




MASTER OF SCIENCE IN ANALYTICS
PRACTICUM PROGRAM



UNIVERSITY OF SAN FRANCISCO



The Master of Science in Analytics (MSAN) Program at the University of San Francisco trains students to scrape, process, organize, and analyze large data sets to identify patterns and trends. The resulting analytics are used to drive strategic and operational decisions for our Practicum partners.

PROGRAM OVERVIEW

The Master of Science in Analytics (MSAN) program at the University of San Francisco is a full-time, one-year, technically-rigorous program that provides students with the skills necessary to develop techniques and processes for data-driven decision-making.

PRACTICUM OVERVIEW

The Practicum is a project sponsored by a company, allowing students to work with industry partners to gain analytics experience and reconcile mathematical theory with business practice. Student groups—supervised by an MSAN faculty member—work with the Practicum company to identify, define, scope, and analyze a particular business problem. All groups are additionally supported and supervised by the MSAN Practicum director.

Each cohort of MSAN students is engaged in Practicum projects from October through July of each academic year, in which they are expected to work 15 hours per week. The duration of Practicum projects can be tailored to company needs, from fourteen weeks up to nine months. The MSAN program does not require that students be compensated.

The Master of Science in Analytics program at the University of San Francisco sends Practicum teams to companies tackling data science problems in industries ranging from high-frequency trading to hospitality and energy efficiency to sports. Our Practicum partners are small start-up companies, not-for-profit organizations, and established Bay Area technology firms. Practicum partners include Airbnb, PayPal, Uber, Williams-Sonoma, Flyr, Wells Fargo, GE Software, and Houston Astros.

CURRICULUM HIGHLIGHTS

Statistical Modeling

- Linear Regression Analysis
- Time Series Analysis
- Multivariate Statistical Analysis
- Experimental Design*

Data Management

- Data Acquisition
- Relational Databases (SQL)
- Introduction to Distributed Computing
- Advanced Distributed Computing*
- NoSQL Databases
- Data Visualization

Computation and Machine Learning

- Exploratory Data Analysis
- Computation for Analytics
- Introduction to Machine Learning
- Advanced Machine Learning
- Network Analytics*
- Bioinformatics*

Strategy and Operations

- Business Strategy for Big Data
- Web Analytics
- Marketing Analytics*
- Supply Chain Analytics*

Professional Skills

- Practicum
- Business Communications for Analytics
- Application Development for Data Science
- Interview Skills

*Electives

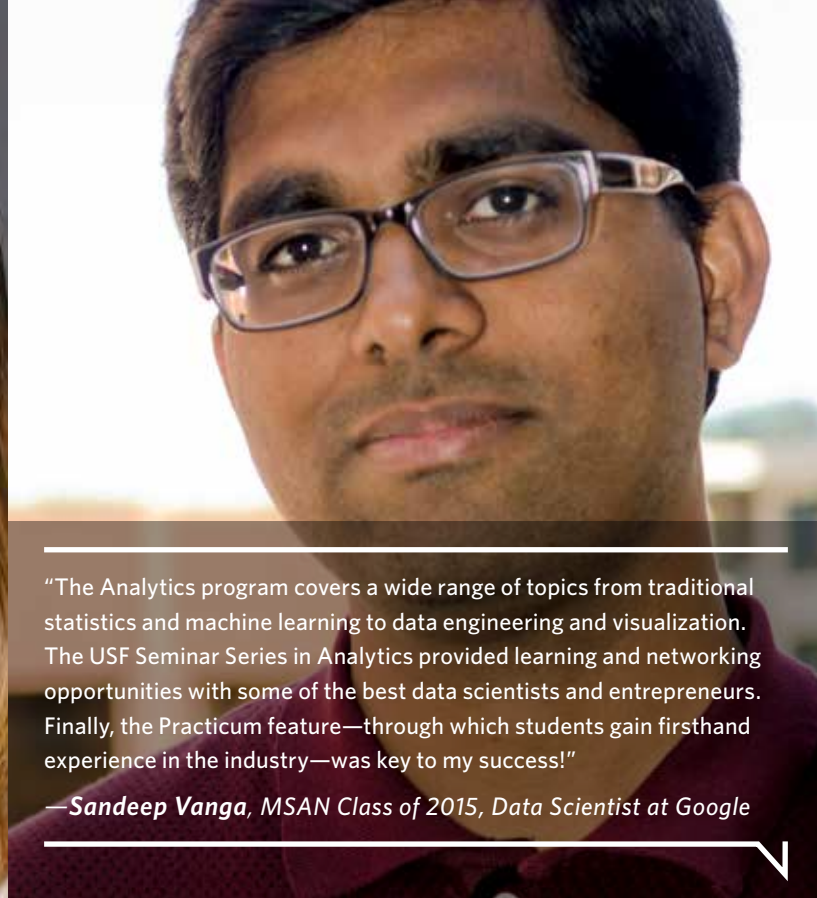
“The MS in Analytics program at USF not only equips students with the technical skills to master data science and analytics techniques, but also provides them the opportunity to apply these skills directly to real-world problems. Through the Practicum program, students are able to gain valuable industry experience and guidance by working alongside data science experts in top-notch Bay Area companies.”

