

*Thank you for joining!*

# **Graduate Data Science Programs**

INFORMATION SESSION WILL BEGIN AT 1 PM CT

**Northwestern**

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SCHOOL OF  
PROFESSIONAL STUDIES

# Graduate Data Science Programs

**Northwestern**

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SCHOOL OF  
PROFESSIONAL STUDIES



# Thomas W. Miller

MSDS Faculty Director

## COURSES for 2025-26

Go and AI-Assisted Programming

Technology Product Engineering

Analysis of Financial Markets

Financial Engineering

Graphical and Network Models

Knowledge Engineering

## Education

PhD, Psychology (psychometrics), University of Minnesota

MS, Statistics, University of Minnesota

MBA, MS Economics, University of Oregon

BA, Philosophy, Ursinus College

## Prior Academic Appointments

Taught marketing research and strategy at the University of Wisconsin-Madison School of Business

Additional appointments at the University of Oregon, Oregon State University, Hamline University, and the University of Minnesota

## Business and Consulting Experience

Former director of the A.C. Nielsen Center for Marketing Research

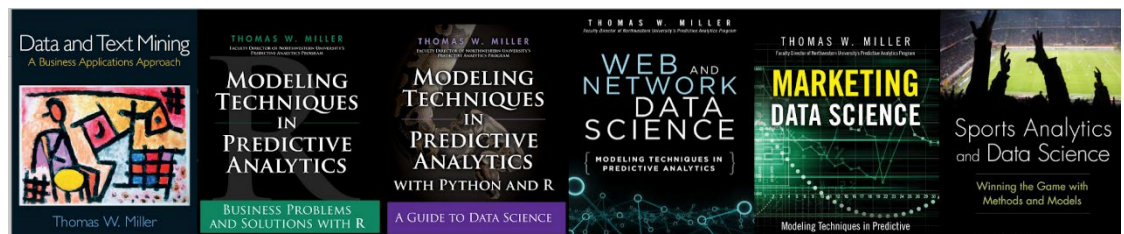
Experience with corporate IT: Hewlett-Packard and NCR Comten

Owner of Research Publishers LLC, Manhattan Beach, CA, offering publishing and consulting services) ([www.research-publishers.com](http://www.research-publishers.com))

Alumni member of CQF Institute (quantitative finance)

Political analysis at The Virtual Tout ([www.virtualtout.com](http://www.virtualtout.com))

Author of six textbooks about data science





Founded in  
**1933**

**Ranked #6**



in the  
country

**Faculty includes:**

- Northwestern scholars
- Experienced practitioners
- Industry leaders





**Kathreen  
Fontecha**

MASTER OF SCIENCE  
IN INFORMATION  
DESIGN AND  
STRATEGY



**Ignatius Valentine  
Aloysius**

MASTER OF ARTS/  
FINE ARTS IN  
CREATIVE WRITING



**Paula  
Derdiger, PhD**

MASTER OF ARTS IN  
LITERATURE



**Stephanie  
Cisneros**

MASTER OF ARTS IN  
LIBERAL STUDIES



**Henry Gabb, PhD**

MASTER OF  
SCIENCE IN HEALTH  
INFORMATICS



**JC Kibbey**

MASTER OF  
ARTS IN PUBLIC  
POLICY AND  
ADMINISTRATION



**Brad Bauer**

MASTER OF  
ARTS IN SPORTS  
ADMINISTRATION



**Justina  
Lakinger**

MASTER OF  
SCIENCE IN  
DATA SCIENCE



**Nancy  
Dandridge**

MASTER OF  
SCIENCE IN  
INFORMATION  
SYSTEMS



**John Barker**

MASTER OF  
SCIENCE IN  
REGULATORY  
COMPLIANCE



**Stephanie  
Kang**

MASTER OF  
SCIENCE IN  
GLOBAL HEALTH



## Course Length



10 weeks

## Where



Online

## When



**ONLINE**  
Flexible  
scheduling  
with periodic  
coordinated  
web  
conference  
sessions

## Courses Per Quarter



**AVERAGE**  
1–2  
**MAXIMUM**  
3

## Time to Finish



2–5 years  
*You set the  
pace*

# SPS Distance Learning Philosophy

Courses designed to ensure the success of every student

## **Learning-by-doing and case study approach to education**

- Courses are grounded in theories of learning and cognition that facilitate active engagement in individual learning
- Students are immersed in vibrant discussion, applying high-end skill sets, and developing solutions to real-life problems

