DATA SCIENCE, CERTIFICATE

(Programs of Computer Science and Mathematics & Statistics)

Overview

The Wake Forest University Certificate in Data Science program seeks to train and mentor students to become well qualified scientists and researchers. The certificate provides training in algorithms for structured and unstructured datasets, as well as statistical modeling techniques for such datasets. Students will study the theory and application of databases, data processing, data mining, statistical modeling and statistical learning.

Students who successfully complete the program will receive a certificate in Data Science, as well as a degree in any other graduate programs in which they matriculate. The program is implemented by collaboration among the programs of Computer Science and Mathematics & Statistics at Wake Forest University. For currently enrolled Wake Forest Graduate students, following matriculation and at least one semester of coursework in a graduate program, students can apply for admission. Admission is initiated by meeting with one of the Co-Directors. The student will then submit a letter of intent and a Wake Forest University graduate transcript to the admissions committee. The letter of intent should express the student's interest in the program, a proposed plan of study, and how the program meets the student's career and academic goals. Following favorable evaluation, applicants may be recommended for admission by the admissions committee, with final approval determined by the Graduate School. Students not enrolled in a Wake Forest graduate program may apply directly to the program.

Prior to admission, applicants must have completed coursework (or demonstrate sufficient background) in calculus, linear algebra, and introductory statistics, as well as computer programming and also a background course covering data structures, algorithms, and complexity (material equivalent to CSC 201). Gaps in student preparation should be discussed with the program Co-Directors. Students enrolled in the certificate program as well as another graduate program must complete all graduate degree requirements in the individual department to which they were admitted.

Requirements

Students must take 15 credits, with two courses selected from each of Areas A and B, and one elective. The Co-Directors are tasked with approving a student's plan of coursework. In particular, any courses from Areas A and B taken from outside a student's home department should not count towards both the certificate as well as their degree program.

Students completing a thesis related to Data Science may count up to three credits of independent study towards the Certificate, with approval from the DS Co-Directors. Graduate students who were previously Wake Forest University undergraduate students and took the 300-level equivalent of any courses in Area A or Area B are exempted from those course requirements, but still must complete a total of 15 credits at the 600 or 700 level by selecting additional electives.

Students completing a thesis related to Data Science may count up to three credits of independent study towards the Certificate, with approval from the DS Co-Directors. Graduate students who were previously Wake Forest University undergraduate students and took the 300-level equivalent of any courses in Area A or Area B are exempted from those course requirements, but still must complete a total of 15 credits at the 600 or 700 level by selecting additional electives.

Area A -- Statistical Modeling and Statistical Learning

Code	Title	Hours
Select two of the following:		
STA 612	Linear Models	3
STA 662	Multivariate Statistics	3
STA 663	Introduction to Statistical Learning	3

Area B -- Computational Data Science

Code	Title	Hours
Select two of the following:		
CSC 621	Database Management Systems	3
CSC 622	Data Management and Analytics	3
CSC 673	Data Mining	3
CSC 675	Neural Networks and Deep Learning	3
or CSC 764	Machine Learning	

Electives

One additional graduate elective selected from STA, an approved course from MST, or a CSC course.

Code	Title	Hours
Select one of the following:		
Any CSC course listed in but not taken as part of fulfilling the Area B requirements		3
CSC 652	Numerical Linear Algebra	3
CSC 655	Introduction to Numerical Methods	3
CSC 646	Parallel Computation	3
CSC 647	GPU Programming	3
CSC 671	Artificial Intelligence	3
CSC 726	Parallel Algorithms	3

Students in the program have access to state-of-the-art equipment and facilities in multiple departments, including the DEAC Linux cluster (deac.wfu.edu (http://deac.wfu.edu)). The Interdisciplinary Graduate Certificate Program in Data Science began in 2020.

Faculty

Program Co-Directors Samuel Cho, Robert Erhardt
Professors Erin Fulp, Paúl Pauca, James Norris
Associate Professors Samuel Cho, Robert Erhardt,
Jennifer Erway, Stan Thomas, William Turkett
Assistant Professors Gray Ballard, Lucy D'Agostino-McGowan, Staci Hepler, Sneha Jadhav, Natalia Khuri