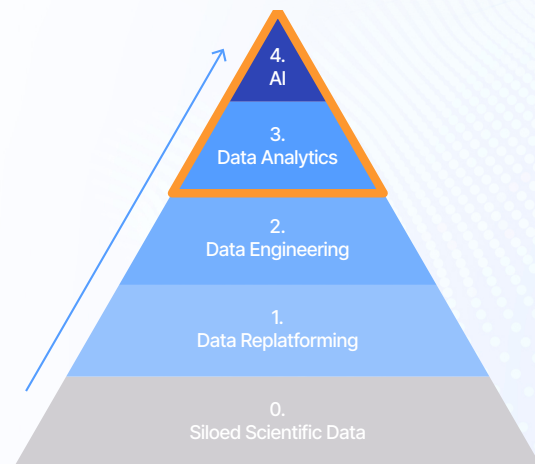


Case Study Highlights: Data Analytics and Scientific AI

Modern biopharma generates vast volumes of scientific data, but raw, siloed data has limited value. To unlock its full potential, it must follow a defined sequence of operations. This journey consists of four layers:

1. **Data Replatforming:** Assemble scientific data into a centralized, purpose-built cloud while automating data workflows.
2. **Data Engineering:** Convert replatformed data into purpose-engineered, liquid, compliant, and large-scale datasets, which are optimized for advanced analytics and AI/ML.
3. **Data Analytics:** Visualize trends, monitor operations, and extract real-time insights using interactive dashboards and data applications.
4. **Scientific AI:** Build and train AI/ML models using high-quality datasets to predict and optimize scientific outcomes.

Here, we focus on the top two layers—**analytics and AI**. The following case studies show how biopharmaceutical organizations use replatformed and engineered data from the Tetra Scientific Data and AI Cloud™, combined with advanced analytics and AI, to accelerate decision-making, scale operations, and gain deeper scientific insights across the value chain.



Explore the case studies

Click any case study below to jump to its summary.

Discovery & Research

High-throughput screening #1

High-throughput screening #2

Cell profiling/sorting #1

Cell profiling/sorting #2

Development/CMC

ADME/Tox testing

Lead clone selection

Media formulation

Bioprocess purification development

Gene therapy development (qPCR)

Manufacturing & Quality

Quality testing

Fueling drug discovery with AI-native data

Phase: Research & Discovery

Customer: Leading biotech

Challenge

Scientists relied on a manual, fragmented workflow to prepare high-throughput screening (HTS) data for AI applications. Data movement between instruments and systems was error-prone and time-consuming, with no single source of truth or standardized metadata. This slowed research and compromised data integrity.

Solution

The company adopted the Tetra Scientific Data and AI Cloud to automate data collection, contextualization, and migration across systems. Streamlined HTS workflows ensured consistent metadata, eliminated manual transfers, and delivered AI-ready datasets in real time to support faster, more scalable drug discovery.

Outcomes

- Streamlined operations, freeing up 240 hours per year for scientists
- Improved data accessibility with centralized, contextualized data in the cloud
- Enhanced data integrity by minimizing manual, error-prone tasks
- Future-proofed integrations and pipelines
- Automatically prepared AI-native data

[Read Full Case Study](#)

Powering dashboards for faster drug discovery

Phase: Research & Discovery

Customer: Clinical-stage biotech

Challenge

Scientists had limited access to high-throughput screening data. Most could not access the screening data directly and had to rely on computational biologists to manually gather, process, and analyze it. This inefficient process slowed drug discovery.

Solution

The company deployed the Tetra Scientific Data and AI Cloud to centralize, contextualize, and engineer screening data into AI-ready data. This data now powers a searchable dashboard, giving all scientists real-time access to visualizations without relying on intermediaries.

Outcomes

- Reduced data search and aggregation time from 1–2 days to 10 minutes
- Boosted productivity by refocusing computational biologists on more valuable work
- Cut hit selection timelines from 2 weeks to 1–2 days

[Read Full Case Study](#)

Streamlined flow cytometry for antibody screening

Phase: Research & Discovery

Customer: Top 25 biopharma

Challenge

Manual data preparation, including gating and quality control, was a bottleneck in high-throughput antibody screening. Scientists spent hours per screen handling flow cytometry data, which slowed throughput, introduced errors, and limited scalability.

Solution

The Tetra Scientific Data and AI Cloud automated the collection, gating, contextualization, and QC of flow cytometry data. By integrating with customer-built tools and dashboards, the solution enabled faster data prep, improved data quality, and supported a scalable, multiplexed screening approach.

Outcomes

- Accelerated data preparation by 25x, including gating and QC
- Saved up to 48 hours per screen
- Increased screening throughput by over 3x by supporting a multiplexing approach
- Generated higher-quality data, centralized and searchable in the cloud

[Read Full Case Study](#)

Driving high-impact scientific outcomes with Tetra Sciborgs

Phase: Research & Discovery, Development/CMC

Customer: Top 25 biopharma

Challenge

The flow cytometry core facility faced complex data challenges. Scientists struggled with data curation, while facility staff had difficulty monitoring instrument performance. Both groups needed more efficient ways to manage and analyze their data.

Solution

Tetra Sciborgs applied a science-led approach that combines the Tetra Scientific Data and AI Cloud, domain expertise, and a library of scientific use cases and supporting artifacts to automate data ingestion, contextualization, and calibration monitoring.