## **Rich distance learning experience**

- Designed to promote interactions among students and faculty
- Asynchronous with live elements layered in as appropriate
- Courses continually updated with current technology

## **Employing universal instructional design**

- Courses are designed and taught utilizing principles of universal instructional design, creating a learning environment in which every student can succeed
- Universal instructional design recognizes and respects that students bring diverse cultures, backgrounds, and learning styles to the classroom



# Strong Demand for Data Scientists and Data Engineers

Cover image from the December 2023 issue of *Communications of the ACM* says it all

Northwestern data science degrees and certificates provide necessary skills for many positions.

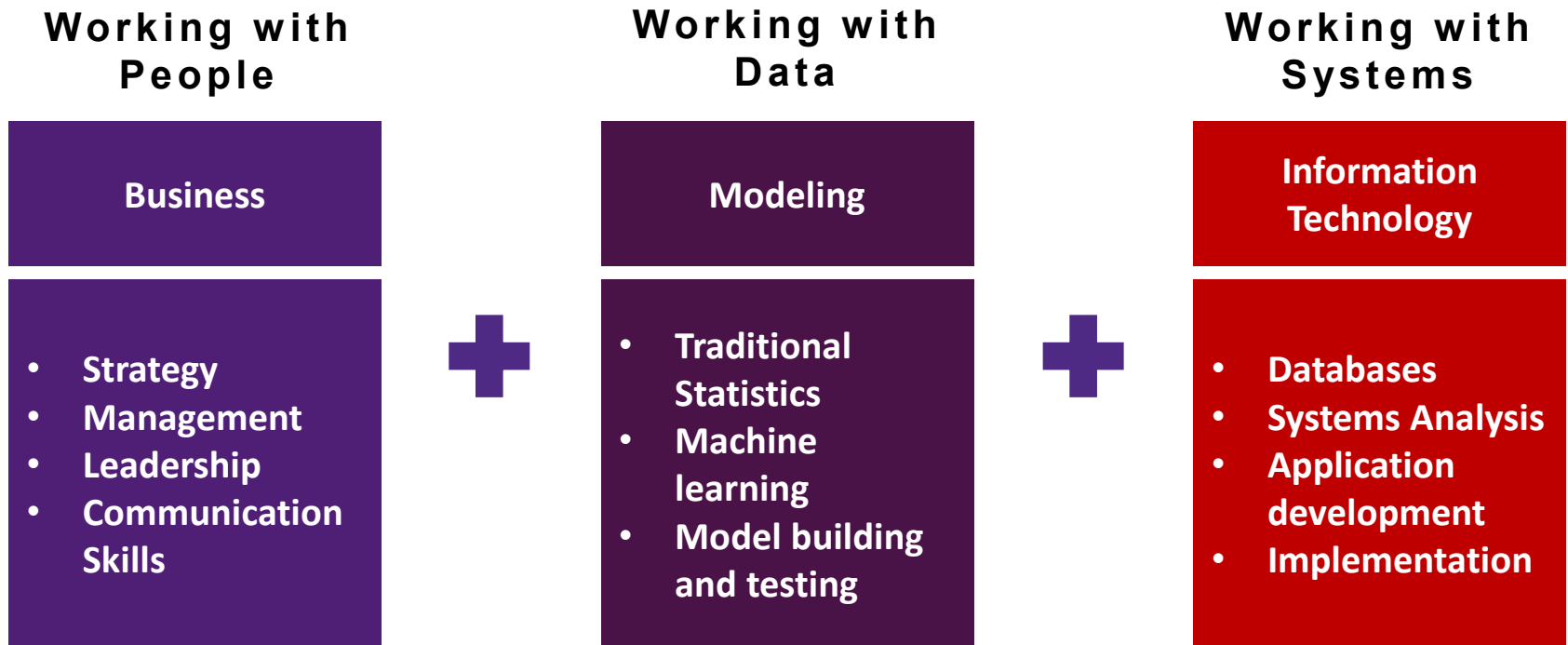
Offering five specializations:

