

AI & Digital Business
**Business Analytics (Online):
Create Value Through
Data Analysis**



— Columbia Business School,
Manhattanville Campus,
New York City

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Overview

Making data-driven decisions is no longer optional – it’s essential. With the increasing volume of data available, the ability to analyze and derive actionable insights from it is what sets successful businesses apart.

This comprehensive six-week Business Analytics (Online) program guides you through the foundational concepts of predictive and prescriptive analytics, equipping you with the skills needed to turn complex data into strategic advantages. By the end of the program, you will confidently apply advanced analytical techniques to real-world scenarios, transforming raw data into powerful business decisions.

Despite the potential of data leadership, many organizations still struggle with cultural shifts and leadership recognition of data’s strategic importance.

70%

CDOs who cited difficulty in changing behaviors as the top challenge to creating a data-driven culture.

[Source](#)

59%

CDOs who reported the absence of a data-driven culture as a significant organizational challenge.

[Source](#)

89%

Number of organizations with strong data leadership that met or exceeded revenue goals in the past year.

[Source](#)

Key Benefits

With this program participants will:

- Understand the fundamental concepts and quantitative analytical methods to think critically about data and the data analytics performed by or presented to their team
- Practice the most common analytical methods and techniques in various industries and sectors to develop data-driven insights and support their business decisions
- Feel empowered to identify and evaluate opportunities for creating value for their organization
- Explore the strategies and challenges of implementing analytical approaches within their organization

Participant Profile

- **Mid-to senior-level professionals** in marketing, operations, finance/accounting, sales, human resources, or customer service who want to understand how data analysis (including marketing analysis, operations analytics, statistical analysis, and data visualization) can inform business decisions and affect change
- **Managers and team leaders** who supervise business analysts and would like to gain an analytic mindset to communicate with their teams more effectively
- **Business professionals and entrepreneurs** pursuing their next professional goals in business analytics, including data analytics, marketing analytics, operations analytics, accounting analytics, and customer analytics



Learning Journey

This asynchronous business analytics program was designed to introduce strategies to tackle business challenges in three main areas of data analysis:

Predictive Analytics

Learn the foundational elements of predictive business analytics; select topics include logistic regression, k-nearest neighbor, quality of predictions, and ROC. Discover how to predict a continuous outcome, a 0 or 1 outcome, the flaw of averages, the quality of fit, prediction errors, and future performance based on past performance.

1.

Prescriptive Analytics

Take a deeper dive into prescriptive analytics decision-making including data analysis with a deterministic objective, multiple objectives, under uncertainty, and with an unclear link between decisions and impact. Get the data analysis tools needed for testing, simulating, and optimizing.

2.

Implementation

Get a deeper understanding of structured decision-making from concept to deployment including decision support systems that remove biases in the system and reduce inefficiencies.

3.

The program's robust content is organized into bite-sized lecture videos with case studies from varying industries, self-assessments, peer learning, and virtual office hours. The estimated time commitment per week is 4-6 hours.

How You Will Advance

Master Predictive Techniques

Learn how to apply logistic regression, k-nearest neighbors, and other predictive methods through real-world applications.

Optimize Decisions with Prescriptive Analytics

Understand and implement optimization strategies and decision support systems, illustrated by practical examples in industries such as retail, finance, healthcare, and manufacturing.

Real-World Application and Implementation

Revisit key concepts and emerging challenges, and develop your own analytics toolkit for immediate application in your organization.

Program Content

As the volume and variety of available data continue to grow, business analytics is emerging as an essential capability for enterprises of all types and sizes. Applied in functions ranging from operations and marketing to finance and strategic planning, organizations that effectively harness analytics turn data into strategic insights, leading to improved business decisions.

In this six-week program, you will develop a robust foundation in business analytics, empowering you to:

- **Identify, evaluate, and capitalize on opportunities more efficiently**
- **Enhance your predictive accuracy**
- **Generate tangible value for your business**

Lecture Sessions

1. Predictive Analytics

Introduction + Predictive Analytics I

Start by gaining a clear understanding of business analytics and learning how to apply logistic regression through a practical example from the Nomis Solutions case.

Introduction to Business Analytics

This session provides an introduction to business analytics, focusing on the key tools organizations use to generate value. Delve into the early stages of the analytics life cycle, examining a real-life example from the Nomis Solutions case. As you begin your journey, you'll map out the course ahead and set your personal learning goals.

