

Andrew G. Huff, PhD, MS

EXPERT WITNESS CURRICULUM VITAE

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RF

AI and machine-learning validation • Epidemiology and biosurveillance • Food-system and supply-chain risk • Critical-infrastructure resilience

PROFESSIONAL PROFILE

Doctorally trained scientist (PhD, Environmental Health Science; MS, Security Technologies) with more than twenty years of experience spanning epidemiology, applied machine learning, biosurveillance, national security, and critical-infrastructure risk. Expert qualification is grounded in formal epidemiologic validity theory: sensitivity, specificity, predictive value, bias, confounding, and measurement error, the same framework used to evaluate the reliability, accuracy, and fairness of machine-learning systems. Principal investigator on more than \$5.8M in federally funded biosurveillance research; author of peer-reviewed studies evaluating and verifying production machine-learning and NLP systems; DoD and FBI trained forensic epidemiology investigator; combat veteran. Retained as an expert witness in litigation; experienced consulting expert across regulated industries.

AREAS OF EXPERT OPINION

Artificial intelligence and machine learning. Validation, verification, and reliability of machine-learning and NLP systems; assessment of training-data bias, selection bias, and confounding; sensitivity, specificity, and error-rate analysis; whether a model was properly tested against ground truth; explainability and adequacy of model documentation; fitness of a model for its claimed purpose.

Epidemiology and biosurveillance. Infectious-disease epidemiology, outbreak investigation, forensic and causation analysis, disease modeling and forecasting, surveillance-system design and failure analysis, exposure assessment.

Food-system and supply-chain risk. Food-system criticality and vulnerability assessment, food defense and contamination risk, supply-chain mapping and single-point-of-failure analysis, recall and foodborne-illness causation.

Critical-infrastructure resilience. Cascading-failure and interdependency analysis, spatial and geospatial risk assessment, resilience evaluation of tightly coupled systems.

Security engineering and threat assessment. Threat, vulnerability, and risk methods across physical, cyber, and biological threat models; standard of care and foreseeability.

Research integrity and federal grant compliance. Grant terms, reporting obligations, oversight failures, and institutional conduct.

EXPERT ENGAGEMENT EXPERIENCE

- **Retained expert, litigation.** Retained in two matters (plaintiff side). Sworn written expert opinions by declaration and affidavit under penalty of perjury: epidemiology, forensic analysis, COVID-19 analytics, and vaccine-safety assessment. Not yet called to give deposition or trial testimony. Retaining-attorney references and matter details available on request, subject to confidentiality and protective orders.

- **Consulting expert.** Multiple engagements providing scientific and technical analysis in epidemiology, AI and deep-technology systems, food systems, and enterprise risk for government, legal, healthcare, and Fortune 500 clients.
- **Domains engaged.** Criminal forensic, administrative, personal injury, election, and regulated-industry (including energy) matters.

EDUCATION AND CERTIFICATION

- PhD, Environmental Health Science (Environmental Infectious Disease and Epidemiology track), University of Minnesota, 2014. Advisors: Jeff Bender, Craig Hedberg, Jim Hodges, Michael Osterholm.
- MS, Security Technologies (Geographic Information Science minor), University of Minnesota, 2011.
- BA, Psychology, University of Minnesota, 2010.
- Postgraduate study, Complex Systems, MIT and New England Complex Systems Institute, 2014.
- Certification: DoD and FBI Criminal Forensic Epidemiological Investigations, 2012.

PROFESSIONAL EXPERIENCE

- **Founder and Principal Consultant, Risk Factor Research LLC, 2010 to present.** Scientific and technical consulting, forensic analysis, AI-driven risk systems, and expert-witness services for government, legal, healthcare, and commercial clients.
- **Co-Founder and CEO, MTRX, Inc., 2016 to 2024.** Led development and validation of AI, computer-vision, RF-sensing, and IoT analytics platforms; partnerships with Microsoft, PepsiCo, Panasonic, and Extreme Networks.
- **Senior Director, Population Health, JUUL Labs, 2019 to 2020.** Directed epidemiologic modeling and NLP analytic pipelines supporting regulatory strategy.
- **Assistant Professor and Director of Hospital Epidemiology, Michigan State University, 2016 to 2019.** Federally funded biosurveillance and infectious-disease research; clinical trials; built hospital-epidemiology and infection-prevention programs.
- **Vice President and Senior Scientist, EcoHealth Alliance, 2014 to 2016.** Directed international biosurveillance and disease-modeling programs (DoD, DTRA, USAID); USAID PREDICT country coordinator, Jordan and Sudan.
- **Senior Member of Technical Staff, Sandia National Laboratories, National Infrastructure Simulation and Analysis Center, 2013 to 2014.** Modeling, simulation, and risk analysis of biological threats and critical-infrastructure vulnerabilities for national-security programs. Held a DOE Q clearance.
- **Research Fellow and Co-Investigator, National Center for Food Protection and Defense (DHS Center of Excellence), University of Minnesota, 2011 to 2013.** Food-system criticality, biosurveillance, and supply-chain vulnerability research adopted by government stakeholders.
- **Adjunct Faculty, Columbia University, Department of Ecology, Evolution and Environmental Biology, 2014 to 2022.** Guest lecturer, George Washington University Law School, National Security Program.
- **Earlier.** Contracting Officer's Representative, U.S. Department of Veterans Affairs, 2006 to 2009; software-security intern, Clango (Oracle identity and access management), 2010 to 2011; judicial clerk and extern, Minnesota courts, 2008 to 2010.

