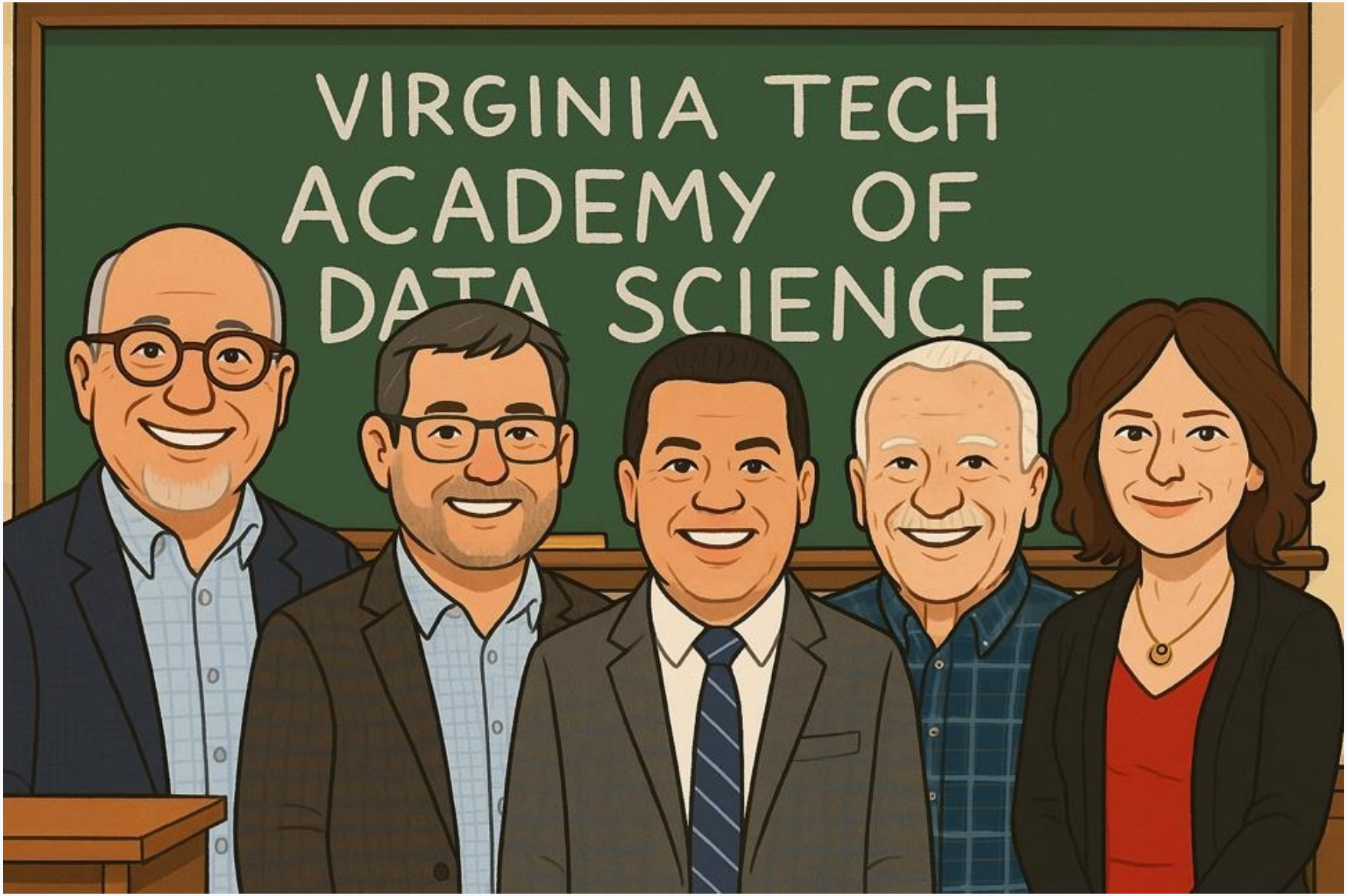
Overview of M.S. Data Science Open House

