

# CRACKING THE CODE:

YOUR GUIDE TO EARNING A MASTER'S  
IN DATA SCIENCE AND APPLIED  
STATISTICS AT CORNELL BOWERS CIS



**Cornell Bowers CIS**  
College of Computing and Information Science





As demand for data-driven insights increases, data science and applied statistics have become a universal language in the modern world, used to power decisions across industries and careers. From manufacturing to healthcare, the complexity and volume of data require a new generation of professionals equipped with cutting-edge skills. The more we develop and advance the ever-evolving field of data science and applied statistics, the greater the need for experts in the job market.

When preparing for a lucrative and innovative career in data science and applied statistics, graduate education is key. Whether you've just earned your bachelor's degree, are looking to pivot in your career, or want to build on a strong quantitative background, advanced education can help you achieve that next step.

This resource dives into the significance and strategic benefits of pursuing a master's degree in data science and statistics, specifically a Master of Professional Studies (MPS). It also offers an in-depth analysis of the MPS in Data Science and Applied Statistics program at Cornell Bowers CIS, empowering you to confidently embark on the path toward this practical and career-focused degree.

# TABLE OF CONTENTS

<b>Chapter 1: Why Pursue a Master’s Degree in Data Science and Statistics?</b>	<b>4</b>
The Evolution and Relevance of Statistics and Data Science	<b>5</b>
The Benefits of Data Science and Applied Statistics Master’s Programs	<b>8</b>
<b>Chapter 2: Understanding the Master of Professional Studies Degree</b>	<b>10</b>
What is an MPS Degree?	<b>11</b>
MPS vs. MS in Applied Statistics and Data Science	<b>12</b>
The Practicality of an MPS for Statistics and Data Science Careers	<b>13</b>
<b>Chapter 3: Cornell Bowers CIS’ MPS in Data Science and Applied Statistics</b>	<b>14</b>
MPS Overview	<b>14</b>
Program Specializations	<b>15</b>
Curriculum	<b>16</b>
Admission Requirements	<b>19</b>
Financial Considerations	<b>20</b>
<b>Chapter 4: Move Your Career in Data Science Forward at the Cornell Ann S. Bowers College of Computing and Information Science</b>	<b>21</b>

## CHAPTER 1:

# WHY PURSUE A MASTER'S DEGREE IN DATA SCIENCE AND STATISTICS?

As businesses and industries continue on the path of digital transformation, data is at the heart of every decision that is made. Because of this, it's important to be well-versed and well-trained in the data that drives that decision-making.

Let's further explore the relevance of statistics and data science in today's world and why a master's degree in these fields is worth pursuing.



# THE EVOLUTION AND RELEVANCE OF STATISTICS AND DATA SCIENCE

The use of statistics dates back to ancient civilizations, but some of the notable contributors have been in the last few centuries.

## THE EARLY FOUNDATIONS OF STATISTICS

**1654:**

Blaise Pascal and Pierre de Fermat developed probability theory through correspondence on gambling problems, marking the start of modern statistical thinking.

**1858:**

Florence Nightingale used statistical charts to visualize high mortality rates from poor sanitation in military hospitals, influencing health policy.

**1930s:**

Governments began using statistical methods to forecast economic trends, manage inflation, and shape fiscal policies. The introduction of statistical models allowed for more informed decision-making in public policy.

**1830s:**

Adolphe Quetelet applied statistical methods to social science, introducing the concept of the "average man" to study human behavior patterns.

**Early 1900s:**

Ronald Fisher and Karl Pearson formalized core statistical methods—ANOVA and correlation—transforming agricultural research. These methods helped farmers increase crop yields by optimizing growth conditions.

**1970s:**

Statistical methods in clinical trials enabled pharmaceutical companies to rigorously test and validate new drugs, improving the reliability of medications and advancing treatment protocols.

# THE EMERGENCE OF DATA SCIENCE

## 1950:

Alan Turing published “Computing Machinery and Intelligence,” introducing the concept of machine intelligence and proposing the Turing Test—a method for evaluating a machine’s ability to exhibit human-like intelligence.

## 1970:

Edgar F. Codd introduced the relational database model in his paper, which became the foundation for SQL and modern database systems.

## 2001:

William S. Cleveland formally proposed “data science” as an independent discipline combining statistics with computer science and data management in his paper “Data Science: An Action Plan for Expanding Technical Areas of the Field of Statistics.”

## 1965:

NASA used IBM computers at the Manned Spacecraft Center to process large volumes of flight data during the Apollo missions.