- Analytics and Modeling
- Artificial Intelligence
- Data Engineering
- Analytics Management
- Technology Entrepreneurship





# What is Data Science?



*Each component is thoroughly covered in the MSDS program*

# About the MSDS Program

## **Cutting-Edge Technology**

- Brings together data management, statistical analysis, communication, and leadership
- Use Python, R, and Go for data science and data engineering
- Use state-of-the-art systems for machine learning and artificial intelligence
- Work with high-performance, enterprise-ready database systems, including relational, document, graph-relational, and vector databases
- Work with systems and applications using Docker containers and Docker Hub
- Use cloud services from many providers

## **Learn from Leaders in the Field**

- Courses taught by distinguished Northwestern faculty and experienced data scientists
- Prepare for key roles in electronic commerce, marketing, finance, health care, operations management, and more

# What makes the MSDS program special?

## **Noteworthy Information about the Program**


- 14+ years in online analytics and data science education
- 80% of faculty with doctoral degrees
- 95% of faculty with business experience
- 2,000+ Master's degree graduates
- Five specializations and 40+ courses to choose from in MSDS
- Courses in MSIS may be selected as electives

## **Additional Northwestern Resources**

- Extensive Library Collections
- Springer Collection of Online Resources
- Safari Online (O'Reilly, Manning, and other publishers)
- LinkedIn Training (formerly Linda.com)
- Learning Studios (Python, R, Go, Excel, and Statistics)
- The Writing Place and The Math Place




# 12 Courses

- 
- 6 Core Courses
  - 2 Specialization Courses (optional)
  - 2 Elective Courses
  - 1 Additional core course selected from eight options
  - 1 Capstone Project or Thesis

# 5 Specializations

- 
- Analytics Management
  - Analytics and Modeling
  - Artificial Intelligence
  - Data Engineering
  - Technology Entrepreneurship

# 6 Core Courses

- 
- Math for Modelers
  - Applied Statistics with R
  - Data Governance, Ethics, and Law
  - Database Systems
  - Practical Machine Learning
  - Decision Analytics

# Languages for Data Science: Python, R, Go, and SQL

Students in the MSDS program gain experience with key languages for data science and data engineering and can tailor studies to their own needs and interests. See <https://msds-program.netlify.app>

- Python is the primary language in most Artificial Intelligence courses
- R is the primary language in most Analytics and Modeling courses
- Go is used extensively in Data Engineering courses along with other languages and systems. See <https://msdsgo.netlify.app>
- Structured query language (SQL) used in courses with relational databases

## Courses Introducing Languages for Data Sciences

**Python for Data  
Science**

**Applied Statistics  
with R**

**Go and AI-Assisted  
Programming**

**Database Systems  
(SQL)**

# Analytics and Modeling

- Builds on the tradition of the Master of Science in Predictive Analytics (MSPA) program. Designed for data scientists seeking technical roles as data analysts, applied statisticians, and modelers. Courses focus on statistical inference and applications of predictive models.

## SUGGESTED LANGUAGE PRELIMINARIES

**R Learning Studio**

## REQUIRED COURSES

**Supervised Learning  
Methods**

**Unsupervised  
Learning Methods**

## SUGGESTED ELECTIVE COURSES

**Time Series Analysis  
and Forecasting**

**Marketing  
Data Science**

**Financial Engineering**

**Applied Probability  
and Simulation  
Modeling**

**Graphical and  
Network Models**

**Research Design for  
Data Science**

**Data Visualization**

**Special Topics: SAS  
for Data Scientists**



# Artificial Intelligence

- Designed for students seeking technical positions in machine learning and artificial intelligence (AI). Students develop programming skills in deep learning, as needed for computer vision, natural language processing, intelligent systems, and robotics.