April 1, 2025

Agenda

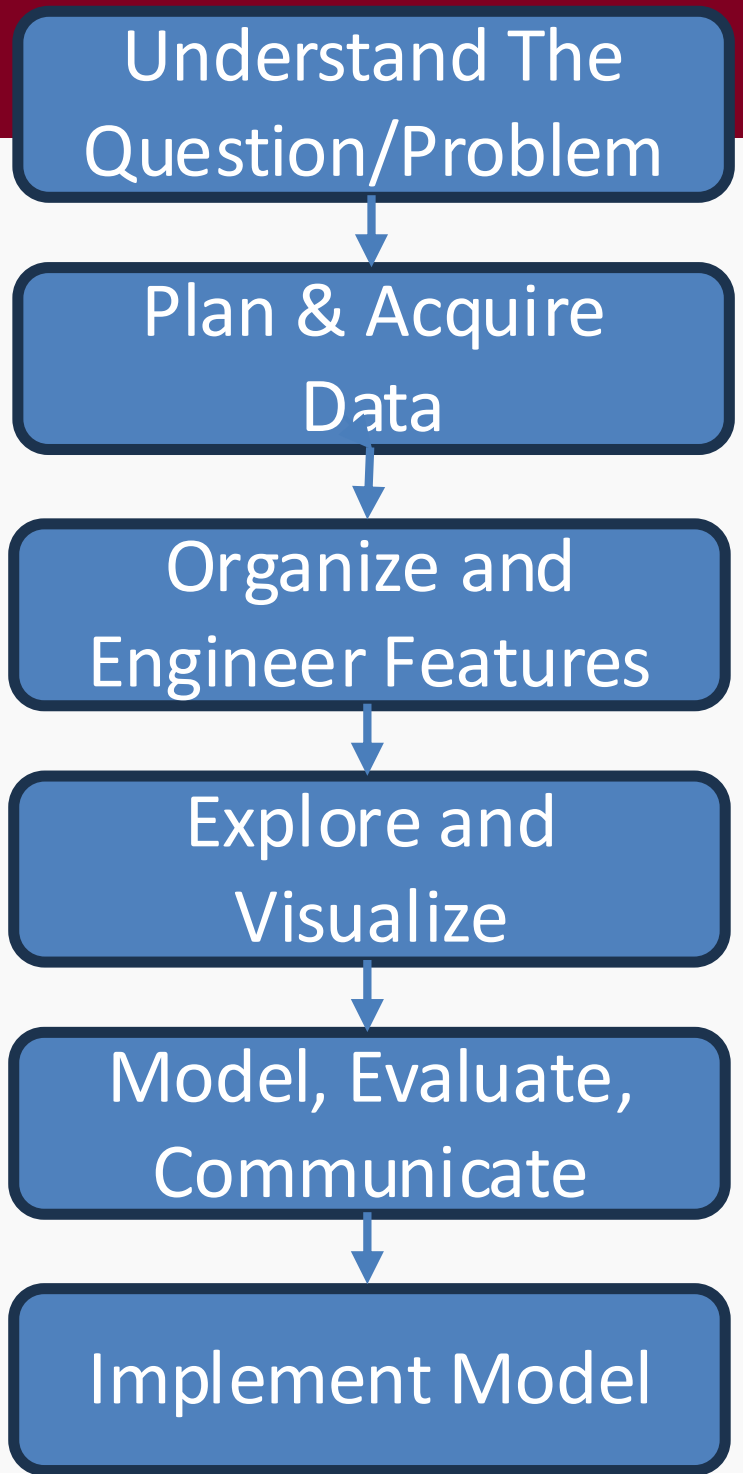
- Introductions
- Overview of the Curriculum
- 4+1 Accelerated Program this Fall
- How to Apply
- Remarks from Faculty
- Q&A

The Starting Lineup



What is Data Science?

