



## FRISTACHI SCIENTIFIC CONSULTING, LLC

human health and ecological risk assessment • environmental statistics

### Anthony Fristachi

*President, Senior Risk Assessor and Environmental Statistician*

#### Education

MS, Environmental Health Science/  
Risk Sciences and Public Policy, Johns  
Hopkins University Bloomberg School  
of Public Health, 2004

BS, Environmental Health Science /  
Statistics, University of Georgia, 2000

#### Years of Experience

With FSC: 4

With Other Firms: 10

#### Professional Associations

Society for Risk Analysis

American Statistical Association

#### Certifications

40-Hour HAZWOPER Training and  
Certification

#### Clearances

Secret, Department of Defense, May  
2009 to 2014 (expired).

NACLC investigation completed on  
February 5, 2008.

#### Awards

2009 Performance Award Battelle  
Memorial Institute for contribution to  
chloroprene, n-butanol, t-butanol and  
cadmium IRIS program assessments.

2007 US Environmental Protection  
Agency Outstanding Performance  
award for "Outstanding scientific  
contributions to the mission of NCEA-  
Cincinnati"

2004-2007 Oak Ridge Institute for  
Science and Education (ORISE) Fellow

Mr. Fristachi has over 12 years of experience conducting human health and ecological risk assessments, probabilistic exposure assessments, and analyzing environmental data. His principal research areas include complex survey data analysis, probabilistic modeling, benchmark dose modeling, and the critical review of toxicological and epidemiological studies, all with a focus on large datasets. Mr. Fristachi's strong understanding of the relationship among the different facets of an environmental investigation allows him to quickly develop practical and efficient approaches to problem definition, sampling design and data analysis implemented through strong statistical computing skills in SAS, R, Matlab, Access, and Excel. His publications on chemical mixtures have become important to the US Environmental Protection Agency for use in developing drinking water regulatory guidelines.

#### PROJECT EXPERIENCE

**Los Alamos National Laboratory.** Senior consulting risk assessor providing risk assessment and statistical support for human health and ecological assessments for the S-Site Aggregate Area Investigation Reports and Potrillo/Fence Canyon Aggregate Area Supplemental Investigation Reports. [Navarro Research and Engineering, Inc. and Portage, Inc.]

**US Department of Energy.** Senior consulting risk assessor for human health and ecological assessments for chemicals and radionuclides in soil and rock via multiple scenarios, including vapor intrusion modeling at the Miamisburg, Ohio closure project. [Portage, Inc.]

**Rocky Mountain Oilfield Testing Center (RMOTC).** Provided data validation support for landfill groundwater sampling program. [Navarro Research and Engineering, Inc.]

**Gary/Chicago International Airport.** Developed a sampling plan to assess pollution on airport property and form plans for cleanup activities in support of the upcoming airport expansion project. [AECOM Technical Services.]

**NuWest North Maybe Mines.** Calculated bioaccumulation factors for plant tissue in support of ecological risk assessments at East Mill Dump and North and South Open pit mines. Estimated Tier1 and Tier2 risk values. Developed a sampling plan to define the distribution of concentrations representative of background for the area and specified methods for development of site-specific background threshold values and comparison of background concentrations to site concentrations [AECOM Technical Services.]

**Magnablend, Inc, Mills, WY site.** Related to the presence of arsenic and selenium in soil and selenium in groundwater in excess of default criteria, developed a background sampling design that utilizes use of background soil data collected previously as part of a remedial investigation process at the nearby BP/Amoco Former Refinery North Properties. BP North Properties soil boring logs were reviewed to identify locations with comparable lithology Magnablend site. The resulting data set consisted of selenium and arsenic soil samples considered for developing background threshold values, which were compared to site data using several non-parametric two-sample hypotheses testing approaches. [AECOM Technical Services.]

**Lower Passaic River Study Area.** Estimated the distribution exposure durations for residents in the LPRSA, based on the probability of a resident moving out of the study area during a 5-year age group and the probability that a person will die during that period using U.S. Census Bureau data and N.J. Department of Health (NJDH), Center for Health Statistics Bergen, Essex, Hudson and Passaic county mortality data for 2000-09. [AECOM Technical Services.]

**NAVFAC Bangor.** Performed a cluster analysis in support of the sampling plan for the Nearshore Functional Assessment Tool calibration area in Puget Sound. A total of 4770 potential sampling locations were selected based on 14 Biology, 14 engineering and 29 hydrological clustering variables. A Gaussian finite mixture EEE (ellipsoidal, equal volume, shape and orientation) model fitted by the Expectation-Maximization algorithm resulted in the identification of 22 clusters. [AECOM Technical Services.]

