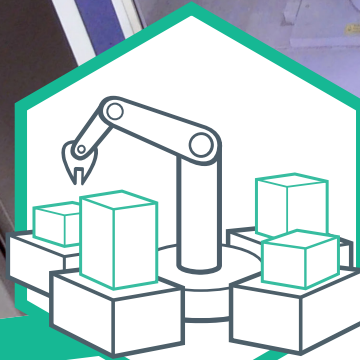


How Cloud Labs Work



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

Filter by:

Emerald Therapeutics (Team)

Select Lab Notebook

Select Experiment Type

Date To Date

In Cart 3

Backlog 0

Awaiting Resources 2

Processing 21

Completed 180

Archives 34

Threads In Use

0 10 20 30

21/30

Emerald Therapeutics

Threads track how many experiments your team can have running at any given moment. Your team's account is provisioned for 30 threads, so your team can collectively have a maximum of 30 experiments processing simultaneously in the lab. If additional throughput is desired, please [contact sales](#) to increase your team's thread count.

21 Processing

Sort by: Date started (newest - oldest)

Started on: Thu Oct 26, 2018 10:26am

Object[Protocol, HPLC, "id:kMp2IYsjMYfWT5qw"] | Owner: Catherine Hofer

RST Fluorescence Kinetics > Kinetic studies of 15 nt RST purified complexes > repeat translation reactions > standard curve quick test

Jump to page

Copy Object ID

Report an Issue

Time Estimate

Complete In: 6h 30m

Checkpoints: HPLC

1 20m Picking Resources

2 1h 30m Preparing Samples

3 Est. 6h Acquiring Data

4 Est. 15m Sample Post-Processing

5 Est. 15m Returning Materials

Started on: Thu Oct 26, 2018 9:03am

Object[Protocol, MassSpectrometry, "id:ouVMhiVwZSJp6VGk"] | Owner: Catherine Hofer

Click > Sn2 Testing of Bromohexyl Modification

Jump to page

Copy Object ID

Report an Issue

Time Estimate

Complete In: 5h 41m

Checkpoints: MassSpectrometry

1 15m Picking Resources

2 23m Preparing Instrumentation

3 Est. 3h 51m Processing Materials

4 Est. 10m Sample Post-Processing

5 Est. 1h 40m Returning Materials

Started on: Thu Oct 26, 2018 8:32am

Object[Protocol, HPLC, "id:ouVMhiVwZSJp6VGk"] | Owner: Catherine Hofer

Click > Cleavage of Tri-Link Bromide/DBCO Strands > Second vacuum evac protocol

Jump to page

Copy Object ID

Report an Issue

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..

Binding Analysis Studios

Shipments

Inventory

Experiments

Antibody Purity Analysis

Cell Formatting

Font Family

Size

Color

B

I

U

Experimental Results

Let's look first at the blanks to ensure there's nothing in our buffers that might show up in the experimental runs:

PlotObject[Object[Protocol, HPLC, "id:n8k9mGB1LVNw"] [BlankData]]

Examining 3D plots of the data:

PlotObject[Object[Protocol, HPLC, "id:n8k9mGB1LVNw"] [StandardData] [[1]], PlotType -> ListPlot3D]

Object[Data, Chromatography, "id:eGakIdJ8l06o"]

Absorbance (mAU)

Wavelength (nm)

Command Builder

Experiment > ExperimentHPLC

Start Over

Inputs > Options

Hide Null Options

Command Builder

ExperimentHPLC[

{

Object[Sample, Oligomer, "id:cj2UcdK5xxZWEN1c"].

Object[Sample, Oligomer, "id:PSrWuUqCWKAB2IGI"].

Object[Sample, Oligomer, "id:UVYB9Da38p3kr8Po"]

}

InjectionVolumn -> 35 Celsius,

DetectionWavelength -> 260 Nanometer,

GradientA -> {

{0 Minute, 90 Percent},

{5 Minute, 90 Percent},

{20 Minute, 40 Percent}

}

Validate

Paste into Page

Binding Analysis Studios

Shipments

Inventory

Experiments

Antibody Purity Analysis

Cell Formatting

Font Family

Size

Color

B

I

U

Parallel Line Analysis (PLA)

A Four Parameter Logistic Regression is applied to both standard and analyte samples fitting a trend of concentration (log scale) versus fluorescence intensity. The relative potency ratio can be calculated on the EC50 difference (orange dotted line).