- Data Science is an interdisciplinary field that…
- uses statistics, computational and mathematical modeling, and domain knowledge
- to collect, process and analyze data (numeric, natural language, image, etc)
- to inform decision-making and solve complex problems

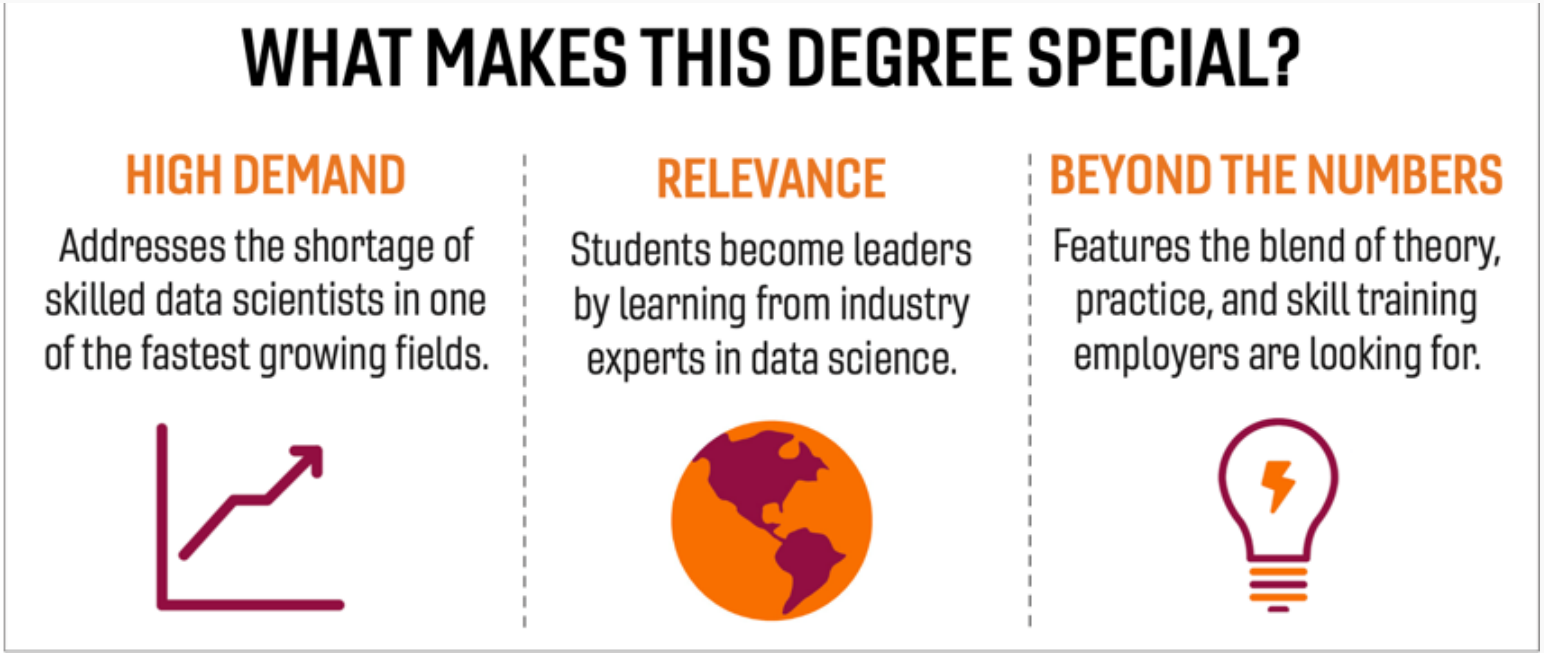


Degree Overview: What Makes This Degree Special?

Do you want to combine computing, statistics, and mathematics to answer important questions and affect decision making regarding critical issues of the day?

Do you want to develop the leadership and communications skills needed to drive change through data?

Do you want to work with outstanding faculty that have leading-edge industry experience?