## LANGUAGE PRELIMINARIES

**Python Learning  
Studio**

**Python for Data  
Science**

## REQUIRED COURSES

**Artificial Intelligence  
and Deep Learning**

**Natural Language  
Processing**

## SUGGESTED ELECTIVE COURSES

**Conversational AI  
Assistants**

**AI Agent Design and  
Development**

**Computer Vision**

**Intelligent Systems  
and Robotics**

**Knowledge  
Engineering**

**Applied Generative AI**

# Data Engineering

- Designed for students seeking technical positions with a focus on data science applications, software development, and information systems analysis and deployment.
- Students learn about technologies for gathering, storing, and analyzing data in interactive, batch, and stream processing environments.

## SUGGESTED LANGUAGE PRELIMINARIES

**Go Learning Studio**

**Go and AI-Assisted  
Programming**

## REQUIRED COURSES

**Foundations of Data  
Engineering**

**Data Science and  
Cloud Computing**

## SUGGESTED ELECTIVE COURSES

**Technology Product  
Engineering**

**Knowledge  
Engineering**

**Special Topics:  
Recommender  
Systems**

# Analytics Management

- Designed for students seeking technical leadership and data science management positions.

## REQUIRED COURSES

**Accounting and Finance  
for Technology  
Managers**

**Business Process  
Analytics**

## SUGGESTED ELECTIVE COURSES

**Data Science and  
Digital Transformation**

**Management  
Consulting**

**Project Management**

**Business Leadership  
and Communication**

**Research Design for  
Data Science**

**Data Visualization**

**Special Topics:  
Analysis of Financial  
Markets**



# Technology Entrepreneurship

- Entrepreneurship involves creating a new business or business function where one did not exist before.
- Data science, machine learning, and artificial intelligence provide new business opportunities. This specialization shows students ways of building successful, innovation-driven startups.

