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Engineering & Scientific Consulting

Kristin Lennox, Ph.D.

Senior Managing Scientist | Data Sciences
Phoenix
+1-650-688-7283 | klennox@exponent.com

Professional Profile

Dr. Lennox has more than ten years of experience applying statistics, machine learning, and operations research techniques to scientific and engineering problems. Her expertise includes experimental design, analysis of computer experiments, and risk assessment in high consequence environments.

Dr. Lennox's career has included data science applications in aerospace, automotive engineering, chemical engineering, materials science, process engineering, oil and gas, public infrastructure, bioinformatics, software development, and manufacturing. She has worked with many varieties of data ranging from large publicly available datasets to small scale designed experiments and specializes in combining disparate data types and sources to solve complex problems. Dr. Lennox's recent professional experience has focused on design of artificial intelligence (AI) systems intended to act in partnership with people. Since joining Exponent, she has been studying safety benefits of advanced driver assistance systems (ADAS) and automated driving.

After completing her PhD in statistics, Dr. Lennox joined Lawrence Livermore National Laboratory (LLNL) where she worked on a variety of scientific and engineering problems, with a research emphasis on design and analysis of computer experiments (DACE), Bayesian statistics, and nonparametric statistics. She co-founded and led the LLNL statistical consulting service, which gave her exposure to diverse areas across the lab including medical surveillance, computer vision, and radiation detection. In addition to serving as a consultant on many projects, she led multidisciplinary efforts in risk assessment and radiation detection.

After leaving the laboratory, Dr. Lennox worked as a Principal Data Scientist for GE Aviation and multiple startups targeting AI applications in industry. Dr. Lennox developed models and other analytics tools to support increased efficiency in manufacturing and materials science and led development efforts for software applications to support both aerospace and chemical manufacturing.

Dr. Lennox is passionate about statistics and AI education and has created a series of videos for engineers and lay audiences on these topics.

Academic Credentials & Professional Honors

Ph.D., Statistics, Texas A&M University, 2010

M.S., Statistics, Texas A&M University, 2007

B.S., Applied Mathematics, Texas A&M University, 2005

Parzen Graduate Research Fellowship, Texas A&M University, 2009

National Merit Scholar, Texas A&M University, 2003

Prior Experience

Principal Data Scientist, Citrine Informatics, 2019-2020

Technical Head of Industrial IoT, Beyond Limits, 2019

Principal Data Scientist, Beyond Limits, 2018-2019

Principal Data Scientist, GE Aviation, 2016-2018

Director of Statistical Consulting, Lawrence Livermore National Laboratory, 2013-2016

Applied Statistician, Lawrence Livermore National Laboratory, 2010-2016

Professional Affiliations

American Statistical Association (ASA)

Institute of Mathematical Statistics (IMS)

International Statistical Engineering Association (ISEA)

Conference on Data Analysis – Organizing Committee (2013-2017)

Society for Risk Analysis (SRA)

Patents

US Patent, 10,078,145: Methods and Systems for Calibration of Particle Detectors, 2018 (Wurtz R, Lennox KP).

Publications

Tsuji, JS, Lennox, KP, Watson, HN, & Chang, ET. Essential Concepts for Interpreting the Dose-Response of Low-Level Arsenic Exposure in Epidemiological Studies. *Toxicology* 2021; 457:152801.

D'Andrade B, Murphy P, Lennox KP. Internet of Things Risks. In *Software Engineering: Artificial Intelligence, Compliance, and Security*. New York: Nova Science Publishers. 2021; 179-235.

Lennox KP, Rosenfield P, Blair B, Kaplan A, Armendariz JR, Glenn A, Wurtz R. Assessing and Minimizing Contamination in Time of Flight Based Validation Data. *Nuclear Instruments and Methods Section A* 2017; 870:30-36.

Lennox KP, Glascoe L. A Bayesian Measurement Error Model for Misaligned Radiographic Data. *Technometrics* 2013; 55:450-460.

Day R, Joo H, Chavan AG, Lennox KP, Chen A, Dahl DB, Vannucci M, Tsai JW. Understanding the General Packing Rearrangements Required for Successful Template Based Modeling of Protein Structure from a CASP Experiment. *Computational Biology and Chemistry* 2013; 42:40-48.

Cadag E, Vitalis E, Lennox KP, Zhou CLE, Zemla AT. Computational Analysis of Pathogen-Borne Metallo β -Lactamases Reveals Discriminating Structural Features Between B1 Types. BMC Research Notes 2012;. 5:96.

Lennox KP, Glascoe L. Constrained Classification for Infrastructure Threat Assessment. Proceedings of the 2011 IEEE Conference on Technologies for Homeland Security 2011; 92–97.

Chavan AG, Joo H, Day R, Lennox KP, Sukharnov P, Dahl DB, Vannucci M, Tsai JW. Near-Native Protein Loop Sampling using Nonparametric Density Estimation Accommodating Sparsity. PLoS Computational Biology 2011. 7:e1002234.

Day, R, Lennox KP, Dahl DB, Vannucci M, Tsai JW. Characterizing the Regularity of Tetrahedral Packing Motifs in Protein Tertiary Structure. Bioinformatics 2010; 26:3059-3066.

Lennox KP, Dahl DB, Vannucci M, Day R, Tsai JW. A Dirichlet Process Mixture of Hidden Markov Models for Protein Structure Prediction. Annals of Applied Statistics 2010; 4:916-962.

Lennox KP, Sherman M. Efficient Experimental Design for Binary Matched Pairs Data. Statistics in Medicine 2009; 28:2952-2966.

Lennox KP, Dahl DB, Vannucci M, Tsai JW. Density Estimation for Protein Conformation Angles Using a Bivariate von Mises Distribution and Bayesian Nonparametrics. Journal of the American Statistical Association 2009; 104:586-596.

Mintz, BJ, Lennox KP, Wilson AK. Truncation of the Correlation Consistent Basis Sets: An Effective Approach to the Reduction of Computational Cost? Journal of Chemical Physics 2004; 121:5629-5634.

Presentations

Lennox, KP. The Minds of Machines. Arab Artificial Intelligence Summit, Sweimeh, Jordan. 2019.

<https://www.youtube.com/watch?v=sobDffsNYC0>

Lennox, KP. All About that Bayes. Lawrence Livermore National Laboratory, Livermore, CA. 2016.

<https://www.youtube.com/watch?v=eDMGDhyDxuY>

Lennox, KP. Everything Wrong with Statistics (and How to Fix It). Lawrence Livermore National Laboratory, Livermore, CA 2015.

<https://www.youtube.com/watch?v=be2wuOagIFY>