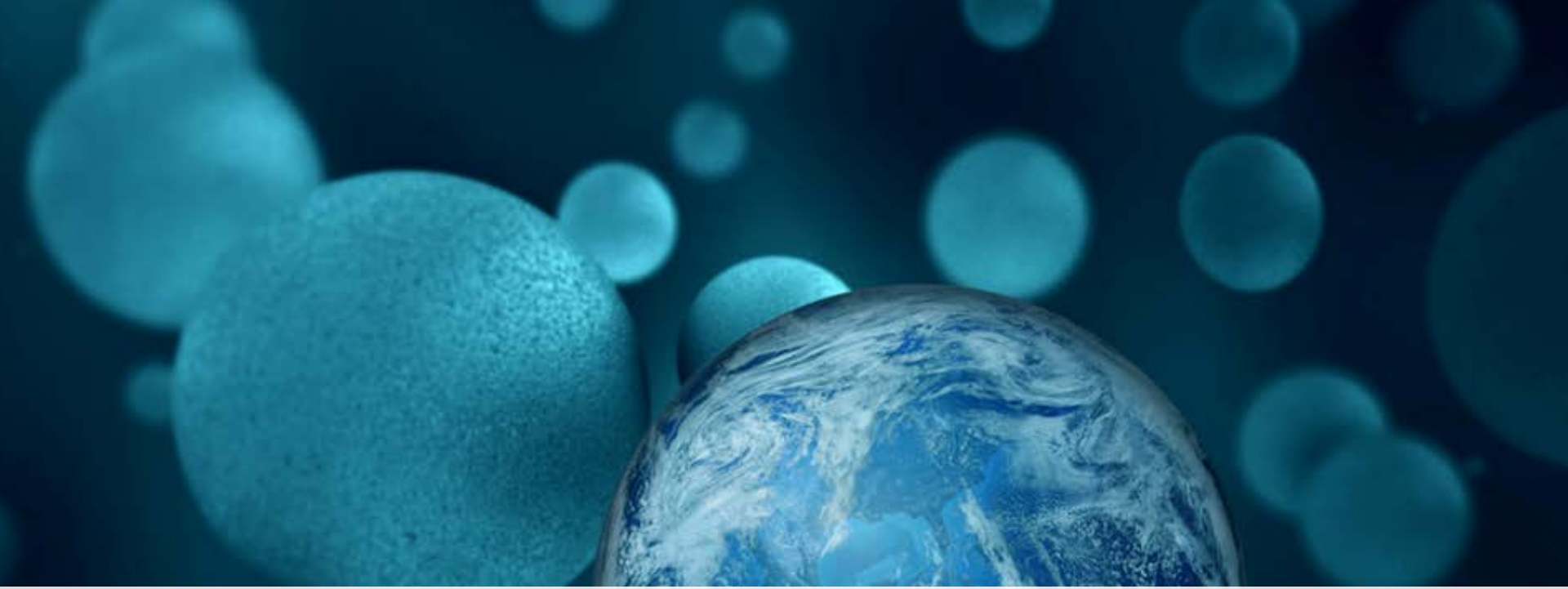
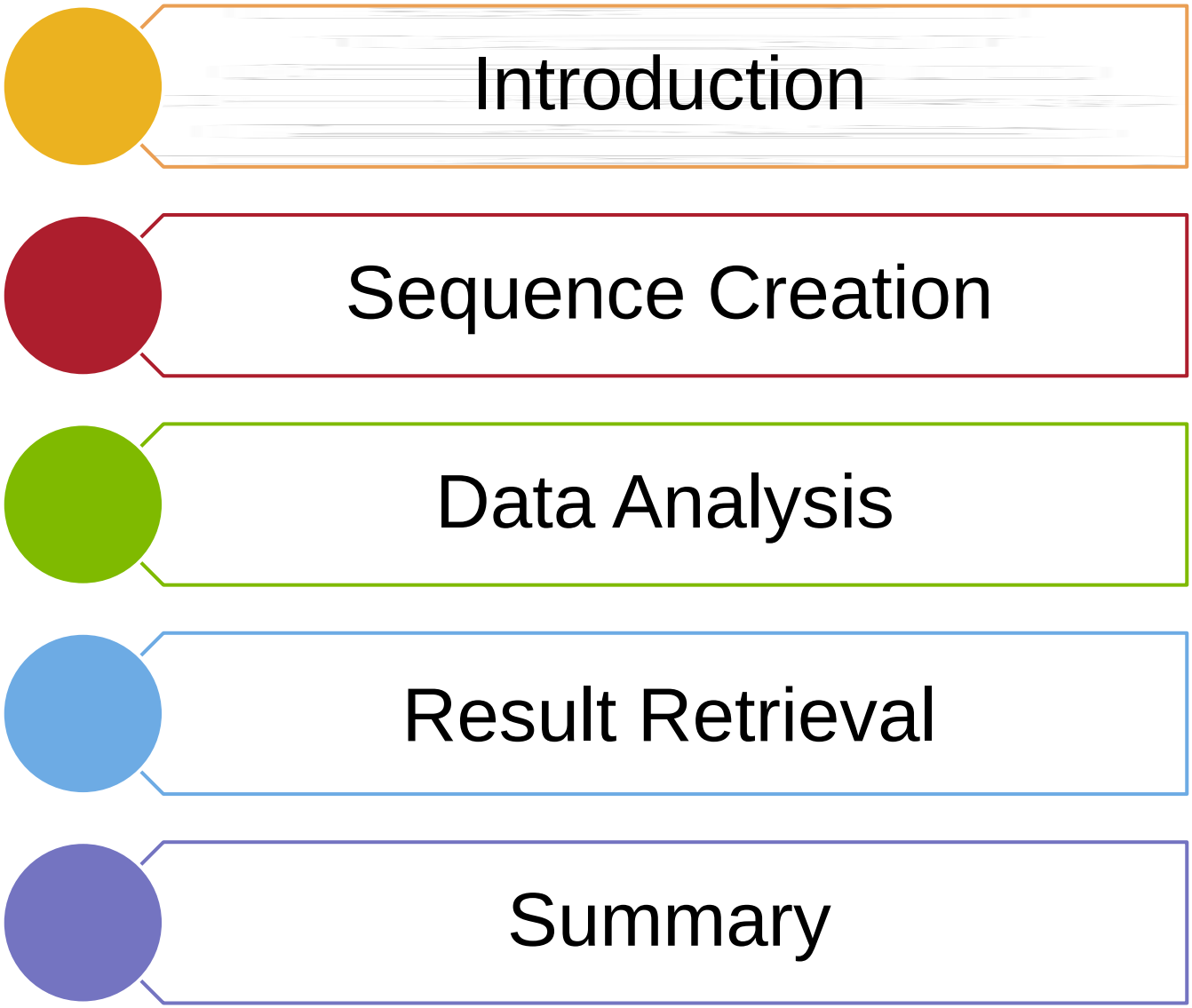


ThermoFisher SCIENTIFIC

Streamlining Your Chromatography Laboratory Operations Through End-to-End Workflows

Darren Barrington-Light
Senior Manager - Product Marketing
Informatics & Chromatography Software



- Introduction
- Sequence Creation
- Data Analysis
- Result Retrieval
- Summary

Data Into Knowledge

LIMS, SDMS, LES

Data management & integration across the laboratory

Data Management

Laboratory Management

System Integration

Instrument Control & Monitoring

Data Capture

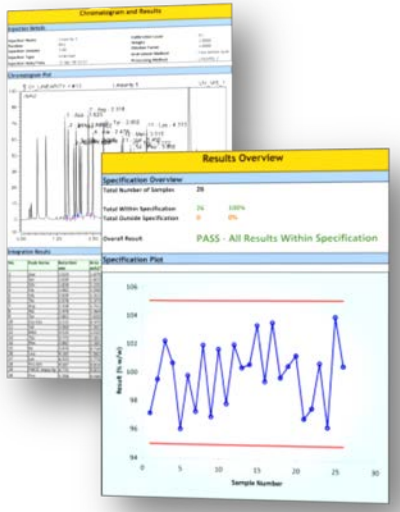
Data Analysis

CDS

Chromatography data acquisition & management

Streamlining Chromatography

From samples….



… to final results

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Introduction

Sequence Creation

Data Analysis

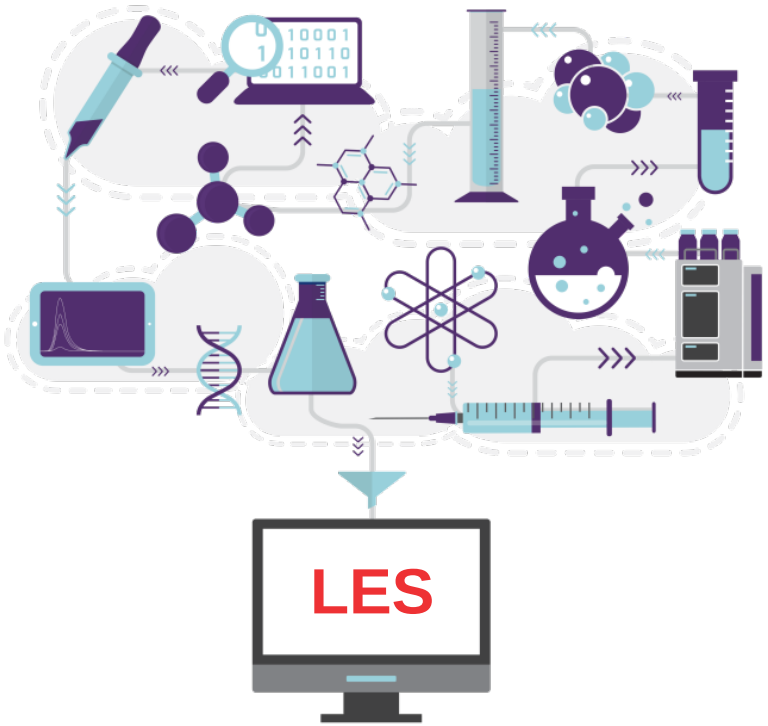
Result Retrieval

Summary

Sequence Creation

Beyond paper SOPs…

LES (Laboratory Execution System) provides a simple step-wise approach to executing laboratory processes



- Lab Execution
- Instrument Integration
- Lab Execution Reporting
- Lab Method Configuration

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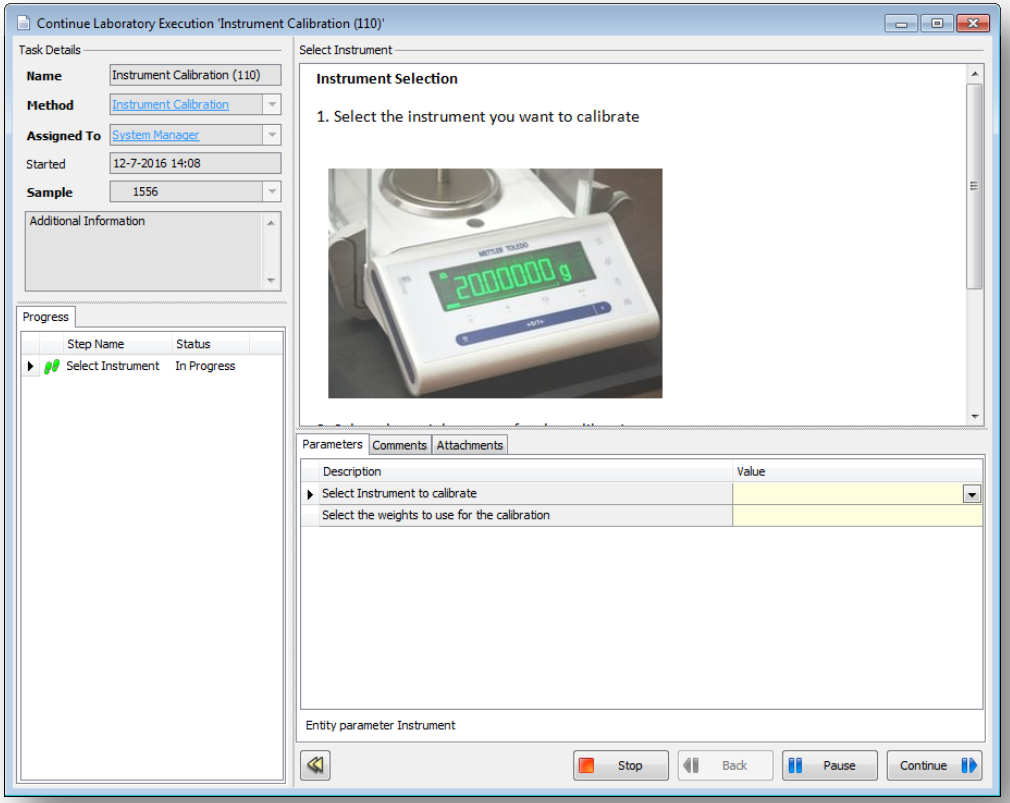
Sequence Creation

Transform your paper/digital SOPs into electronic methods for process execution

- Step-wise approach
- Workflow execution, such as Batch, Sequence, Stock Batch, Sample, …
- Instrument integration
- Review with auto-validate
- eSignatures/cross check
- Generate SOP report with execution outcomes



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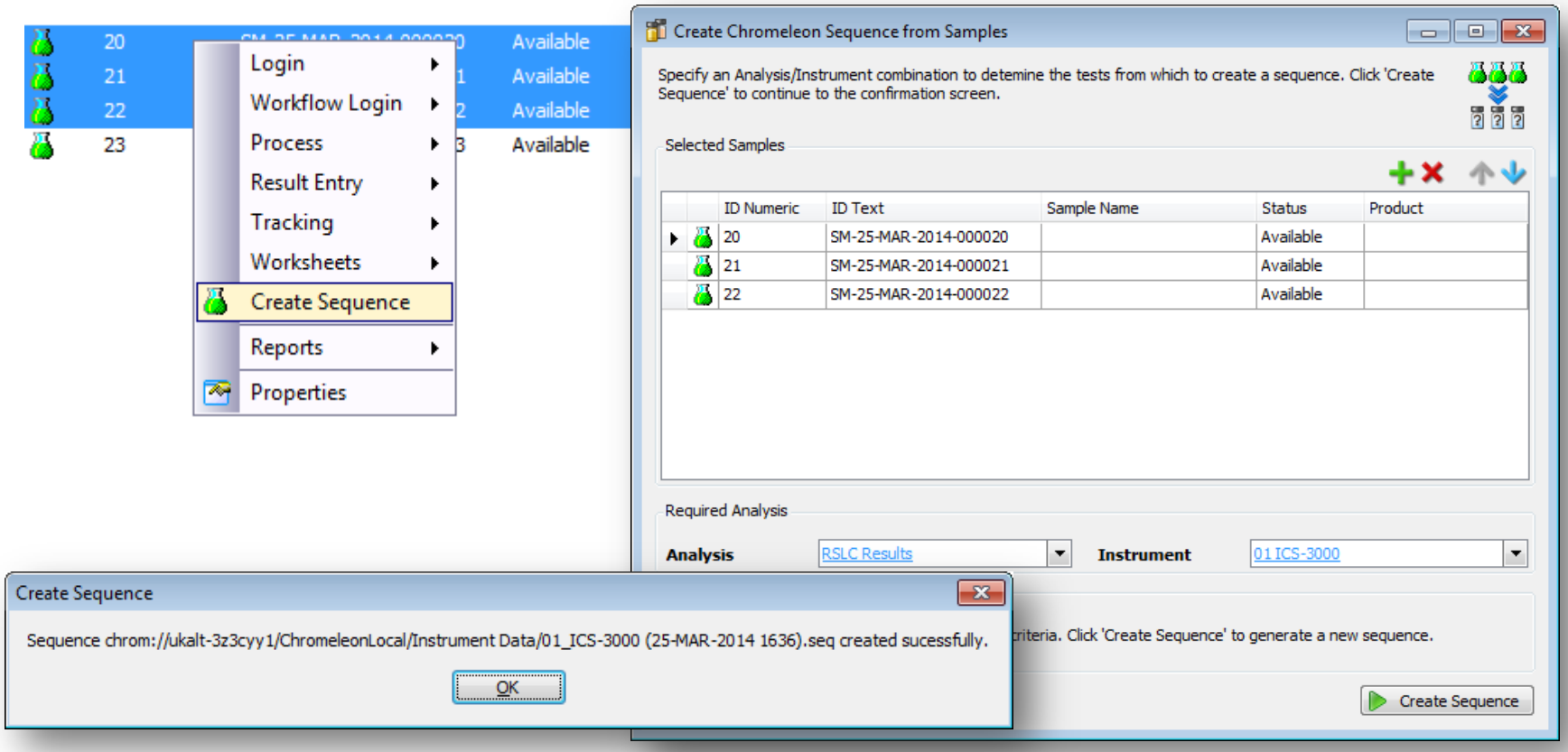
Sequence Creation

