How Cloud Labs Work

1. Command

Drop your samples off at designated drop off points on campus and design your experiments in the Command Center application.

2. Run

Your experiments are remotely conducted in a highly automated cloud lab facility exactly to your specifications.

3. Explore

Constellation organizes your data into a powerful knowledge graph, growing automatically over time as you conduct more experiments.

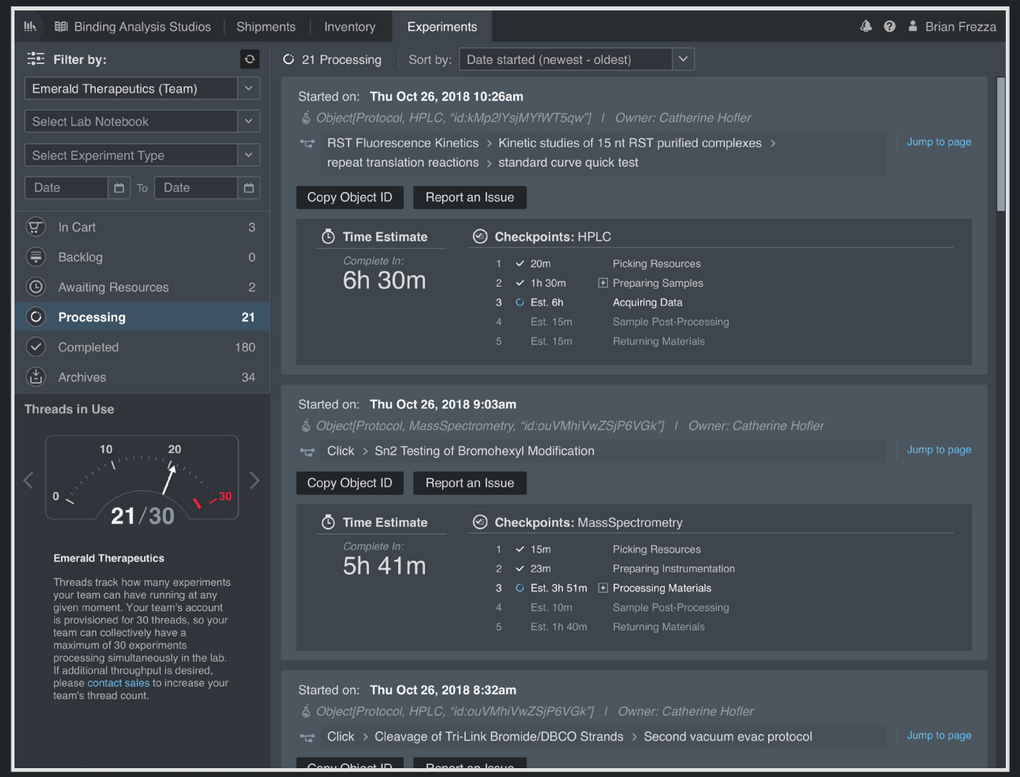
4. Analyze

Command Center provides an extensive suite of tools to plot, analyze, and visualize your results. Pick up your processed samples at the designated drop off points.

1. Command

Drop your samples off at designated drop off points on campus and design your experiments in the Command Center application.