## 1990s:

With the rise of the internet, data mining tools were developed to extract patterns from large datasets, enabling businesses to use data for more effective decision-making and predictive analysis, particularly in retail and finance.

## 2006

The release of Hadoop enabled the **processing of massive datasets**, providing open-source software utilities for all areas that need big data computing.

# DATA SCIENCE AND STATISTICS TODAY

Today, data science and applied statistics continue to evolve with real-time analytics, large language models (LLMs), and artificial intelligence (AI) tools being used across sectors like healthcare, finance, logistics, and public policy. In finance, they guide investments and detect fraud. In healthcare, they support accurate diagnoses and improve patient outcomes. In technology, they power systems such as recommendation engines and self-driving cars.

Over time, major breakthroughs have shaped how these tools are used. Machine learning models can now help predict disease outbreaks. Businesses use customer data to personalize marketing. Real-time analytics now support smarter, faster decisions in areas like logistics and public policy.

As the field continues to grow, the U.S. Bureau of Labor Statistics projects **36% job growth for data scientists by 2033**, much higher than the average growth rate across occupations. At the same time, **the U.S. faces a shortage of data professionals**, leading to a talent deficit in the field. Companies have more data than ever, but lack the trained professionals to analyze it effectively.



That is why employers seek candidates with a long skill set. A long skill set is more than just a few specific skills; it's a broad array of abilities that allow someone to adapt and excel in different situations. Employers want professionals who are able to code, analyze, problem-solve, and quickly adapt. For individuals who have a strong foundation in math or statistics, pursuing a master's degree is a logical and strategic next step.

The return on investment is clear: **data scientists earn an average salary of \$119,380, and data engineers earn \$130,733**. As the tools and technologies evolve, the need for professionals who understand data and can apply it effectively remains constant. This is where advanced training makes a difference.

# THE BENEFITS OF DATA SCIENCE AND APPLIED STATISTICS MASTER'S PROGRAMS

---

Earning a master's degree in data science and applied statistics gives you the credentials to apply your knowledge in a variety of fields. The tools you will gain with this advanced degree are highly transferable and applicable, allowing you to sharpen your skillset and prepare for evolving career opportunities.

## ADVANCED SKILLS AND KNOWLEDGE

The skills and knowledge you'll develop as you work toward a graduate degree will position you as a subject matter expert in the data science field, and you'll graduate ready to make meaningful contributions to our data-driven world.

Common skills master's students gain during the course of a data science and applied statistics graduate program include:

**statistical analysis**

**data mining and database management**

**programming languages**

**machine learning and predictive modeling**

**data visualization**

**domain knowledge**

**critical thinking and problem-solving**

**communication**

# CAREER OPPORTUNITIES AND JOB STABILITY

A master's degree opens the door to more career opportunities and long-term job security.

Data science employers often prefer candidates with advanced degrees over those who hold a bachelor's degree alone, especially for roles with leadership potential or specialized technical knowledge. Whether your path leads to finance, biomedical research, artificial intelligence, public policy, or beyond, you will be positioned to work in global industries that rely on data to drive innovation.

Many in-demand professions either require or strongly prefer a master's degree, including:

Position	Degree Preferred	Average Salary (2024)
<b>Data Scientist</b>	Master's Degree	<u>\$112,590</u>
<b>Data Engineer</b>	Master's Degree	<u>\$126,141</u>
<b>Statistician</b>	Master's Degree	<u>\$104,350</u>
<b>Research Scientist</b>	Master's Degree	<u>\$100,708</u>
<b>Operations Research Analyst</b>	Master's Degree	<u>\$91,290</u>
<b>Industrial Engineer</b>	Master's Degree	<u>\$101,140</u>
<b>Quantitative Analyst</b>	Master's Degree	<u>\$138,786</u>
<b>Mathematician</b>	Master's Degree	<u>\$104,350</u>

As the field continues to grow, so does the demand for professionals who can interpret, innovate, and lead. A graduate program will help you build those capabilities and stand out in a competitive job market.

# CHAPTER 2: UNDERSTANDING THE MASTER OF PROFESSIONAL STUDIES DEGREE

If you are exploring a graduate degree in data science or applied statistics, it is worth understanding the unique value of a Master of Professional Studies (MPS) degree.

Unlike traditional academic programs, an MPS is designed with industry outcomes in mind, equipping professionals with the specialized skills they need to make an immediate impact upon joining the field.