Core Curriculum & Required Courses: 18 – 21 Credit Hours

The program requires 30 - 33 credit hours consisting of the core curriculum, required courses, and electives.

Core Curriculum (15 Credits)

- ADS 5064 Foundations of Data Science (3)
- ADS 5224 Communication in Team-Based Data Science (3)
- CS 5054 Programming Models for Big Data (3)
- ADS 5525/6 Statistical Learning I & II (6)

Other required courses (3 - 6 Credits)

- CS 5045 Computation for Data Sciences (3)*
- ADS 5804 Capstone Experience I: Data & Definition (1)
- ADS 5814 Capstone Experience II: Implementation (2)

Electives: 12 Credit Hours

Students work with advisors to select 12 hours of electives from a designated area of **concentration**, or an individually developed concentration subject to approval.

There are currently four concentrations:

1. Applied Data Science
2. Geosciences
3. Economics
4. Environmental Data Science

Additional concentrations are being developed.

Applied Data Science Concentration

- ADS 5094 Data Science Business Applications
- CS 5644 Machine Learning with Big Data (3)
- CS 5664 Social Media Analytics (3)
- CS 5764 Information Visualization (3)
- CS 5834 Introduction to Urban Computing (3)
- CMDA 4634 Scalable Computing for Computational Modeling and Data Analytics (3)
- MATH 5424 Numerical Linear Algebra (3)
- MATH 5544 Mathematical Optimization for Machine Learning (3)
- MATH 5564 Model Reduction: System-Theoretic Methods (3)
- STAT 5054 Introduction to Statistical Computing (3)
- STAT 5154 Statistical Computing for Data Analytics (3)
- STAT 5234 Experimental Design for Data Science (3)
- STAT 6554 Advanced Statistical Computing (3)

Geosciences Concentration (one example of several)

- GEOS/MATH 5144 Inverse Theory and Geoscience Applications (3)
- GEOS 5184 Advanced Geodesy in the Earth Sciences (3)
- GEOS 5314 Advanced Coastal Hazards (3)
- GEOS 5984 Data Science in the Geosciences (3) In Preparation.
- GEOS 6104 Advanced Topics in Geosciences (3)

4+1 Plan of Study (Undergrad-Graduate Accelerated Program)

Students in the senior year of their undergraduate degree will also be enrolled in other courses related to their major. Those courses are not listed here.

