

Sample* Syllabi for Hybrid Module Course

Analytics for Decision Making

Each 5-week module will comprise of three 1.5 credit courses delivered over five weeks. The module will begin with two weeks of asynchronous work for all three courses. In the third week, classes will be held in person at Stern Monday through Saturday, from 9 AM until 4:30 PM with a break for lunch. Following the on-campus immersion, you will complete the Module with another two weeks of asynchronous work.

Jan-Feb Module

Asynchronous work: Jan 8 - Jan 21

On-campus immersion: Jan 22 - Jan 27

Asynchronous work: Jan 28 - Feb 11

Important note: This module overlaps the first week of spring classes. You will be completing the final week of asynchronous work while you are beginning any spring classes you plan to take. Please plan accordingly.

INTA-GB 3401.V1 Analytics for Decision-Making

OPMG-GB 2150 Decision Models

Instructor: Ilan Lobel

Specializations:

- Business Analytics
- FinTech
- Financial Systems & Analytics
- Management
- Management of Technology & Operations
- Quantitative Finance
- Supply Chain Management & Global Sourcing
- Tech Product Management

TECH-GB 3106 Visualizing Data

Instructor: Kristen Sosulski

Specialization:

- Business Analytics

TECH-GB 3109 Digital Marketing Analytics

Instructor: Anindya Ghose

Specializations:

- Brand Management
- Business Analytics
- Digital Marketing
- Management of Technology & Operations
- Marketing
- Tech Product Management


*These are sample syllabi taken from previous terms and may be from 3cr versions. The exact syllabi for each course will be shared closer to the start of the term.



Decision Models & Analytics

One of the most crucial skills for a modern manager is knowing how to use data to make decisions. In Decision Models & Analytics, you will learn how to use modern analytics tools, such as optimization and simulation, to solve complex business problems. Whether you want to pursue a career in finance, consulting, technology, operations or marketing, knowing how to model and solve complex problems will make you a more effective decision-maker and give you a competitive edge.

The course is hands-on. In class, you will learn how to model and solve the following problems, among many others:



Online Advertising

If you own a website, how do you maximize the ad revenues you earn from it?

