

Syllabus for BSTA-620-001 2021C: Probability I

**Lecture Schedule:** Tues/Thu 10:15-11:45am Eastern, Aug 31 - Dec 9  
at Blockley 701

No class on Sept 14

**Midterm Exam:** Thu Oct 21 10:15-11:45am Eastern at Blockley 701

**Final Exam:** Wed Dec 16 10am-12pm Eastern at Blockley 701

**Textbook:** Statistical Inference (2nd Edition) by George Casella  
and Roger L. Berger

**TA:** Sarah Hegarty (hegarty@penmedicine.upenn.edu)

Sarah's office hours: Thu 1-2pm (virtual)

**Lecture Faculty:**

Di Shu, PhD (Di.Shu@penmedicine.upenn.edu)

Assistant Professor of Biostatistics, DBEI

Di's office hours take place on Tues 4-5pm and are available by  
appointment only (virtual)

**Grading:** Course grade will be 10% class participation + 30%  
homework + 30% midterm exam + 30% final exam

Each homework assignment due at the beginning of class unless  
otherwise noted and posted on Canvas a week before the due date

**Topics:**

- Preliminary such as set theory
- Conditional probability and independence
- Random variables
- Distribution functions, and density and mass functions
- Common probability distributions
- Functions of a random variable
- Expected values and variances
- Moments and moment-generating functions
- Joint and marginal distributions
- Conditional distributions and independence
- Bivariate transformations
- Hierarchical models
- Covariance and correlation
- Multivariate distributions
- Probability inequalities
- Properties of a random sample
- Order statistics
- Convergence
- Law of Large Numbers and Central Limit Theorem
- Delta method