

Dear New Major:

The Major in Statistical Science provides students with in-depth exposure to modern statistical reasoning and the science of statistical modeling and analysis. Majors develop the skills needed to create, analyze and utilize statistical techniques for addressing quantitative, data-based problems in the natural and social sciences, engineering, technology, and biomedical sciences.

Statistical Science Majors are exposed to a broad range of statistical methods using tools from mathematical and computational sciences. Developing skills and expertise in problem articulation and solving, and abilities to appreciate and accommodate uncertainty in decision-making, are central goals. Graduating students are extremely well-prepared and competitive for graduate study in statistics and allied disciplines and for early careers in business, finance, law, medicine or other fields.

Statistical Science majors also have the option to complete an honors thesis in their senior year. This is a year-long research project that students work on under the supervision of a Duke Statistical Science faculty member. These projects can involve the analysis of complex data, the development of new methods or theory, or the extension and evaluation of existing techniques.

Below is a detailed explanation of the major requirements and how advising works in the department.

### The Major

- **Recommended gateway:** The recommended gateway course to the major is STA 199 – Intro to Data Science.
- **Five prerequisites:** The skills developed and techniques explored in these courses are necessary for study of advanced statistical methods in the major.
  - MATH 21 Introductory Calculus I OR Math 111L Laboratory Calculus I
  - MATH 122 Introductory Calculus II OR Math 112L Laboratory Calculus II
  - MATH 212 Multivariable Calculus OR Math 222 Advanced Multivariable Calculus OR MATH 202 Multivariable Calculus for Economics
  - MATH 216 Linear Algebra and Differential Equations OR MATH 221 Linear Algebra and Application OR Math 218 Matrices and Vector Spaces
  - CS 101L Introduction to Computer Science OR CS 201 Data Structures and Algorithms. Other CS courses require pre-approval from the DUS.
- **Five core courses:**
  - STA 210 Regression Analysis: methods of exploratory data analysis and model-based applied regression analysis.
  - STA 240: Probability and Mathematical Foundations of Statistics (recommended, under development but likely offered Fall 2019) or STA 230 Probability: a full semester course in probability. (Crosslisted as MATH 230)
  - STA 250 Statistics: a mathematical statistics course covering likelihood and Bayesian methods. (Crosslisted as MATH 342)
  - STA 360 Bayesian and Modern Statistics: an introduction to modern, computationally intensive techniques for statistical analysis, emphasizing the Bayesian perspective. (It is *essential* that you take this course by the end of your junior year, so plan the rest of your courses accordingly.)
  - STA 440 Case Studies in the Practice of Statistics: capstone course taken during the fall semester of senior year. (It is *essential* that you take this course in the Fall semester of your senior year.)

- **Three (BA) or four (BS) electives:** Electives are intended to provide breadth in statistical thinking and methods. STA 199 is allowed to count as an elective. All other electives must contain statistical content beyond what is covered in STA 210. STA 611 cannot be used towards this requirement. Up to two independent study courses can be used towards this requirement. Faculty advisors and the Director of Undergraduate Studies will help majors to select elective courses in accordance with their academic goals. See Course Descriptions and Pathways for potential choices.
  - Bachelor of Arts: 3 Statistical Science electives
  - Bachelor of Science: 3 Statistical Science electives plus 1 elective from an applied field, such as engineering, mathematics, natural sciences, or one of the quantitative social sciences. Applied elective must come from the list of approved courses or must be pre-approved by the Director of Undergraduate Studies. See <http://stat.duke.edu/undergraduate-program/major-statistical-science/external-electives-major> for more information on this requirement.

### Advising

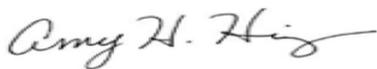
First and second majors are assigned their faculty advisor after declaration of the Statistical Science major. The faculty advisor is your resource for course selection, research opportunities, graduate or professional school information, etc.

Once you have officially declared the Statistical Science major with Pre-Major Advising or the Registrar's Office, please email me, Dr. Amy Herring, the Director of Undergraduate Studies ([dus@stat.duke.edu](mailto:dus@stat.duke.edu)). I will then assign you a faculty advisor. If you have a preference for an advisor, please indicate this in your email. If you have any questions about selecting an advisor, contact me or talk to any faculty member.

Prior to the course registration period each semester, students are expected to contact their advisors to set up an appointment to discuss course selection. It is during these meetings that the major requirements will be reviewed in detail to make sure that students are on the right track for completion of the major. More detailed information is sent to the students prior to the advising period. If you have questions, feel free to contact me.

Welcome to Statistical Science!

Sincerely,



Dr. Amy H. Herring  
Sara & Charles Ayres Professor  
Director of Undergraduate Studies