Create sequences from samples, tests, batches or LES

- Sequences can be reviewed & updated prior to creation in CDS



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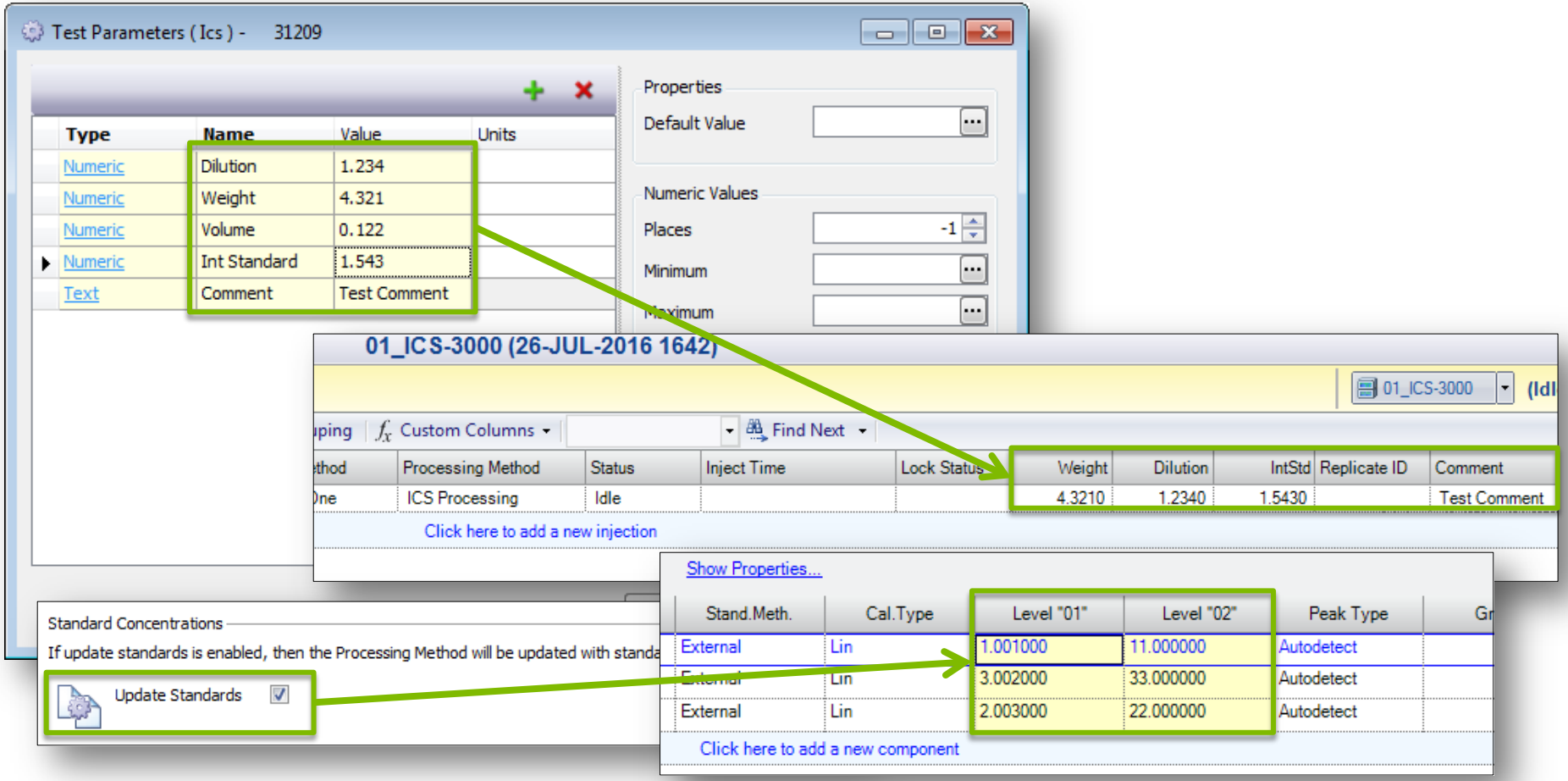
Sequence Creation

- Information captured in LES can be passed into CDS sequence
  - Can also pass calibration standard concentrations



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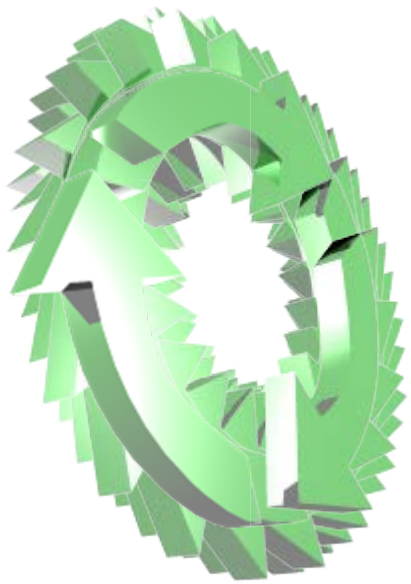
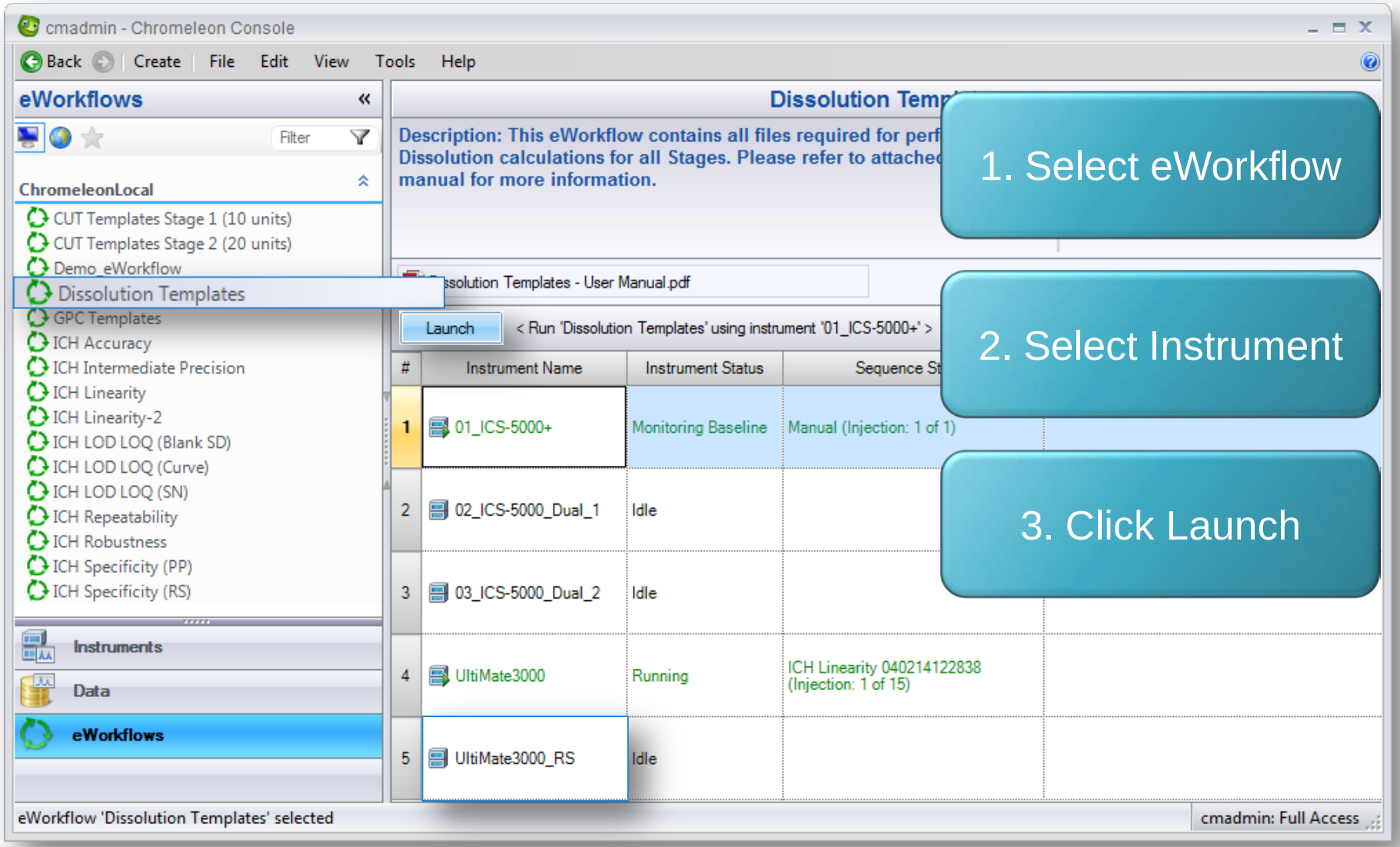
Sequence Creation

- eWorkflows™
  - Fast, easy, accurate sequence creation
  - Assists user in creating an appropriate sequence for a suitable instrument with pre-defined associated files and a well-defined structure

- Contain:
  - Instruments on which the analysis can be run
  - All associated files:
    - Instrument methods
    - Processing methods
    - Reports
    - Spectral libraries
    - External documents (e.g. SOP)
  - Template for sequence name and storage location
  - Custom variables
  - Rules for sequence layout



Sequence Creation



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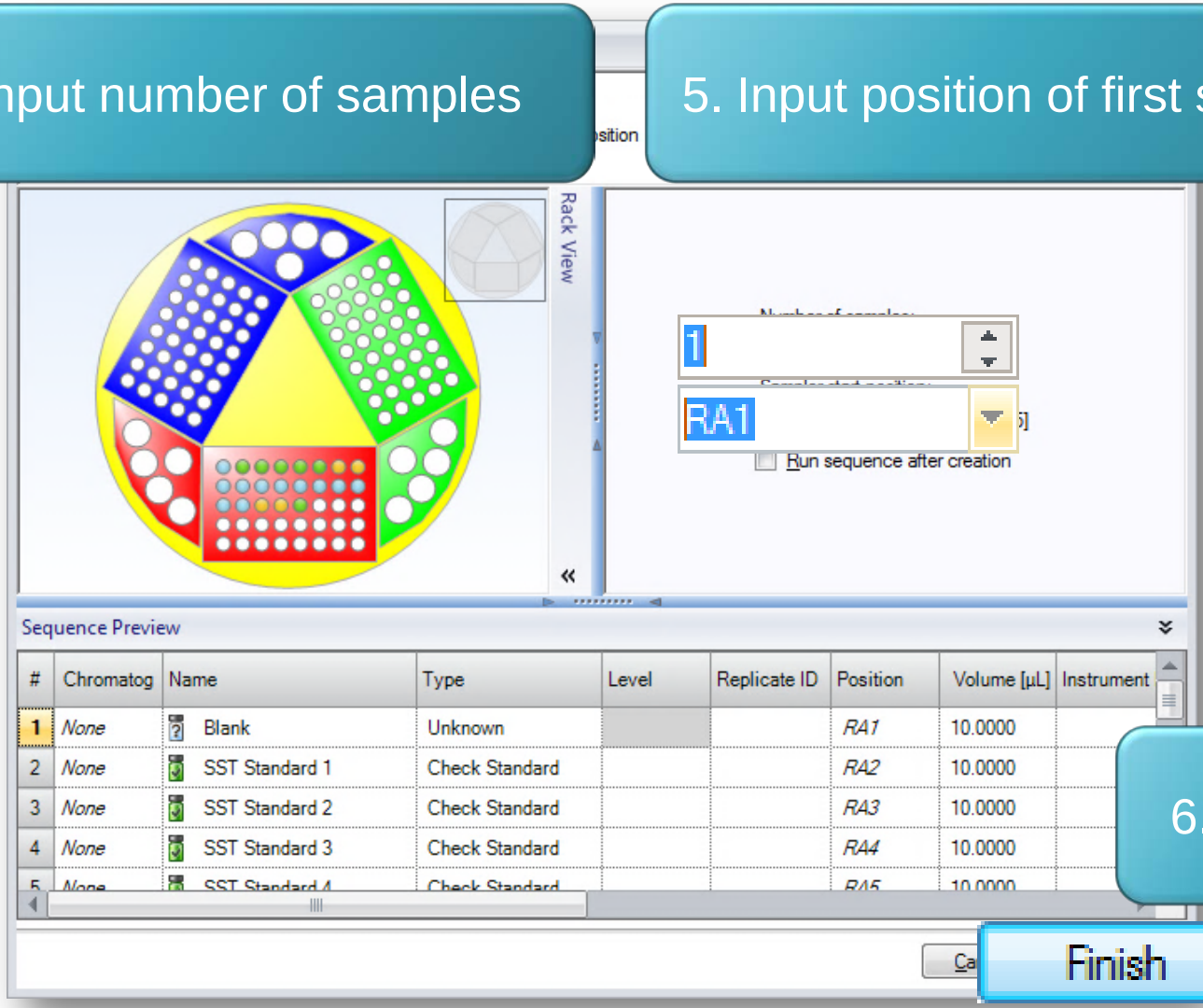
Sequence Creation