Outcomes

- Redirect scientists' time spent on manual data processes to more valuable work
- Accelerated search and analysis by collecting and engineering data automatically in the cloud
- Enabled visualization and trending of instrument calibration data for predictive maintenance
- Recovered over \$50,000 per year through time savings

[Read Full Case Study](#)

Accelerating ADME/Tox testing with data science and AI

Phase: Development/CMC

Customer: Charles River Laboratories Hungary (SOLVO)

Challenge

Scientists conducting drug transporter assays employed inefficient, rigid experimental designs, testing more concentrations than necessary to determine IC_{50} values. This approach underutilized historical data, thereby increasing the time, cost, and manual effort required.

Solution

By replatforming and engineering data, the Tetra Scientific Data and AI Cloud supports the development and validation of an *in silico* model to optimize sampling and improve IC_{50} calculations.

Outcomes

- Cut the number of sampling points by half while improving IC_{50} accuracy
- Reduced wet lab experiments by 50%
- Decreased manual data curation by 1.5 FTE
- Developed the *in silico* model in only 5 months

[Read Full Case Study](#)

Lead Clone Selection Assistant

Phase: Development/CMC

Customer: Top 25 biopharma

Challenge

Lead clone selection is a critical yet resource-intensive step in biopharmaceutical development, traditionally taking around 8 months to complete. Technical, operational, and regulatory hurdles slowed time to clinic and drove up costs.

Solution

The Tetra Lead Clone Selection Assistant transforms this process by combining the Tetra Scientific Data and AI Cloud with advanced AI models like NVIDIA's VISTA-2D and Geneformer. This approach reduced lead clone selection timelines from months to weeks while improving stability and productivity.

Outcomes

- Accelerated timelines: Reduced lead clone selection and stability studies from 8 months to 2.5 months
- Lowered costs: Identifying super clones boosts titer 10x and cuts production costs by up to 85%
- Reduced risk: High-quality, accessible data enables timely decisions, minimizing delays and scale-up failures

[Watch Video](#)

[Read Solution Brief](#)

Media Formulation Assistant

Phase: Development/CMC

Customer: Top 25 biopharma

Challenge

Optimizing cell culture media for new cell lines is time-consuming and resource-intensive. Scientists had to test dozens to hundreds of formulations to identify those that yield the highest titers, slowing development and increasing costs.

Solution

Using the Tetra Media Formulation Assistant, scientists upload metabolic flux data to predict high-performing media *in silico*. The app leverages AI trained on similar cell lines to identify top candidates and provides explainable outputs.

Outcomes

- Reduced wet lab experiments by up to 88%
- Correctly predicted 8 of the top 10 formulations
- Enabled faster insight into key media components using explainable AI

[Watch Video](#)

Improving CMC with analytics-ready chromatography data

Phase: Development/CMC

Customer: Top 10 biopharma

Challenge

CMC scientists used time-consuming, manual methods to gather and analyze large, heterogeneous chromatography datasets from Cytive UNICORN and Waters Empower. This slowed purification process development and left little time for building predictive models.

Solution

The Tetra Scientific Data and AI Cloud automated data aggregation, harmonization, and analysis, delivering AI-native, contextualized datasets. Scientists now utilize an in-house application, powered by this engineered data, to streamline chromatography workflows and develop mechanistic models.

Outcomes

- Accelerated chromatography process development
- Redirected thousands of hours of manual data handling to model building
- Simplified search and retrieval of chromatography data
- Streamlined troubleshooting during scale-up to facilitate tech transfer
- Generated AI-native data for future AI applications

[Read Full Case Study](#)

Advancing gene therapy development with engineered qPCR data

Phase: Development/CMC

Customer: Top 10 biopharma

Challenge

Scientists used a manual, error-prone workflow to process quantitative polymerase chain reaction (qPCR) data for viral vector titers. This slowed throughput, risked data integrity, and made it difficult to analyze results across experiments.

Solution

The Tetra Scientific Data and AI Cloud automated data collection from instruments and the ELN, contextualized results with metadata, and delivered AI-ready datasets to a custom dashboard.

Outcomes

- Increased assay throughput by up to 6x
- Minimized manual steps, saving up to 1 hour per assay
- Enabled meta-analyses across multiple experiments

[Read Full Case Study](#)

Quality Control Workflows for Chromatography Data Analysis

Phase: Manufacturing & Quality

Customer: Top 10 biopharma

Challenge

Scientists relied on slow, manual processes for chromatography-based quality control, including system suitability tests and API shelf-life analysis. Data was siloed across instruments, required manual review and reporting, and lacked standardization. This led to inefficiencies, potential quality risks, and limited data reuse for downstream analysis or AI applications.

Solution

The biopharma implemented the Tetra Scientific Data and AI Cloud to automate chromatography data ingestion, harmonization, and analysis. By engineering analytics-ready data and enabling real-time visualization through tools like Jupyter notebooks, they streamlined system suitability testing, column monitoring, API shelf-life prediction, and overall QC reporting.

Outcomes

- Saved 2+ hours per week per scientist of manual file transfer work
- Reduced manual errors
- Streamlined downstream analysis via data science applications
- Improved data-driven decision-making

[Read Full Case Study](#)