

# Two Short Virtual High Pressure Liquid Chromatography (HPLC) Courses by Waters

Zoe E. Goff

Assistant Chemist, Physical Sciences – Chemical Management, MRIGlobal Kansas City, MO



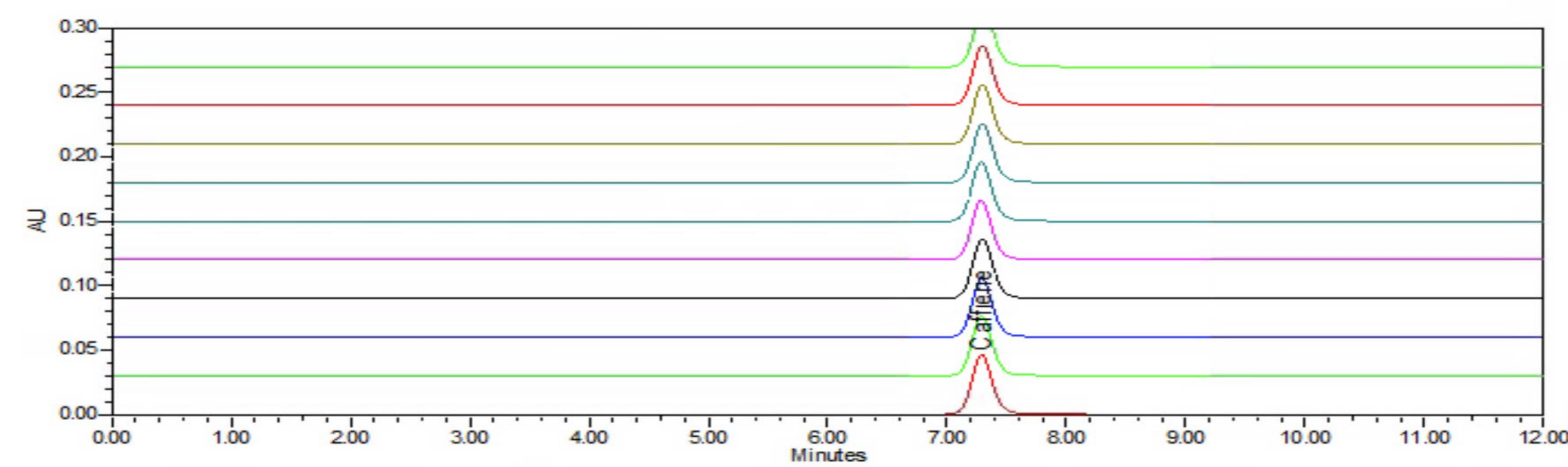
## Introduction

- Many of the High Pressure Liquid Chromatography (HPLC) instruments used to run analyses at MRIGlobal were built by Waters, an analytical laboratory instrument and software company whose focus is to improve human health and well-being through the application of high-value analytical technologies and scientific expertise.
- In addition to vending analytical products, Waters offers multiple virtual and in-person seminars and training courses to assist analysts with improving their technical and chromatographic skills.
- A large focus of the “Fundamentals Course” was the types of columns that exist and how they can be modified.
- The focus of the “Reviewing Data Electronically with Empower 3” course was using the Audit Trails and Result Audit Reviewer functions in the Empower software.

The core objective of attending the two virtual 8 hour courses was to become well-acquainted with the set-up, running, and troubleshooting of an HPLC instrument and Empower software in order to enhance my capabilities within the organization as an analyst and reviewer.

## Applications of Courses and Hands on Training

- Prepped Caffeine sample curve, set-up, and ran HPLC instrument after attending courses and shadowing HPLC trainer for a few weeks
- Processed data and demonstrated proficient knowledge of Empower software and report generation to trainer