linear optimization

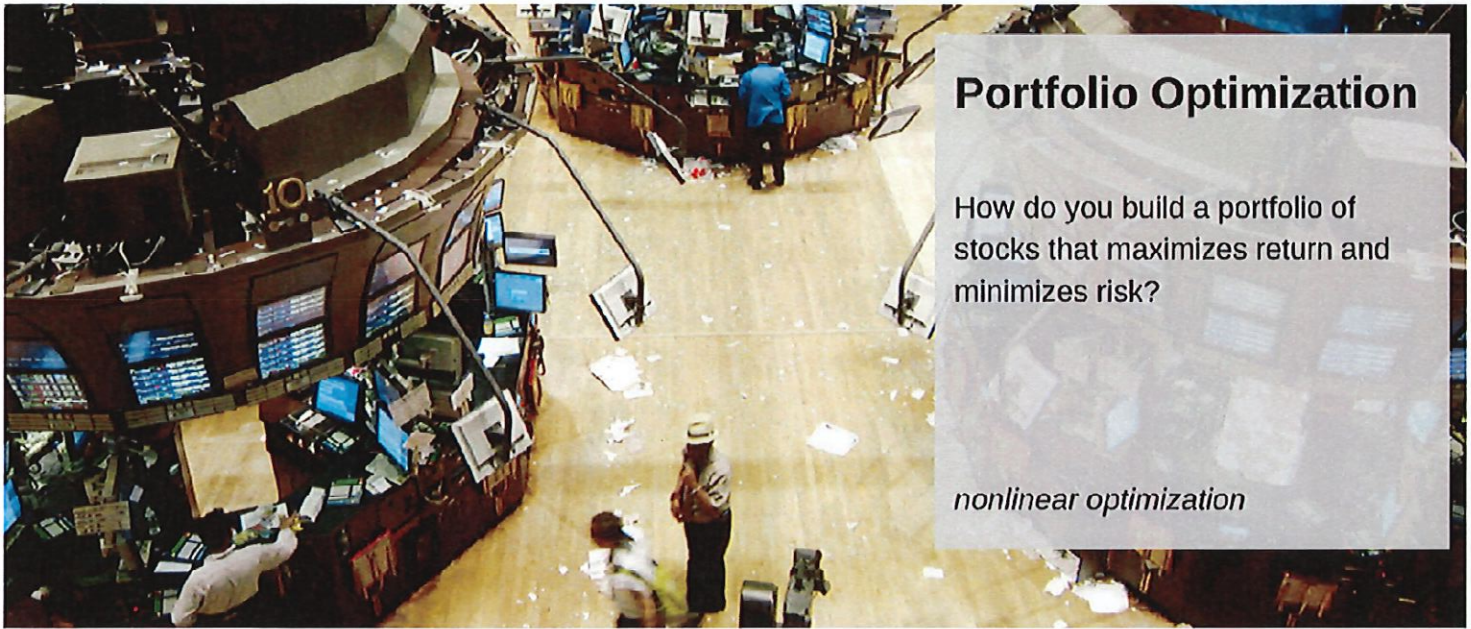




Online Dating

How do you match couples to maximize compatibility?

integer optimization



Portfolio Optimization

How do you build a portfolio of stocks that maximizes return and minimizes risk?

nonlinear optimization





Online Retailing

How do you get your products delivered to your customers in the fastest and cheapest way possible?

network flows



New Product Development

Given design risks and market uncertainty, how do you decide which products to develop?

Monte Carlo simulation





Professor [David Juran](#)

Professor [Ilan Lobel](#)

Professor [Lucius Riccio](#)

Professor [Jiawei Zhang](#)

Professor [Zhengyuan Zhou](#)

Professor [Gustavo Vulcano](#)

Pre-requisites:

Although there are no specific pre-requisites for this class, prior knowledge of basic probability concepts (probability distributions, percentiles, expected value, standard deviation, variance and covariance) would be helpful.

Data Visualization

Draft Syllabus

Last modified: October 30, 2023 - Subject to change

Instructor

Professor Kristen Sosulski, Ed.D

Clinical Professor of Information Systems | Executive Director, Learning Science Lab

ks123@nyu.edu | 212.998.0994 | Tisch Hall, Room 515

Office Hours: By appointment via Zoom (email to set up a day and time)

Teaching Fellow: Alexander Hensler | ah6034@stern.nyu.edu

Course description

Data visualization is an essential skill required in today's data-driven world. With its foundations rooted in statistics, psychology, and computer science, practitioners in almost every field use visualization to explore and present data. This course shows you how to better understand your data, present clear evidence of your findings to your intended audience, and tell engaging data stories that clearly depict the points you want to make all through data graphics. The skills learned in this course offer enormous value for creatives, educators, entrepreneurs, and business leaders in a variety of industries. Whether you are a seasoned visualization designer or just learning about it now, this course will serve as an introduction and reference to becoming visual with data.

This course is an introduction to the principles and techniques for visualizing data. This course shows you how to better understand your data, present clear evidence of your findings to your intended audience, and tell engaging data stories that clearly depict the points you want to make all through data graphics.

You will learn visual representation methods and techniques that increase the understanding of complex data and models. Emphasis is placed on the identification of patterns, trends and differences from data sets across categories, space, and time.

The ways that humans process and encode visual and textual information will be discussed in relation to selecting the appropriate method for the display of quantitative and qualitative data. Graphical methods for specialized data types (times series, categorical, etc.) are presented. Topics include charts, tables, graphics, effective presentations, multimedia content, animation, and dashboard design.

Throughout the course, several questions will drive the design of data visualizations. These include: Who's the audience? What's the data? What's the task? What's the best visual display?

