• **Instructor**
  Vladimir Pozdnyakov  
  Office: AUST 324  
  Email: Vladimir.Pozdnyakov@uconn.edu  
  Office Hours: Tue/Thu 12:30-1:30PM, AUST 324

• **Lectures**
  Tue/Thu 11-12:15PM, AUST 313

• **Class Web Page**
  [http://merlot.stat.uconn.edu/~boba/stat6894/](http://merlot.stat.uconn.edu/~boba/stat6894/)

• **Text**
  A Probability Path  
  *Sidney I. Resnick*

• **Syllabus**
  
  - **Characteristic Functions:** Characteristic Functions: Definition and Basic Properties; Characteristic Function of Normal Distribution; Bochner’s Theorem, Polya’s Theorem, and Characteristic Functions of Lattice Distributions; Inversion Formula; Uniqueness Theorem, Inversion Formula for Z-valued RVs, Inversion Formula for Integrable CFs; Moments of Distributions and Smoothness of CFs; Smoothness of CFs and Moments of Distributions; Characteristic Function of Random Vectors; Multivariate Normal Distribution.

  - **Convergence Concepts and Weak Convergence:** Different Types of Convergence, the Iff Condition for a.s. Convergence; Convergence Graph Theorem; Uniform Convergence to a Continuous cdf; Weak Convergence of Probability Measures, Quantile Function Lemma; Skorohod’s Theorem; Mapping Theorem, Uniform Integrability and Convergence in Distribution Proposition; Portmanteau Theorem; Slutsky’s Theorem; Helly’s selection Theorem; Relatively Compact Family of Probability Measures, Prokhorov’s theorem; Continuity Theorem; Week Laws of Large Numbers, Poisson’s Theorem, Central Limit Theorem; Lindeberg-Feller Theorem, Lyapunov Theorem; Cauchy Criterion for a.s. Convergence; Kolmogorov’s Inequality; Two-Series and Three-Series Theorems; Toeplitz Lemma, Kronecker’s Lemma; Strong LLN for I.I.D. Random Variables.

  - **Conditional Expectation and Martingales:** Conditional Expectation, Existence and Uniqueness of Conditional Expectation; Properties of Conditional Expectation: Linearity, Positivity, Monotonicity, Conditional Monotone Convergence Theorem, Conditional Fatou’s Lemma, Conditional Dominated Convergence Theorem, Conditional Jensen’s Inequality, Tower Property, Non-Anticipating Multiplier Property, Independence Property, and Geometrical Interpretation; Martingale: Definition, Examples of Martingales;
Gambling Theorem, Stopped Martingale Theorem, Doob’s Optional Stopping Theorem; Doob’s Upcrossing Lemma, Doob’s Convergence Theorem; $L_2$-Bounded Martingale Convergence, Doob’s Decomposition; UI Martingale Convergence, Levy’s Convergence Theorem; Doob’s Submartingale Inequality, Doob’s $L_p$ Maximal Inequality.

- **Exam**
  - Midterm exam March 26, 11-12:15PM
  - Final exam TBA

- **Grades**
  - grades are based on the following weighed sum: homework (25%) + midterm (25%) + final exam (50%)
  - the final exam is cumulative
  - there will be no make-up exams