

# WILLIAM A. HUBER

Associated Expert

## AREAS OF EXPERTISE

- Statistics
- Mathematical modeling
- Geographic modeling and analysis
- Geographic information systems (GIS)
- Decision and risk analysis
- Environmental statistics and geostatistics

## SUMMARY OF QUALIFICATIONS

William A. Huber, PhD, PSTAT, performs general statistical consulting with specialized capabilities in statistical sampling, environmental and spatial statistics, risk analysis, and geographic information systems. He directed the data analysis for the FCC's National Broadband Mapping Plan; was a principal reviewer of the US EPA's guidance document on statistical methods for groundwater monitoring; has testified as a statistical and mathematical modeling expert in complex federal litigation; led research and development of data visualization software; provided statistical support for hundreds of investigations of water, soils, groundwater, wastewater, and air quality; developed custom and commercial statistical software for sampling, spatial data analysis, economic estimation, and database querying; and published research in risk assessment, geostatistics, and quantum mechanics. He has taught mathematics and statistics at St. Joseph's University, Haverford College, Penn State-Great Valley, Villanova University, and in short courses for professional organizations. For 12 years he taught whitewater kayaking as an ACA-certified Instructor and Instructor Trainer.

Dr. Huber does business as Quantitative Decisions in Rosemont, PA and is also formally associated with Analysis & Inference in Springfield, PA and SS Papadopoulos & Associates in Bethesda, MD. At A&I he supports litigation as a consulting and testifying expert. Applications have included assessing rare risks, determining disparate impact in age and gender discrimination cases, and obtaining accurate samples of processes and populations. At SSPA, he provides expertise in statistics and geostatistics to support environmental investigations, remediations, monitoring, and litigation.

Formerly, Dr. Huber owned a software development startup and held senior technical and management positions at a large international engineering consulting firm. Over his career, he has helped develop small businesses and volunteer organizations, serving on their boards of directors in various positions, including as Treasurer of the Philadelphia Canoe Club, Editor of Directions Magazine (a Web publication on GIS), and Director of XI corporation (an environmental services company). He has long been building and nurturing professional communities in GIS and statistics on the Web. Currently he is serving as Treasurer of the Philadelphia Chapter of the American Statistical Association.

## GENERAL EXPERIENCE

COLLECTING AND INTERPRETING QUANTITATIVE DATA. SPECIALIZING IN ENHANCING THE VALUE OF SPATIAL AND ENVIRONMENTAL DATA WITH STATISTICAL, GRAPHICAL, AND MATHEMATICAL ANALYSES.

### ENVIRONMENTAL

Development, application, and dissemination of improved methods to monitor and sample environmental media, assess the quality of data, interpret data, make optimal data-based decisions, present conclusions, and evaluate other interpretations. Negotiation and presentation. Peer review

### YEARS OF EXPERIENCE: 25+

#### EDUCATION

- PhD**, Mathematics, Columbia University, 1985
- M. Phil**, Mathematics, Columbia University, 1980
- MA**, Mathematics, Columbia University, 1979
- BA**, Philosophy, Haverford College, 1978
- BA**, Mathematics, Haverford College, 1978

#### PROFESSIONAL HISTORY

##### Quantitative Decisions

President, 1997 to present

##### Dames & Moore, Inc.

Senior Associate, 1992-1997

##### Integrated Data Technologies, Inc.

(IDT), Partner, 1986-1992

##### Time-Life, Inc., Consultant, 1982

##### Oak Ridge National Laboratories,

Researched, 1978-1979

# WILLIAM A. HUBER

Associated Expert

Page 2

and strategy development for environmental investigations, remediation, and closure. Litigation support.

## STATISTICAL

Statistical consulting. Development and application of mathematical and statistical models to analyze and process spatial data, including transportation (network) analysis and real estate market analysis. GIS design and analysis.

## GENERAL

Litigation support, with applications in disparate impact, assessment of rare probabilities, sampling, and review of expert opinions. Risk analysis. Computer programming and database management. Teaching. Theoretical and applied research in mathematics, statistics, and physics.

## REPRESENTATIVE EXPERIENCE

### ENVIRONMENTAL LIABILITY ASSESSMENT

- Evaluation of offsite liabilities at a former pigments manufacturing plant. Developed an offsite investigation work plan, evaluated all data, supported the defense of civil and criminal claims, and provided improved methodology to the health authorities for conducting a community survey and blood sampling program (Mexico, 2002).
- Assessment of potential environmental costs for brownfields redevelopment at a former refinery. Identified regions most suitable for initial development and evaluated the extent of potential soils contamination (East Coast US, 2001).
- Estimation of financial liabilities at chemical manufacturing facilities, for computing insurance cost recovery and supporting the development of investigation and remedial strategies (NJ, KY, MI).
- Decision analysis to formulate a strategic plan to address liabilities (Puerto Rico, 1997).