Fluorescence (RFU)

Density (µg/mL)

Command Builder

Analyze > AnalyzeParallelLine

Hide Null Options

Command Builder

AnalyzeParallelLine[

Object[Analysis, Fit, "id:QRTEYauWuMO5H48"].

Object[Analysis, Fit, "id:TYN9GInC56pEVt6"].

Domain [

[-5, 8]

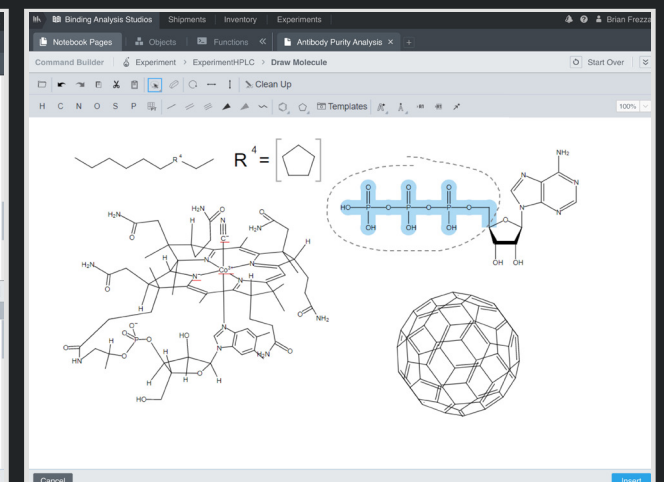
],

ExcludeOutliers -> True

}

Validate

Paste into Page



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

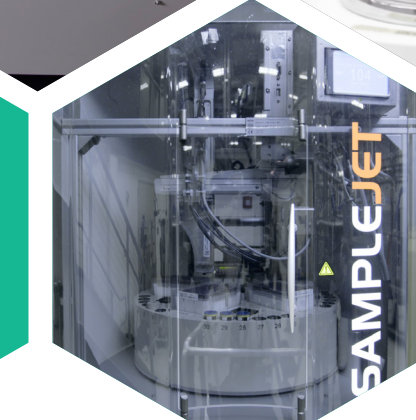
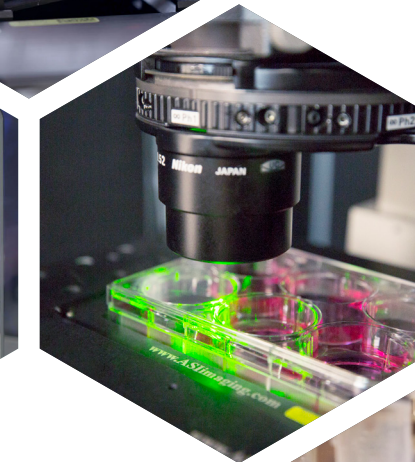
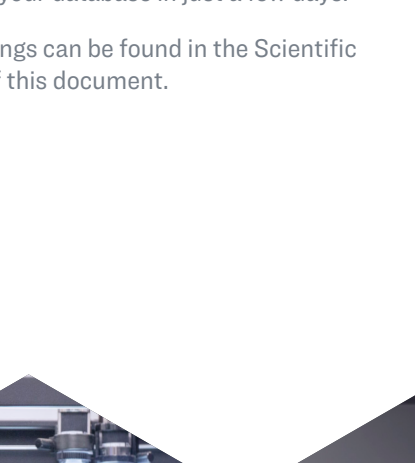
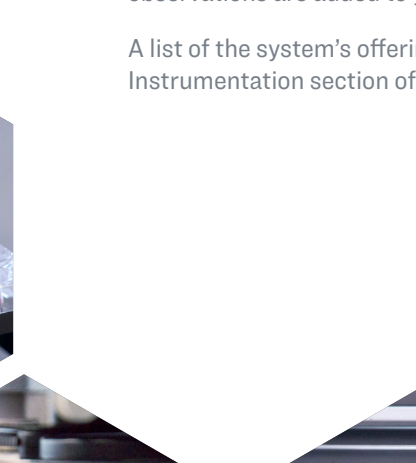
Your experiments are remotely conducted in a highly automated cloud lab facility exactly to your specifications.