Undergraduate Senior Year

Fall	Spring
ADS 5064	ADS 5224
CS 5045*	ADS 5525
6 hours	6 hours

Graduate "+1" Year

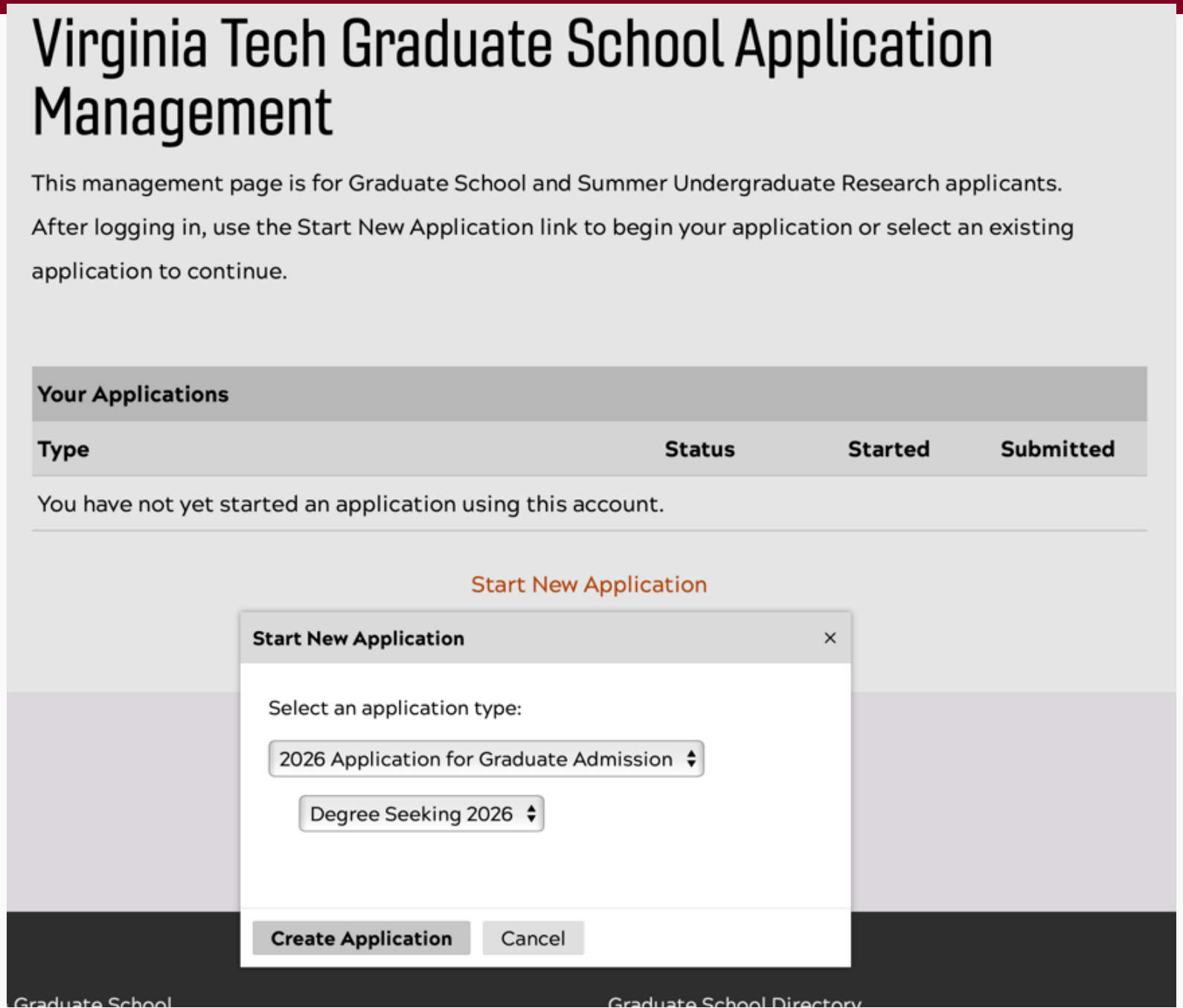
Fall	Spring
ADS 5526	CS 5054
ADS 5804	ADS 5814
Elective	Elective
Elective	Elective
10 hours	11 hours

