

Brain research is underserved by statistics, says Carnegie Mellon's Rob Kass

9 November 2017, by Shilo Rea

Brain-related disorders impact almost everyone, either directly or through family or friends. For many of the disorders, whether they're psychiatric or neurological, there are basic scientific descriptions and valuable treatment options, but none has a satisfactory cure because the underlying mechanisms are not fully understood.

The federal government launched the [BRAIN Initiative](#) in 2013 to ignite the development and application of new technologies needed for major advances toward understanding the brain. Carnegie Mellon University's Rob Kass believes brain research is in desperate need of cutting-edge statistics, which can and should supply a crucial link between new, highly complex data and the thorough scientific explanations the research aims to generate.

As the Committee of Presidents of Statistical Societies' 2017 R.A Fisher Lecturer, Kass outlined his case in "The Importance of Statistics: Lessons From the Brain Sciences."

"Most people have no idea how advanced statistical thinking can elevate research and accelerate scientific discovery," said Kass, the Maurice Falk Professor of Statistics and Computational Neuroscience in CMU's Dietrich College of Humanities and Social Sciences. "In my lecture, I pointed to some difficulties that arise when statistical ideas are ignored in the analysis of complex neuroscience data."

After illustrating how recordings of neuron activity have played a fundamental role in the [brain sciences](#), Kass gave examples of neuroscience questions that led to interesting statistical problems, and how good solutions to those problems have been guided by the teachings of the discipline of statistics.

"This lecture eloquently describes the central role of statistics in scientific inference, showing how

several modern advances in [neuroscience](#) have been built on Fisher's remarkable foundational work in statistics, nearly a hundred years ago," said Nancy Reid, University Professor of Statistical Sciences at the University of Toronto.

At CMU, Kass holds faculty appointments in the Statistics & Data Science and Machine Learning Departments and is the interim director of the Center for Neural Basis of Cognition. He is the co-author of the books "Geometrical Foundations of Asymptotic Inference" and "Analysis of Neural Data," and has also written widely-read articles on statistical education, including, "Ten Simple Rules for Effective Statistical Practice."

The R.A. Fisher Lecture recognizes individuals whose statistical achievements and scholarship have had a highly significant impact on scientific investigations. Kass was honored "for ground breaking contributions to several areas of statistics including use of differential geometry in statistical theory as well as theory and methodology of Bayesian inference; for strong commitment to the application of principled statistical thinking and modeling to problems in [computational neuroscience](#); and for his strong dedication to training of students and users of statistics."

Provided by Carnegie Mellon University

APA citation: Brain research is underserved by statistics, says Carnegie Mellon's Rob Kass (2017, November 9) retrieved 20 September 2019 from <https://phys.org/news/2017-11-brain-underserved-statistics-carnegie-mellon.html>

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