—**Layla Martin**,
MSAN Class of 2015, Data
Scientist at Under Armour



“The Analytics program covers a wide range of topics from traditional statistics and machine learning to data engineering and visualization. The USF Seminar Series in Analytics provided learning and networking opportunities with some of the best data scientists and entrepreneurs. Finally, the Practicum feature—through which students gain firsthand experience in the industry—was key to my success!”

—**Sandeep Vanga**, MSAN Class of 2015, Data Scientist at Google



“As a woman in technology, I really enjoyed working with our female faculty and being a part of a program that values a gender-balanced cohort. The program provided me an opportunity to establish my foundation as a data scientist and also to network with tech companies in the Bay Area.”

—**Erica Lee**, MSAN Class of 2016, Data Scientist at NCSOFT



“Being educated in such a technically-rigorous program combined with being located in arguably the most influential technological hub allows students such as myself to engage with companies, such as Uber, that are on the cutting edge of analytical innovation.”

—**Spencer Boucher**, MSAN
Class of 2014, Data Scientist
at Uber





"Williams Sonoma Inc. Analytics has participated in the USF MSAN Practicum program over the last three years. The Program has provided an exciting opportunity to extend our Data Science practice into novel areas while engaging a community of learners and practitioners. We have been very impressed by the quality and diligence of the candidates and we have noted the excellent support that they receive from their Program mentors. Suffice to say that our experience has been extremely positive and we plan to continue our association."

Holly Toboni, Director of Customer Analytics at Williams Sonoma Inc.

BECOMING A PRACTICUM PARTNER

The partnership process is designed to provide adequate structure to ensure a successful student experience while integrating seamlessly into a company's existing business practices. While there is no set formula for defining ideal Practicum matches, companies with the technical and operational capacity to manage part-time employees on a project-specific basis will have an advantage. Successful Practicums have a company champion who is minimally able to dedicate one hour per week to meet with and guide students.

In late September, all Practicum partners make a project pitch to all MSAN students, followed by a student-Practicum partner matching process supervised by the

MSAN Practicum Director. Student groups can be a single student, or may comprise as many as four students. Companies may become Practicum partners at any time throughout the year.

The best way for companies to participate in the Practicum program is to become a member of the Data Institute. Membership provides a host of benefits, including guaranteed student assignments to the Practicum project. A list of membership levels and associated benefits can be found at usfca.edu/data-institute. Memberships include tiers aimed at nonprofit institutions and start-ups.

TEACHER-SCHOLARS & PRACTITIONERS

Full time teacher scholars and practitioners of data science bring real world expertise to the classroom.

Michael Brzustowicz, PhD
Google

David-Guy Brizan, PhD
City University of New York

Andy Buteau, MS
Facebook

Stephen Devlin, PhD
University of Maryland

Jeff Hamrick, PhD
Boston University

Yannet Interian, PhD
Cornell University

Paul Intrevado, PhD
McGill University

Terence Parr, PhD
Purdue University

Nick Ross, PhD
University of California, Los Angeles

Nathaniel Stevens, PhD
University of Waterloo

David Uminsky PhD
Boston University

James Wilson, PhD
University of North Carolina, Chapel Hill

Diane Woodbridge, PhD
University of California, Los Angeles

UBER

Eventbrite

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WHAT YOU CAN EXPECT

You can expect our students to be focused, work diligently, demonstrate a high level of professional conduct, exhibit strong written and oral communication skills, and take ownership of their Practicum project.

Whether a Practicum project is self-contained or part of a larger business initiative, our students are trained to address nuanced, complex and highly-challenging data problems that form part of the broader business context and objectives facing the Practicum partner.

Following an initial hypothesis, students typically engage in data acquisition, exploratory data analysis, feature extraction, model development and evaluation, as well as oral and written communication of results. Class schedules are set so that students can work onsite one or two days per week. Each student on the Practicum team is expected to work 15 hours per week. MSAN faculty are assigned to supervise Practicums. They ensure that projects are

structured with frequent milestones and that students produce tangible benefits and actionable insights. Students will receive a grade on their Practicum projects for MSAN program credit, and Practicum partners will have the ability to provide a project appraisal that substantially impacts final grades. The faculty advisor and directors remain in close contact with the company throughout the Practicum to ensure the project stays on track and meets the objectives set forth in the work agreement.

Our partners at Dictionary.com, Under Armour, Flyr, Uber, Autogrid, GE Software, PayPal, Google, Clorox, and Williams-Sonoma have hired students from their respective Practicum teams into full-time positions.