**System Suitability Summary Results**  
Name: Caffeine

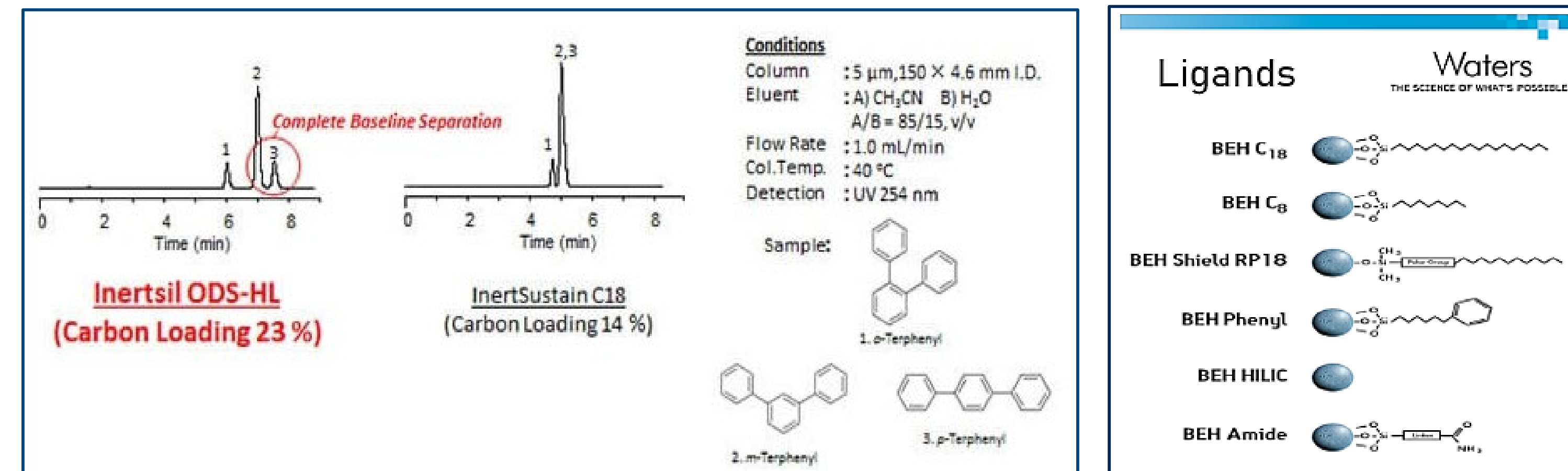
Sample Name	Vial	Name	RT	Area	
1	SS	2	Caffeine	7.288	578340
2	SS	2	Caffeine	7.288	579213
3	SS	2	Caffeine	7.290	578874
4	SS	2	Caffeine	7.295	578891
5	SS	2	Caffeine	7.284	579470
6	SS	2	Caffeine	7.286	579856
7	SS	3	Caffeine	7.296	577532
8	SS	3	Caffeine	7.296	579626
9	SS	3	Caffeine	7.297	579334
10	SS	3	Caffeine	7.304	579466
11	SS	3	Caffeine	7.305	579883

Sample Name	Vial	Name	RT	Area
Mean			7.294	579135.097
Std Dev			0.007	701.224
%RSD			0.1	0.1



## Course 1: HPLC Fundamentals and Troubleshooting

- There are many types of packing materials for columns
  - Hybrid packing material such as the Bridged Ethane-Silicon Hybrid Particles settle into the column more uniformly and are stable at a greater pH range than silica
  - Packing material can be modified with ligands to achieve greater selectivity
  - Modifying the material by carbon loading and end-capping improves the resolution and peak shape of the chromatography