Lending Analytics - Nomis B

This session examines a widely used tool for predicting outcomes: logistic regression. The Nomis Solutions case is further explored, with practice in applying logistic regression to make informed, data-driven decisions.

Predictive Analytics II

Understand the basic methods of k-nearest neighbors and how it is used in recommendation systems.

Recommendation Analytics - Pandora

The possibilities provided by large-scale data and the potential for mass customization of services are explored. Recommendation systems used by companies like Pandora, Netflix, and Amazon are introduced, demonstrating how they predict user preferences based on collected information.

Quality of Predictions and Classification - Tahoe Healthcare

Assessing the quality of predictions and quantifying errors one may make when predicting 0/1 outcomes is covered, with an emphasis on ROC curves and how to account for errors in economic trade-offs. The task of predicting hospital patient readmissions is used to illustrate these concepts and their impact on preventive treatment measures.

Predictive Analytics III

Assess the quality of predictions using out-of-sample predictions methods and explore how to separate skill versus luck when making predictions about future performances.

Financial Analytics - Training and Testing Models

The concepts of in-sample versus out-of-sample predictions underscores the importance of out-of-sample methods in accurately assessing prediction quality, particularly within the framework of designing trading strategies.

Skill Versus Luck - Sports Analytics

An exploration of how to differentiate skill from luck in predicting future performance, such as for sports players or investors, is conducted by introducing the concept of shrinkage estimators.

2. Prescriptive Analytics

Prescriptive Analytics I

Evaluate the effectiveness of decision-making in complex environments where perfect experiments are not feasible, and simulate business decisions under conditions of uncertainty.

Testing - Channel Management in Retail

In transitioning to the prescriptive analytics module, the focus shifts to evaluating and optimizing decision quality. The Difference in Differences tool is presented as a method for testing decision changes in complex environments lacking perfect experimental conditions.

Simulation - Pension Analytics

The session introduces simulation as a method for assessing decisions in uncertain conditions, using the evaluation of pension liabilities at GM as an example.

Prescriptive Analytics II + Implementation

Explore how to optimize your decisions in the presence of multiple objectives and discuss how to

evaluate new decision support systems along with their real-life challenges.

Optimization Analytics - Pharmaceutical Detailing

The process of formalizing the optimization of a large number of decisions is introduced, accounting for various physical and business constraints. Decision-making with multiple objectives is practiced by exploring the concept of the efficient frontier, with a particular focus on assigning sales representatives to doctors in the pharmaceutical retailing context.

From Concept to Deployment - Zara

Zara's implementation of new algorithms for dispatching products across its store network is examined, with an analysis of the models underlying its decision support system. Evaluation approaches for this system are discussed, consolidating the course's key concepts and presenting a full view of the analytics life cycle.

3. Implementation

Implementation

Revisit the key concepts from earlier sessions and address the emerging challenges organizations face in applying them. Conclude your learning journey by building a personalized analytics toolkit to achieve your specific goals. For Python users, review the bonus session in Analytics techniques using Python.

Business Analytics: Frontiers and Emerging Challenges

This session revisits key concepts covered in class while also addressing emerging challenges like bias and algorithmic fairness.

(Bonus Module) Analytics in Practice using Python

For Python users, this session introduces how to implement key Analytics techniques, such as logistic regression and optimization, using Python.

Faculty Directors



Omar Besbes

Vikram S. Pandit Professor of Business

Omar Besbes is a leading expert in data-driven decision-making, with research focused on e-commerce, pricing, revenue management, and operations. He has received numerous accolades, including the Dean's award for teaching excellence.

[Read full bio](#)



Mark N. Broadie

Carson Family Professor of Business

An expert in derivative pricing and risk management, Mark Broadie has contributed significantly to financial research, holding editorial positions in leading journals. He has received two Dean's teaching awards and serves as vice chairman of Enterprise Risk Management Institute International (ERM-II).

[Read full bio](#)



Charles Daniel Guetta

Associate Professor of Professional Practice

Specializing in data-driven decision-making, Daniel Guetta directs Columbia's Business Analytics Initiative. He has authored award-winning case studies, co-authored "Python for MBAs," and has extensive experience as a former data scientist at Palantir Technologies.