### GEOTECHNICAL

- Construction of a quantitative geological model. DuPont Chambers Works (NJ), 1993. Developed and applied novel geostatistical techniques to interpolate gamma and neutron log data across six distinct aquifers beneath a 2 square mile site in the Delaware River basin.
- Three-dimensional interpolation and visualization of cone penetrometer tests. Mohawk Chemicals (CA), 1999. Applied 3D kriging to 80,000 measurements obtained in 500 CPT logs to model and visualize soil permeabilities within the San Francisco Forebay.
- Assessing risk of release of landfill leachate. Fresh Kills Landfill (NY), 1992. Applied geostatistical techniques to well log data in order to map the thickness of an underlying lacustrine clay layer and identify areas of greatest probability of leachate release.

### ENVIRONMENTAL STATISTICS

- Develop statistical procedures for the RCRA groundwater monitoring program, 2017.
- Develop statistical methods to analyze groundwater monitoring data. Hanford Site, Washington, 2016. New methods incorporate natural influences on groundwater quality, trends, and temporal correlation.
- Evaluate monitored natural attenuation in groundwater. Agrico Site (FL), 2009. Used hydrological modeling and statistical theory to estimate cleanup times and confidence intervals for them. Proposed improvements to methods in US EPA guidance for MNA.
- Develop alternate groundwater monitoring compliance limits (ACLs) for arsenic in groundwater at a petroleum refinery and pipeline facility, 2008.
- RCRA groundwater monitoring permit development for a Midwest oil refinery, 2004: comprehensive data review, selection of monitoring wells, monitoring parameters, and statistical tests; negotiation with state and Federal regulatory agencies; creation of the written permit; and development of software to streamline permit compliance.

# WILLIAM A. HUBER

Associated Expert

Page 3

- Peer review of the Hendry County Groundwater Flow Model for the South Florida Water Management District, 2001.
- Develop and defend remedial goals and optimize remedial designs for metals in soils at sites (NY, PA).
- Evaluation of soils data for investigations, waste characterization, management, and disposal (CA, CT, FL, GA, IL, IN, KY, MI, MO, NJ, NY, OH, OK, PA, VA, WI, Canada, and The Netherlands)
- Statistical plans to reduce soil and groundwater sampling costs for environmental investigations (CA, CT, DE, IL, FL, NJ, NY, PA, OK).
- Developing alternate groundwater monitoring compliance limits (ACLs) for a uranium mine regulated by the NRC (WY, 1995-7).
- Consulting on RCRA groundwater monitoring issues. (AR, AZ, KS, KY, MO, NJ, OH, OK, PA, TX, VA).

## RISK ASSESSMENT AND DECISION ANALYSIS

- Expert reviewer for the USEPA of procedures developed to establish decision-making guidelines for residual disinfectant levels in drinking water and to set maximum contaminant levels (MCLs) for disinfectant byproducts (1999).
- Invited presenter at the Second Workshop on the Practical Issues in the Use of Probabilistic Risk Assessment sponsored by the USEPA and University of Florida (1999).
- Participation as an invited expert in the EPA's Workshop on Selecting Input Distributions for Probabilistic Risk Assessments (NY, 1998).
- Development of a multiattribute valuation function to prioritize 8,000 sites according to suitability for cellular towers (NJ, 1999). <http://www.quantdec.com/projects/wireless.htm>
- Decision support for development of an open space preservation plan, Franklin Township, NJ, 1999. <http://www.quantdec.com/open.htm>

## LITIGATION SUPPORT AND NEGOTIATION

- Assessment of disparate impactment in employment termination (IA, 2016).
- Geostatistical mapping of PCB contamination in soils (AL, 2010).
- DNAPL plume evaluation (KY, 2010).
- Workplace benzene exposure model evaluation (AZ, 2009).
- Statistical assessment of crop damage from alleged windborne contamination (ID, 2008).
- Expert witness, evaluation of principal components/factor analysis used to identify contamination sources in soils, water, sediments, and groundwater. (OK, 2008).
- Expert witness, modeling and measurement of lead solder contamination in an industrial building (CA, 2006).
- Statistical support to evaluate MTBE in public water supply wells (NY, 2006).
- Expert testimony, geostatistics. US Department of Justice (defendant). Evaluated a complex hydrological model formulated by plaintiffs to support a \$4 billion claim for natural resources damages. Discovered and testified to fundamental flaws in the estimates of a chlorinated groundwater plume extent. The client was subsequently dropped from the case (NM, 2002).
- Expert review and criticism of a complex probabilistic dose reconstruction model. Provided advice to defense counsel and helped prepare for deposing expert witnesses in hydrogeology, statistics, and risk assessment (CA, 2001-2).
- Independent review of local and regional groundwater data at an MTBE contaminated wellfield on behalf of a former gas station owner. Addressed regulatory concerns about data quality (high detection limits) and geological conditions (CA, 2000-2001).