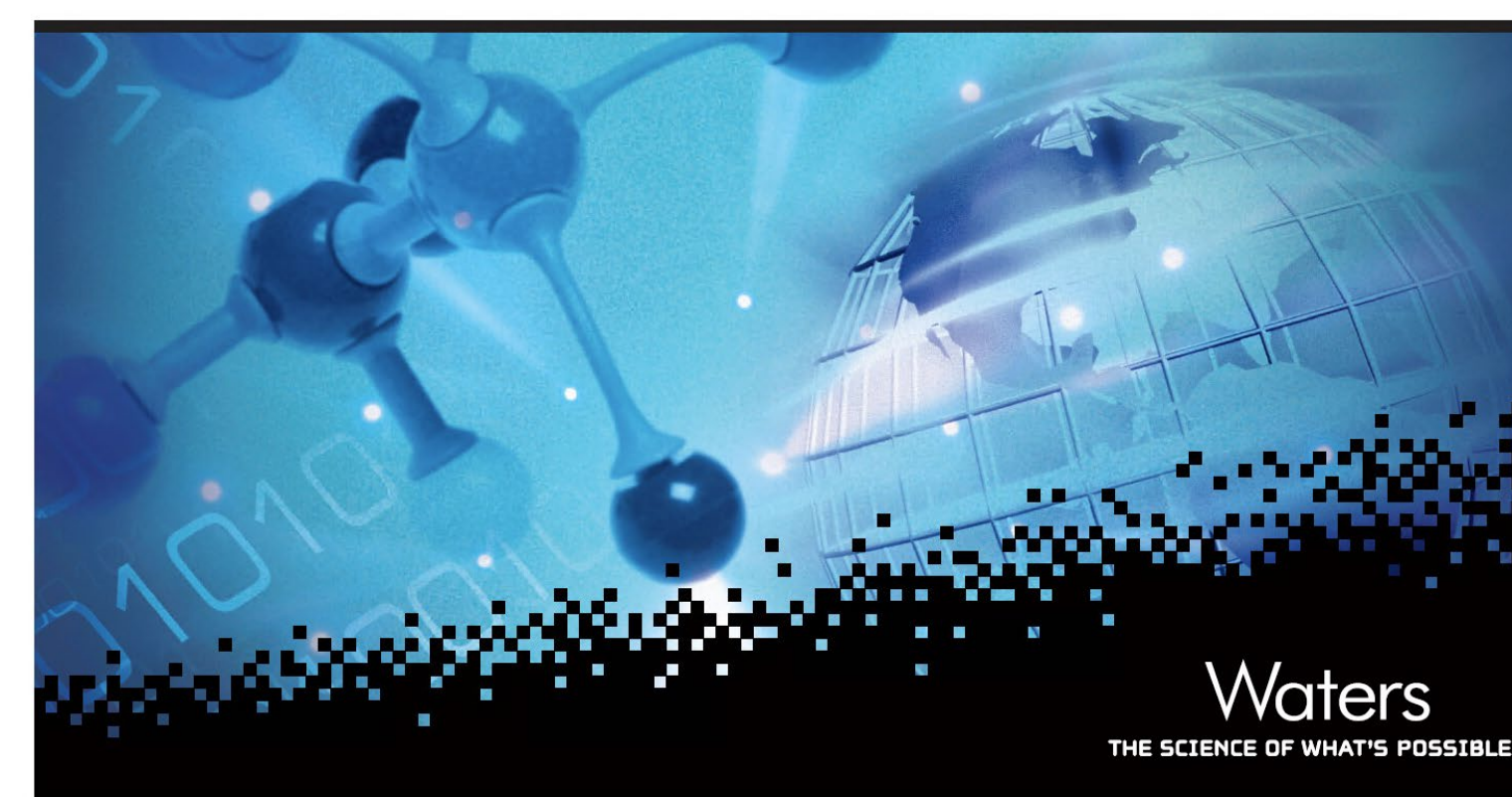


## Deliverables and Conclusions

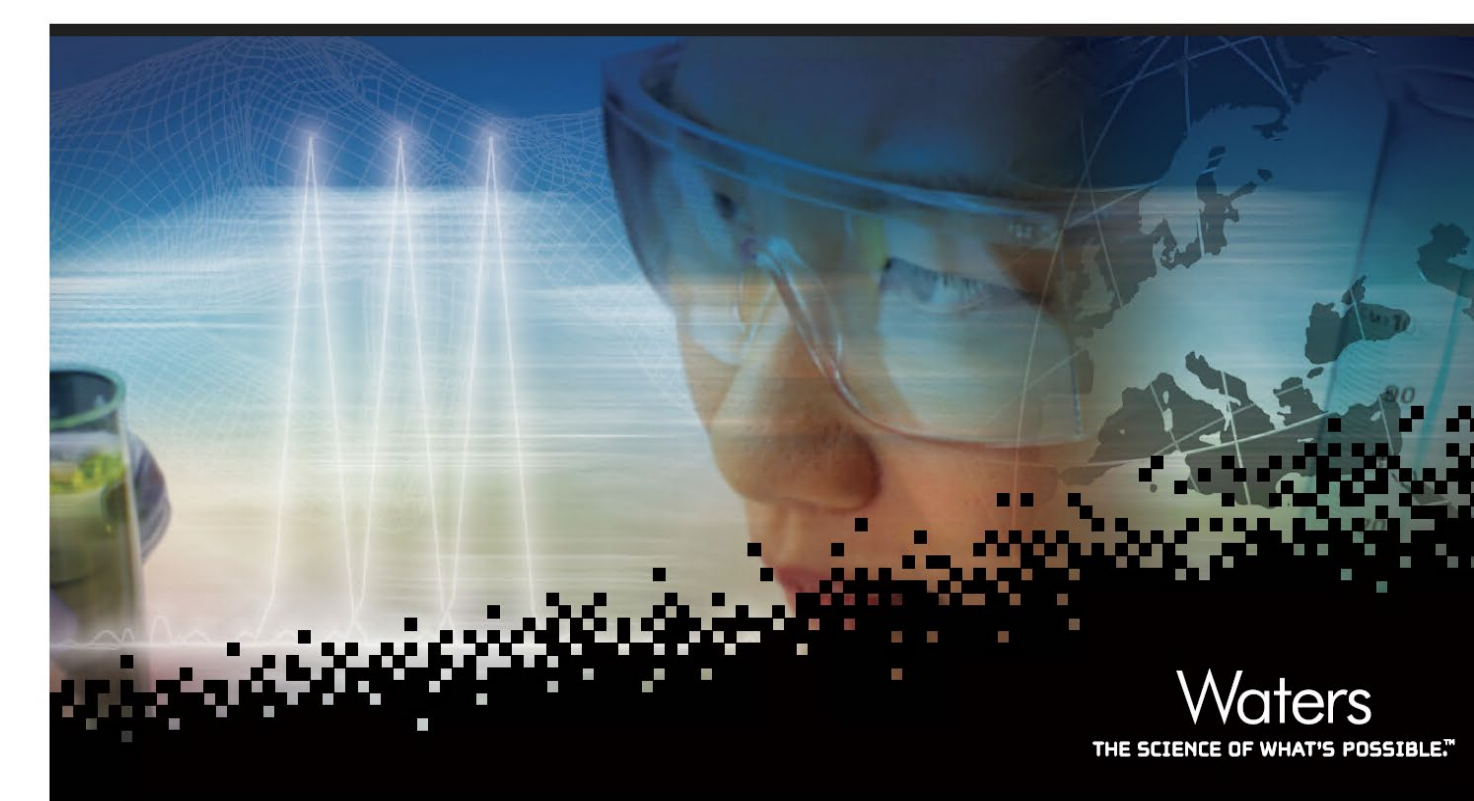
- Obtained resources for future analysts to access
  - HPLC Fundamentals and Troubleshooting Downloadable Training Manual
  - Reviewing Data Electronically with Empower 3 FR2 Downloadable Training Manual
- Obtained Certificates of Completion for both courses
- Completed sample curve and analysis wet run and was signed off on HPLC Training by trainer

