JOHNS HOPKINS
CAREY BUSINESS SCHOOL

# DATA IN ACTION: ANALYTICS CONSULTING PROJECT WITH QUODD

Collaborating for data-driven innovation

## ABOUT THE ANALYTICS CONSULTING PROJECT

Turn your data challenge into actionable business value through a classroom-powered consulting competition. In eight weeks, organizations work with teams of Business Analytics and Artificial Intelligence students to engineer data, build machine learning solutions, and pressure test solution models, delivering a portfolio of analytical approaches with clear KPIs to inform strategy and speed implementation. Supported by Carey faculty, students apply a range of analytical methods tailored to your business challenge. Methods can include regression, classification, clustering, time series forecasting, optimization, and modern AI simulation. The result is actionable insights, reproducible code, and executive-ready recommendations that help your organization move from data to decision.

## BUSINESS PARTNER: QUODD

QUODD is a next-generation financial market data provider delivering enterprise-grade, normalized data across all major asset classes with uncompromising reliability and compliance. QUODD powers mission-critical trading systems, portfolio accounting, and digital client experiences through cutting-edge cloud APIs and enterprise feeds. By combining comprehensive market coverage with streamlined exchange licensing, QUODD eliminates the complexity and cost burdens of legacy vendors.

## PROJECT GOAL

### ENHANCE DATA INTEGRITY THROUGH ADVANCED ANOMALY DETECTION

QUODD's Data Quality Manager partnered with student consulting teams to strengthen the reliability of historical equity pricing across the New York Stock Exchange, NASDAQ, and OTC Markets Group.

- **The objective:** Build a scalable framework for detecting and categorizing anomalies that compromise client trading platforms, portfolio accounting systems, and regulatory compliance.

> "Working across millions of records in one of the most complex data environments in financial markets, these students identified key areas of exposure and delivered production-ready tools that meaningfully advance how QUODD ensures data integrity."
>
> **RITU GHOSH**
> Data Quality Manager at QUODD

## PROJECT APPROACH

### METHODOLOGY

- Designed a Python-based detection pipeline to accurately flag pricing anomalies, data gaps, and missing corporate action adjustments
- Combined rule-based detectors with statistical methods including rolling Z-score, STL decomposition, Prophet forecasting, DBSCAN clustering, and volatility-aware dynamic thresholds
- Analyzed raw and adjusted prices and adjustment factors to isolate root causes across different anomaly categories
- Cross-validated flagged anomalies against external sources to verify suspected anomalies and reduce false positives
- Assigned severity scores and tiered priorities to flagged anomalies, producing review-ready outputs for QUODD's data engineering team

## DATA AND RESEARCH

### HISTORICAL TIME SERIES ANALYSIS

- Analyzed equity price data across XNYS, XNAS, and OOTC, from 1994 to present date via QUODD's Historical API
- Examined corporate actions as critical factors affecting cumulative historical accuracy and adjustment logic failures
- Integrated external validation sources like SEC EDGAR filings, Yahoo Finance, and exchange trading calendars

## OUTCOMES

Students presented an executive summary of findings and recommendations to QUODD's leadership, outlining strategies to optimize the organization's data quality framework. The final deliverable included a fully documented Python notebook containing:

- Produced anomaly catalogs organized by root cause, paired with severity-scored CSV outputs designed for direct triage
- Demonstrated detection workflows that process large segments of QUODD's historical universe in minutes per exchange, with configurable thresholds and modular detectors that can be tuned without code changes
- Key insights to strengthen QUODD's adjustment logic and embed automated data quality gates into production workflows

> "Working with QUODD gave me the rare opportunity to tackle a real-life business issue by building a production-ready anomaly detection pipeline. It showed me how rigorous data engineering can directly translate into business impact."
>
> **XINYUE XING**
> BAAI '26

## DATA SECURITY

Carey uses Johns Hopkins University's SAFER environment, a cloud-based system meeting federal standards for sensitive information. Students accessed data through individual virtual desktops with multi-factor authentication in a controlled space where downloading, copying, or removing data was disabled. Upon project completion, all work was securely returned to QUODD before being deleted to ensure complete data protection.

## CAREY EXPERTISE

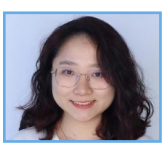
Meet the students selected as the top-performing team on this challenge. Their diverse backgrounds, collaborative mindset, and support from their faculty coaches helped them deliver innovative solutions.

### STUDENTS

**Jialu Chi**: Chi holds degrees in accounting and finance and cares about energy markets, optimization, quantitative trading, and sustainable management

**Yuanheng Fang**: Fang is interested in AI applications and financial data quality

**Xinyue Xing**: Xing is passionate about AI analytics, financial services industries, and stream media



**Qiyue Yao**: Yao has experience in AI education technology, financial data analytics, and user growth strategy

**Yumeng Jiang**: Jiang's background is in data-driven business strategy, machine learning, and time-series analytics

### FACULTY

**Nazli Turken**: Expertise in operations management and business analytics

**Rick Smith**: Expertise in business consulting, strategic human capital, global strategy, strategic management and leadership

**Christina Black**: Expertise in business communication, law and ethics, management and organization

## READY TO SOLVE YOUR ORGANIZATION'S CHALLENGES?

Please contact **Experiential Learning Director Dan Sheats at dansheats@jhu.edu** to discuss how your organization can participate in the Analytics Consulting Project.