This is a hands-on course. In this course, we will focus on **Tableau** and **Excel** to create, edit, alter, and display your data graphics.

Learning outcomes

By the end of the course students will be able to understand the following topics and apply various visual representation methods and techniques to visualize data:

- **Data formatting and analysis for data graphics:** Use visual data exploration methods that aid in data understanding. Learn techniques for data preparation including data formatting and cleaning. Identify the target audience and the line of inquiry.
- **Creation of data graphics:** Identify appropriate data visualization techniques given particular requirements imposed by the data together with the driving questions. Build data graphics with the appropriate data visualization and analytics software for the task at hand.
- **Refinement of data graphics:** Refine the data graphics to improve the readability, clarity, and accessibility of the data insights. Highlight and annotate to aid in the interpretation of the data.
- **Presentation with data graphics:** Tell stories with data graphics that will resonate with the audience. Visually communicate the key takeaways.
- **Data visualization case studies and examples:** See how data graphics are used in practice through case studies showcasing a unique approach to using data graphics in different settings.

Course format and meetings

Start date: 1/8/2024 | End date: 2/11/2024

- Online Pre-module: 1/8/2024 - 1/21/2024
- In class meetings: Friday, 1/26/2024 and Saturday, 1/27/2024 from 9:00am - 4:30pm
- Online Post-module: 1/29/2024 - 2/11/2024

Requirements & grading

Grade breakdown

Lab exercises	50%
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There will be 5 lab exercises to complete.

Assignments	40%
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There will be 2 assignments to complete

Class participation	10%
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During the in-person class meetings you will be required to submit a worksheet demonstrating your participation.

Total	100%
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Class participation

I expect you to contribute actively to class discussions that take place throughout the course.

Grading scheme

The grading of the assignment, lab exercises, and in-class work will be based on the following criteria:

- 0 points: Little or no effort. Didn't follow directions.
- 10 – 50 points: Missing many of the key elements of the assignment.
- 51 – 80 points: Somewhat met the requirements. Missing key elements.
- 81 – 90 points: Met the requirements.
- 91 – 100 points: Above and beyond. You met the requirements of the exercise and went beyond what was expected.

These criteria are designed for you to achieve your highest potential and go above and beyond the requirements. This involves trying new techniques and approaches.

Late work

No late work will be accepted.

Required readings and materials

Textbook

- Sosulski, K. (2019). *Data Visualization Made Simple: Insights into Becoming Visual*. New York: Routledge. Available for purchase on [Amazon](#).

Tutorial website

- Sosulski, K. (2022). [Data Visualization Made Simple: The Practice of Becoming Visual](#).

Please note: Selected labs are linked to the lessons here on Bright Space. They require a user name and password:

username = XXX

password= XXX

- *In addition to the required readings, expect to frequently reference the documentation from Tableau.*

Required software

The major graphics tools we will be using in this course for creating visualizations are Excel and Tableau. You must have a computer that allows you to install additional software (you should have administrator access to your computer).

- Microsoft Excel, PowerPoint (Mac users are encouraged to use KeyNote), and a basic text editor such as Notepad or TextEdit.
- Tableau Desktop. Please follow the instructions to install and activate:
 - Download the latest version of Tableau Desktop from <https://www.tableau.com/tft/activation>
 - Click on the link above, and select Tableau Desktop. On the form, enter your email address for Business E-mail and enter the name of your school for Organization.
 - Activate with your product key: XXXXXX
 - Already have a copy of Tableau Desktop installed? Update your license in the application: Help menu > Manage product keys
- Geocodio: an online geocoder. [Free registration.](#)

Communication strategy

There are several resources and communication channels available to support you in your learning and to answer your questions.