SELECTED FEDERALLY FUNDED RESEARCH

- **Principal Investigator, DoD and DTRA biosurveillance, 2014 to 2017, \$5.8M total.** Built GRITS, an NLP-based global infectious-disease biosurveillance system, and predictive analytics within the Biosurveillance Ecosystem (BSVE).
- **Co-Investigator, USAID PREDICT, 2014 to 2017, \$45M program.** Country coordinator, Jordan and Sudan.
- **Co-Investigator, NIH, USDA, and DHS funded research.** Infectious disease, antimicrobial resistance, food defense, and clinical trials, including a roughly \$1M Zoetis and Pfizer trial portfolio and the USDA Borlaug program.

Career total: contributed to more than \$55M in federally funded, academic, and industry-supported research and technology programs across DHS, DoD and DTRA, NIH, NSF, USDA, FDA, CDC, VA, USAID, and the U.S. Department of State.

METHODOLOGIES AND SYSTEMS DEVELOPED

- **GRITS (Global Rapid Identification of Threats System).** Production NLP and machine-learning system for infectious-disease detection in textual data; independently evaluated and verified in the peer-reviewed literature.
- **CRISTAL (Criticality Spatial Analysis).** DHS S&T funded supply-chain mapping and spatial vulnerability-assessment methodology developed at the Food Protection and Defense Institute after his evaluation of FASCAT exposed the sector tool's problems. United States patent application 14/212,749 (2014); maintained as a protected trade secret.
- **TACE (Temporally Adaptive Conditional Estimator).** Statistical early-warning method for cascading failure in tightly coupled systems; validated on financial-contagion data against established comparators. Under review at Risk Analysis.
- **FLIRT.** Web application predicting the movement of infected travelers, validated against the Zika epidemic.
- **FASCAT evaluation.** Independent evaluation of the Food and Agriculture Sector Criticality Assessment Tool and its collected data (Risk Analysis, 2015) and of state officials' perceptions of the tool (Journal of Homeland Security and Emergency Management, 2014).

Intellectual property: provisional patent applications filed (Metrix RF-telemetry asset tracking; CRISTAL, University of Minnesota), subsequently converted to and maintained as protected trade secrets.

PEER-REVIEWED PUBLICATIONS

1. Garcia JD, Huff AG, Huff ES. Understanding farmers' biosecurity beliefs and behaviours related to antimicrobial resistant bacteria in Michigan, USA. *Animal Production Science*, 2020. doi:10.1071/AN18765
2. Roberts JN, Grooms DL, Thompson ER, Huff AG. Evaluation of bull breeding soundness examination. *Clinical Theriogenology* 10(4), 2018.
3. Huff AG, Allen T, Whiting K, Williams F, Hunter L, Gold Z, Madoff LC, Karesh WB. Biosurveillance: a systematic review of global infectious disease surveillance systems from 1900 to 2016. *Revue Scientifique et Technique (OIE)* 36(2):513-524, 2017. doi:10.20506/rst.36.2.2670
4. Huff AG, Breit N, Allen T, Whiting K, Kiley C. Evaluation and verification of the Global Rapid Identification of Threats System for infectious diseases in textual data sources. *Interdisciplinary Perspectives on Infectious Diseases* 2016:5080746, 2016. doi:10.1155/2016/5080746
5. Huff A, Allen T, Whiting K, Breit N, Arnold B. FLIRT-ing with Zika: a web application to predict the movement of infected travelers validated against the current Zika virus epidemic. *PLoS Currents Outbreaks*, 2016. doi:10.1371/currents.outbreaks.711379ace737b7c04c89765342a9a8c9
6. Breit NA, Allen T, Arnold B, Huff A, Madoff L, Pollack M. Evaluation of ProMED-mail global surveillance capability (conference abstract). *International Journal of Infectious Diseases* 53:140, 2016. doi:10.1016/j.ijid.2016.11.344
7. Huff AG, Beyeler WE, Kelley NS, McNitt JA. How resilient is the United States' food system to pandemics? *Journal of Environmental Studies and Sciences* 5(3):337-347, 2015. doi:10.1007/s13412-015-0275-3
8. Huff AG, Hodges JS, Kennedy SP, Kircher A. Evaluation of the Food and Agriculture Sector Criticality Assessment Tool (FASCAT) and the collected data. *Risk Analysis* 35(8):1448-1467, 2015. doi:10.1111/risa.12377
9. Huff AG, Kircher A, Hodges JS, Kennedy S. State officials' perceptions of the Food and Agriculture Sector Criticality Assessment Tool (FASCAT), food-system risk, and food defense funding. *Journal of Homeland Security and Emergency Management* 11(1):101-116, 2014. doi:10.1515/jhsem-2013-0063
10. Huff AG, Kircher A, Hoffman J, Kennedy SP. The development and use of the Food and Agriculture Systems Criticality Assessment Tool (FASCAT). *Food Protection Trends* 33(4):218-223, 2013.