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.

SUPPLIER

Object[Company, Supplier, id:1A2B3C4D5E]

Organizational Information

- Model: Object[Company, Supplier, id:1A2B3C4D5E]
- Type: Object[Company, Supplier]
- ID: 1A2B3C4D5E
- Name: Phosphoric Acid
- Phone: 555-123-4567
- Website: http://www.phosphoric.com

Product Specifications

- Product: Object[Product, id:1A2B3C4D5E]
- Product Name: Phosphoric Acid
- Product Description: Phosphoric Acid, 85% solution, 55 gal drum
- Product ID: 1A2B3C4D5E
- Product Type: Chemical
- Product Category: Acid
- Product Subcategory: Phosphoric Acid
- Product Manufacturer: Phosphoric Acid Co.
- Product Supplier: Phosphoric Acid Co.
- Product Supplier Address: 1234 Main St, Anytown, USA
- Product Supplier Phone: 555-123-4567
- Product Supplier Email: info@phosphoric.com
- Product Supplier Website: http://www.phosphoric.com

PRODUCT

Object[Product, id:1A2B3C4D5E]

Organizational Information

- Model: Object[Product, id:1A2B3C4D5E]
- Type: Object[Product]
- ID: 1A2B3C4D5E
- Name: Phosphoric Acid
- Phone: 555-123-4567
- Website: http://www.phosphoric.com

Product Specifications

- Product: Object[Product, id:1A2B3C4D5E]
- Product Name: Phosphoric Acid
- Product Description: Phosphoric Acid, 85% solution, 55 gal drum
- Product ID: 1A2B3C4D5E
- Product Type: Chemical
- Product Category: Acid
- Product Subcategory: Phosphoric Acid
- Product Manufacturer: Phosphoric Acid Co.
- Product Supplier: Phosphoric Acid Co.
- Product Supplier Address: 1234 Main St, Anytown, USA
- Product Supplier Phone: 555-123-4567
- Product Supplier Email: info@phosphoric.com
- Product Supplier Website: http://www.phosphoric.com

COLUMN

Object[Column, id:1A2B3C4D5E]

Organizational Information

- Model: Object[Column, id:1A2B3C4D5E]
- Type: Object[Column]
- ID: 1A2B3C4D5E
- Name: Phosphoric Acid
- Phone: 555-123-4567
- Website: http://www.phosphoric.com

Product Specifications

- Product: Object[Column, id:1A2B3C4D5E]
- Product Name: Phosphoric Acid
- Product Description: Phosphoric Acid, 85% solution, 55 gal drum
- Product ID: 1A2B3C4D5E
- Product Type: Chemical
- Product Category: Acid
- Product Subcategory: Phosphoric Acid
- Product Manufacturer: Phosphoric Acid Co.
- Product Supplier: Phosphoric Acid Co.
- Product Supplier Address: 1234 Main St, Anytown, USA
- Product Supplier Phone: 555-123-4567
- Product Supplier Email: info@phosphoric.com
- Product Supplier Website: http://www.phosphoric.com