**Arrow Energy:** Developed a sampling plan to divide the priority matrix sources into categories including facilities, equipment and components identified by equipment type, mode of operation and type of emission and incorporating measurements at valves, flanges, connectors, compressor seals, pressure relief valves, compressor open-ended line and at flares. Initially measured data was subjected to a multivariate statistical analysis to determine precision, bias, accuracy and uncertainty. Comparison of total measured emissions extrapolated across Arrows gas field/ processing operations against current calculated loss determinations was performed. [AECOM Technical Services.]

**FE Warren AFB Landfill-C501/Landfill 8 long-term monitoring:** The goals of the statistical evaluation were to determine the presence of a statistically significant concentration increase (S51) for any of the laboratory-analyzed constituents. The statistical evaluations included both inter-well and intra-well analyses; the inter-well analyses compares the groundwater concentrations between background well and downgradient wells and the intra-well screening comparing median concentrations to the UPL. To further evaluate the potential for an SSI, a Non-Parametric Prediction Limit Statistical Test for Future Median was performed at a 97.5% level of confidence. [AECOM Technical Services.]

## OTHER REPRESENTATIVE EXPERIENCE

**Battelle Memorial Institute, Statistics and Information Analysis Product Line, Columbus, Ohio. Research Scientist.** Senior risk assessor for the dose-response modeling effort and calculation of benchmark dose values for numerous chemicals identified by USEPA in the Integrated Risk Information System (IRIS) program. Critically evaluated data from key mammalian and human toxicology studies for the development and modeling of benchmark dose values for the endpoint(s) of concern along with quantification of any uncertainties.

Developed R scripts to parse data into a Department of Homeland Security Biological Threat Risk Assessment (BTRA) model that estimated the risks associated with the intentional release of 26 biological agents and the parameters associated with incubation time, treatment availability and human behavior with the intention of prioritizing countermeasures.

Technical leader for development of a statistical methodology for calculating estimates and bootstrap confidence intervals based on the multistage cancer model for trichloroethene using data from pharmacokinetic (PBPK) Bioassay model Data. Collaborating with toxicologists, mathematicians and programmers, algorithms and scripts in R were written to calculate bootstrap confidence intervals from the output of multistage polynomial cancer model written in C++.

Employed mixed model analyses using SAS to test the stability of disinfectant by-products (DBPs) mixtures in treated drinking water used for rodent bioassays resulting in presentations at national toxicology conferences. [09/2007-09/2009]

**US Environmental Protection Agency - National Center for Environmental Assessment, Drinking Water Assessment - Office of Water Programs, Cincinnati, Ohio. Environmental Health Scientist/ORISE Fellow.** Conducted quantitative analyses of environmental exposure data, with an emphasis on chemical mixtures, including exposure modeling, linear regression modeling, uncertainty analysis, descriptive statistics, and the compilation and analysis of large datasets. Prepared work plans; reviewed toxicological and human exposure data; data management; data interpretation; model development; preparation of studies reports.

Principal investigator for probabilistic exposure assessments of several contaminants typically found in treated drinking water or source water, including mixtures of organotins, nitrosamines, cyanobacterial toxins and drinking water disinfection byproducts for use in developing drinking water regulatory guidelines. Published four journal publications (three as first author), a book chapter and contributed to an important EPA report on cumulative risk assessment.

**US Environmental Protection Agency - Office of Science Coordination and Policy, Metals Exposure Research, Washington, DC. Graduate Student Researcher.** Researched endocrine disruption-related health effects from exposure to metals, ultimately focusing on the effects of cadmium on measures of skeletal health using NHANES data. Provided statistical support for studies on the spatial distribution of dietary intake of mercury via fish and shellfish in the US using spatial statistical methods and geographic information systems (GIS). [01/2003-10/2004]

**Georgia Department of Natural Resources - Environmental Protection Division, Athens, Georgia. Environmental Data Analyst.** Developed a relational database using Microsoft Access to analyze toxicological data on levels of metals, PCBs, dioxins, and pesticides in edible fish tissue collected from 1991 to 2001 in support of the Fish Consumption Advisory program. Developed queries and produced maps with ArcView and developed shapefile-based directories linked to geodatabases anchored in the Access database. [08/2000-07/2002]

**PUBLICATIONS: PEER REVIEWED**

- Adams WA, Xu Y, Little JC, **Fristachi A**, Rice G, and Impellitteri CA 2011 Predicting the migration rate of dialkyl organotins from PVC pipe into water Environ. Sci. Technol., 45 (16), pp. 6902–6907.
- Fristachi A**, Xu Y, Rice G, Impellitteri CA, Carlson-Lynch H and Little J. 2009. A Probabilistic Assessment of Human Exposure to Organotin in Drinking Water Transported by Polyvinyl Chloride Pipe. Risk Analysis 29(11): 1615-1628.
- Fristachi A** and Rice G. 2007. Estimation of the total daily oral intake of NDMA attributable to drinking water. Journal of Water and Health 5(3): 341–355.
- Fristachi A**, Linkov I, Rice G and Steevens J. 2007. A Preliminary Exposure Assessment of Microcystins from Consumption of Drinking Water in the United States. Lake & Reservoir Management 23(3): 203-210.