Questions about course content (concepts, assignment instructions, etc.):

- Please feel free to email me at ks123@nyu.edu and the teaching fellow with any **course content and grading-related** questions. We will respond within 24-48 hours. If, for some reason, we do not respond, please resend your email.
- To schedule a time to meet with me during office hours via Zoom, please schedule with me by email a few days in advance, if possible.
- In most cases, if you have a question, at least some of your classmates will benefit from seeing the answer or be able to answer you themselves. So, please post course content questions to the Q&A discussion forum on Bright Space. The Teaching Fellow and I will be monitoring forms and responding to questions.

Other course-related issues

Please send an email to the Teaching Fellow or to me. We will respond within 24 hours.

Conduct

Academic integrity

Academic integrity is central to our mission as an educational institution. By signing the [NYU Stern Code of Conduct](#) when you began the program you pledged to exercise integrity in all aspects of your academic work. That includes a) not engaging in any method or means that gives you or others an unfair advantage and b) clearly acknowledging the work and efforts of others when submitting written work as your own. Behavior inconsistent with the Code of Conduct will be referred to the NYU Stern Judiciary Committee.

Large language models (LLMs) may be used in this class, however you must cite it as you would any other reference material. Failure to acknowledge that content was GenAI generated will be considered a violation of academic integrity.

Equity & inclusion

New York University is committed to equal treatment and opportunity for its students and to maintaining an environment that is free of bias, prejudice, discrimination, and harassment ([details on policy and reporting](#)). Taking this further, a goal of this program is to support and cultivate diversity of thought, perspectives, and experiences. The intent is to present materials and activities that will challenge your current perspectives with the goal of understanding how others might see situations differently. We expect everyone in the program and this course to be committed to making this an inclusive learning environment for all.

Accessibility

Academic accommodations are available for students with disabilities. Please contact the [Moses Center for Students with Disabilities](#) (212) 998-4980 for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

NYU is committed to providing equal educational opportunity and participation for students with disabilities. If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Student Accessibility verifying your registration and outlining the accommodations they recommend. If you will need exam accommodations, you must submit a completed Exam Accommodations Form to the Moses Center at least one week prior to the scheduled exam time to be guaranteed accommodation.

Wellness

School can be stressful. If you would like help, we encourage you to reach out to the NYU Wellness Exchange for mental health support. You can reach them 24/7 at 212-443-9999, or via their app. There are also drop-in hours and appointments. Learn more on [NYU's Counseling & Wellness Services](#) website.

DIGITAL MARKETING ANALYTICS

Professor Anindya Ghose

January 2024

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COURSE OVERVIEW

From Twitter to Facebook to Google to the smartphone, the shared infrastructure of IT-enabled platforms are playing a transformational role in today's digital age. This course examines the major trends in digital marketing using tools from business analytics and data science. While there will be sufficient attention given to top level strategy used by companies adopting digital marketing, the focus of the course is on business analytics: how to make firms more intelligent in how they conduct business in the digital age. Measurement plays a big role in this space.

The course is based off various assignments that I have been involved in with companies over the last 20 years. I have consulted for Alibaba, Apple, Berkeley Corporation, CBS, Dataxu, DFS Group, Facebook, Google, HR Ratings Mexico, Marico India, Microsoft, NBC Universal, OneVest, Samsung, Showtime, Snapchat, Verizon, Yahoo, 1-800-Contacts, and 3TI World, and collaborated with Adobe, Alibaba, China Mobile, Google, IBM, Indiegogo, Iqiyi, Microsoft, Recobell, Telefonica, Travelocity, Via, and many other leading firms on realizing business value from IT investments, internet marketing, business analytics, mobile marketing, digital analytics, social media, and other areas.

