

Data Science Seminar

Hosted by the Department of Mathematics and Statistics

- Date: Tuesday, September 26, 2023
- Time: 12:00pm – 1:00pm
- Room: Whitney Hall 100E
- Speaker: Dr. Marianthi Markatou (SUNY University at Buffalo)
- Title: Distances and their role in statistical inference.

Abstract

Statistical distances, divergencies, and similar quantities play a fundamental role in statistics. However, their extensive role has been played out behind the scenes with other aspects of the statistical problem being viewed as more interesting or more important. In this talk, we will discuss a unifying framework for inference, based on statistical distances, a prominent example of which is the likelihood distance. We will use a specific class, the class of quadratic distances, to exemplify their role in inferential tasks. The estimators of quadratic distances are expressed as U- and V- statistics with appropriately defined kernels. We discuss the concept of root kernel and the considerations for its selection. Power considerations pertaining to the use of the above U- and V- statistics in goodness-of-fit lead to a method akin to the Neyman-Pearson lemma for optimal kernel construction for specific alternatives. Furthermore, we introduce a statistical definition of diffusion kernels and briefly elucidate their role in inference.

Biography of the speaker: Dr. Marianthi Markatou is SUNY Distinguished Professor and Associate Chair of Research and Healthcare Informatics, Department of Biostatistics, School of Public Health and Health Professions. She also holds an Adjunct Professorship in the Department of Computer Science and Engineering, at the University at Buffalo. Dr. Markatou received a Ph. D. in Statistics from the Pennsylvania State University in 1988. Her research interests are broad and include problems at the interface of statistics and machine learning, modeling, mixture models, robustness, theory and applications of statistical distances, surveillance methods, emerging safety sciences, biomedical informatics, and statistical methods for the analysis of massive (big) data such as Electronic Health Record data, text mining, and clustering methods for mixed-type data. Her publications appear in top journals of both Statistical Science (e.g. Journal of the American Statistical Association, Annals of Statistics, Journal of Multivariate Analysis, Journal of Statistical Planning and Inference, International Statistical Review, TEST, Statistics in Medicine, Statistica Sinica, and many others), and Computer Science (e.g. Journal of Machine Learning Research, Machine Learning), as well as in top medical and biomedical informatics journals (e.g. Journal of Biomedical Informatics, Journal of the American Medical Informatics Association, Hepatology, PLoSOne, and many others). Since 1990, her research work has continuously been funded, by NSF, NIH, FDA, PCORI, and other non-profit organizations and research foundations. Dr. Markatou is an Elected Fellow of the American Statistical Association, an Elected Fellow of the Institute of Mathematical Statistics, and an Elected Member of the International Statistical Institute. Other honors include an A-level research award from IBM (2011), a Fulbright fellowship award (2017, 2019), an Outstanding Achievement award from the National Science Foundation (2002), and a Senior Researcher of the Year award (2019) from the School of Public Health & Health Professions, University at Buffalo. Dr. Markatou is an Associate Editor for the Theory and Methods Section, Journal of the American Statistical

Association (2008-2018, 2019- present). From 2000-2002 she was a Program Director of Statistics, NSF. Dr. Markatou was for many years a Professor at Columbia University, NY (Departments of Biostatistics/Statistics), and an affiliate Professor in the Department of Biomedical Informatics at Columbia University. Furthermore, she spent 2 years at the IBM T. J. Watson Research Center. Dr. Markatou served as a Scientific Advisor to the Office of Biostatistics and Epidemiology, Center for Biologics Evaluation and Research (CBER), Food and Drug Administration (2009-2010). From 2014-2020. Dr. Markatou was a permanent (federally appointed) member of the Biostatistical Methods and Research Design (BMRD) study section, NIH, and currently she is a Scientific Advisory Committee Member, IMEDS Program, Reagan-Udall Foundation for the FDA. Additionally, Dr. Markatou has been a member of many scientific conference committees. Examples are: Knowledge and Data Discovery (KDD) Program committee (2011), Scientific Committee of the SAMSI 2012-2013 program on "Data-Driven Decisions in Health Care", Data Science, Learning and Applications to Biomedical Health Science Workshop (2016), Workshop on Precision Medicine, Institute of Mathematics and its Applications (2018) and many others. She has been a keynote and invited speaker at many international and national conferences, and was a thematic leader of "Emerging Applications" of the National Science Foundation (NSF)-funded report "Statistics at a Crossroads: Who is for the Challenge?" Currently, she is Editor-in-Chief of International Statistical Review, the flagship journal of the International Statistical Institute.

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Last update: **2023/09/19 14:52**