CHAPTERS, PATENT APPLICATION, DISSERTATION, AND WORK UNDER REVIEW

- Huff AG. Food defense. In: Encyclopedia of Food Chemistry. Elsevier / Academic Press, 2019.
- Huff AG. Assessing vulnerabilities. In: Food Defense Planning and Prevention of Intentional Adulteration. Grocery Manufacturers Association, 2013.
- Huff AG, Kennedy SP, Kircher AL, Hoffman JT. Criticality spatial analysis. United States patent application 14/212,749, 2014.
- Huff AG. Enhancing food defense: risk managers' perceptions, criticality assessments, and a novel method for objectively determining food systems' criticality. PhD dissertation, University of Minnesota, 2014.
- Huff AG. A temporally adaptive conditional estimator (TACE) for cluster-weighted conditional probability with a permutation-based cascade-detection test. Under review, Risk Analysis, 2026. *Manuscript available to retaining counsel on request.*
- Huff AG. Neuromorphic edge sensing for persistent chemical and biological threat early warning. Submitted to Health Security, 2026. *Preprint, not peer reviewed. Available on request.*
- Huff AG. Proof before fielding: the Army is adopting military AI faster than it can test it. Medicine already built the fix. Article manuscript, 2026. *Available on request.*

This is the expert witness CV. The full curriculum vitae, with the complete publication, technical-report, and presentation list, is available on request. Google Scholar and ORCID profiles are linked from andrewhuff.com.

SELECTED INVITED BRIEFINGS

Methodologies (GRITS, FASCAT evaluation, CRISTAL) presented to and adopted by U.S. government and industry stakeholders, including the FDA Center for Food Safety and Applied Nutrition; DHS Government and Sector Coordinating Councils; the Defense Threat Reduction Agency; Battelle Memorial Institute; and the Grocery Manufacturers Association Food Defense Working Group. Multiple classified executive briefings to senior U.S. government officials on behalf of Sandia National Laboratories, 2013 to 2014.

TECHNICAL AND ANALYTICAL SKILLS

Machine learning, NLP, and predictive analytics (Python); statistical modeling (R, JMP, Stata, SPSS); SQL and databases; geospatial analysis (ArcGIS, QGIS); GPU and HPC-accelerated modeling; agent-based and systems-dynamics simulation; model validation and verification; uncertainty quantification; spatial epidemiology.

SCIENTIFIC SERVICE

Reviewer for Risk Analysis, Ticks and Tick-Borne Diseases, Journal of Environmental Studies and Sciences, and Journal of Homeland Security and Emergency Management. NSF Graduate Research Fellowship reviewer (Disease Ecology; Engineering). NIH study-section reviewer, 2017 to 2018.

MILITARY SERVICE

U.S. Army infantryman (11C), 2003 to 2005. Two deployments: Operation Enduring Freedom (Joint Task Force Bravo, Honduras) and Operation Iraqi Freedom (Iraq). Decorations include the Army Commendation Medal, Army Achievement Medal, Iraq Campaign Medal, and Global War on Terrorism Expeditionary and Service Medals.

BOOKS, PUBLIC WRITING, AND DISCLOSURES

Author, The Truth About Wuhan: How I Uncovered the Biggest Lie in History (Skyhorse, 2022). Opinion contributor, The Hill. Writer of the Risk Factor newsletter. Former DOE Q-cleared scientist; no active clearance is claimed. Competing interests are disclosed in writing on every engagement.