In addition to the various phenomena shaping the digital economy, we will discuss statistical and econometric issues in data analytics and casual inference such as:

- selection problem, omitted variables problem, endogeneity and simultaneity problems
- assessing the output of a regression and interpreting the results to tell a story
- various econometrics-based tools such as multivariate regressions, linear and non-linear probability models (Logit and Probit), estimating discrete and continuous dependent variables, count data models (Poisson and Negative Binomial), cross-sectional models vs. panel data models (Fixed Effects and Random Effects)
- experimental techniques that help can tease out correlation from causality such as randomized field experiments

We will be using a software package called STATA (available from the Stern Apps server) or R to analyze data. The choice of STATA vs R is up to the student but the instructor will use STATA in class for illustrative purposes only. In order to get the most out of the course, students need to have a solid understanding of regression analyses and statistics. The focus of data analytics will be on causal or explanatory modelling as opposed to pure predictive modelling or data

mining. In-class time will be spent largely on lectures, in-class assignments involving data analyses using statistical modelling and case study analyses.

COURSE DESCRIPTION

Our goal in this class is to discuss the new business models that have been enabled by Internet-based new media and digital technologies, and to analyze the impact these technologies have had on industries, firms and people. We will inform our discussions with insights from data and conceptual frameworks that can guide us. To recognize how businesses can successfully leverage these technologies, we will therefore go beyond the technology itself and investigate some key questions. A few examples (these are just illustrative and not comprehensive) are as follows:

1. What are the metrics for measuring ROI in sponsored search and display advertising?
2. What role does programmatic advertising play in the digital marketing world? What are the different experimental methods used for measurement and causal analyses in the digital marketing world?
3. What frameworks are deployed today for marketing mix modeling and digital attribution modeling?
4. What is the economic value of textual information in online markets? What are the techniques used these days in this space for mining unstructured data?
5. How are mobile technologies enabling newer kinds of predictive analytics for better targeting of consumers?
6. What are the key effectiveness metrics used by firms these days to measure the performance of mobile marketing?

These are just some examples of questions we will address through lectures.

GRADING

Students need to be prepared for each class and have read the assigned cases. A student's overall score will be calculated as the weighted average of the scores computed according to the following distribution:

1. Pre Module Questions and Case Analyses 25%
2. In-Class Data Analyses and Case discussions 25%
3. Final Individual Assignments (Post Module) 50%

REQUIRED READING – CASE STUDIES ON NYU CLASSES

1. Air France Internet Marketing: Optimizing Google, Yahoo, MSN, and Kayak Sponsored Search (Product number: KEL319-PDF-ENG) by Mark Jeffery, Lisa Egli, Andy Gieraltowski, Jessica Lambert, Jason Miller, Liz Neely, and Rakesh Sharma.
2. Cloverleaf case by Anindya Ghose and Lee Thomas. January 2015.

RECOMMENDED READING – EBOOK

Tap: Unlocking the Mobile Economy – Anindya Ghose (2017)

PRE-MODULE INDIVIDUAL ASSIGNMENT

- This is a group assignment. All pre-module work is to be done in groups of 4 or 5 members. If you cannot form a group, you may submit individually.
- A 3 hour Pre Module video tutorial on STATA and regressions will be offered. The purpose of this tutorial is to help you prepare for the remaining course that involves running statistical regressions and econometric models. Please watch all the videos that provide the tutorials for how to run regressions in STATA.
- The Cloverleaf excel dataset in NYU Classes has two tabs: one is the main data and the other is the legend for the variables
- Based on this dataset, build and estimate using STATA an OLS (ordinary least squares regression model) that predicts the drivers of click-through rate for a search keyword ad. Interpret the various coefficients in the regression output in terms of their signs and statistical significance.

POST-MODULE INDIVIDUAL ASSIGNMENT

- 1) There will also be an individual exam consisting of Multiple Choice questions and True/False questions. It will be open book and open notes. The exam has three parts.
 - Part (A) consists of multiple-choice questions.
 - Part (B) has 'true-or-false' questions.
 - Part (C) consists of short-answer questions.

The table below is a tentative guideline of the different substantive topics and econometric methods we will learn over the two days. They will go hand in hand. The exact order will be subject to change.

