



THE UNIVERSITY OF CHICAGO

Department of Statistics STATISTICS COLLOQUIUM

AXEL MUNK

Department of Mathematics and Computer Science
Georg August University Göttingen and Max Planck Institute for Biophysical Chemistry

Nanostatistics

MONDAY, November 8, 2021 at 12:30 PM
Via Zoom

ABSTRACT

Conventional light microscopes have been used for centuries for the study of small length scales down to about 250 nanometers. At such a resolution level images are blurred and noisy and the data often can be well approximated by a Gaussian or Poisson model. This has been the focus of a multitude of statistical and computational deconvolution and image recovery techniques during the past. However, such conventional light microscopes have an intrinsic physical limit of resolution which was broken recently with the advent of modern super-resolution fluorescence microscopy (nanoscopy), acknowledged with the Nobel prize in Chemistry 2014. Nowadays, nanoscopy is an indispensable tool in medical and biological research for studying structure, function, communication and dynamics of living cells. Current experimental advances go to the physical limits of fluorescent imaging where the quantum nature of photons becomes predominant. Consequently, nanoscopy is inherently random and we argue that this challenges established statistical methods and models for data analysis of conventional light microscopy. This will be illustrated with several examples: Nanoscale testing, quantifying spatial protein correlation as well as the amount of proteins at a certain spot.

For further information and inquiries about building access for persons with disabilities, please contact Jonathan Rodriguez at 773.702.8333 or send him an email at jgrodriquez@galton.uchicago.edu. If you wish to subscribe to our email list, please visit the following website:
<https://lists.uchicago.edu/web/subscribe/statseminars>.