# WILLIAM A. HUBER

Associated Expert

Page 4

- Development of a waste sampling and analysis program to help a landfill demonstrate attainment of Land Disposal Restriction (LDR) standards (OH, 1999-2001).
- Second opinion, peer review, and support in deposing expert witnesses for an insurance claim litigation concerning soils contamination by heavy metals at a former rail maintenance yard (PA, 2000).
- Investigation strategy development, data visualization, and geostatistical analysis to help a chemical manufacturer limit liability for extensive groundwater contamination by chlorinated solvents (CA, 1997-2000).
- Statistical support to defend a client against a claim of using an incorrect statistical test for RCRA groundwater monitoring at a large hazardous waste facility (OH, 1998).
- Criticism of a probabilistic ground water model purporting to demonstrate historical landfill releases of chromium (PA, 1997).

## MODELING

- Estimating the US market for veterinary pharmaceuticals. VetStreet (2015). Developed statistical methods to perform accurate monthly projections of product sales from a large dataset. Implemented the methods in software.
- Development of new techniques to find optimal travel costs in spatially diffuse networks. Patented 2012.
- National broadband availability model: statistical director. Federal Communications Commission, 2009. <http://www.broadband.gov/plan/>
- Development of new methods and software to simulate, evaluate, and predict supply and demand within regional markets. In collaboration with Fiscal Associates, Newark, DE, 2003-2012.
- Development of new methods and implementation of software to optimize reallocation of agricultural lands. Alterra, Wageningen, The Netherlands, 2002-3.
- Development of improved techniques and software for the computation and visualization of contaminant plumes from regional air sources (TNO-MEP, The Netherlands, 1999). <http://www.quantdec.com/projects/ammonia.htm>
- Critical evaluation and analysis of draft EPA guidance, for regulated facilities; for example, see "PCBs in Pipes" at <http://www.quantdec.com/Articles/pcbpipe/pcbpipe.pdf>.

## TEACHING

- Regression Methods. Math 8406, Villanova University, 2015.
- Environmental Statistics in Pennsylvania. 8-hour workshop. PA Council of Professional Geologists, 2010 and 2011.
- Spatial Statistics. 8-hour workshop on the web. NITLE, 2010
- Spatial Statistics. NITLE 40-hour workshop, 2007.
- 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 Statistics. Computer Engineering 597, Penn State-Great Valley, 2001.
- Environmental GIS. Systems Engineering 597, Penn State-Great Valley. Semester course taught to Master's degree candidates, 1997 – 2003.
- Environmental Sampling. Two-day course developed and taught for Government Institutes, 1994-

# WILLIAM A. HUBER

Associated Expert

Page 5

95.

## PREVIOUS EXPERIENCE

### **Dames and Moore, Inc.**, Willow Grove, PA and Sacramento, CA

Project management, marketing, and firm-wide technical support for issues related to environmental statistics and information management. Provided written evaluations for approximately 200 projects world-wide and participated in about 200 proposal efforts. Served private sector clients and state government agencies.

### **Integrated Data Technologies, Inc. (IDT)**, Philadelphia, PA

Developed and managed an environmental software, database, and statistical consulting business.

### **Time-Life, Inc.**

Database programming.

### **OakRidge National Laboratories**, Tennessee

Computer modeling of quantum mechanical systems

## PROFESSIONAL SOCIETIES

American Statistical Association

## PROFESSIONAL ACTIVITIES

- PStat® (Accredited Professional Statistician), 2016.
- Editorial Board, Risk Analysis 2009-2013.
- Peer reviewer, Human & Ecological Risk Assessment (1998); Environmental Science & Technology (1997-2002), Risk Assessment (1996-99), Risk Analysis (2003-2012), Journal of Hydraulic Engineering (1994-6; 2005); Environmental and Ecological Statistics (1994-2000); Geotechnical Testing Journal (1995).
- Elected moderator of the statistics and GIS communities on the Web at <http://stats.stackexchange.com>, 2011 – present.
- Best reviewer award. Society for Risk Analysis, 2009.
- Peer review of the 2009 Unified Guidance, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, for the US EPA.
- Author of over 40 publicly available software programs to perform statistical and geometric analysis and visualization of data.
- ESRI (GIS) Support Center User Forums annual “MVP” Award, 2003, and all semi-annual awards, 2002-2010. <http://support.esri.com> .
- Invited speaker on Designing Environmental Investigations with GIS at the 2nd Annual GIS and Public Health Day: Methods and Strategies for Enhancing Environmental Health Surveillance. Center for Public Health Preparedness, School of Public Health, SUNY Albany, NY, May 9 – 10, 2006. [http://www.ualbanycphp.org/Events/GISDay\\_05\\_09\\_06/default.cfm](http://www.ualbanycphp.org/Events/GISDay_05_09_06/default.cfm) .
- Editor, Directions Magazine (<http://www.directionsmag.com/>), 2001. Directions is a Web magazine, focusing on geographic information systems, with about 75,000 viewers monthly.
- Contributing Editor, Directions Magazine, 1999-2000 and 2002-2003.
- Invited speaker on statistics at the National Groundwater Association’s Second Theis Conference, Amelia Island, Florida, November 1999.
- Invited panel member, Workshop on Selecting Input Distributions for Probabilistic Risk Assessment, U.S. EPA, New York City, April 21-22, 1998.
- Keynote speaker, The Nature Conservancy Mid-Atlantic Region GIS Conference, Conshohocken, PA, March 1998.
- Invited speaker, GIS for Brownfields Redevelopment, Arizona Department of Environmental

