

Data Science Major

Department of Mathematical Sciences

ABOUT THE MAJOR

Data science is the study of how to extract meaning from data. Data science is a rapidly growing field that can provide students with exciting and rewarding career paths, and opportunities for advanced study in various disciplines. The core of the data science major gives students a foundation in computer science, statistics and mathematics, which is relevant for analyzing and manipulating complex data. The data science major is a rigorous program that covers the practical use of data science methods as well as the theoretical properties underpinning the performance of the methods and algorithms. What makes data science unique is its interdisciplinary nature, which allows for exploration of various subject areas. Whether it is the sciences, the social sciences, the humanities or business, the reach of data within a discipline and the need to understand its possibilities and its impact on society are continuously growing. Data scientists can help quantify and address the pressing concerns of modern society, including those in health care, sustainability, security, equity and economics, through data analysis. The Data Science Program at Salisbury University prepares individuals with the skills necessary to help fulfill data scientist demands.

The Data Science Program

The curriculum involves a data science core and six different applied tracks. The core consists of data science fundamentals, including calculus, statistics, linear algebra, programming, and data visualization and interpretation. The core is required for all data science majors and is completed during the first two years of study, with the exception of the capstone sequence, which is completed during the last year of study. During the first or second year, a data science major chooses one of six applied tracks. The students apply data science fundamentals to an applied field through one of the following tracks:

- astrostatistics
- bioinformatics
- chemometrics
- geoanalytics
- computational data science
- mathematical data science

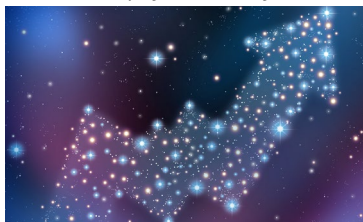
During the senior year, all data science majors, regardless of chosen track, complete a two-semester course sequence involving research methods in data science and a capstone project. The curriculum is designed with sufficient space for technical and general electives to complement a student's program of study.

Find the Right Track

Astrostatistics

Astrostatistics is a discipline that spans astrophysics, statistical analysis and data mining. It is used to process the vast amount of data produced by automated scanning of the cosmos, to characterize complex

datasets and to link astronomical data to astrophysical theory.



Bioinformatics

Bioinformatics is an interdisciplinary field that develops methods and software tools for understanding biological data. As an interdisciplinary field of science, bioinformatics combines biology, computer science, information engineering, mathematics and statistics to analyze and interpret biological data. Bioinformatics is used for computational analyses of biological queries using mathematical and statistical techniques.



Chemometrics

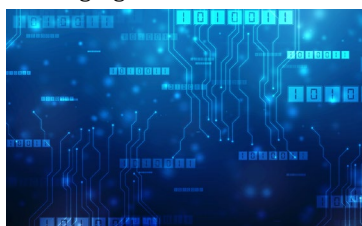
Chemometrics is applied to solve both descriptive and predictive problems in experimental natural sciences, especially in chemistry. In descriptive applications, properties of chemical systems are modeled with the intent of learning the underlying relationships and structure of the

system. In predictive applications, properties of chemical systems are modeled with the intent of predicting new properties or behavior of interest. In both cases, the datasets can be small but are often very large and highly complex.



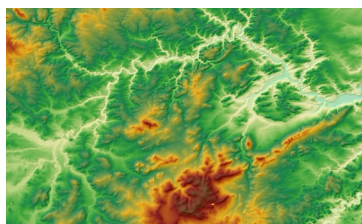
Computational Data Science

This track focuses on the computational foundations of the data sciences, including the design, implementation and analysis of software that manages the volume, heterogeneity and dynamic characteristics of large data sets and that leverages the computational power of multicore hardware. Students in this option take upper-level courses in computer science and related fields to develop the skills necessary to construct efficient solutions to computational problems involving big data.



Geoanalytics

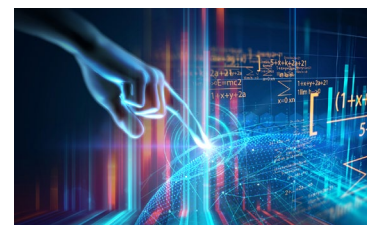
Geoanalytics combines traditional analytics with location-based information to provide greater context and perspective about the data being studied. The field incorporates many concepts from established fields like geographic information systems (GIS), which allows data to be layered on and compared between locations; measured by cities, regions and countries; and manipulated to offer unexpected trends and patterns.



Mathematical Data Science

Almost all the techniques of data science, including machine

learning, have a deep mathematical underpinning. This track focuses on the machinery under the hood, rather than just being the person behind the wheel with no knowledge about the car. This track provides a solid understanding of the mathematical machinery behind the powerful data science algorithms.



Data Science Careers

According to the job-search firm Indeed, data-science job openings are expanding faster than the number of technologists looking for them. Burning Glass Technologies, IBM and the Business Higher Education Forum conducted a study and found that there were over 2.35 million listings for data science and analytics jobs in the United States and that demand has been growing at over 10% per year. Upon graduation, a student with this major should be able to apply for entry-level data analyst positions.

Examples of data science job titles include, but are not limited to, data scientist, data engineer, data researcher, sports analyst, machine learning engineer, AI engineer, business data analyst, pricing and inventory systems engineer, statistical programmer, music analyst, decision science engineer, solution specialist, biomedical data scientist, global data scientist, GIS data scientist, social data scientist, clinical data scientist, health data scientist, microbiome data scientist, financial data scientist, forecasting data scientist, citizen data scientist, and pricing and inventory algorithm data scientist.

CONTACT INFORMATION

For information on the Data Science Program, contact: **410-543-6471**



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