Constellation

A New Model for Managing Scientific Data

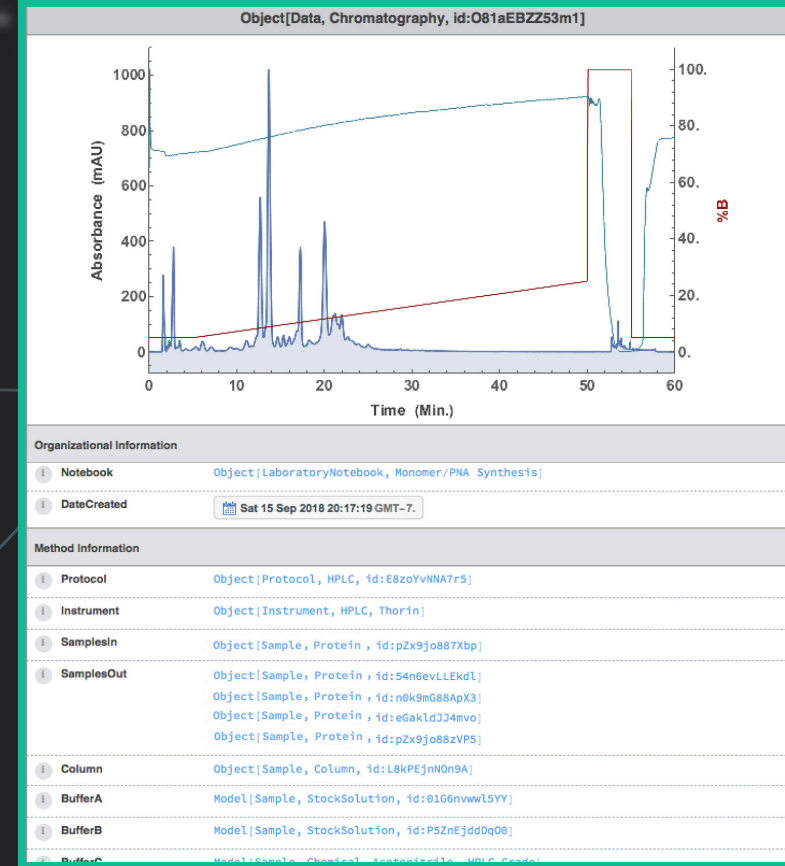
Constellation extends far beyond what traditional or electronic laboratory notebooks handle. In addition to storing sample information, it organizes all experimental data and data analysis, environmental data, inventory information, protocol information, and instrument diagnostics. This is all captured 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.

Property	Value
Model	Object[Sample, Protein, id:1A2B3C4D5E]
Type	Object[Sample, Protein]
ID	1A2B3C4D5E
Name	Phosphoric Acid
Phone	555-123-4567
Website	http://www.phosphoric.com
Product Specifications	Object[Product, id:1A2B3C4D5E]
Product Name	Phosphoric Acid
Product Description	Phosphoric Acid, 85% solution, 55 gal drum
Product ID	1A2B3C4D5E
Product Type	Chemical
Product Category	Acid
Product Subcategory	Phosphoric Acid
Product Manufacturer	Phosphoric Acid Co.
Product Supplier	Phosphoric Acid Co.
Product Supplier Address	1234 Main St, Anytown, USA
Product Supplier Phone	555-123-4567
Product Supplier Email	info@phosphoric.com
Product Supplier Website	http://www.phosphoric.com

Property	Value
Model	Object[Sample, Protein, id:1A2B3C4D5E]
Type	Object[Sample, Protein]
ID	1A2B3C4D5E
Name	Phosphoric Acid
Phone	555-123-4567
Website	http://www.phosphoric.com
Product Specifications	Object[Product, id:1A2B3C4D5E]
Product Name	Phosphoric Acid
Product Description	Phosphoric Acid, 85% solution, 55 gal drum
Product ID	1A2B3C4D5E
Product Type	Chemical
Product Category	Acid
Product Subcategory	Phosphoric Acid
Product Manufacturer	Phosphoric Acid Co.
Product Supplier	Phosphoric Acid Co.
Product Supplier Address	1234 Main St, Anytown, USA
Product Supplier Phone	555-123-4567
Product Supplier Email	info@phosphoric.com
Product Supplier Website	http://www.phosphoric.com