Command Center

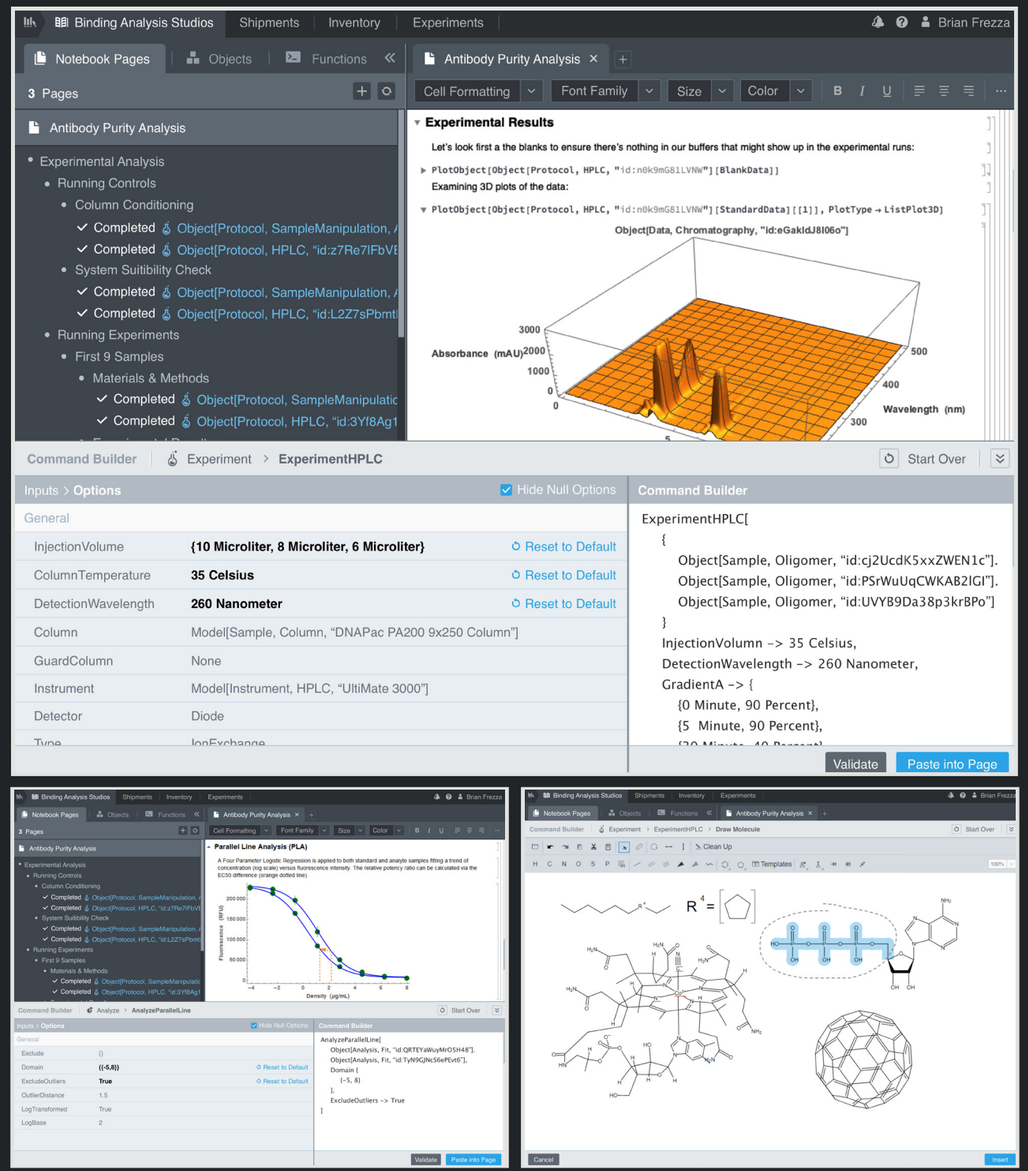


One Scientist, Infinite Hands

With a cloud lab account, you can execute as many experiments in parallel as you like, limited only by the rate at which you can think of them. It's not unusual for cloud lab users to be orchestrating dozens of protocols simultaneously, far more than one could ever manage working in a traditional laboratory.

The CMU cloud lab facility runs your experiments on-demand, 24-hours a day, 7 days a week, 365 days a year. Leaving just hours between the moment you conceive of your experiment and the moment you receive your results.

Accounts are priced based on their bandwidth in the lab — something we call lab threads. The number of lab threads is the maximum number of simultaneous experiments you can have running in the facility at a given moment during the day..



Automation Taken to its Logical Conclusion

Command Center is the gateway to the CMU cloud Lab and allows scientists to design and execute experiments, analyze results, and browse and search their data with zero manual labor. Command Center consolidates dozens of different instrument control and analysis packages into one seamless interface.

Because the cloud lab is command-driven, every action taken in the lab, as well as in data processing and visualization, is fully scriptable. You can build scripts which automatically execute a series of experiments of arbitrary complexity, reproduce results, process the data, and generate reports for you to analyze.

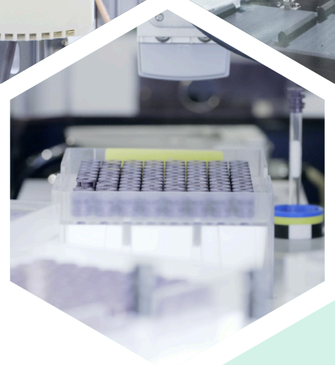
2. Run

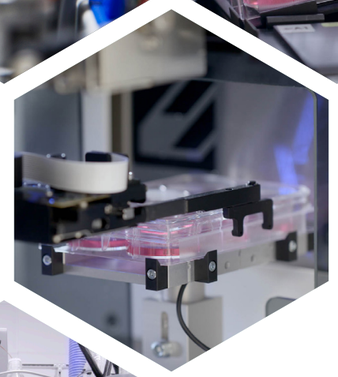
Your experiments are remotely conducted in a highly automated cloud lab facility exactly to your specifications.