## REQUIRED COURSES

**Technology  
Entrepreneurship**

**Accounting and  
Finance for  
Technology Managers**

## SUGGESTED ELECTIVE COURSES

**Project Management**

**Business Leadership  
and Communications**

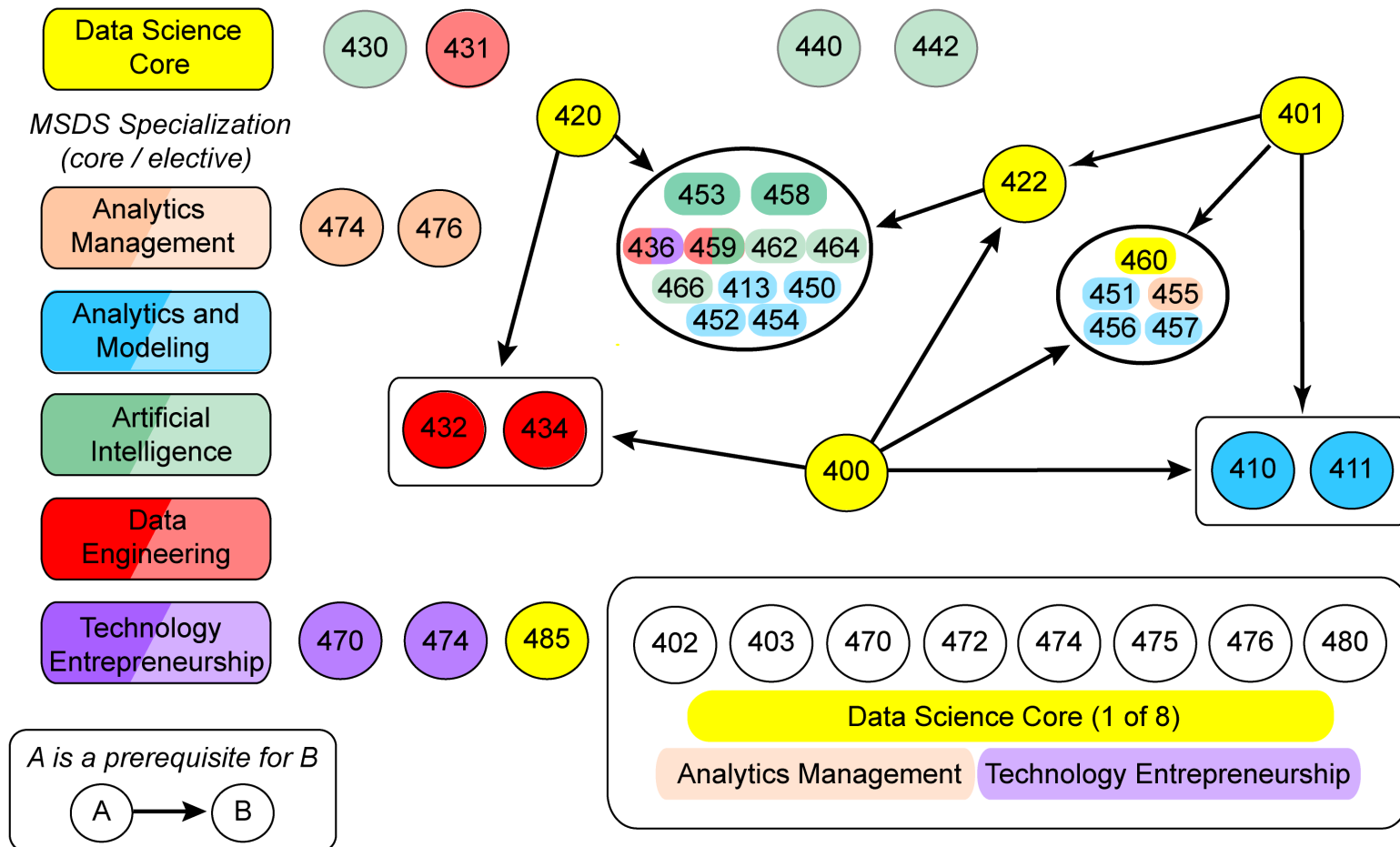
**Data Governance,  
Ethics, and Law**

**Management  
Consulting**

**Business Process  
Analytics**

**Technology Product  
Engineering**

## Curriculum Map for Graduate Courses in Data Science



The MSDS degree requires twelve courses, including a capstone course or master's thesis. Registration for the capstone (MSDS 498) or thesis (MSDS 590) requires prior completion of core courses and all but one elective course. This curriculum map shows hard prerequisites as checked by the registration system.

The background of the slide is a complex digital collage. It features a blue and purple gradient with white binary code (0s and 1s) scattered throughout. Overlaid on this are various data visualization elements: a 3D bar chart with yellow bars, a line graph with a blue line, a pie chart with yellow segments, and several smaller bar charts. Text labels like 'Rental for storage', 'Birmingham', 'London', and 'Derfield' are visible, along with numerical values and percentages. The overall aesthetic is high-tech and data-driven.

# General Track

- Students can opt to tailor elective coursework to their specific professional needs
- Useful for data scientists seeking employment with small businesses and smaller-scale projects, in which a single data scientist might have to serve the functions of data analyst, data engineer, and analytics manager simultaneously
- Students choosing no specialization will take four electives of their choosing



# Graduate Certificate Programs

- For the student with a bachelor's degree
- Admission requirements similar to the MSDS program
- Four to six graduate courses selected from the MSDS program

## Courses:

- Analytics and Modeling
- Analytics Management
- Artificial Intelligence
- Data Engineering
- Sports Analytics
- Technology Entrepreneurship

# Advanced Data Science Certificate

For the student with a master's degree in data science or a quantitative field, including training in database systems and machine learning

Four to six graduate courses selected from the MSDS program:

## Corporate Certificate Program

Data science and technology education tailored for each company

Focus on issues especially relevant to the company, such as digital transformation

Courses available from MSDS specializations and from the MSIS program

Credits transferable to the full MSDS program

# MSDS Accelerated Option

## EARN YOUR DEGREE IN ONE YEAR

- Course load is three courses per quarter (two on-ground and one online)
  - Seven core courses
  - Two required courses corresponding to a declared specialization
  - Two elective courses (one of which will be MSDS 480-0 Business Leadership and Communication)
  - One capstone project with a corporate sponsor
- Choose from five specializations
  - Analytics and Modeling
  - Artificial Intelligence
  - Data Engineering
  - Analytics Management
  - Technology Entrepreneurship