# WHAT IS AN **MPS** DEGREE

---

An MPS is a specialized graduate degree designed to equip professionals with practical and industry-specific skills and knowledge. It is tailored to meet the specific demands of professional fields, offering a balance of theoretical understanding and hands-on application. Courses are structured around real-world challenges and current industry developments, ensuring students graduate with the skills employers actively seek.

## WHO BENEFITS FROM AN MPS DEGREE?

---

**Working professionals aiming to advance their current careers by acquiring specialized skills and knowledge**

---

**Individuals seeking a career change or entry into a new industry who need practical expertise to succeed**

---

**Recent graduates or early-career professionals who desire a targeted, industry-aligned master's degree to accelerate their career progression**

Whether you want to advance, pivot, or launch your career, the MPS provides a direct path forward.



# MPS VS. MS IN APPLIED STATISTICS AND DATA SCIENCE

---

While both MPS and master of science (MS) degrees cover core concepts in statistics and data science, they are designed with different goals in mind. The key distinctions lie in the focus and approach of the programs.

## CURRICULUM

MS programs have a stronger focus on theoretical concepts and research methodologies, ideal for those interested in pursuing academic or research-oriented careers. **MPS programs** prioritize practical, industry-relevant skills and knowledge, catering to professionals seeking immediate applicability in their respective fields.

## SKILL DEVELOPMENT

While both degrees cover essential concepts, **MPS programs** emphasize the development of practical, hands-on skills directly applicable to the workforce.

## PROFESSIONAL DEVELOPMENT

**MPS programs** often incorporate elements like industry projects and professional development seminars to foster direct integration into the professional landscape, preparing students for the immediate demands of their chosen industry.

# THE PRACTICALITY OF AN MPS FOR STATISTICS AND **DATA SCIENCE CAREERS**

---

For careers in statistics and data science, an MPS is a practical way to gain in-demand skills. Here's how:

## **ELEVATED SKILLSET**

A specialized curriculum is tailored to elevate students' skills, focusing on practical, hands-on learning experiences that directly apply to real-world challenges in statistics and data science careers.

## **INDUSTRY-SPECIFIC TRAINING**

An MPS degree equips students with industry-specific skills and knowledge, enabling them to immediately and seamlessly contribute to their respective fields upon graduation.

In a field where relevance and adaptability are everything, the MPS stands out as a degree designed for modern needs and modern careers.

## **SHORT DURATION**

The MPS is designed to be completed efficiently, providing a quicker route to acquiring specialized knowledge and skills. This streamlined nature allows professionals to enhance their qualifications without extended academic commitments.

## **IMMEDIATE APPLICABILITY**

The skills and knowledge gained are immediately transferable, making graduates highly sought after in industries where practical expertise is essential for success.

## CHAPTER 3:

# DATA SCIENCE AND APPLIED STATS: ONE-YEAR MASTER'S PROGRAM AT CORNELL BOWERS CIS

Housed in the Cornell Ann S. Bowers College of Computing and Information Science, the Master of Professional Studies (MPS) in Data Science and Applied Statistics offers a powerful combination of academic depth and real-world application. This one-year program is designed to give students a strong foundation in statistical theory while equipping them with practical tools to navigate and lead in today's data-driven industries.



# PROGRAM SPECIALIZATIONS

---

The MPS in Data Science and Applied Statistics offers two distinct options:

## **OPTION 1**

### **APPLIED STATISTICS**

This option mirrors the traditional MPS pathway, focusing on statistical analysis techniques in real-world settings.

---

## **OPTION 2**

### **DATA SCIENCE**

This option is a specialized track that includes all the core elements of Option I with additional training in computer science to prepare students to deal with data science challenges effectively. Applicants for Option II are ideally computer science majors or professionals with significant exposure to computer science-related fields.

# CURRICULUM

---

The curriculum combines a strong foundation in statistics with specialized electives and a professional development focus. While there are more core courses and elective options, here's a look at some of the course offerings:

## **CORE COURSES INCLUDE:**

**Probability Models and Inference**

**Project Development &  
Professional Communication**

**Realtime Project Management**

## **ELECTIVE OPTIONS INCLUDE:**

**Big Data Management and Analysis**

**Statistical Computing**

**Natural Language Processing**

**Integrated Ethics in Data Science**

Department faculty are notably ranked **among the best in the world** for graduate programs in statistics and operations research. Examples of the wide range of **research topics of expertise** within the program include:

**Clinical trials**

**Machine learning**

**Econometrics**

**Stochastic processes**

Students also engage in an in-depth statistical analysis [MPS project](#), supported by core coursework, that often serves as a springboard into future career opportunities. Some of the award-winning MPS projects that students have conducted in the past include:

## **SPRING 2024:**

Students developed statistical and machine learning models for a leading investment management firm to support data-driven financial decisions.