4. Input number of samples

5. Input position of first sample



6. Click Finish

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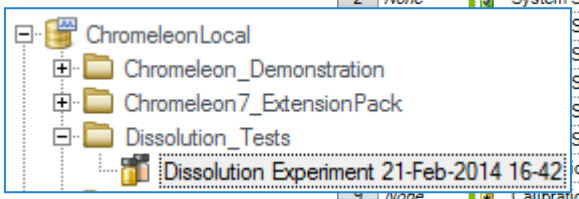
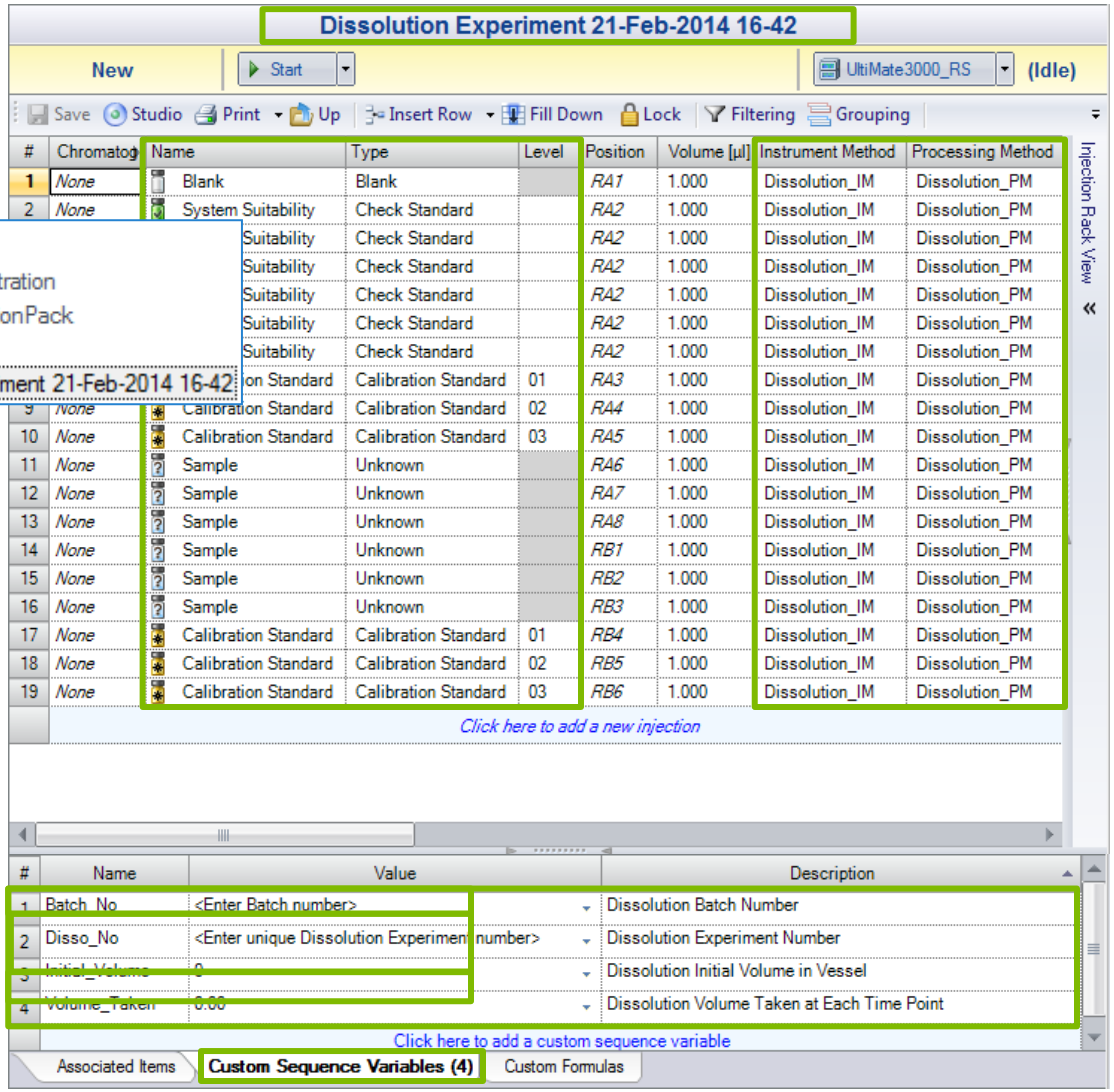
Sequence Creation

- Sequence created in 6 clicks with correct:
  - Name
  - Location
  - Methods
  - Report
  - Structure
  - Custom Variables
- Plus:
  - SOP attached
  - Can run immediately





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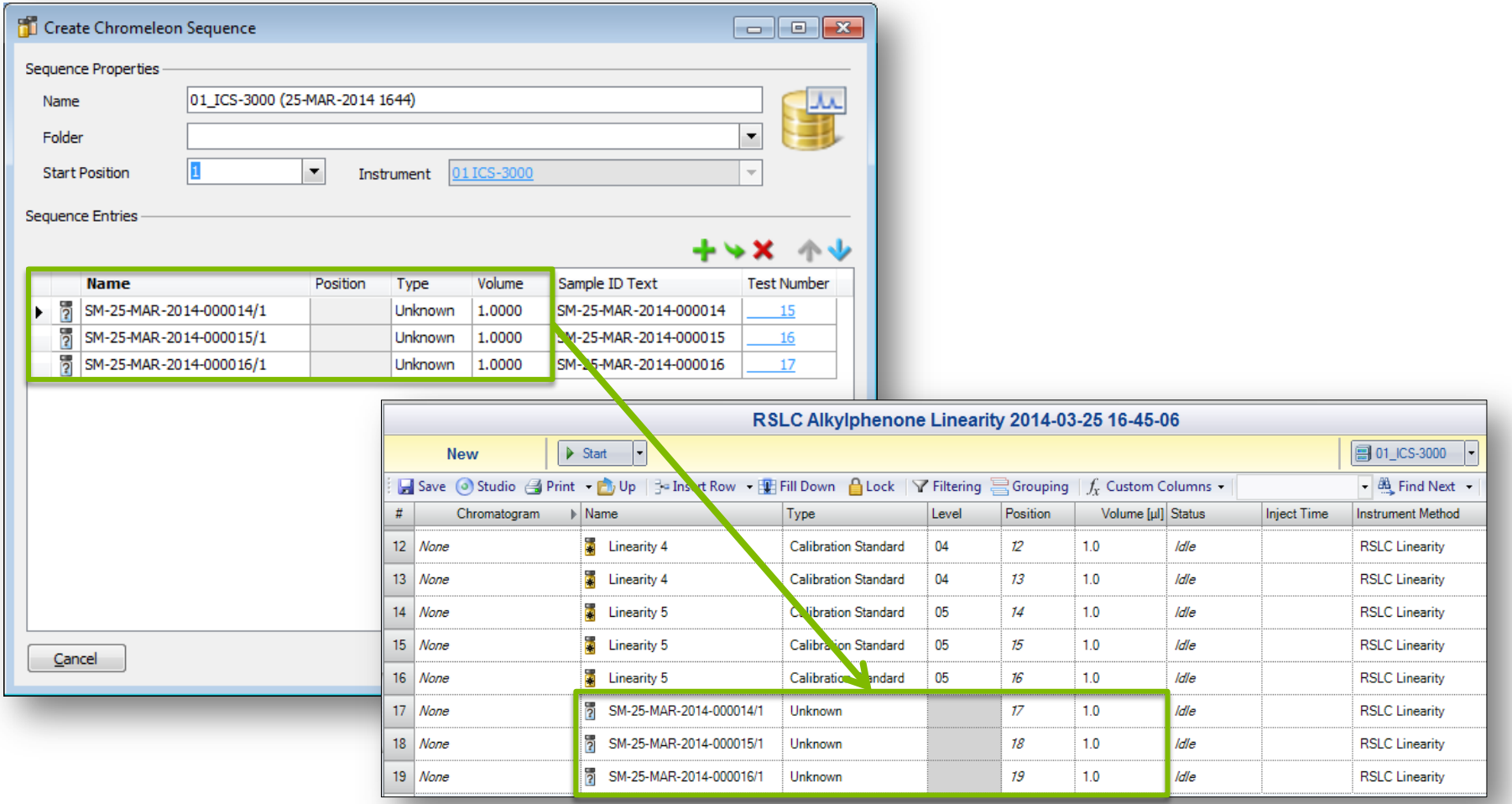
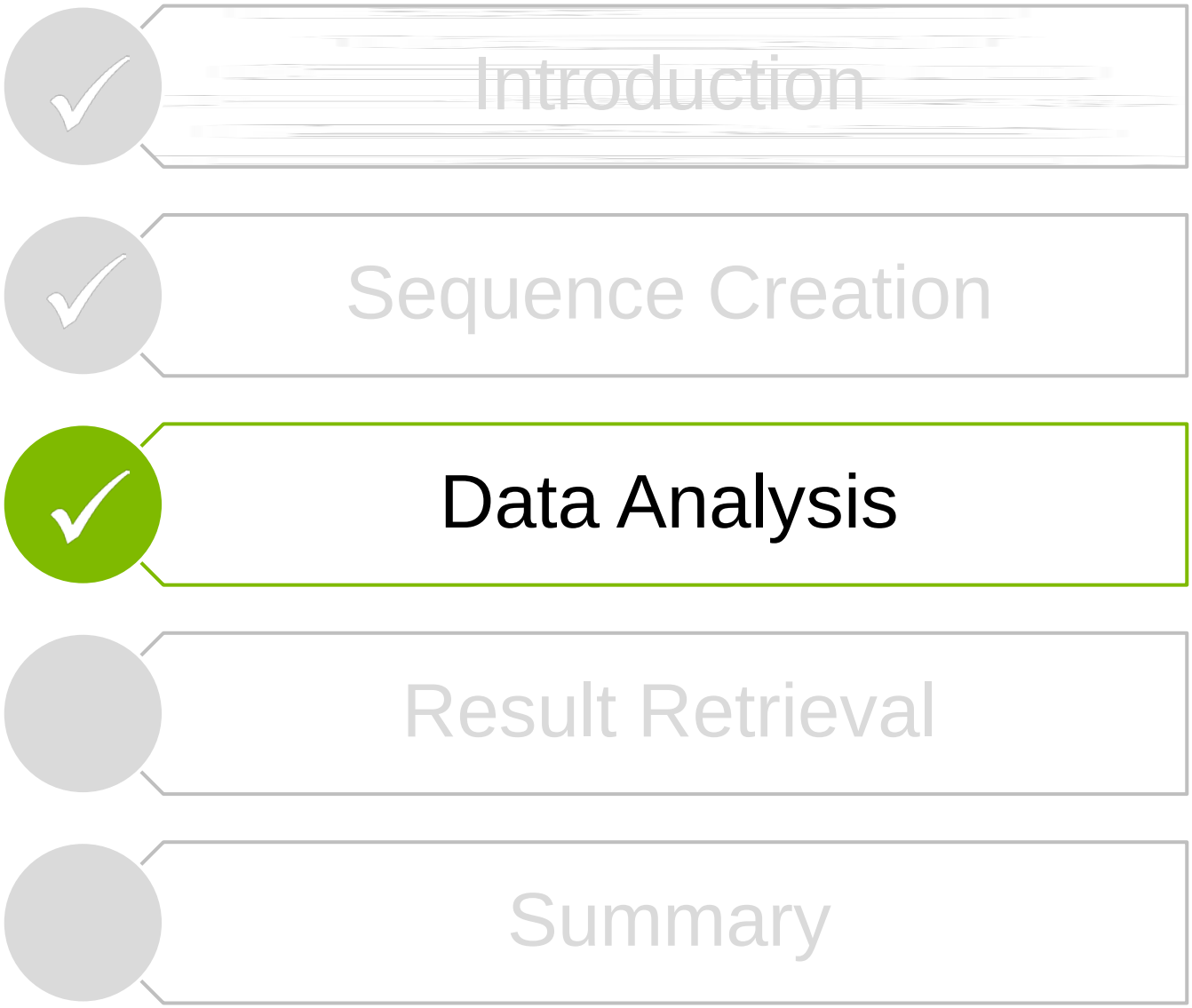
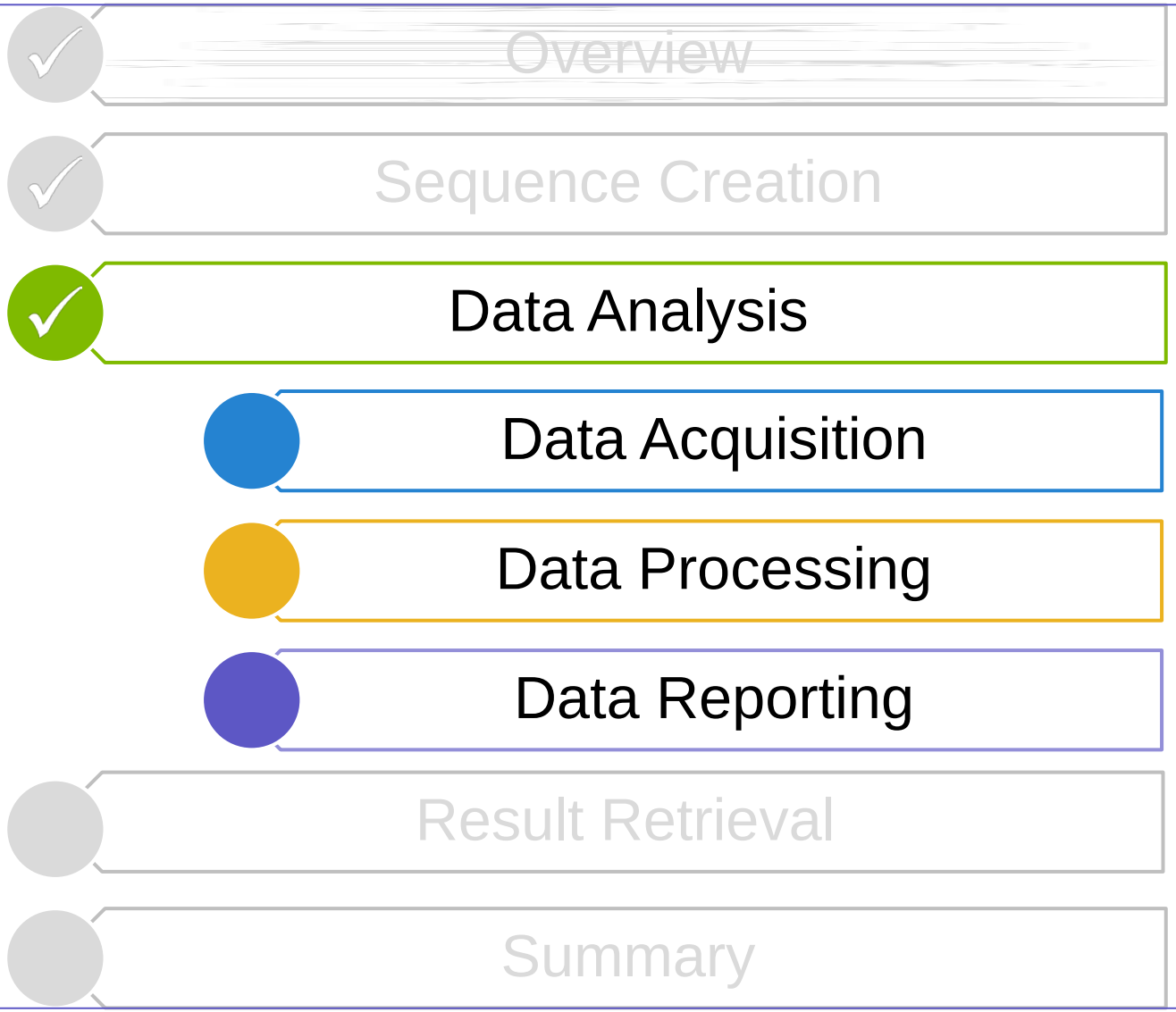
Sequence Creation