Applications Open Now

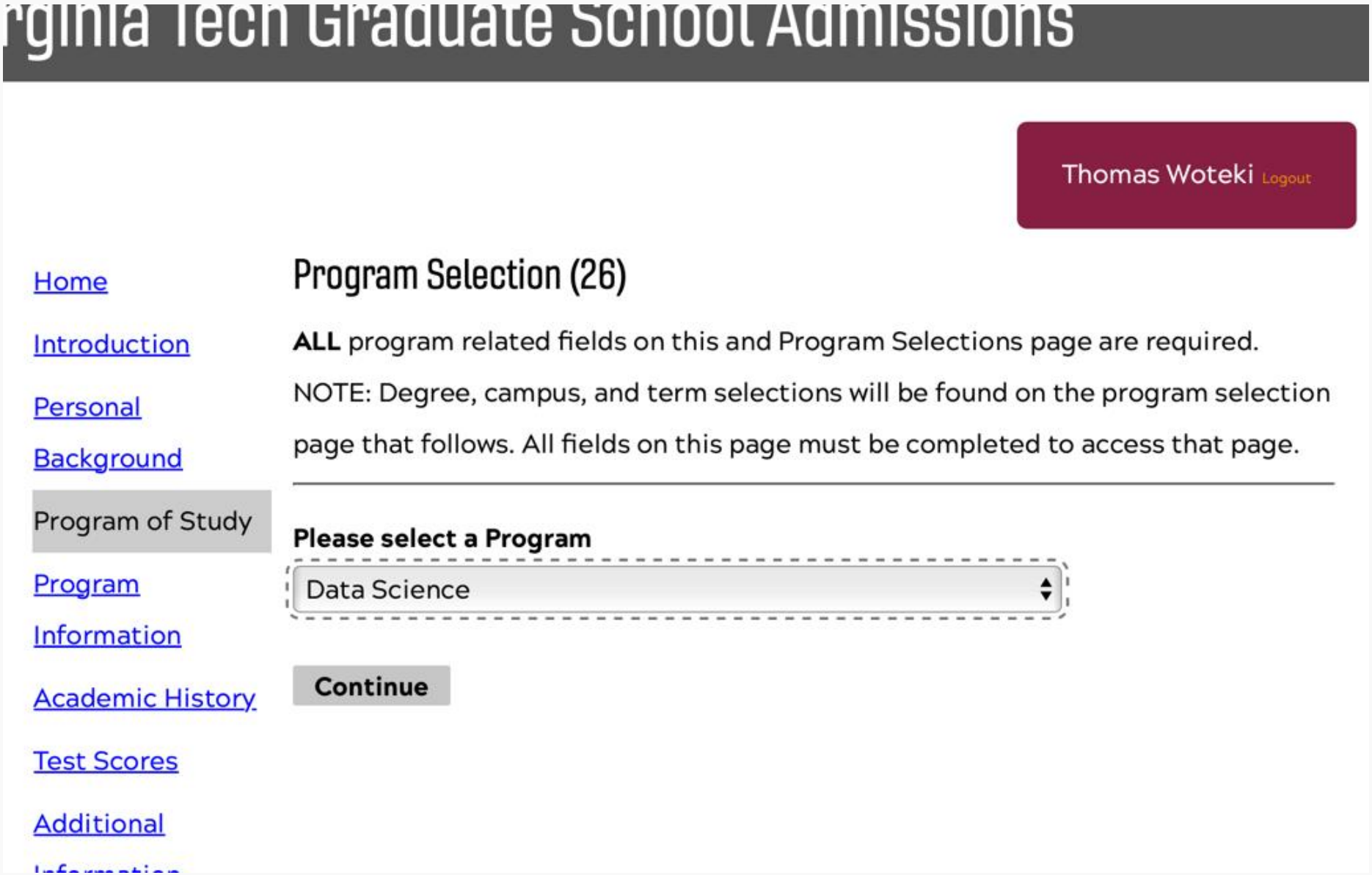
Fall 2025: Who Should Apply

- The first cohort starting in Fall 2025 will be in the accelerated undergraduate/graduate or 4 + 1 degree program.
- Current juniors with a GPA of 3.3 or higher, and who satisfy recommended prerequisites can apply.
- In their senior year, a student in the 4 + 1 program must be able to take 6 credit hours per semester towards the M.S
- **Applications are open now, due date is May 1**

How to Apply: Select 2026 Application for Admission



Select Data Science as Program of Study



Select Accelerated UG/G Degree, Full Time

Home

Introduction

Personal Background

Program of Study

MSDS Program Selections

Program Information

Academic History

Test Scores

Additional Information

Recommenders

Document Upload

Data Science Program Selections

All fields are required.

Full or Part Time Enrollment

- [x] Full Time (9 or more hours per semester)
- [ ] Part Time (8 or fewer hours per semester)

Please select a Degree Type

Master of Science in Data Science

Degree Option

VT undergraduate Accelerated UG/GR degree

The **Accelerated Undergrad/Graduate Program (UGG)** is for Virginia Tech undergraduate students who are interested in pursuing graduate studies at Virginia Tech. Students must be accepted into the program prior to the beginning of the semester in which they would enroll in courses to be used in the accelerated program.