# WILLIAM A. HUBER

Associated Expert

Page 6

Quality, November 1996.

- Organizer and speaker, Brownfields and Beyond, March 1996, New York City.
- Invited speaker, Statistics in Environmental Applications, American Statistical Association conference held at the University of Delaware, April 1995.
- Developer of the Government Institutes' two-day course on Environmental Sampling, Washington, D.C., October 1994, and Orlando, FL, January 1995.

## SELECTED PUBLICATIONS

- Tonkin, M., J. Kennel, W. Huber, and J.M. Lambie, Multi-Event Universal Kriging (MEUK). *Advances in Water Resources* 87 pp 92-105, January 2016.
- G. William Bailey, William A. Huber. Methods and systems for optimizing network travel costs. Patent US8332247 B1, Dec 11, 2012.
- 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
- Jamall, IS, T Lu, and WA Huber, 2005. Distinguishing Between Multiple Chlorinated Solvent Plumes: A Comprehensive Approach. The Annual International Conference on Soils, Sediments, and Water, Amherst, MA.
- 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., 2002. GIS & Steganography—Part 3: Vector Steganography. Published on the Web in *Directions Magazine* at [http://www.directionsmag.com/article.php?article\\_id=195&trv=1](http://www.directionsmag.com/article.php?article_id=195&trv=1) , April 18, 2002.
- Huber, William A., 2001. Estimating Markov Transitions. *Journal of Environmental Management*, v 61, no. 4, pp 381-385.
- Huber, William A., 2000. Variability and Uncertainty. Chapter 12.2 of *The Standard Handbook of Environmental Science, Health, and Technology*, J. Lehr, Ed. McGraw-Hill.
- Huber, William A. and W. A. S. Nijenuis, 2000. Predictive Modeling of Ammonia Deposition from Large Numbers of Agricultural Sources . 4th International Conference on Integrating GIS and Environmental Modeling (GIS/EM4): Problems, Prospects and Research Needs. Banff, Alberta, Canada, September 3 - 8, 2000.
- Harkness, Bracco, Franz, Tsentas, Becker, Huber, Orient, Rich, & Figura, 1998. Natural Attenuation of Chlorinated Aliphatics at the Naval Air Engineering Station, Lakehurst, NJ. In *Natural Attenuation/Chlorinated and Recalcitrant Compounds*, Wickramanayake & Hinchey, Eds.



## WILLIAM A. HUBER

Associated Expert

Page 7

- Huber, William A, 1996. Discussion: Detection of Low-level Environmental Pollutants. Environmental and Ecological Statistics.
- Huber, William A., and Douglas W. Watt, 1994. Probabilistic Data Analysis and Soil Vacuum Extraction Used for Identifying the Location of DNAPLs. Technical Papers of the Twelfth Annual Environmental Management and Technology Conference International, Philadelphia, PA, June 1994. Pages 492-513.
- Huber, William A., 1993. Discussion: Resampling from Stochastic Simulations for Assessing Uncertainty in Global Estimation. Journal of Environmental Statistics, v. 1, no. 2.
- Huber, William A., 1993. Graphical Techniques for Enhancing the Utility of Multivariate Environmental Statistics. Multivariate Environmental Statistics, G.P. Patil et al., eds., North Holland/Elsevier, 1993. Pages 203-213.
- Huber, William A., 1992. Selecting a Statistical Methodology for RCRA Facilities. Short Course, HMCRI Superfund '92, Washington, D.C.
- Huber, William A., and Richard N. Sands, 1989. Regulating the Pollution of Groundwater: Lessons from a Pollution Discharge Elimination Program. HazMat World.
- Huber, William A., 1989. Well Placement and Well Elimination. NWWA conference on solving water problems with models, Indianapolis, Indiana. pages 187-207.
- Huber, WA and C Bottcher, 1980. Dielectronic Recombination in a Magnetic Field. J. Phys. B: At. Mol. Phys. 13 L399-L404.