We invite you to find out more about how your organization might benefit from working with a group of highly-motivated and committed students from this innovative and interdisciplinary graduate program.

At **Williams-Sonoma**, students developed an automatic image selection and tagging algorithm using ensemble methods, achieving an accuracy of 99% between silhouette/product images and 90% accuracy for color prediction and labeling.

Students at **Eventbrite** implemented a K Nearest Neighbors model that clustered events with similar characteristics to leverage the distribution of costs of similar, successful events to suggest an appropriate range of ticket prices that the organizer can use when creating an event.

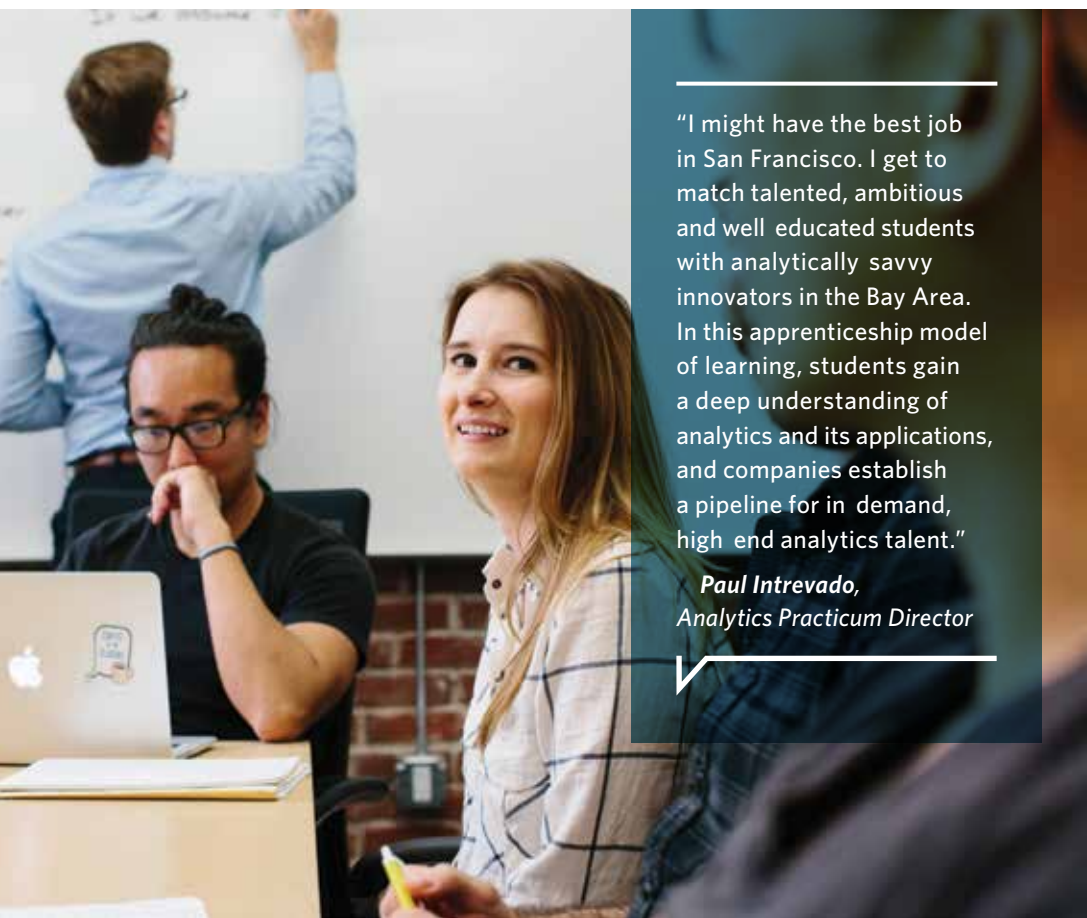
At **First Republic Bank**, students developed an automated process to optimize cash allocation for the liquidity buffer and a loan level loss allocation process to support capital stress testing.

Students at **Capital One Data Labs** employed machine learning techniques using H2O and Dato in order to evaluate software robustness and increase accuracy of fraud detection.

At **Airbnb**, students employed machine learning techniques to identify features indicative of positive outcomes using R and Python and used D3.js to build a web session visualizer.

At **Vungle**, students used Python and Spark to improve both the efficiency and accuracy of predictions for an ad recommendation system and lifetime value related models.

Students at **UCSF** performed text and geo spatial analysis on over 300,000+ tweets for a time series analysis to create a model to detect conjunctivitis outbreaks.



"I might have the best job in San Francisco. I get to match talented, ambitious and well educated students with analytically savvy innovators in the Bay Area. In this apprenticeship model of learning, students gain a deep understanding of analytics and its applications, and companies establish a pipeline for in demand, high end analytics talent."

Paul Intrevado,
Analytics Practicum Director



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