



MathSci.ai

# Panel: Teaching the Mathematics of Data Science

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2/28/2025

# Math = Key to AI



The Coca-Cola Company

Director, Data Science & Analysis

Bachelor's or Master's degree in **Statistics**, Economics, **Mathematics**, Computer Science, or related discipline

2/28/2023



Data Scientist, Product Analytics (PhD)

Currently has or in the process of obtaining **Ph.D. in Mathematics, Statistics**, a relevant technical field, or equivalent practical experience. Degree must be completed prior to joining Meta.



NVIDIA

10,001+ employees

Artificial Intelligence Algorithms Engineer – New College Grad 2024

PhD or Master's Degree in Computer Science, AI, **Applied Math**, or related field  
**Strong Mathematical fundamentals** and AI/DL algorithms skills or experience

## OpenAI

Research Engineer/Scientist, Long Context (Foundations)

You have a background in statistical machine learning, physics, **mathematics**, or another theoretically and empirically rigorous field.

Product Manager, ChatGPT Growth

Obtained a bachelor's degree in Computer Science, Engineering, Information Systems, Analytics, **Mathematics**, Physics, Applied Sciences, or a related field.



Senior Data Scientist

Degree in a quantitative field (e.g. **Statistics, Mathematics**, Physics)



Data Scientist - New Grad (2025 Start)

You will have graduated in December 2024 or Spring 2025 with a Master's or PhD degree in a quantitative field (e.g., **Statistics, Math**, Computer Science, Physics, Economics, Operational Research or Engineering)



Data Scientist III, Research

Master's degree in **Statistics**, Data Science, **Mathematics**, Physics, Economics, Operations Research, Engineering, or a related quantitative field.



# What's Missing in Math Requirements

## What's Typically Required

- Calculus ~~(x3)~~ (x2)
- Linear Algebra
- Differential Equations
- Discrete Mathematics
- Real Analysis
- ~~Complex Analysis~~
- ~~Abstract Algebra~~

*Career Options*

## What Should Be Required

- Probability
- Programming
- Inference (Optimization or Statistical)
- Modeling (Statistical or Computational)

Data Science

Computational Sci & Eng

Software Eng.

Financial Mathematics

Mathematical Biology

# Key Math Skills for Data Scientists



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- Numerical Linear Algebra
  - Rank
  - Solving Linear Systems, Least Squares
  - Eigen- and Singular Value Decompositions
  - Computational Complexity
- Numerical Optimization
  - Gradients and related concepts
  - Chain rule!
  - Basic definitions – critical point, minimizer, global versus local, etc.
  - Methodology – methods, line searchers, etc.
- Probability
  - Rules of Probability, e.g., Bayes Theorem
  - Bias and Variance
  - Standard Distributions
  - Principal Component Analysis