Property	Value
Model	Object[Sample, Protein, id:1A2B3C4D5E]
Type	Object[Sample, Protein]
ID	1A2B3C4D5E
Name	Phosphoric Acid
Phone	555-123-4567
Website	http://www.phosphoric.com
Product Specifications	Object[Product, id:1A2B3C4D5E]
Product Name	Phosphoric Acid
Product Description	Phosphoric Acid, 85% solution, 55 gal drum
Product ID	1A2B3C4D5E
Product Type	Chemical
Product Category	Acid
Product Subcategory	Phosphoric Acid
Product Manufacturer	Phosphoric Acid Co.
Product Supplier	Phosphoric Acid Co.
Product Supplier Address	1234 Main St, Anytown, USA
Product Supplier Phone	555-123-4567
Product Supplier Email	info@phosphoric.com
Product Supplier Website	http://www.phosphoric.com

HPLC DATA



HPLC PROTOCOL

Object[Protocol, HPLC, id:E8zoYvNNA7r5]

Organizational Information

- DateCreated: Thu 13 Sep 2018 19:15:32 GMT-7.

Method Information

- SeparationMode: ReversePhase
- Scale: Preparative
- ChromatographyInstrument: Object[Instrument, HPLC, Thorin]
- Column: Object[Sample, Column, id:L8kPEjN0h9A]
- GuardColumn: Object[Sample, Column, id:KBLSDVYDvLx]

Experimental Results

- Data: Object[Data, Chromatography, id:081aEBZZ53m1], Object[Data, Chromatography, id:Y81kxjM0W9d], Object[Data, Chromatography, id:KE29mQ8R3ZpL]

Cleaning

- WasteGenerated: Waste Type: Model[Sample, Waste, id:4Q5G9WvNNA4Q], Amount: 7.29.492 g

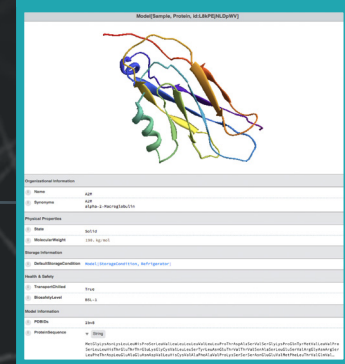
Standards

- Standards: Object[Sample, StockSolution, Standard, id:KBLSDVYDvLx], Object[Sample, StockSolution, Standard, id:KBLSDVYDvLx]

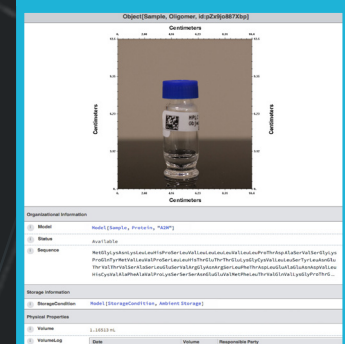
Standards

- Standards: Object[Sample, StockSolution, Standard, id:KBLSDVYDvLx], Object[Sample, StockSolution, Standard, id:KBLSDVYDvLx]