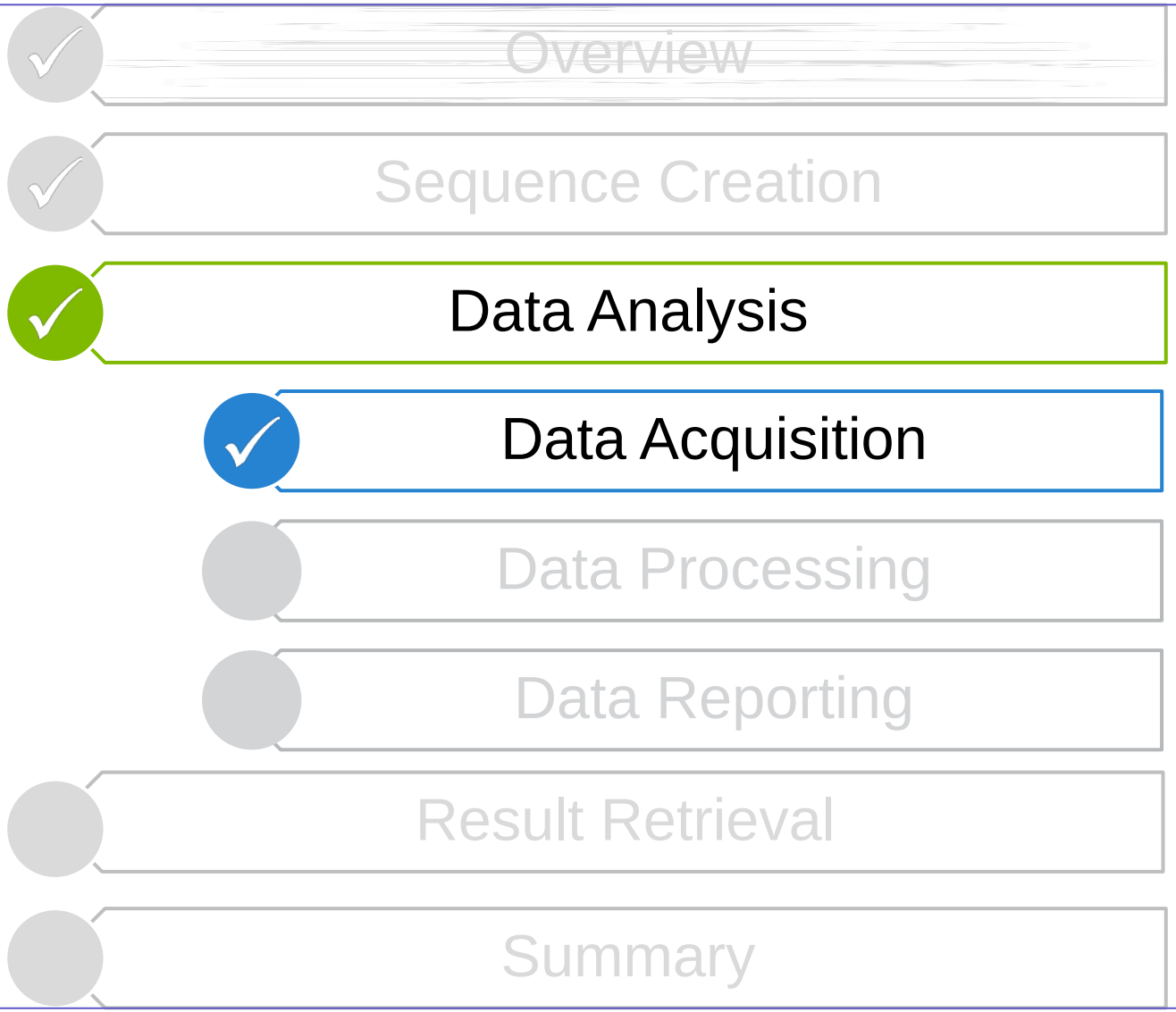
- Thermo Scientific™ SampleManager LIMS™ can create sequences using eWorkflows™



ThermoFisher SCIENTIFIC

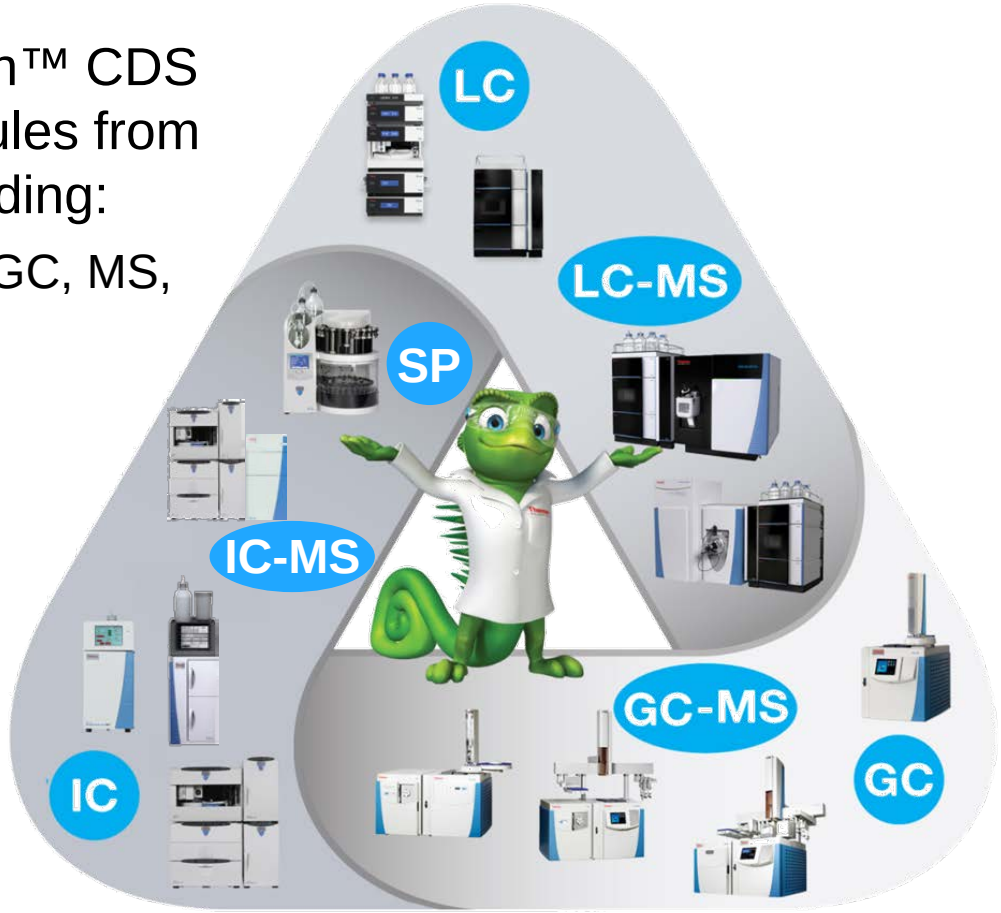




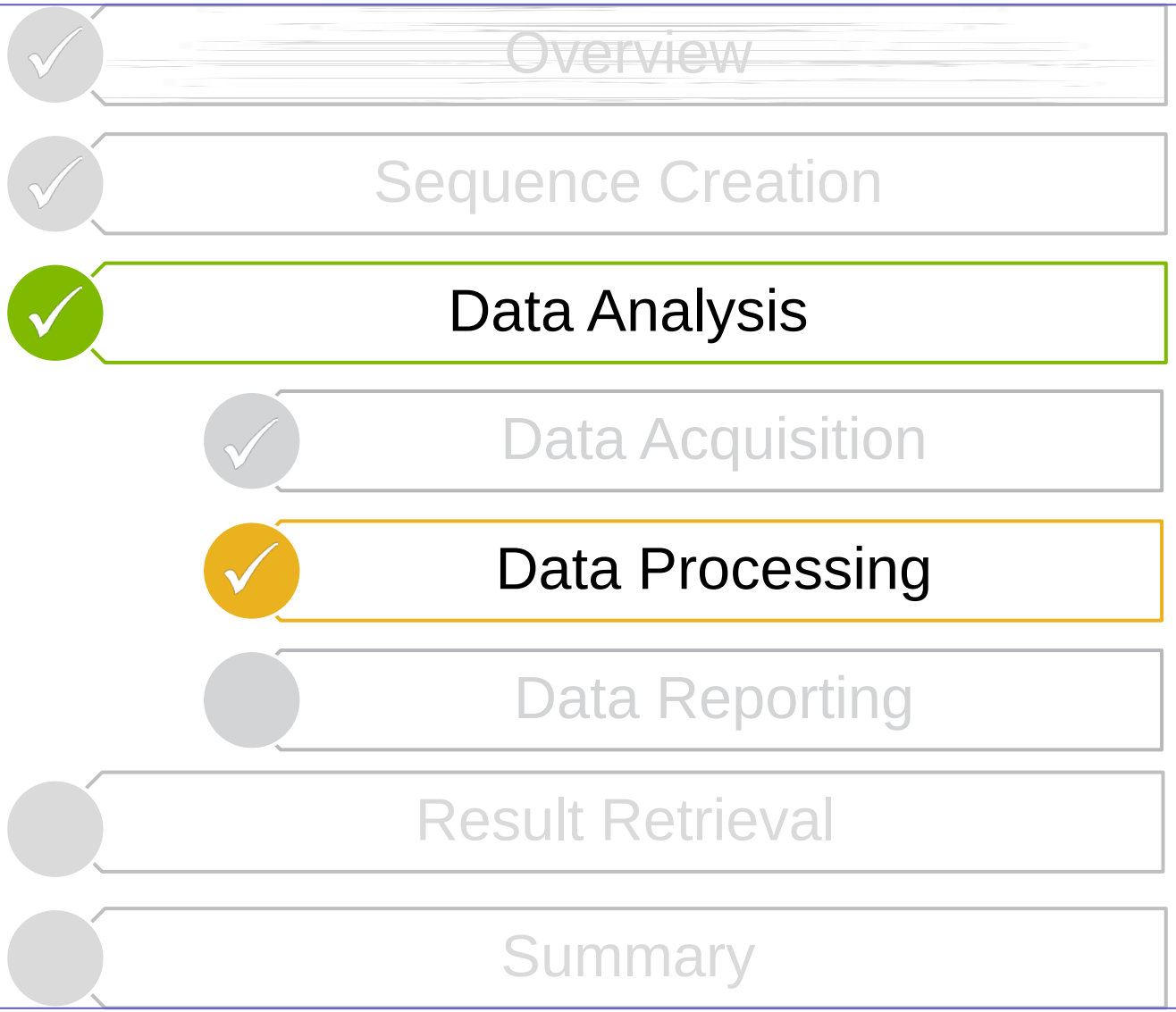


Data Acquisition

- Thermo Scientific™ Chromeleon™ CDS controls over 450 different modules from 18 different manufacturers including:
  - Thermo Fisher Scientific (LC, IC, GC, MS, Sample Prep)
  - Agilent (LC, GC)
  - Waters (LC)
  - Shimadzu (LC, GC)
  - Varian (LC, GC)
  - Perkin Elmer (LC, GC)
  - Gilson (LC)
  - CTC PAL (Sample Prep)



- LIMS can incorporate data from non-chromatographic e.g. AA, ICP, UV, FTIR, MS, etc.) & ‘simple’ instruments (balance, pH meter, etc.)



Data Processing

- Batch review and reprocessing of chromatography data still most time consuming and error prone process
- Inefficient data visualization, tedious, repetitive integration, and multi-step batch reprocessing add significant time
- Operational Simplicity™ speeds up all operations including data review and processing
  - ✓ Minimize steps needed to perform any task
  - ✓ Make all steps easy to understand and easy-to-use
  - ✓ Minimize the time it takes to perform any task

Tiziana Nardin, Fondazione Edmund Mach

*"We found the software **very easy to learn and to use** day-to-day as it is **extremely intuitive** with a **clean, user-friendly interface**"*

Data Processing – Competitor Comparison

Translating Operational Simplicity into Lab Productivity

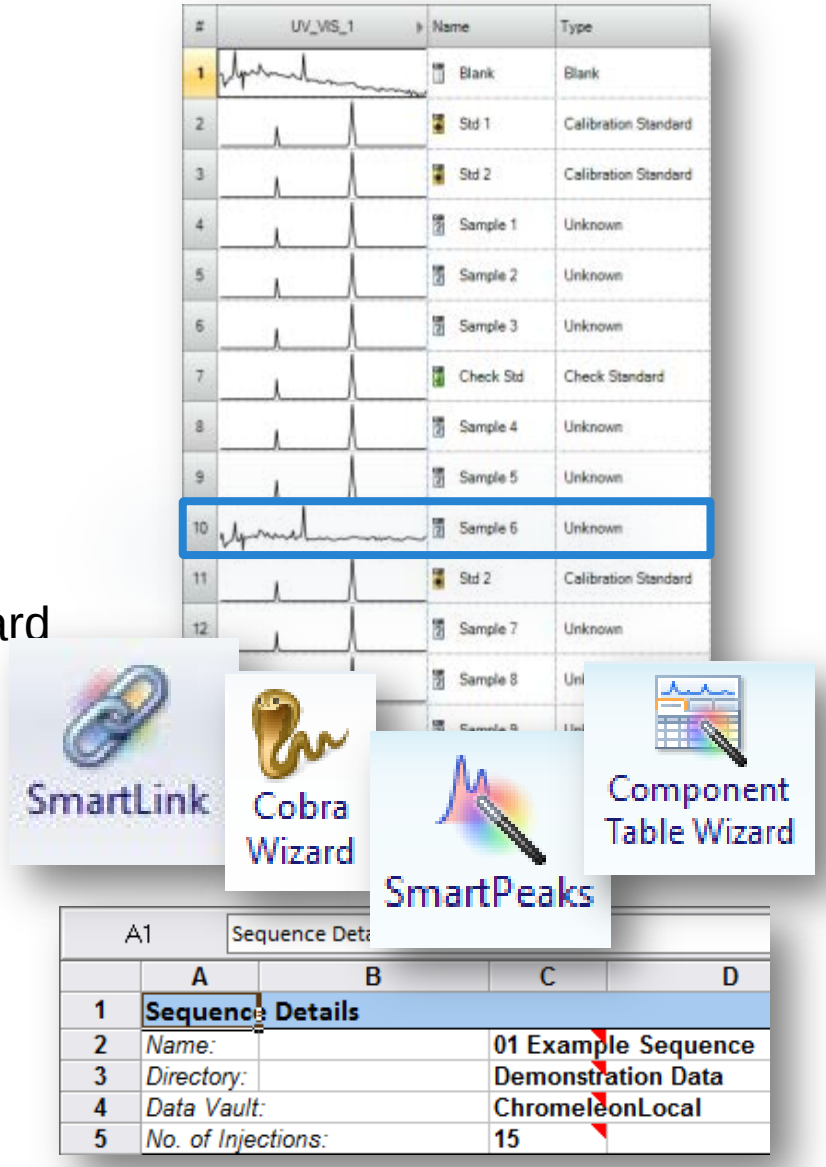
- Significant productivity gains reported by range of customers from different industries
- In addition, productivity gains have been verified by direct competitor comparison
  - Head-to-head comparison of the same tasks (prescribed by customer) in each CDS