## THE SPS COURSE EXPERIENCE

- Students move through a cohort, building strong relationships learning with a diverse group of professionals – many of whom are highly-placed in their fields
- Schedule offers flexibility and balance that allows for part-time internships and policy-related roles with area organizations





## Students' Background

- Manufacturing
- Finance
- Marketing/Sales and Service
- Information Technology
- Government and Public Administration
- Business Management and Administration

## Post-graduation


- Data Scientist
- Data Engineer
- Analytics Manager
- Business Intelligence and Analytics Manager
- Director, Analytics and Modeling
- Marketing Analytics

# Data Science in the Marketplace

- Since 2016, Glassdoor has consistently ranked data scientist and data engineer as some of the best jobs in the marketplace
- Northwestern can help you decide which job is right for you:
  - <https://sps.northwestern.edu/stories/news-stories/what-data-science-job-is-right-for-me.php>



# Application Requirements

- 
- Completed online application
  - Nonrefundable \$75 application fee
  - Official Transcripts
  - Two letters of recommendation
  - Statement of Purpose
  - Current resume
  - Applicants with international credentials also need:**
    - Course-by-course evaluation by an accredited NACES member
    - Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS)\*

*\* Test scores are required for international applicants who did not complete a degree in which the courses were taught in English*





## Winter 2026

APPLICATION DEADLINE

October 15, 2025

CLASSES BEGIN

January 5, 2026

## Spring 2026

APPLICATION DEADLINE

January 15, 2026

CLASSES BEGIN

March 31, 2026

## Summer 2026

APPLICATION DEADLINE

April 15, 2026

CLASSES BEGIN

June 22, 2026

## Fall 2026

APPLICATION DEADLINE

July 15, 2026

CLASSES BEGIN

September 22, 2026

- Academic planning and course selection
- Career coaching
- Resume and cover letter guidance
- Career workshops and events
- Student experience support



- Quantitative coursework support (The Math Place)
- Writing and editing assistance (The Writing Place)
- In-course TA Assistance
- Access to science, language, and ESL tutoring
- Independent tutor referral

- Student Leadership Council (SLC)

# Student Leadership Council (SLC)

- The purpose of SLC is to help foster relationships among students in the program, alumni, and world-renowned industry professionals
- The SLC creates opportunities and events that allow students and alumni of the program to grow their knowledge of Data Science and their professional networks
- Some examples of past events include:
  - PyTorch Event with Ali Afzal, Senior Software Engineer at Meta
  - Technical Interview Workshop with Dr. Syamala Srinivasan
  - Virtual Speed Networking with current students and alumni
  - SQL Bootcamp
  - Ace the Data Science Interview with Nick Singh



# Northwestern University Alumni Association

Founded 140 years ago, the NAA offers a rich array of career resources and services

- Connect to a global alumni community of over 200,000
- Access to Handshake—Northwestern's central platform for job listings, internships, and career development workshops
- Notice of career fairs and networking events



The background of the slide features a stylized world map composed of blue dots. Overlaid on the map are various data visualization elements: vertical lines with colored circles (red, orange, yellow, white) at different heights, and floating numerical values in blue and white, such as +45.565, 425, 25.425, +34389.36, +56.45, +455, +123.85, and +45. The overall aesthetic is high-tech and data-driven.

# Frequently Asked Questions

- How does a degree in Data Science differ from an MBA or an MS in Statistics?
- Are there specific prerequisite courses I need before applying?
- Can I be successful in the program without a strong IT or programming background?
- Can I substitute courses that I've already taken in a previous masters program?
- Is GRE or GMAT score required to apply?

[datascience@northwestern.edu](mailto:datascience@northwestern.edu)  
(312) 503-2579

# Help is Available

## ADMISSIONS ADVISER

- [datascience@northwestern.edu](mailto:datascience@northwestern.edu)
- 312-503-2579

## TRANSCRIPTS SUBMISSION

- [spsadmissions@northwestern.edu](mailto:spsadmissions@northwestern.edu)
- MSDS Graduate Admissions  
Northwestern University School of Professional Studies  
Wieboldt Hall, Sixth Floor  
339 East Chicago Avenue  
Chicago, Illinois 60611-3008

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