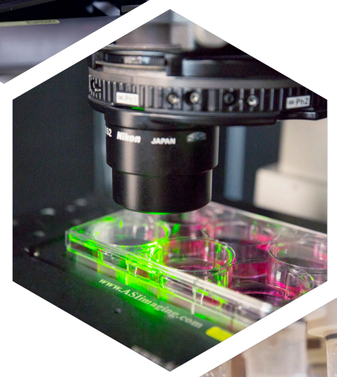
Let The Robots Do the Work

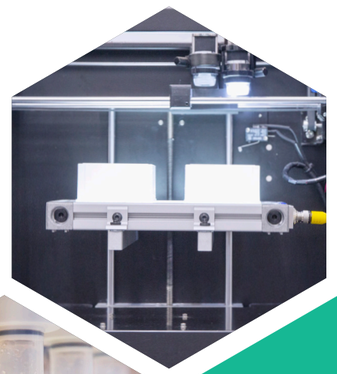
The CMU cloud lab allows you to remotely execute a wide array of experimental capabilities in our state-of-the-art facilities, including HPLC, Western Blot, Peptide Synthesis, Mass Spectrometry, and NMR. Experiments are conducted using automated instrumentation and robotics to carry out your instructions exactly as specified. Once you submit an experiment through the Command Center application, the experiment is run automatically and the results and observations are added to your database in just a few days.

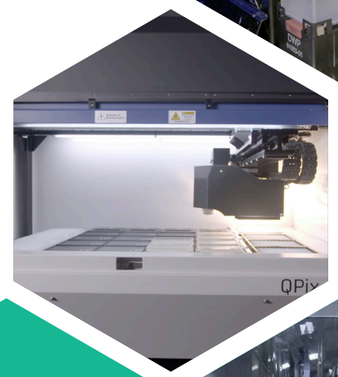
A list of the system's offerings can be found in the Scientific Instrumentation section of this document.

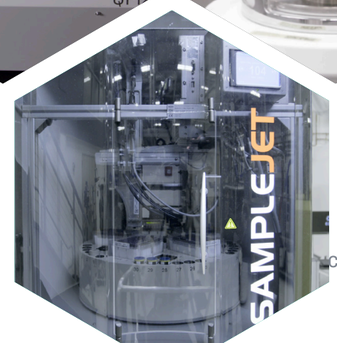






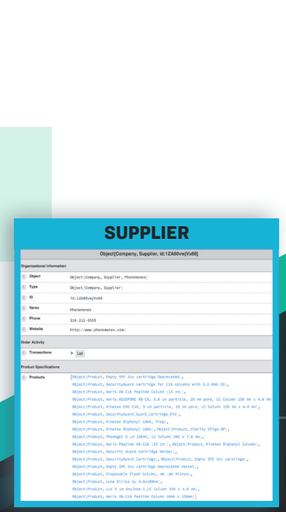


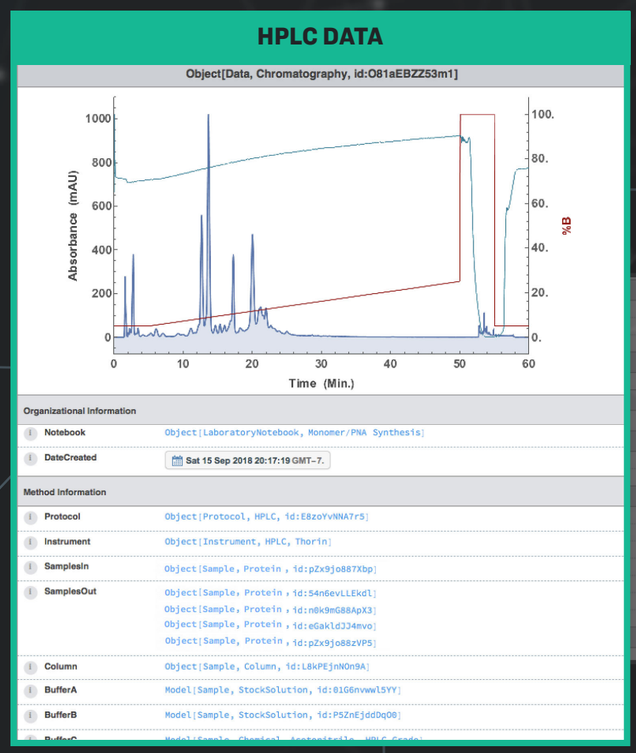


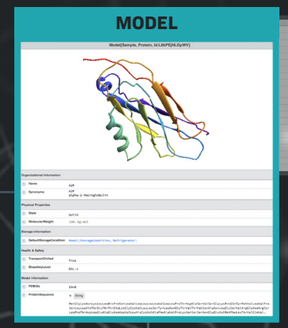


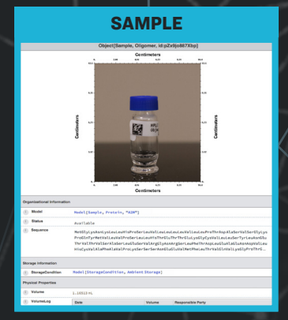
3. Explore

Constellation organizes your data into a powerful knowledge graph, growing automatically over time as you conduct more experiments.