Rob Allen, Catalent Pharma

*"After switching to Chromeleon we found we were **saving on average 20 minutes per analyst per day** on data processing and reporting."*

Data Processing

- Faster data processing
  - Dynamic data updating
- Faster data reviewing
  - MiniPlots™
  - SmartLink
- Faster processing method setup
  - Cobra™ peak detection algorithm and wizard
  - SmartPeaks™ Integration Assistant
  - Component table wizard
- Advanced spreadsheet reporting
  - Eliminate external spreadsheets
  - Dynamic result updating
  - Controlled, compliant report generation



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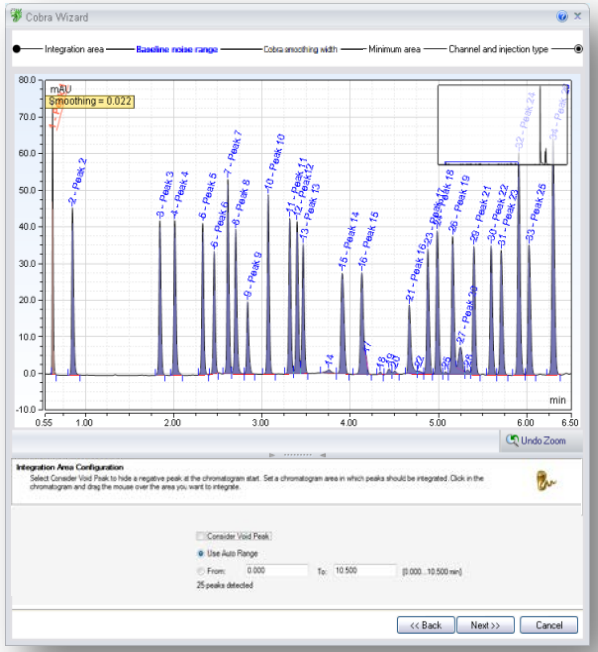
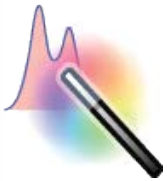
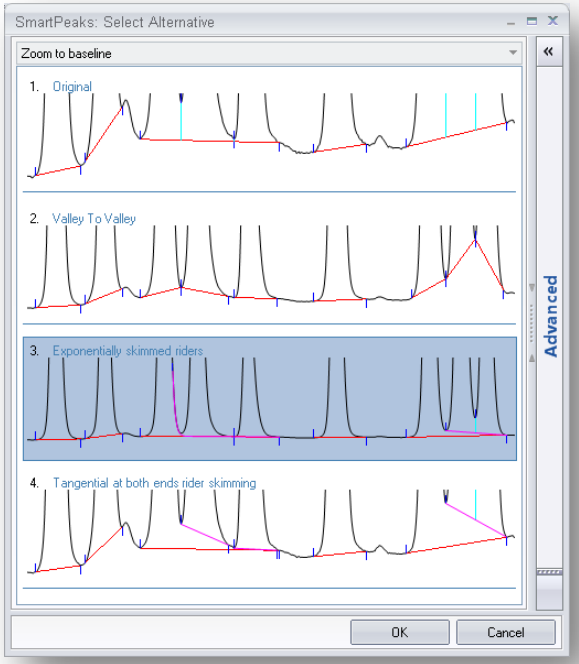
Data Processing

- Smart functions simplify and speed up data processing including:
  - Cobra peak detection algorithm and wizard
  - SmartPeaks Integration Assistant







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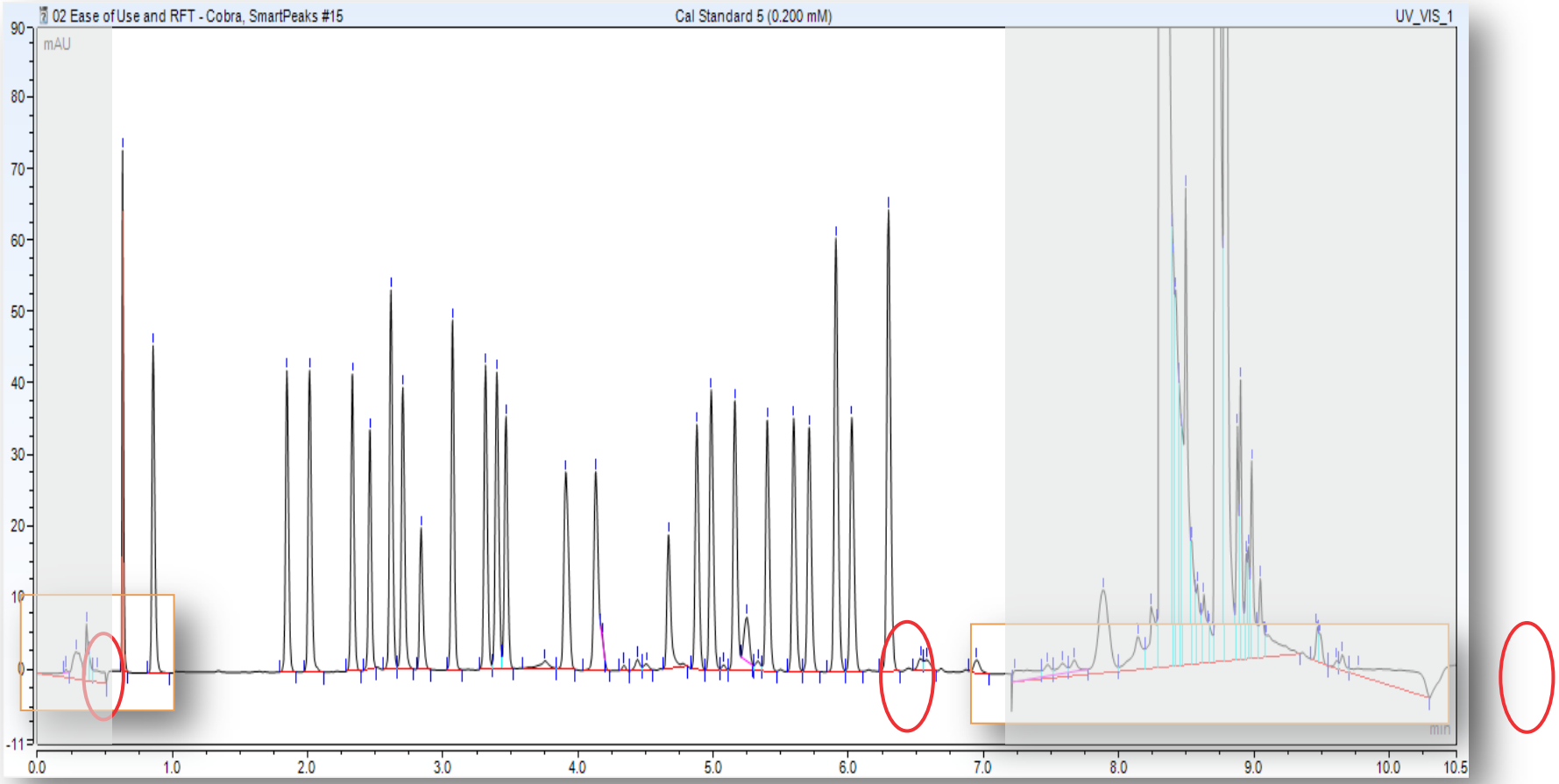
Data Processing – Cobra Algorithm

- Parameter-less first pass Cobra integration



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Data Processing – Cobra Peak Detection Wizard

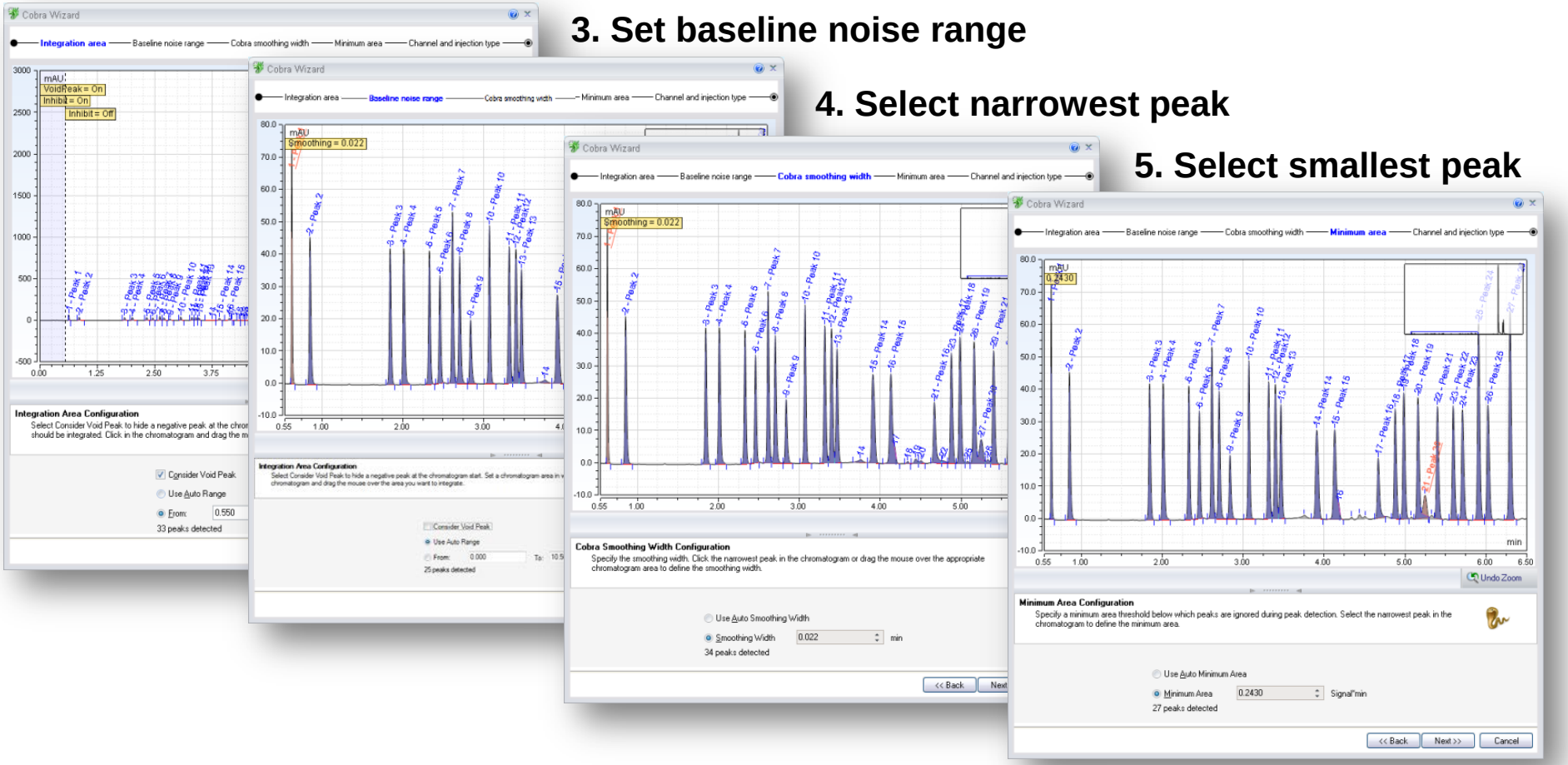
1. Start Cobra Wizard

2. Define integration range

3. Set baseline noise range

4. Select narrowest peak

5. Select smallest peak



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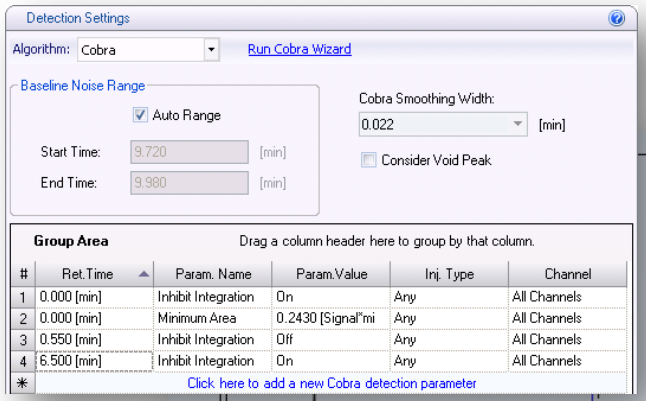
Data Processing – Cobra Peak Detection Wizard



- Parameters added to component table…

Brian Alliston, Sterling Pharma Solutions

*"Chromeleon is **much quicker** in all activities. Use of the Cobra wizard allows for **quick setup** of optimum integration parameters giving us consistent integration **much faster** than either of our previous CDS."*

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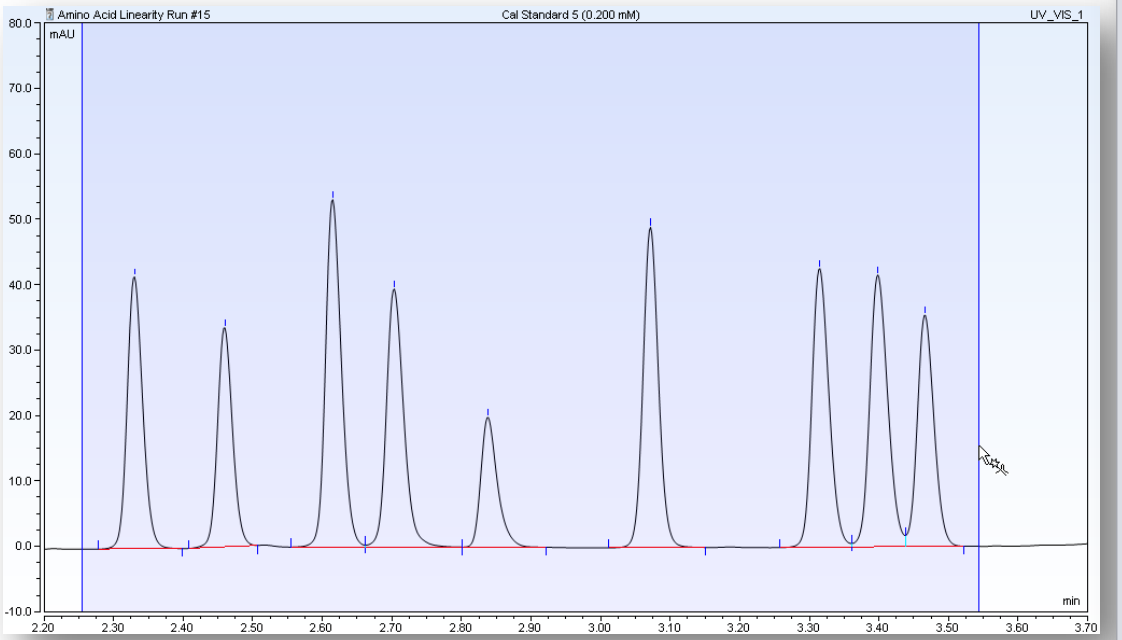
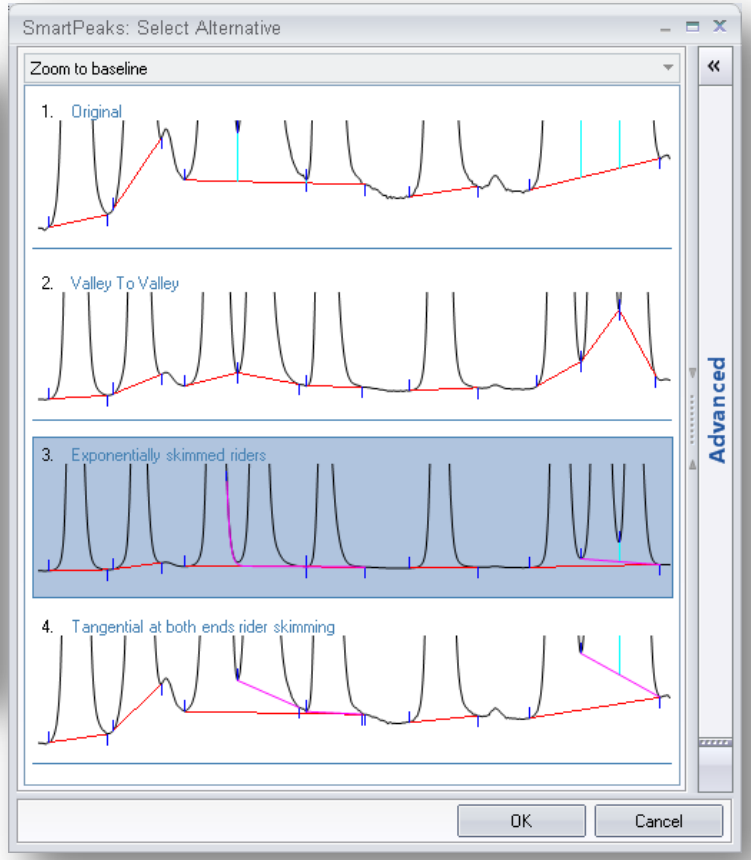
Data Processing – SmartPeaks Integration Assistant