### Goals Going Forward:

- Meet project needs by running samples by HPLC or reviewing HPLC data packets
- Research how HPLC connects to mass spectrometry and become familiar with mass spectrometry data
- Practice reviewing mass spectrometry data



Reviewing Data Electronically with Empower 3 FR2



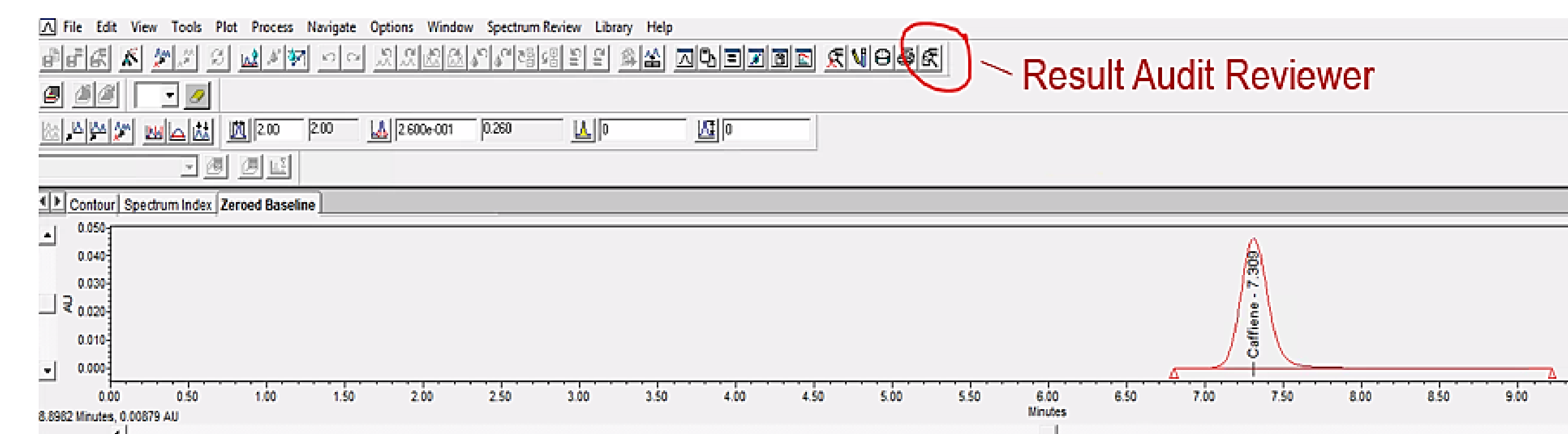
HPLC Fundamentals & Troubleshooting

## Course 2: Reviewing Data Electronically with Empower 3

- The “Audit Trails” function in Empower tracks changes made at the system, project, method, and sample level including who made the changes and what time and day they were made