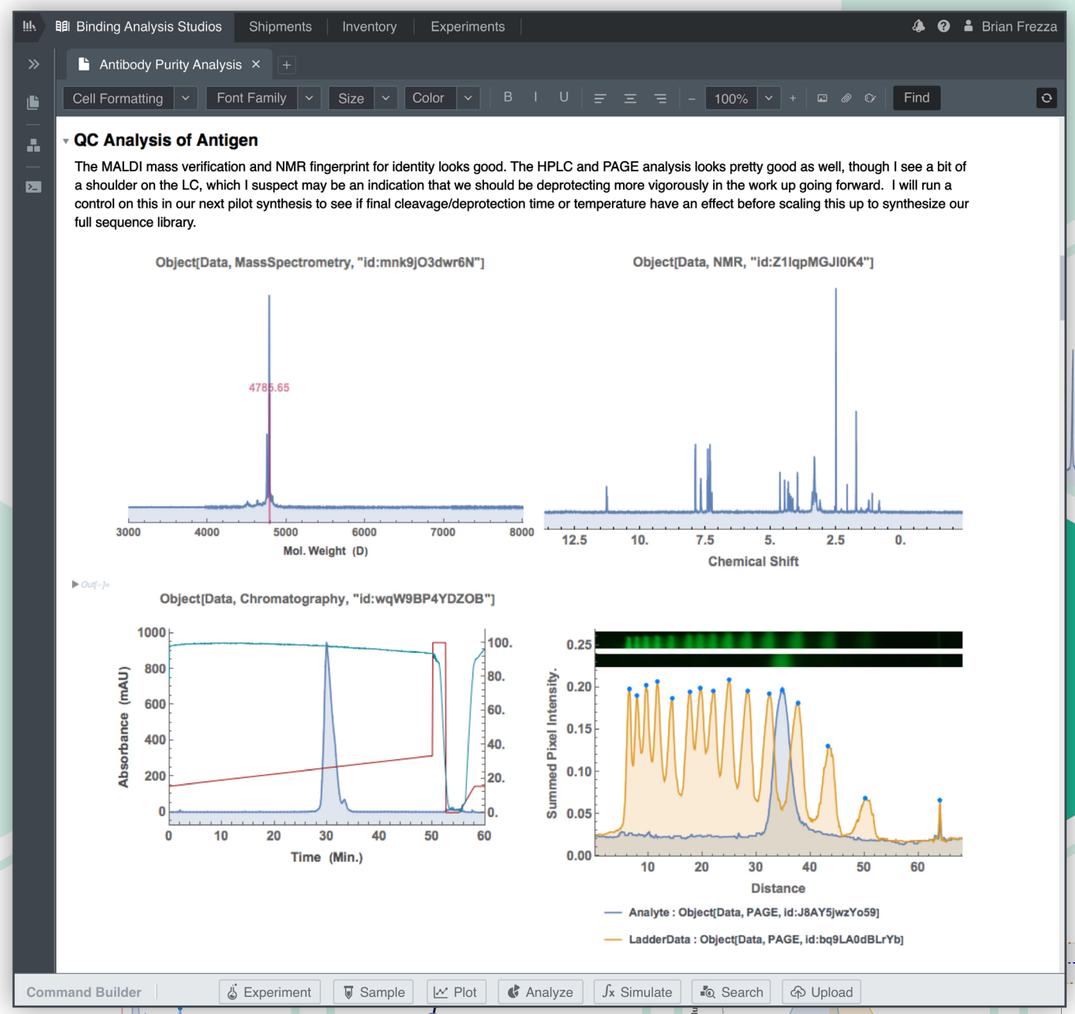
Constellation

A New Model for Managing Scientific Data

Constellation extends far beyond what traditional or electronic laboratory notebooks handle. In addition to storing sample information, it organizes all experimental data and data analysis, environmental data, inventory information, protocol information, and instrument diagnostics. This is all captured and linked automatically behind the scenes, building an easily surfable and searchable knowledge graph that fully encompasses a complete set of source information without any manual data entry.

4. Analyze

Command Center provides an extensive suite of tools to plot, analyze, and visualize your results. Pick up your processed samples at the designated drop off points.



A Full Workstation for Data Analysis

The Command Center provides over 4,500 powerful functions for data visualization, analysis, and simulation. The software also allows your experiments, data, analysis, results, and even scientific figures to be exported, shared, or published on the web.

All of these tools can be accessed through both a point-and-click interface and direct entry of the commands into your lab notebook. This makes it easy to repeat or scale any analysis with a single command and to automate report generation through higher-level scripting.