GRADUATE SCHOOL
VIRGINIA TECH

ACCELERATED UG/GR DEGREE AND COURSE DESIGNATION REQUEST

Apply online to a graduate degree program and then submit this form to the Graduate School for processing. This form must be submitted and approved by the Graduate School before beginning any coursework that will count toward both undergraduate and graduate degrees. Both the online application and this form are needed to finalize the graduate degree program admission decision and designate UG/GR status. This form notifies the Graduate School of your departmental support for the accelerated UG/GR degree and designates the courses to be used in the program. All course information must be completed in full and a letter grade of B or higher is required for any course to be used toward the graduate degree.

Last/Family Name _____ **First/Given Name** _____ **Middle Name** _____

Last 4 digits of VT ID: _____

E-mail Address _____ *@vt.edu account, preferred*

Current Program _____

Anticipated Completion of Bachelors Degree

FALL SPRING SUMMER YEAR _____

Term to Begin Counting Graduate-Level Credit *(within last 12 months of UG degree)*

FALL SPRING SUMMER YEAR _____

First Term of Enrollment as a Graduate Student

FALL SPRING SUMMER YEAR _____

Requested Status

ACCELERATED (double count courses) DUAL (graduate courses only)

Maximum of 12 credit hours may be designated.

UPDATED FROM INITIAL SUBMISSION

TERM	YEAR	DEPARTMENT	COURSE NUMBER	CRN (IF KNOWN)	# OF CREDIT HOURS	COURSE TITLE

STUDENT Signature _____ Date (MM/DD/YY) _____

Oliver Schabenberger
Professor of Practice
Academy of Data Science

Academic Experience

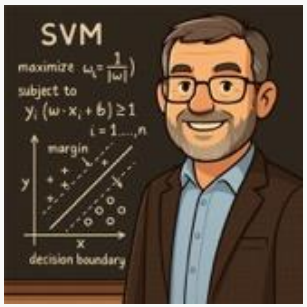
- MSU (1996—1999) Dept. of Crop & Soil Sciences
- VT (1999—2002) Dept. of Statistics
- VT (2023—present) Academy of Data Science
- Courses
  - Applied Statistics, Research Methods
  - Spatial Statistics
  - Statistical Programming
  - Computational Thinking
  - **Statistical Learning (ADS 5525, 5526)**
  - **Foundations of Data Science (ADS 5064)**

Industry Experience

- SAS (2002—2021)
  - Software Developer
  - Director, Research & Development
  - VP, Research & Development
  - EVP & Chief Technology Officer
  - EVP & Chief Operating Officer
- SingleStore (2021—2023)
  - Chief Innovation Officer

Analytic Software Development

Cloud Database Innovation



Excited about M.S. Data Science

Data Science Education Done Right™

- Support the many paths to data science
- Math/Stat/CS are important, that does not make a great data scientist
- Degree informed by practical reality of data science
  - Apply Math/Stat/CS to solve real-world problems
  - Need for lifelong learning, growth mindset, skill development
  - How to stay on top of a rapidly developing field
  - How do organizations practice data science
  - What does it take to be successful in this profession

ADS 5094 – Data Science Business Applications

- Professor Scott Mutchler
- 20+ years experience as a Data Scientist (in many industries)
- Built multiple data science consulting practices

- 6-8 Real-world Data Science Problems
- Large, complex data sets
- Mix of data engineering, Machine Learning and AI & Linear Programming
- Perform all the steps in CRISP-DM methodology

SQL

↓

UMAP, etc.

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XGBoost, etc.

↓

LLMs, etc.