1. Activate SmartPeaks Wizard

2. Select Area of Interest



3. Select the Integration You Want



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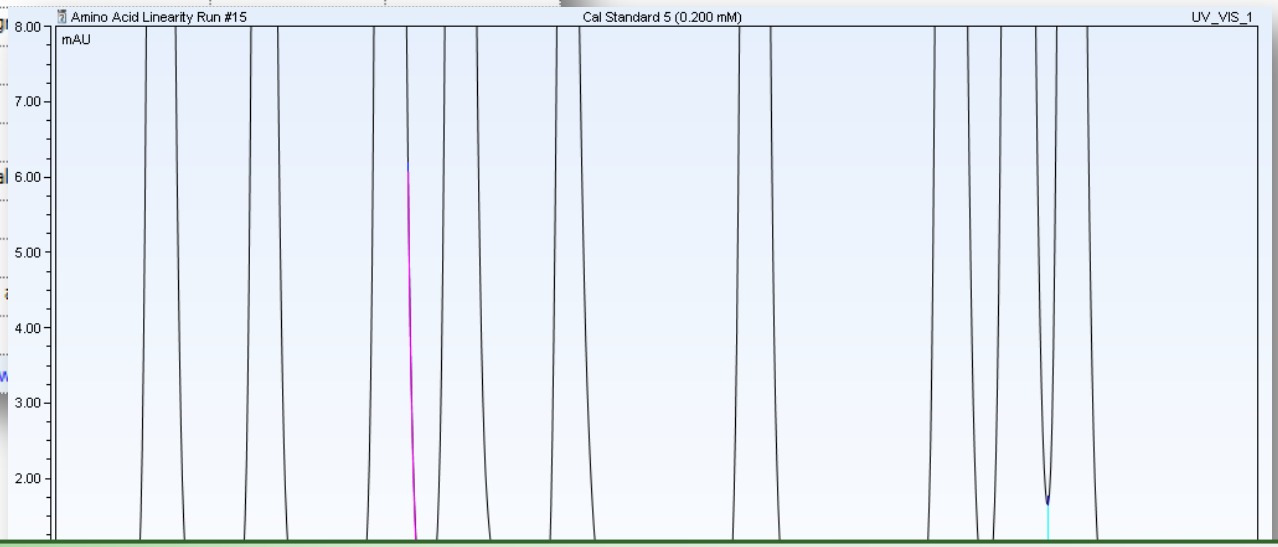
Data Processing – SmartPeaks Integration Assistant

- Parameters added to component table
- Changes apply to ALL chromatograms in sequence

#	Ret.Time	Param. Name	Param.Value	Inj. Type	Channel
1	0.000 [min]	Inhibit Integration	On	Any	All Channels
2	0.000 [min]	Minimum Area	0.2430 [Sig		
3	0.505 [min]	Inhibit Integration	Off		
4	3.200 [min]	Minimum Rider Ratio	0 [%]		
5	3.200 [min]	Maximum Rider Ratio	100 [%]		
6	3.200 [min]	Rider Skimming	Exponential		
7	4.329 [min]	Minimum Rider Ratio	10 [%]		
8	4.329 [min]	Maximum Rider Ratio	20 [%]		
9	4.329 [min]	Rider Skimming	Tangential		
10	6.714 [min]	Inhibit Integration	On		
*		Click here to add a new			



Michael Faley, Sigma Aldrich

"After a brief familiarization it felt like you could just walk up to the system and accomplish what needed be done without jumping through an excessive number of hoops. You can tell that the software was ***built for the user's ease****."*

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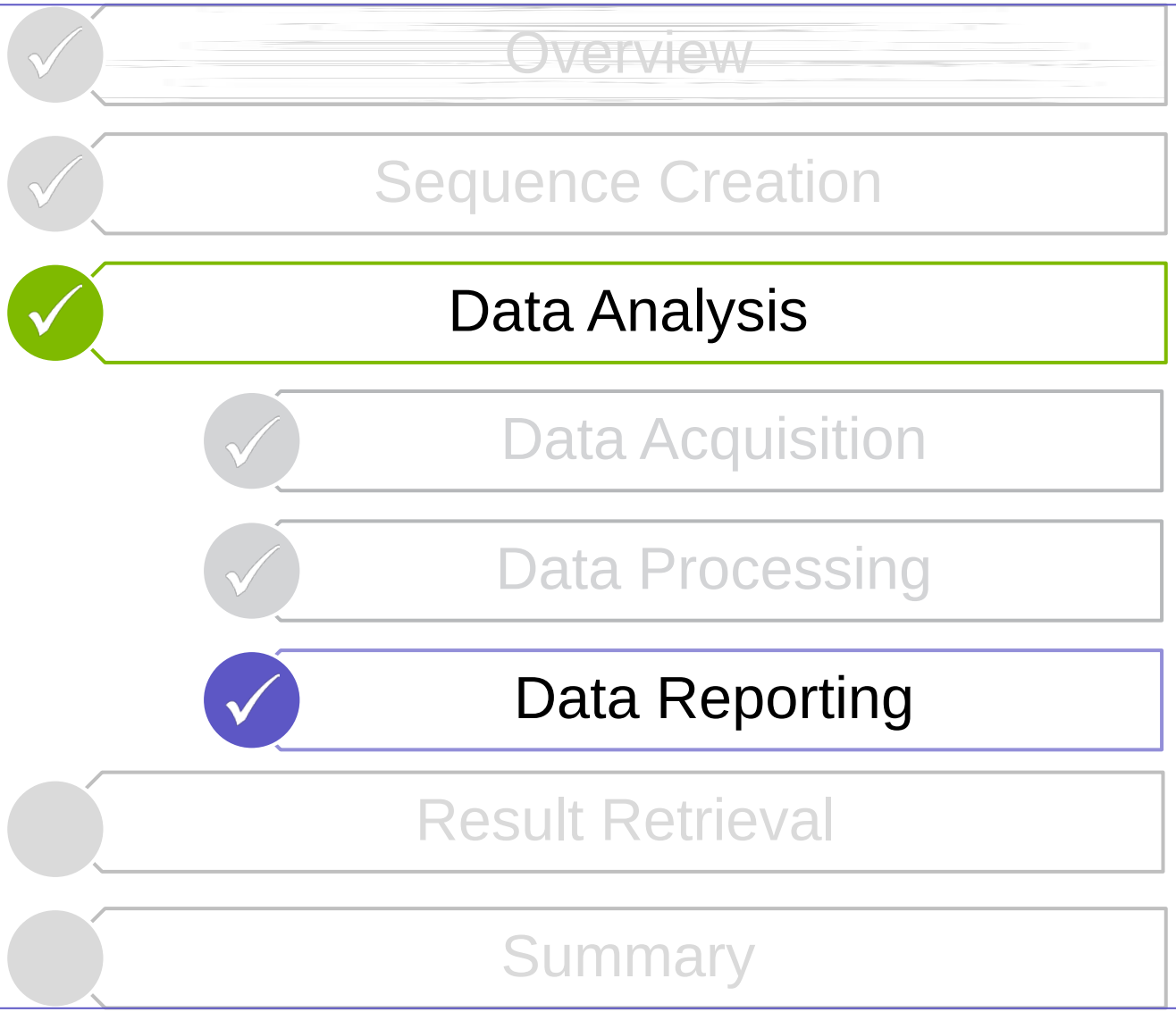
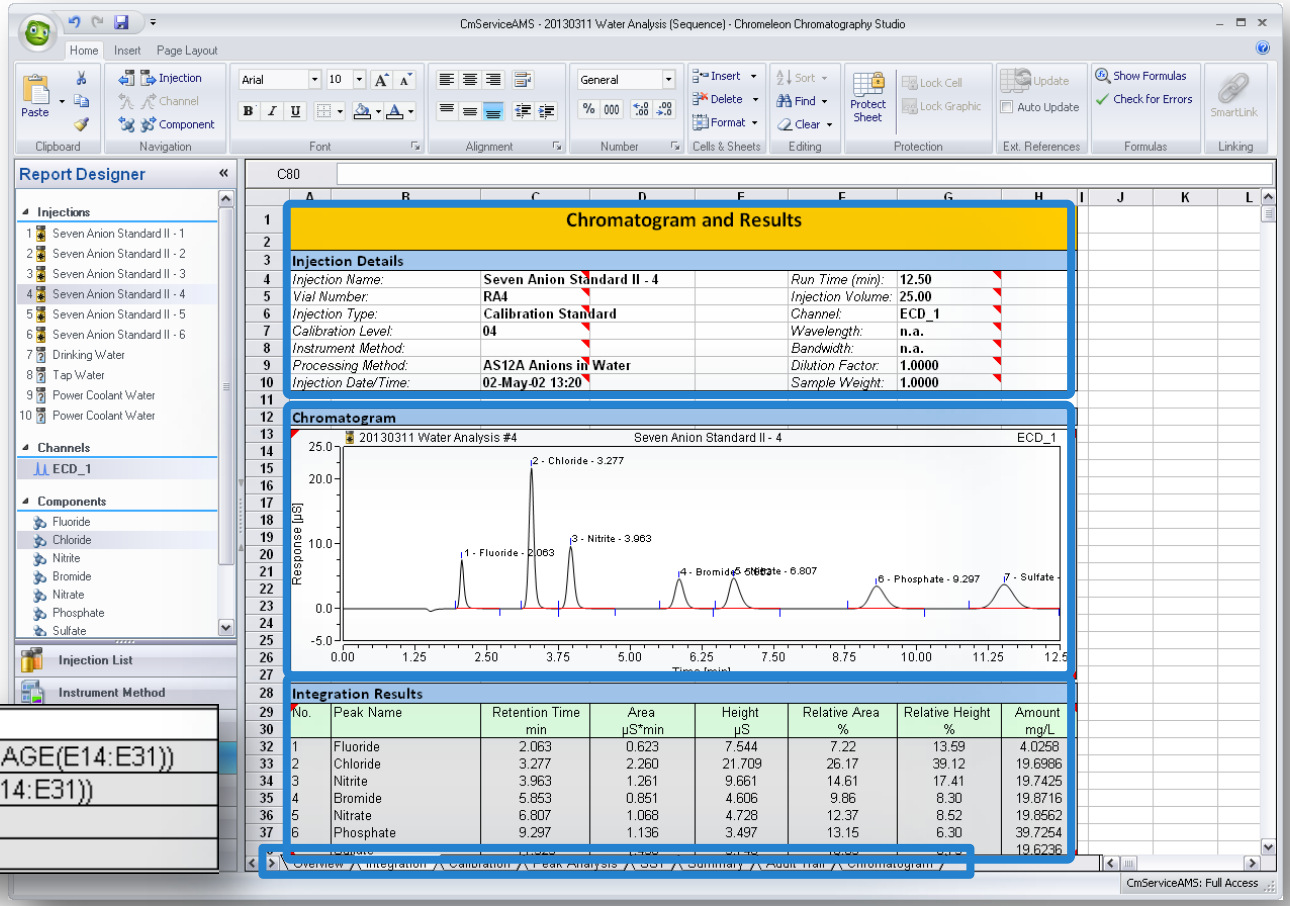


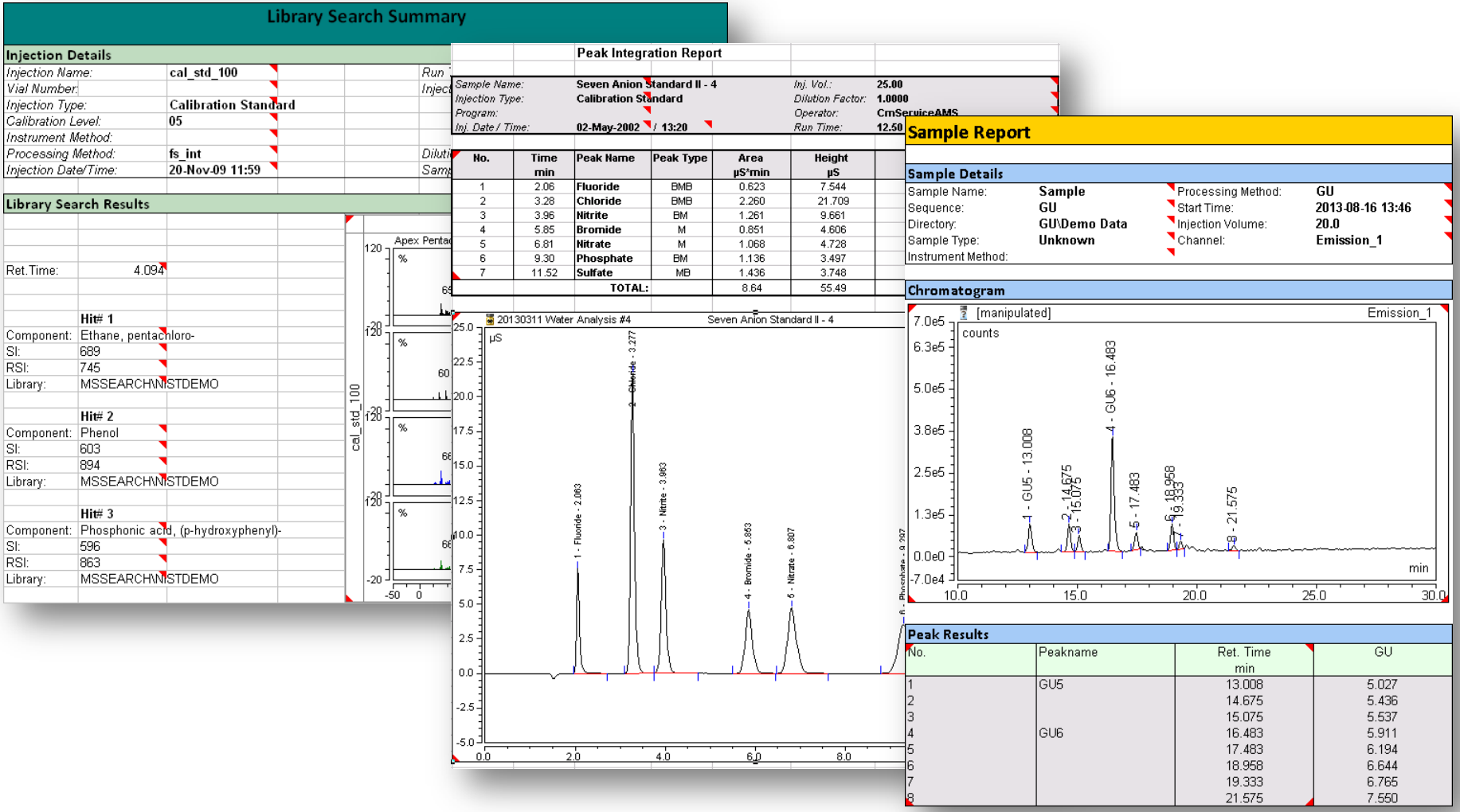
Data Reporting

- CDS Report Designer can contain:
  - Multiple worksheets
  - Text and variables
  - Various result tables
  - Various plot types
  - Custom equations



Data Reporting

… to create the report you need.