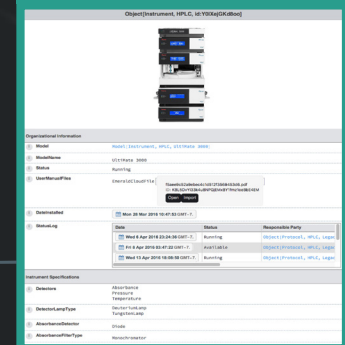
MODEL



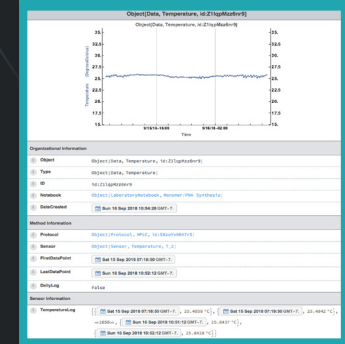
SAMPLE



INSTRUMENT



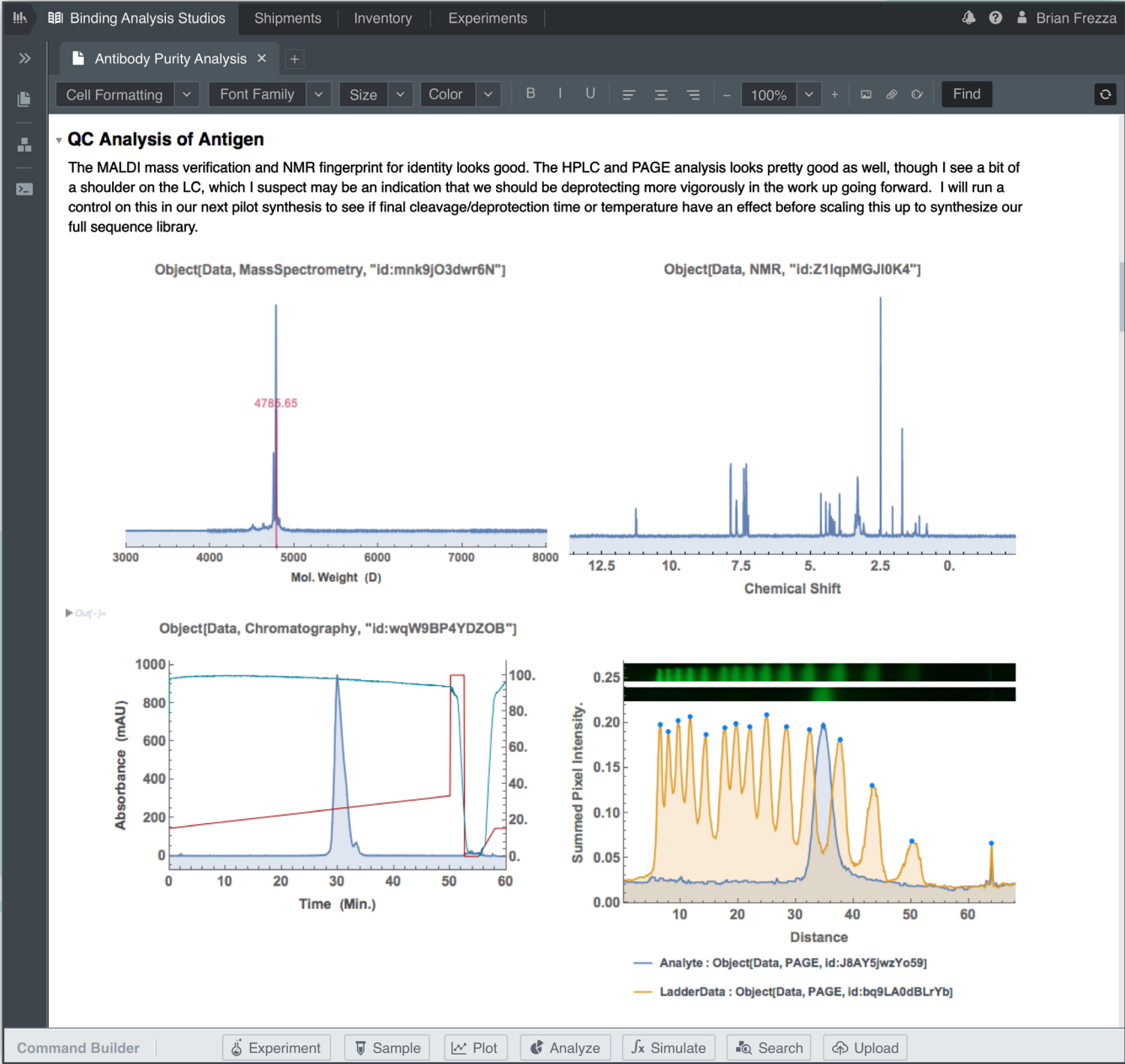
ENVIRONMENTAL DATA





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.

Peak #	Retention Time	Height	Area
1	2.36 (Min.)	93.2 (mAU)	3.2 (%)
2	12.98 (Min.)	49.62 (mAU)	4. (%)
3	18.57 (Min.)	21.34 (mAU)	1.4 (%)
4	23.21 (Min.)	26.29 (mAU)	1.8 (%)
5	25.66 (Min.)	92.14 (mAU)	8.2 (%)
6	28.37 (Min.)	38.62 (mAU)	3.1 (%)