



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics

STATISTICS COLLOQUIUM

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Nanostatistics

MONDAY, May 10, 2021 at **12:00 PM**

Via Zoom (session information will be e-mailed to subscribers)

### 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 superresolution 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.

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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](mailto: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>.