SESSION	TOPICS
Substantive Topics	<ul style="list-style-type: none"> • New Media Enabled Business Models • Search Engines and Digital Advertising. • Marketing Mix Modeling • Sentiment Analysis and Word-of-Mouth Modeling • The Mobile Economy
Methods Used in Data Analytics	<ul style="list-style-type: none"> • STATA introduction • Multivariate regressions • Endogeneity and simultaneity problems in regressions • Linear and non-linear probability models • Count data models • Fixed Effects and Random Effects.

DETAILED SESSION OUTLINE

Day 1

- Overview of the current digital landscape
- Four pillars of business analytics
- Search advertising
- Hands-on case analysis Air France search marketing case.
- Display advertising and programmatic marketing
- A framework for digital attribution and marketing mix modeling.
- Case discussion of BBVA Bank.

Day 2

- Online communities
- Text mining and Word of Mouth modeling
- Analyses using the High Note Freemium Pricing case
- Mobile economy monetization and analytics
- Hands on data analyses in class: Mobile apps demand estimation exercise

BIO OF PROFESSOR GHOSE

Anindya Ghose is the Heinz Riehl Chair Professor of Technology and Marketing at New York University's Leonard N. Stern School of Business where he holds a joint appointment in the [TOPS](#) and [Marketing](#) departments. He is the author of [TAP: Unlocking The Mobile Economy](#) which is a double winner in the [2018 Axiom Business Book Awards](#) and has been translated into five languages (Korean, Mandarin, Vietnamese, Japanese and Taiwanese). He is the Director of the [Masters of Business Analytics Program](#) at NYU Stern. He is a Leonard Stern Faculty Scholar with an MBA scholarship (the Ghose Scholarship) named after him. He has been a Visiting Professor at the Wharton School of Business. In 2014, he was named by Poets & Quants as one of the [Top 40 Professors Under 40 Worldwide](#) and by Analytics Week as one of the [Top 200 Thought Leaders in Big Data and Business Analytics](#). He is the youngest recipient of the prestigious [INFORMS ISS Distinguished Fellow Award](#), given to recognize individuals who (i) have made outstanding intellectual contributions to the discipline with publications that have made a significant impact on theory, research, and practice and (ii) intellectual stewardship of the field as reflected in the mentoring of doctoral students and young researchers. In 2017 he was recognized by Thinkers50 as one of the [Top Management Thinkers](#) globally most likely to shape the future of how organizations are managed and led in the next generation. Thinkers50 also bestowed the [Distinguished Achievement Award Nomination](#) for 'Digital Thinking' in 2017. In 2019, he was recognized by Web of Science citation Index [in the top 1%](#) of researchers selected for their significant influence in their fields over a 10 year period (2008-2018). In 2020, he was recognized by the INFORMS Information Systems Society (ISS) with the inaugural [Practical Impacts Award](#). This award honors business school academics who have demonstrated outstanding leadership and sustained impact on the industry by deeply influencing practitioners, managers, executives, and policy makers using their academic research. In 2022, he became the youngest recipient of the [Distinguished Alumni Award](#) from IIM Calcutta in its 58 year history. He received the [AIS Fellow Award](#) in 2022. This award is given to scholars who have made significant global contributions to the discipline in terms of research, teaching and service. His rise from assistant to full professor in 8.5 years at NYU Stern is widely regarded as one of the fastest in the history of several disciplines in business schools globally.