**PUBLICATIONS: BOOKS**

- Fristachi A**, Sinclair JL, Hall S, Hambrook-Berkman JA, Boyer G, Burkholder J, Burns J, Carmichael W, DuFour A, et al. 2008. Occurrence of Cyanobacterial Harmful Algal Blooms. In: Cyanobacterial Harmful Algal Blooms: State of the Science and Research Needs (Advances in Experimental Medicine and Biology Series) (Hudnell HK, ed). New York: Springer, 45-103.
- Fristachi A** and Choudhury H. 2008. Cadmium. In: International Encyclopedia of Public Health (Heggenhougen K, ed). Oxford: Academic Press, 377-380.
- Linkov I, **Fristachi A**, Satterstrom F, Shifrin A, Steevens J, Clyde Jr, G & Rice, G. (2007). Harmful Cyanobacterial Blooms in Managing Critical Infrastructure Risks: Decision Tools and Applications for Port Security. Springer Netherlands. 207-242

**PUBLICATIONS: TECHNICAL REPORTS**

- LANL 2011 Investigation Report for S-Site Aggregate Area, LA-UR-10-5472, Los Alamos National Laboratory, Los Alamos, NM
- DOE, 2010, The Miamisburg Closure Project Parcel 9 Residual Risk Evaluation, U.S. Department of Energy, Miamisburg, OH.
- Rice G, Teuschler L, Lipscomb J, Narotsky JM, Osier M, Reid J, Simmons JE, Wright JM, Fransen JM, Hertzberg R, Hunter JS, Lambert J and **Fristachi A**. 2005. Method for Development of Mode of Action Subgroups and Application to Drinking Water Disinfection Byproducts EPA Report NCEA-C-1798.

**SELECTED INVITED PRESENTATIONS**

- Fristachi A**. Model Development for Prediction of Leaching Rates For Mono- and Di- Alkyltin Chlorides Used as Stabilizers in PVC Water Pipe. Joint Meeting of the Midwest Chapter of the Society of Environmental Toxicology and Chemistry and Chicago Regional Chapter of the Society for Risk Analysis. Argonne, IL, February 2007
- Fristachi A**. Risk Assessment of Cyanobacterial Toxins in Drinking and Recreational Water. North American Lake Management Society Annual Meeting. Madison, WI, October 2005.

**SELECTED CONTRIBUTED PRESENTATIONS**

- Roff D, **Fristachi A**, Adair, B, Clark S and Lehto E. Retrospective Analysis of Conversion of a Large Groundwater Sampling Program from Traditional Sampling Methods to a No-Purge Method. Conference Proceedings of the Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds. Monterey, CA; May 2014
- Teuschler LK, Aume LS, Rice GE, Simmons JE, Pressman JG, Narotsky MG, Speth TF, Miltner RJ, Hunter, III ES, McDonald A, Craft J, Feder PI, **Fristachi A**, Parvez S and Richardson SD. 2011. A Statistical Approach for Judging Stability of Whole Mixture Chemical Composition over Time for Highly Complex Disinfection By-Product Mixtures from EPA's Four Lab Study. International Toxicology of Mixtures Conference, Arlington, VA October 2011 and Society Risk Analysis Annual Meeting, Charleston, SC, December 2011
- Fristachi A** and Miranda R. Human Health and Ecological Risk Screening Assessments at Los Alamos National Laboratory. Society Risk Analysis Annual Meeting. Charleston, SC, December 2011.
- Fristachi A**. Session chair: Exposure Assessment Approaches for Chemical Mixtures. 17th Annual Conference of the International Society of Exposure Analysis. Durham, NC, September 2007.
- Rice G, Teuschler TK, Flowers L, Gehlhaus M, J. L, Lambert J, **Fristachi A**, Wright JM, Simmons JE, et al. 2007. Component-Based Health Risk Assessment Methods for Chemical Mixtures. US EPA BOSC Drinking Water Review. Washington, DC. May 2007
- Fristachi A**. 2006. Daily Oral Intake of N-Nitrosodimethylamine (NDMA) Attributable to Drinking Water. International Conference on Environmental Epidemiology & Exposure. Paris, France, September 2006
- Fristachi A**, Linkov I, Carmichael WW, Sinclair J, Cubbison C and Steevens J. Risk Assessment of Cyanobacterial Toxins in Drinking and Recreational Water. Session co-chair at Society for Risk Analysis Annual Conference. Orlando, FL, December 2005.
- Boutin B, Broder M, Cubbison C, **Fristachi A**, Swartout J and Rothermich M. Development of Microbial Risk Assessment Methods. US EPA Science Forum. Washington, DC, May 2005