, inaccessible sources of soil and groundwater contamination. Developed maps and graphs to communicate findings to corporate executives and state regulators. Managed the ensuing remediation project, a soil vapor extraction system (1992 – 1993).

#### Decision Analysis and Support

**Alterra (Wageningen).** Developed mathematical models of the utility of agricultural land in the Netherlands based on use, location and proximity. Built software prototypes to support and optimize land redistribution (2003).

**FMC Corporation.** Employed influence diagrams and decision modeling to lead experts in identifying critical risks in managing environmental liabilities at industrial properties (1996).

#### Research

**MEUK.** US patent 1x,xxx,xxx awarded 2019 for systems and methods configured to create contour maps of geospatial variables based on hydrometeorological data. With JM Lambie, J Dahl, J Kennel, M Tonkin, and M Karanovic.

**National Energy Independence Plan (NEIP).** Scientific, mathematical, and statistical modeling of energy markets and alternative energy plans. Editorial assistance with reports and presentations (2009 – 2014).

**GridRoute.** US patent 8332247 awarded 2012 for algorithms integrating vector and raster data structures to support high-speed, large-volume computation of travel times utilizing networks embedded within a spatially extensive matrix.

**Groundwater Data Visualization (Ben Franklin Partnership of PA).** Secured and directed a \$100K research grant to develop PC software for innovative visualization of spatial data (1991).

#### PROFESSIONAL ACTIVITIES

**Treasurer,** American Statistical Association-Philadelphia 2015 – present.

**Newsletter Editor,** American Statistical Association-Philadelphia 2014 – 2015.

**Editorial Board,** *Risk Analysis* 2009 – 2013.

**Elected moderator** of the professional statistics and GIS communities on the Web at <http://stats.stackexchange.com> 2011 – present.

**Best reviewer award.** Society for Risk Analysis 2009.

**Leader, Haverford College Problem Solving Group.** 2005 – 2018.

**Author of over 40 open source software programs** to perform statistical and geometric analysis and visualization of data. 2000 – 2005.

#### Teaching

**Regression Methods.** Math 8406, Villanova University, 2015.



**Groundwater Statistics.** 8-hour workshop. Nestle North America, 2014.

**Environmental Statistics in Pennsylvania.** 8-hour workshop. PA Council of Professional Geologists, 2010 and 2011.

**Spatial Statistics.** 40-hour workshop, 2007. 8-hour workshop on the web. NITLE, 2010

**Introduction to GIS.** Geology 328, Bryn Mawr College, 2007.

**Problem Solving.** Weekly undergraduate seminar at Haverford College, 2005 – present.

**Introduction to Statistics.** Math 103, Haverford College, 2006.

**Statistics.** Math 203, Haverford College, 2006.

**Exploratory Data Analysis.** Math 209, Haverford College, 2005.

**Environmental GIS.** Systems Engineering 597, Penn State-Great Valley, 1997 – 2003.

**Environmental Statistics.** Computer Engineering 597, Penn State-Great Valley, 2001.

**Environmental Sampling.** Two-day course developed and taught for Government Institutes, 1994 – 1995.

## SELECTED PUBLICATIONS

Fairley, William B. and William A. Huber, 2020. *On Being an Ethical Statistical Expert in a Legal Case.* Accepted for publication in *The American Statistician*, doi: 10.1080/00031305.2020.1763834.

Fairley, William B. and William A. Huber, 2018. *Statistical Criticism and Causality in Prima Facie Proof of Disparate Impact Discrimination.* *Observational Studies*, February 2018.

Tonkin, Matthew J., Jonathan Kennel, William Huber, and John M. Lambie, 2016. *Multi-event Universal Kriging (MEUK).* *Advances in Water Resources* **87** (2016) pp. 92-105. doi:10.1016/j.advwatres.2015.11.001

Huber, William A., 2010. *Ignorance is Not Probability.* *Risk Analysis* **30** issue 3, pp 371-376, March 2010. doi: 10.1111/j.1539-6924.2010.01361.x

Huber, William A., 2010. Comment on *Why Risk is Not Variance: An Expository Note.* *Risk Analysis* **30** issue 3, pp 327-8, March 2010.

Guagliardo, Mark F., William A. Huber, Deborah M. Quint, and Stephen J. Teach, 2007. *Does Spatial Accessibility of Pharmacy Services Predict Compliance with Long Term Control Medications?* *Journal of Asthma*, 44:10, 881-883. doi: 10.1080/02770900701752680

Cox, LA and WA Huber, 2007. *Symmetry, Identifiability, and Prediction Uncertainties in Multistage Clonal Expansion (MSCE) Models of Carcinogenesis.* *Risk Analysis* 2007 Dec(6): 1441-53. doi: 10.1111/j.1539-6924.2007.00980.x

Sinton, Diana and William A. Huber, 2007. *Mapping Polka and Its Ethnic Heritage in the United States.* *Journal of Geography* **106** 41-47. doi: 10.1080/00221340701487913



Cox, LA, D Babayev, and WA Huber, 2005. *Limitations of Qualitative Risk Assessment*. Risk Analysis **25** (3), 651-662. doi: 10.1111/j.1539-6924.2005.00615.x

Huber, William A, 1996. Discussion: *Detection of Low-level Environmental Pollutants*. [Environmental and Ecological Statistics](#).

Huber, WA and C Bottcher, 1980. *Dielectronic Recombination in a Magnetic Field*. *J. Phys. B: At. Mol. Phys.* **13** L399-L404.