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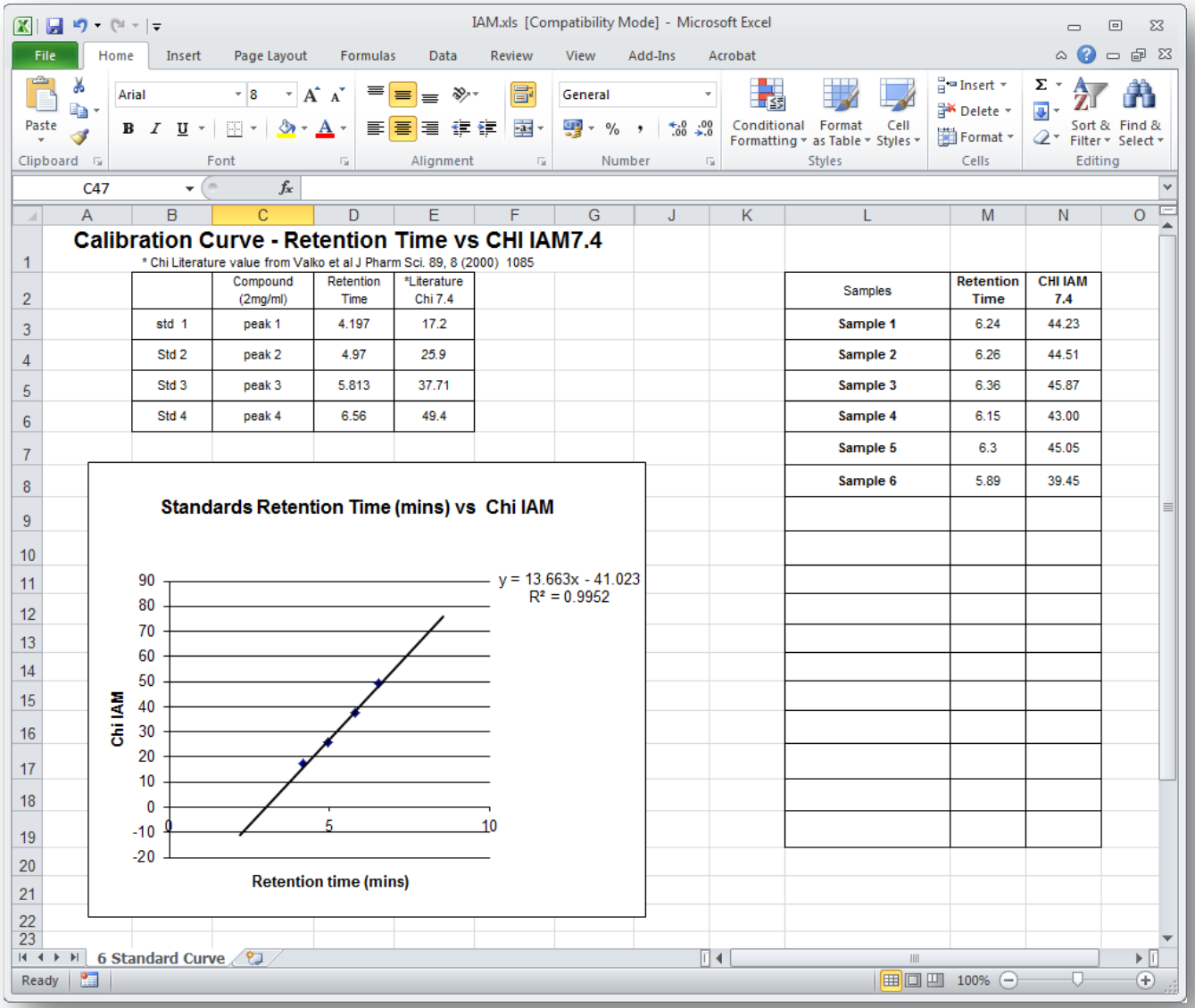
Data Reporting – Example Report in Microsoft Excel



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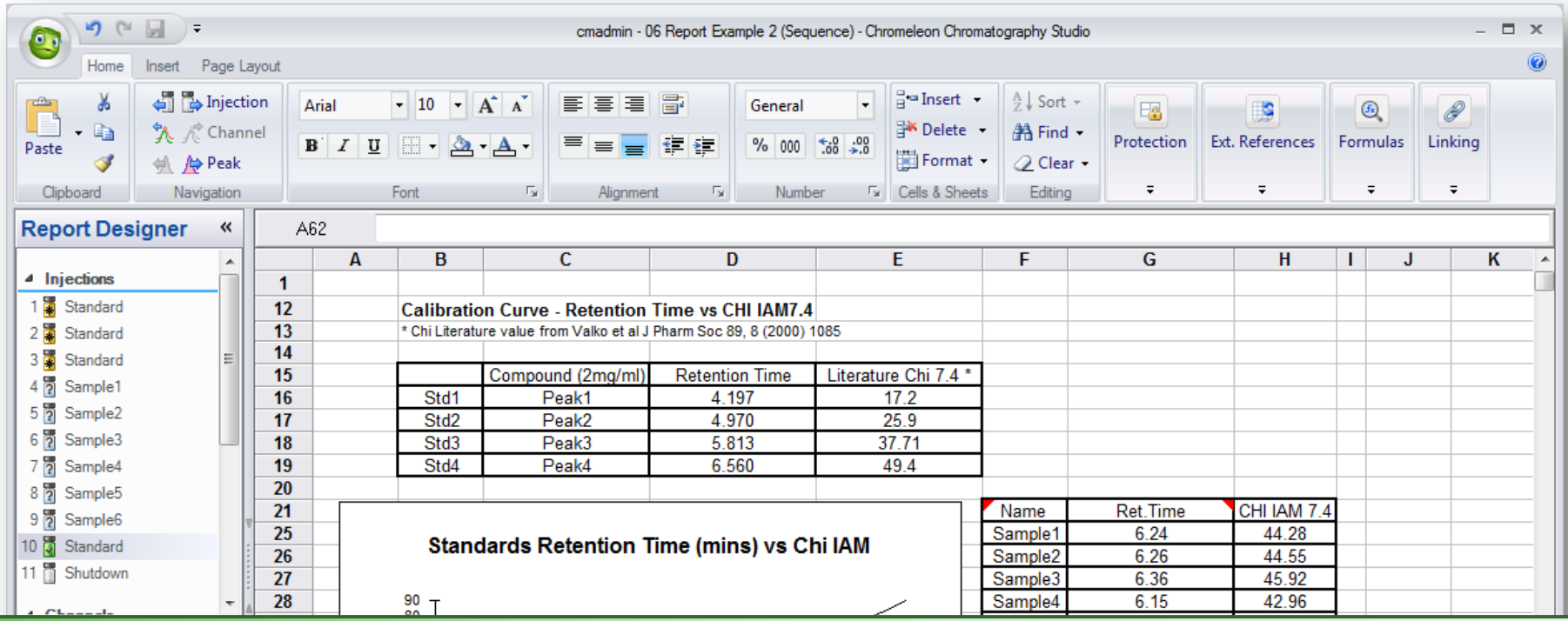
Data Reporting – Example Report in Chromeleon CDS



Bernd Boscolo, Douglas Manufacturing Ltd.

*"The Chromeleon Report Designer is a **mighty tool** to calculate and present data, and to our understanding is **far better than any other software package**. With the Chromeleon Reports, we are seeing **time and cost savings equivalent to four to five full time employees** depending on the workload in each month. These **savings are higher than anticipated**."*

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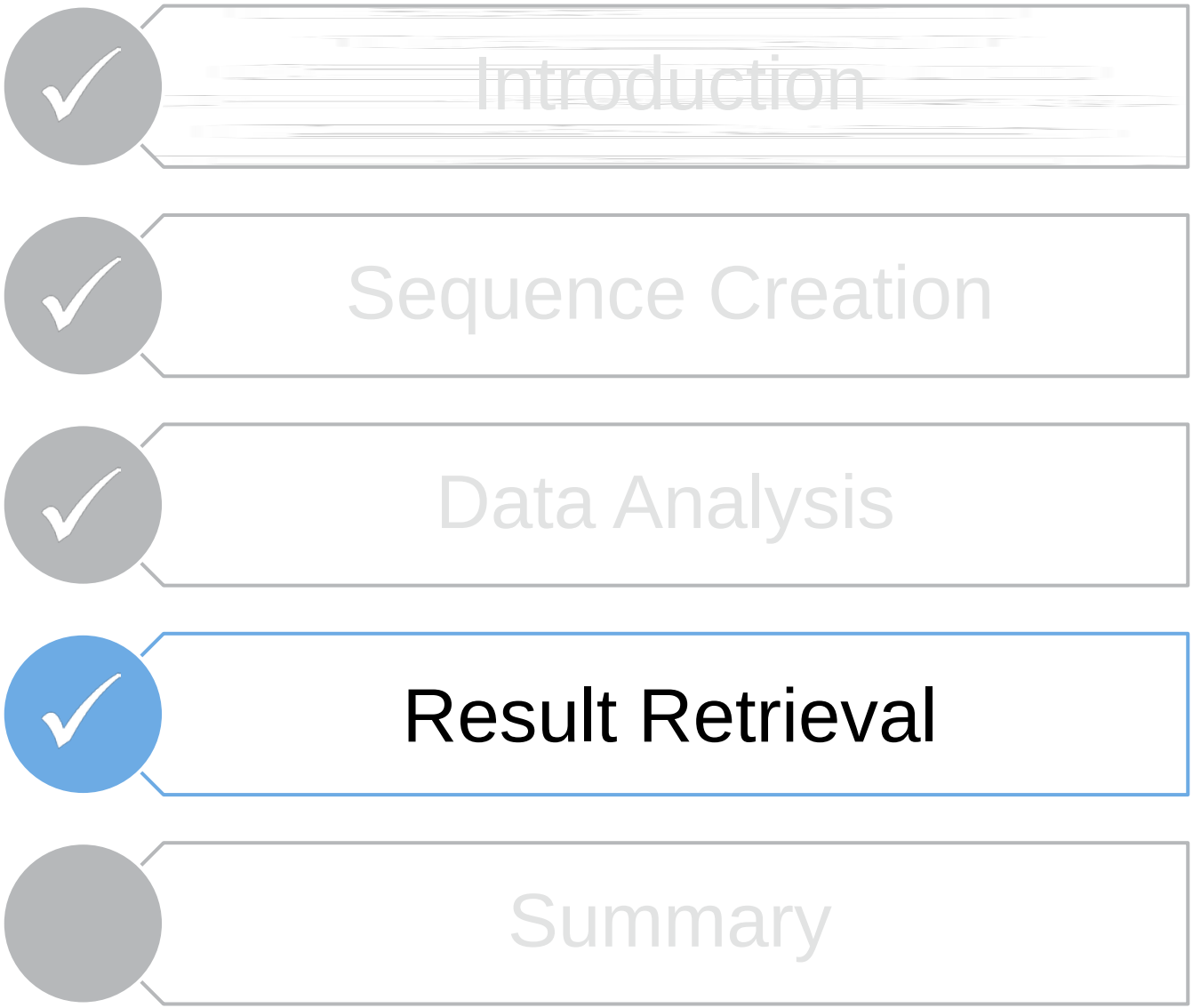
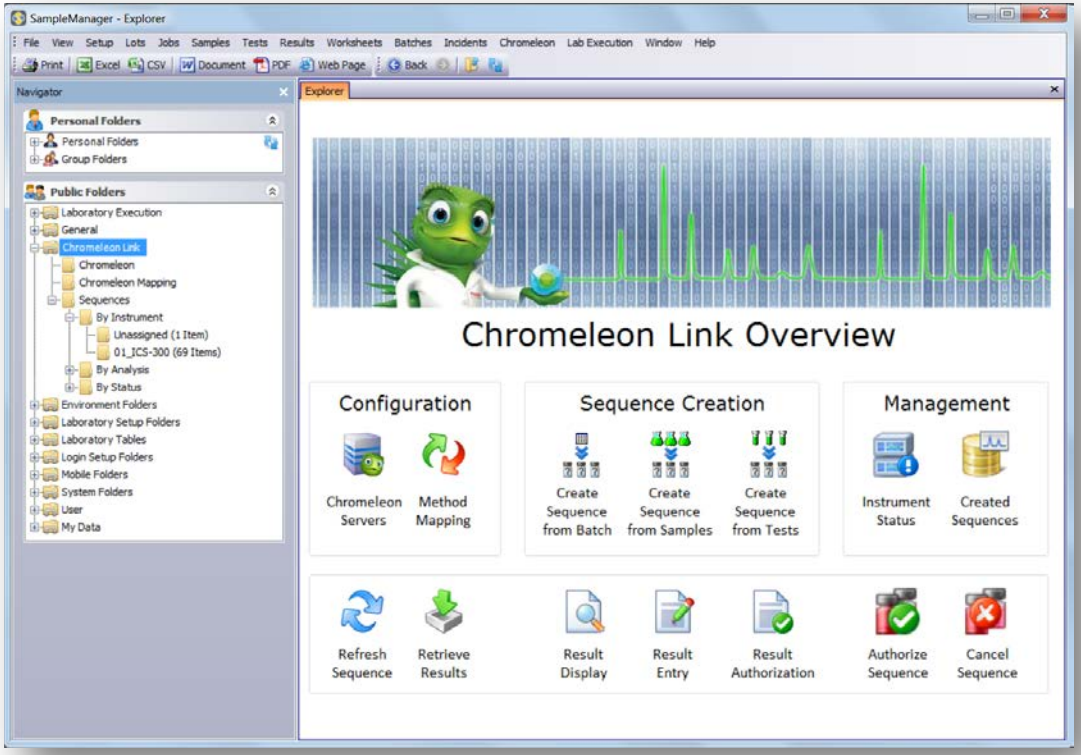