He has consulted in various capacities for [Alibaba](#), [Apple](#), [Berkeley Corporation](#), [CBS](#), [Dataxu](#), [Delhivery](#), [DFS Group](#), [Facebook](#), [Google](#), [HR Ratings Mexico](#), [Marico India](#), [Microsoft](#), [NBC Universal](#), [OneVest](#), [Samsung](#), [Showtime](#), [Snapchat](#), [TD Bank](#), [Tinder](#), [Verizon](#), [Yahoo](#), [1-800-Contacts](#), and [3TI World](#), and collaborated with [Adobe](#), [Alibaba](#), [China Mobile](#), [Google](#), [IBM](#), [Indiegogo](#), [Iqiyi](#), [Microsoft](#), [Recobell](#), [Shinsegae Korea](#), [Telefonica](#), [Travelocity](#), [Via](#), and many other leading firms on realizing business value from IT investments, internet marketing, business analytics, mobile marketing, digital analytics, social media, and other areas. He serves or has served as an Advisor to start-ups in the US, India, Hong Kong, Netherlands, South Korea, Singapore, and China including [Revenue Roll](#), [Leverage Edu](#), [Netcore](#), [Ibus Networks](#), [ZeroWeb](#), and [EywaMedia](#) amongst others. He is a Council Board Member of the [All India Gaming Federation](#). He serves on the [Board of Directors of Delhivery](#).

He has served as an expert witness for information technology and consumer-related litigation and has provided expert testimony in multiple trials and depositions. He has experience in securities, intellectual property, antitrust and competition, trademark and copyright infringement, valuation, and merger appraisal cases. He has provided expert deposition or trial testimony in several high profile litigation matters, including the [Tinder vs. Match valuation lawsuit](#), [Washington DC vs. Meta Cambridge Analytica Privacy lawsuit](#), [TD Bank vs. Stanford Ponzi Scheme](#), [the Facebook IPO matter](#), [the Verizon-AOL merger appraisal matter](#), [the Federal Trade Commission's anti-trust case against 1-800-Contacts](#), [the Snapchat patent violation case against Vaporstream](#), [the counterfeit goods case against Amazon](#), [the Yahoo privacy breach matter](#), and [the interactive music streaming royalty rate case between Apple, Amazon, Google, Spotify, and the Copyright Royalty Board](#).

He is affiliated as a Scientific Expert with [Compass Lexecon](#).

He has published more than 110 papers in premier scientific journals and peer reviewed conferences, and has given more than 300 talks internationally. He is a frequent keynote speaker in executive gatherings and thought leading events globally. His research has received **27 best paper awards and nominations**. He is a winner of the NSF CAREER award and has been awarded **16 grants** from Google, Microsoft, Adobe, Marketing Science Institute, and several other corporations. His research analyzes the economic consequences of the Internet on industries and markets transformed by its shared technology infrastructure. He has worked on digital platforms, product reviews, reputation and rating systems, digital marketing, data privacy trade-offs, digital advertising, wearable technologies, mobile commerce, mobile advertising, crowdfunding, and online markets.

He has been interviewed and his research has been profiled numerous times in the *BBC, Bloomberg TV, CNBC, China Daily, The Economist, The Economic Times, Financial Times, Fox News, Forbes, The Guardian, Knowledge@Wharton, Korean Broadcasting News Company, Los Angeles Times, Marketplace Radio, MSNBC, National Public Radio, NBC, Newsweek, New York Times, New York Daily, NHK Japan Broadcasting, Quartz, Reuters, Time Magazine, Washington Post, Wall Street Journal, Xinhua*, and elsewhere. He teaches courses on social media, digital marketing, business analytics and IT strategy at the undergraduate, MBA, EMBA, MSBA, and Executive Education level in various parts of the world including the US, India, China, South Korea, Taiwan, and Europe.

He has served on the Research Council of the Wharton Customer Analytics Institute, and is a faculty affiliate with the Marketing Science Institute. He has served as an Associate Editor of *Management Science* and a Senior Editor of *Information Systems Research* and is currently serving as a Department Editor of *Management Science*. He has a B. Tech in Engineering from the National Institute of Technology (NIT) in Punjab, and an M.B.A in Finance, Marketing and Systems from the Indian Institute of Management, Calcutta. He received his M.S. and Ph.D. from Carnegie Mellon University's Tepper School of Business.

Anindya is an avid high altitude mountaineer. He has climbed in multiple continents, and is always looking forward to his next summit.