Business Understanding

↓

Data Prep

↓

Feature Engineering

↓

Modeling & Evaluation

↓

Deployment

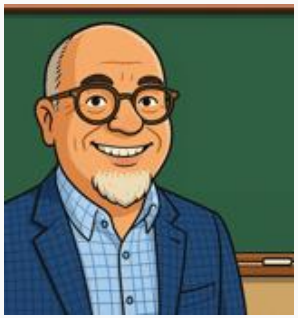
ADS 5094 – Data Science Business Applications

Interactive & Hands-on with Generative AI

- Role Play a Data Scientist using LLM Chatbot

- Build Interactive Applications with ML and Generative AI

- Digital Professor (LLM) – knows the course material and can answer question (24-hour virtual office hours)



Alan Lattimer

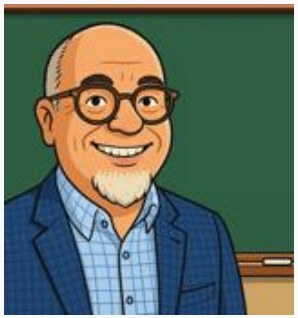
Associate Professor of Practice
Academy of Data Science

Academic Experience

- VT (1999-2001) BS Computer Science
- VT (2010-2012) MS Mathematics
- VT (2012-2016) PhD Mathematics
- VT (2025-) APP in the ADS
- **Currently Teaching**
    - CMDA Capstone (CMDA 4864)

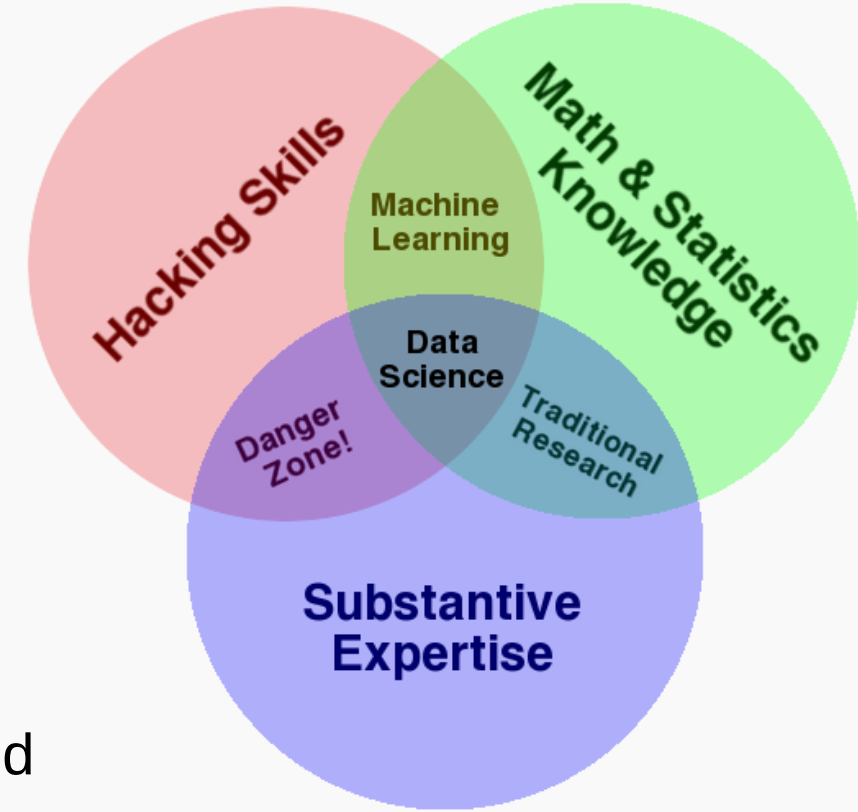
Industry Experience

- USN (1991-1999) Nuclear power plant operator on a submarine
- Sungard (2001-2010) Developer and manager for a healthcare software company
- Jensen Hughes (2016-2018) Developer and manager of fire-based computational software
- Socially Determined (2018-2025) Chief Analytics Officer for a healthcare startup



Why the VT MS in Data Science?

- Domain-based electives
- Experiential learning
- Taught by industry leaders
- Real-world applications
- Data-driven applications in your field

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