---

## **SPRING 2023:**

A team partnered with Gro Intelligence to [forecast winter wheat production in Morocco](#) using historical data on precipitation, land temperature, soil moisture, and other factors. They found two prediction models for informing agricultural decisions concerning wheat.

---

## **SPRING 2022:**

Collaborating with Trinity Life Sciences, students analyzed Medicare spending trajectories using quantile and logistic regression to identify key predictors of high-cost patients. The project had the potential to contribute to the design, application, and timing of interventions.

Many MPS graduates have gone on to impactful careers across industries, working at the intersection of data, technology, and business.



**Minghan Liang, MPS '22**

now works as a data scientist at Chewy, the leading U.S. e-commerce company specializing in pet supplies. He describes the MPS program saying, “[the program] strengthened my foundations in probability, statistics, and machine learning, which are essential for the analytical and modeling work I do daily. Additionally, I gained more practical skills in Python and SQL through the program's diverse coursework, both of which are critical tools in my role.”



**Eric Daza, MPS '02**

is now an associate director and principal clinical data scientist at Boehringer Ingelheim and founder and chief editor of Stats-of-1. Daza’s work earned him recognition from Forbes and Fortune magazines, as well as the COPSS Emerging Leader Award. He also developed a patent-pending technique utilizing his n-of-1 time series causal inference framework.

# ADMISSION REQUIREMENTS

---

Admission to the program is competitive and geared toward applicants who are ready to thrive in a fast-paced, quantitatively rigorous environment.

Admission requirements include:

**Quantitatively oriented bachelor's degree**

**Various applied statistics and data science prerequisites**

**GRE scores**

**TOEFL scores for international applicants**



# FINANCIAL CONSIDERATIONS

---

In terms of tuition and financial aid, the MPS program in Data Science and Applied Statistics is a wise investment. With data science and applied statistics professionals earning high salaries and enjoying strong job security, graduates typically recover their investments quickly.

Although the MPS program does not offer scholarships, fellowships, or assistantships, domestic students may be eligible for student loans, and domestic minority students may qualify for Cornell's Diversity Fellowships. The program's one-year structure also offers an efficient path to career advancement, minimizing time away from the workforce while maximizing long-term earning potential.



## CHAPTER 4:

# MOVE YOUR CAREER IN DATA SCIENCE FORWARD AT THE CORNELL ANN S. BOWERS COLLEGE OF COMPUTING AND INFORMATION SCIENCE

The demand for skilled professionals in statistics and data science is only growing, and so is the need for advanced training that prepares you for industry success. Earning a master's degree is one of the most direct ways to accelerate your career, gain specialized knowledge, and position yourself for high-impact roles in a dynamic and evolving field.



The [MPS in Data Science and Applied Statistics](#) from Cornell Bowers CIS supplies you with the foundation, tools, and experience to lead with confidence. From rigorous academic training to real-world application, this one-year program equips you with everything you need to stand out.

[Applying to the MPS program is a straightforward process.](#) To [start your application](#), you will need the following required materials:

**Academic statement of purpose**

**Personal statement**

**Two academic letters of recommendation**

**One professional letter of recommendation (optional)**

**Official transcripts from all undergraduate and graduate-level studies**

**Official GRE scores**

**Official TOEFL or IELTS scores**

**Resume**

Cornell undergraduates are eligible to apply through the [MPS Early Admit option](#). Otherwise, application deadlines are as follows:

**Fall Admission Deadline: February 1**

**Spring Admission Deadline: October 1 (less common)**

Admission decisions are typically shared in early April and may not be finalized until late May or early June.



As you prepare your materials, keep in mind that reviewers look to understand your academic background, preparation, and experiences that demonstrate your potential for success in this area. They also look for evidence that you have thoroughly researched the program and can clearly articulate why it aligns with your goals.

Your next move matters. Cornell Bowers CIS' MPS is structured to align with your current expertise and guide you toward your future aspirations.

**WHEN YOU'RE READY TO ACCELERATE YOUR CAREER FORWARD WITH AN MPS IN DATA SCIENCE AND APPLIED STATISTICS, TAKE THE NEXT STEPS:**

**Explore the Program**

**Start Your Application**

**Request More Information**

**IS THE MPS IN INFORMATION SCIENCE A BETTER FIT FOR YOUR GOALS?**

**Explore the program →**