Action	Change Date	User	Desc
1 Disconnected from System	LC_84		
2 Created Method	Method: Shutdown 84 Type: Instrument Version: 1 Reason: Created method 'Shutdown 84'. Shutdown method	Wednesday, February 9, 2022 2:30:15 PM CST	zgofff@chemist
3 Created Method	Method: 02092022_LC84_Training_ZGSS Type: Sample Set Version: 1 Reason: Created method '02092022_LC84_Training_ZGSS'. New	Wednesday, February 9, 2022 2:38:04 PM CST	zgofff@chemist
4 Created Method	Method: 02092022_LC84_Training_ZGMS Type: Method Set Version: 1 Reason: Created method '02092022_LC84_Training_ZGMS'. New	Wednesday, February 9, 2022 2:38:40 PM CST	zgofff@chemist
5 Created Method	Method: 02092022_LC84_Training_ZGMS Type: Method Set Version: 1 Reason: Created method '02092022_LC84_Training_ZGMS'. New	Wednesday, February 9, 2022 1:57:05 PM CST	zgofff@chemist
6 Connected to System	LC_84	Wednesday, February 9, 2022 1:47:45 PM CST	zgofff@chemist

- “Result Audit Reviewer” is a tool that allows the reviewer to look at a sample chromatogram and see the details about the sample run and the source the details came from



Result #	Sample Name	Result	Result Comments	Peak	Summary	Result #	Result	Result	Sample Values Used in Calculations	File	Injection	Date Processed	Processing Method	Result Codes	Result Type	Channel Name	Processed Channel/Date	Integration Algorithm	Software Version	Source #
1	1002 SS	process							Injection Volume = 10.00 SampleHeight = 1.0000 Diameter = 1.0000			Friday, March 18, 2022 10:15:41 AM CST	20200114_LC84_Training_09	LC	1002	102488 CHA 2208	Empower 3	Empower 3 Software Build 1471 5/14/2018		

Reason	Action Type	Source
1 User: zgofff, Friday, March 18, 2022 10:15:41 AM CST, user: zgofff, Created method 20200114_LC84_Training_09	Created Method	Sample Set Method Properties
2 Detail: Result Set 20200114_LC84_SS, Sample Set Method 20200114_LC84_SS, Method 20200114_LC84_Training_09, Processed New, Processing Method, Result Set ID: 1079, Sample Set ID: 1022, Reason: process	Created Result Set	Audit Trail Record
3 Detail: Method 20200114_LC84_Training_09, Type: Sample Set, Version: 1, Reason: Created method 20200114_LC84_Training_09	Created Method	Audit Trail Record
4 Detail: System LC_84, Method 20200114_LC84_Training_09, Channel 102488 CHA, Calibration ID: 1071, Calibration Source: Auto	Created Calibration	Audit Trail Record
5 Acquired By: zgofff, Injection: 1, Date Acquired: Friday, March 18, 2022 8:44:44 PM CST, Run Time: 12:00, Auto Method Set: 20200114_LC84_Caffeine_09, Injection Volume: 10.00, Barcode: /RCD, Auto Addition: Injection ID: 1007	Injection Log	Injection Log
6 Injection: 2, Monday, March 14, 2022 1:41:53 PM CST, User: zgofff	Injection Log	Sample Set Method Properties
7 Injection: 1, Monday, March 14, 2022 11:56:51 AM CST, User: zgofff, Created method 20200114_LC84_SS, New sample set	Created Method	Sample Set Method Properties
8 Injection: 1, Monday, March 14, 2022 11:41:04 AM CST, User: zgofff, Created method 20200114_LC84_Caffeine_09, New method	Created Method	Method Method Properties
9 Detail: Method 20200114_LC84_SS, Type: Sample Set, Version: 2, Reason: Run again	Created Method	Audit Trail Record
10 Detail: Method 20200114_LC84_SS, Type: Sample Set, Version: 2, Reason: Run again	Created Method	Audit Trail Record
11 Detail: Method 20200114_LC84_Caffeine_09, Type: Method Set, Version: 1, Reason: Created method 20200114_LC84_Caffeine_09, New method	Created Method	Audit Trail Record
12 Detail: Method 20200114_LC84_Caffeine_09, Type: Method Set, Version: 1, Reason: Created method 20200114_LC84_Caffeine_09, New method	Created Method	Audit Trail Record
13 Detail: Sample Set 20200114_LC84_SS, Sample Set Method 20200114_LC84_SS, Sample Set ID: 1022, Reason: Run again	Run Sample Set	Audit Trail Record

- These tools strengthen the scientific integrity of data being reported and facilitate technical data review; additionally, this manner of data review is paperless

## Contact Information

Zoe Goff  
(816) 325-5335  
zgofff@mriglobal.org

425 Dr. Martin Luther King Jr. Blvd,  
Kansas City, MO 64110

The science you expect. The people you know.