Result Retrieval

- Results can be easily sent to any LIMS
- Thermo Scientific LIMS and CDS software tightly integrated
  - Data can be retrieved direct from variables or report sheets
  - Pull final calculated values from cells



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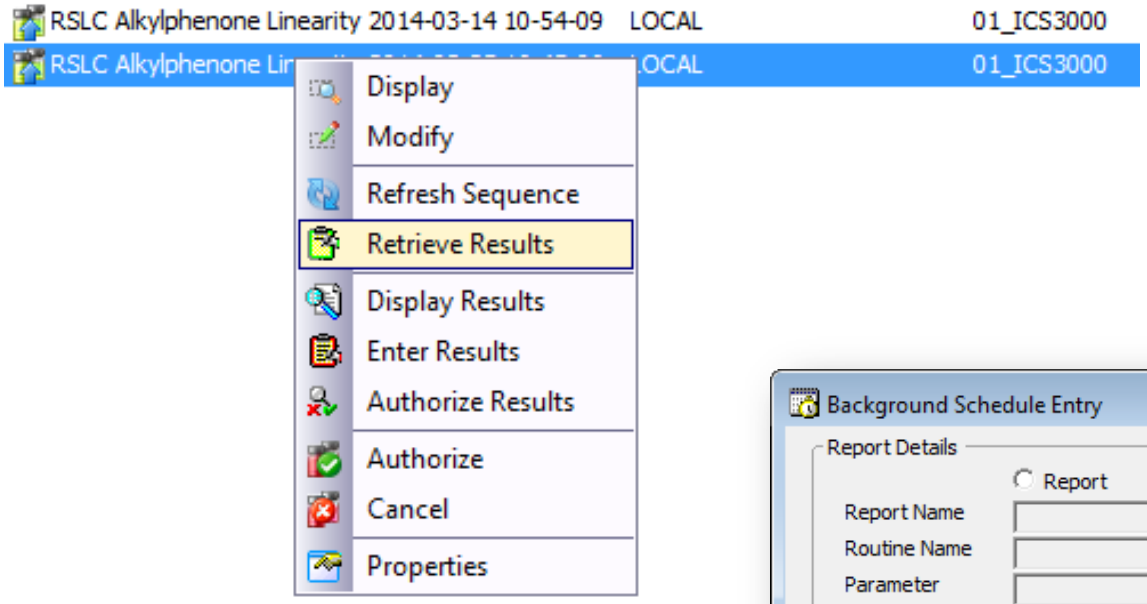
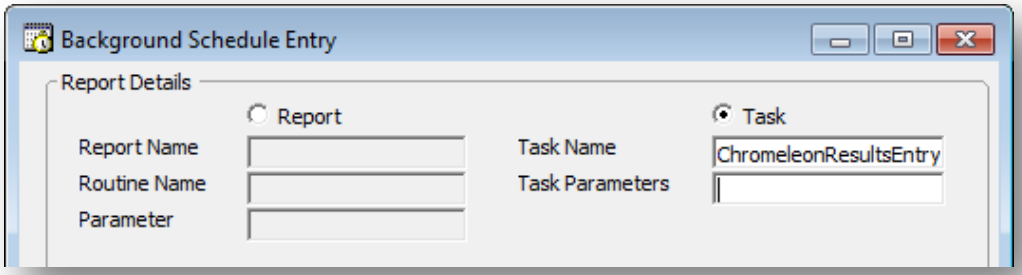
Result Retrieval

- From SampleManager LIMS software
  - Retrieve manually
  - Automate retrieval via background schedule





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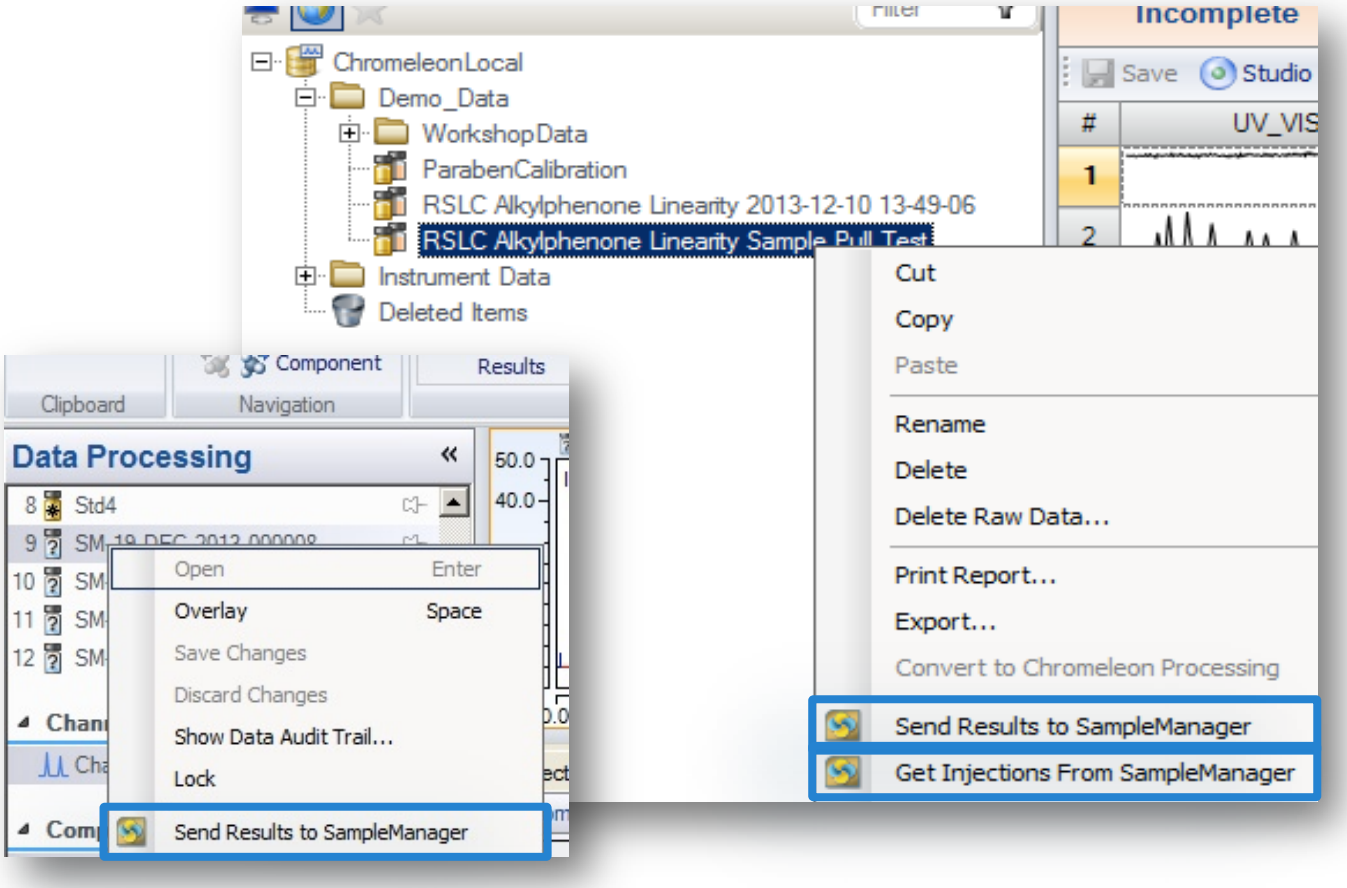
Result Retrieval

- From Chromeleon chromatography data system (CDS)
  - Push to LIMS by sequence or individual injections



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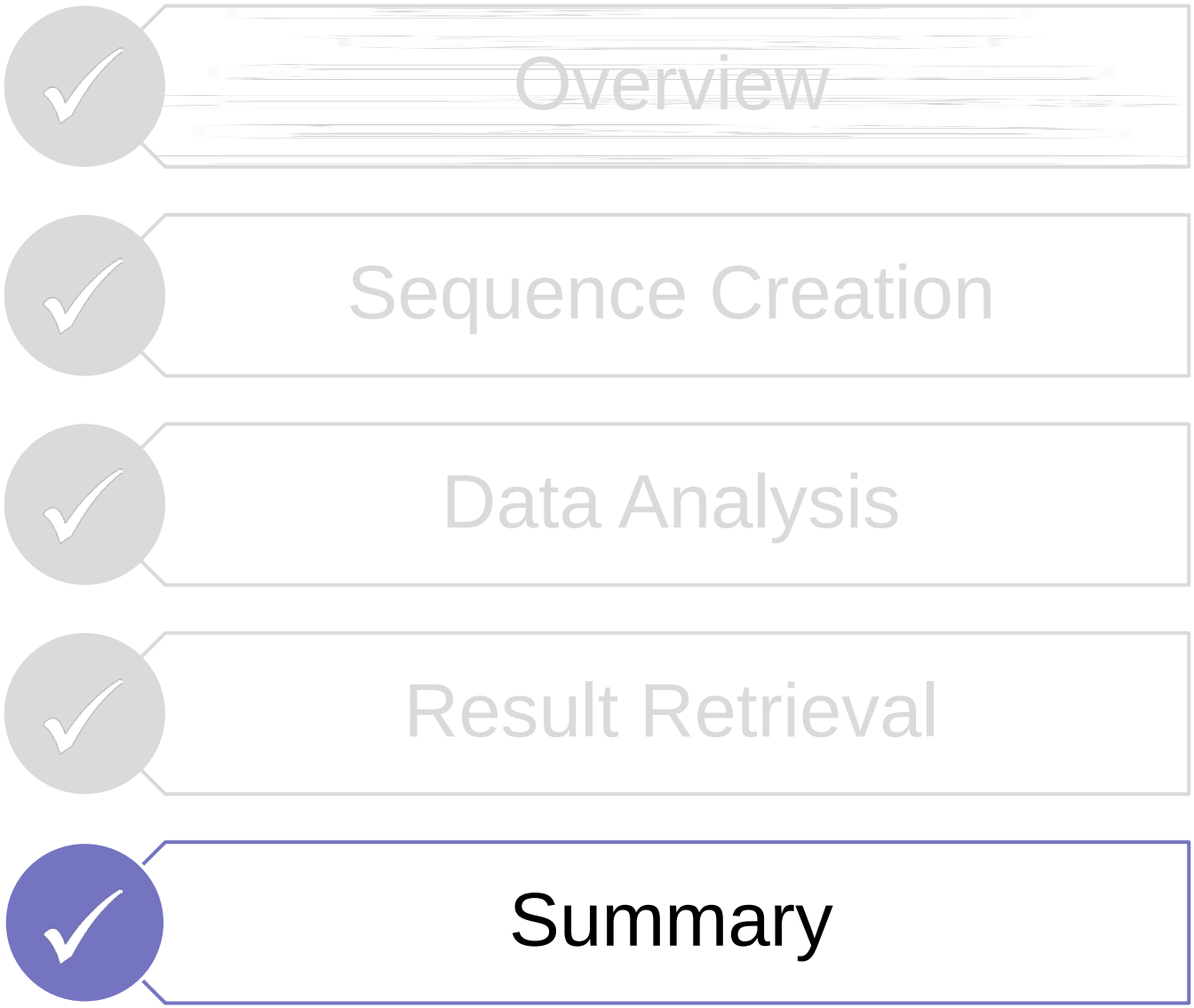
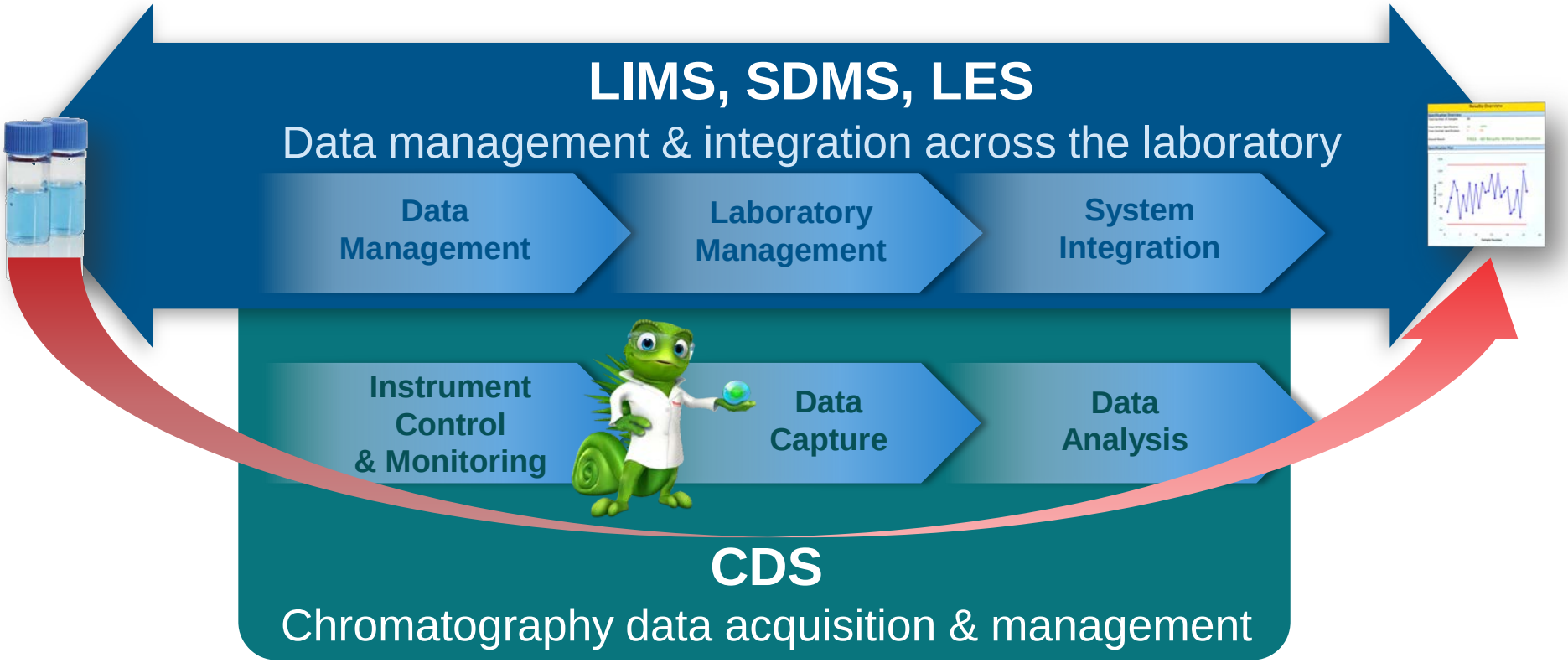


Conclusions

SampleManager LIMS and Chromeleon CDS streamline your workflows getting you from samples to knowledge faster than ever



Streamlining Chromatography

Thank You!

Powerful software to drive efficiency for your entire lab

ThermoFisher SCIENTIFIC

Thank you very much for your attention!

Questions?

Do you have additional questions or do you want to talk to an expert from Thermo Fisher Scientific?

Please send an E-Mail to
analyze.eu@thermofisher.com
and we will get back to you.