[Read full bio](#)



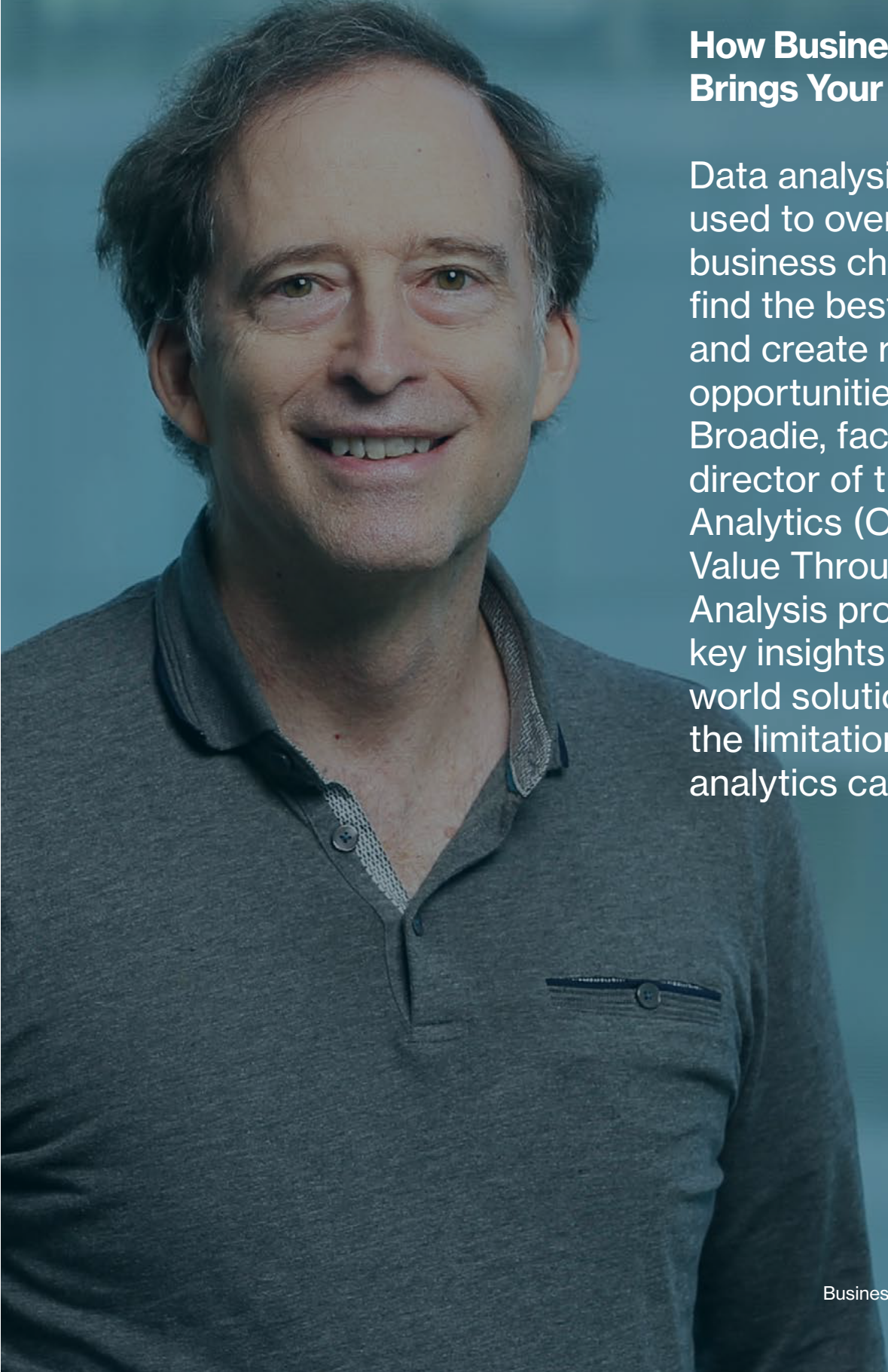
Ciamac C. Moallemi

William Von Mueffling Professor of Business

Ciamac C. Moallemi is a leading figure in financial engineering, specializing in the optimization of large-scale stochastic systems. With a background in both academia and industry, he develops quantitative trading strategies and holds editorial positions at prominent research journals.

[Read full bio](#)

Faculty Interview



How Business Analytics Brings Your A-Game

Data analysis can be used to overcome business challenges, find the best decision, and create rewarding opportunities. Mark N. Broadie, faculty co-director of the Business Analytics (Online): Create Value Through Data Analysis program, shares key insights into the real-world solutions as well as the limitations business analytics can provide.

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