

— SHORT COURSES —

Tuesday & Wednesday, May 7 & 8

The Minnesota Chromatography Forum Education Committee presents four short courses in conjunction with the 2013 Spring Symposium. These courses will be conducted all day May 7th and the morning of May 8th at the Earle Brown Heritage Center. **The registration deadline is April 26, 2013.** Course fees are \$475 for early registration, before April 1, and \$495 after April 1. Registration fees include luncheons, refreshments, and course materials. Course attendees can register for the Spring Symposium at reduced rates. Refer to the registration form for details.

Discounts are available for full time students, please contact the events coordinator to authenticate and provide discount information.

— COURSE OUTLINE —

**“HPLC and UHPLC Troubleshooting:
A Performance Qualification Approach”**

by John Dolan

This popular 1-1/2 day course returns to MCF to help build the HPLC troubleshooting skills of the participants. This year, the content has been expanded to include UHPLC troubleshooting. The first day is spent in the classroom, reviewing all aspects of HPLC equipment operation and maintenance. By focusing on performance qualification (PQ), you'll learn how to test and verify that your instrument is working properly – and learn tricks that will shorten troubleshooting instrument and separation problems. Time is spent to improve the understanding of the separation process and many practical examples are used to help attendees develop skills to identify and correct problems with chromatographic separations. Each participant will receive a workbook containing all the slides and notes presented in the course. Ample time is available for discussion of specific problems that users bring to the class. The morning of the second day is spent in a round robin workshop with several equipment vendors. Each vendor will present a troubleshooting tool or technique to a small group of students to help reinforce material covered in the classroom session. One lucky attendee in this course will receive a free copy of John's book: “Introduction to Modern Liquid Chromatography” – a \$125 value!

— COURSE OUTLINE —

**“Getting the Most out of Capillary Gas
Chromatography”**

by Matthew S. Klee

This course is designed for GC users who seek an enjoyable, practical, and focused update on the latest developments in capillary gas chromatography. Attendees will receive an informed perspective on current “best practices” and the latest trends and advancements in capillary gas chromatography. Traditional GC theory will be expanded and applied to everyday situations. Perspective will be shared to differentiate the marketing hype from that which can make a real difference in the lab. Straightforward and practical explanations will be presented for each topic such that students will be able to make informed decisions on adoption and application of new techniques and instrumentation.

Outline

1. Capillary GC tune-up
 - a. Common myths and misconceptions debunked
2. Sample introduction
 - a. Practical fundamentals from samplers through inlets
 - b. Large volume injection
3. Fast GC
 - a. Is it worth it?
 - b. How to painlessly and quickly migrate your current methods
 - c. What's the story on H₂ carrier gas?
 - d. Putting it together
4. Multidimensional methods (instrumentation, practice)
 - a. Detection (multiple and multiplex)
 - b. Separations
 - c. Deans switch, heartcutting
 - d. Comprehensive multidimensional (GC×GC)
5. Capillary column backflushing – BF with benefits
 - a. Easier than you think
6. Optimal GC/MS
 - a. Staying out of trouble
 - b. Maximizing performance
7. Method development and troubleshooting - interactive discussion

— COURSE OUTLINE —

(continued)

**“An Introduction to the Theory and Practice
of Modern GPC”**

by John McConville

In this course, attendees will be given a thorough overview of conventional GPC theory and practice. In addition information on the use and applicability of absolute molecular weight detectors will be presented together with an overview of multi-detector usage and the emerging technique of two dimensional (2-D) GPC and hyphenated GPC (coupled to ESI-MS, NMR and FTIR).

Course Outline

Principles of GPC separation

GPC equipment

GPC columns

Practical aspects of GPC

Obtaining molecular weight distributions from GPC data;

Aqueous GPC

High Temperature GPC

Preparative GPC

Copolymer Analysis

Practical aspects of detectors, pros and cons:

High Speed GPC – “UGPC”

Multi-Detector GPC and Hyphenated GPC

2-Dimensional (2-D) GPC

Sources of Error in GPC and troubleshooting

Applications

— COURSE OUTLINE —

(continued)

**“Mass Spectral Interpretation:
Fragmentation Mechanisms”**

by Robert Kobelski

Accurate mass measurement and stable isotope information can provide an unambiguous molecular formula but a formula by itself is not identification. To complete the identification of an unknown compound one must identify which of a number of possible isomers has produced the spectrum being evaluated. Often one can differentiate among isomers solely on the basis of the mass fragments found in a mass spectrum because different structures produce different fragmentation patterns. An understanding of common fragmentation mechanisms can help solve these qualitative problems.

This one and one-half day course will explore fragmentation mechanisms that can help interpret unknown mass spectra through the use of imbedded exercises and unknown spectra problems. The course material will include fragmentation processes found in electron ionization and chemical ionization techniques, including electrospray ionization. An understanding of the use of isotope information would be beneficial but not required. An electronic calculator is recommended but not required.

Outline

Day 1

1. Review of Introduction to MS Interpretation
 - a. Isotope information
 - b. Ionization: odd/even electron ions
 - c. Nitrogen Rule
 - d. Logical Losses
 - e. Ion Stability
2. Simple Fragment
3. Alpha Cleavage
 - a. Acyclic molecules
 - b. Cyclic molecules
4. Inductive Cleavage
 - a. Acyclic molecules
 - b. Cyclic Molecules

Day 2

5. Retro Diels- Alder Reaction
6. Rearrangements
 - a. McLafferty Rearrangements
 - b. Even Electron Rearrangements

All sessions will contain embedded problems and exercises.

BIOGRAPHICAL SKETCHES OF COURSE INSTRUCTORS

Dr. Matthew S. Klee is a recognized authority in the area of GC analysis and instrumentation. After receiving his Ph.D. in analytical chemistry from the U. of Georgia under the direction of L.B. "Buck" Rogers, he worked for 7 years in the chemical and pharmaceutical industries developing and validating process analysis and monitoring methods prior to joining HP. During 23 years at HP/Agilent, Matthew served in several roles in Marketing, R&D, and business development. He is now President and chief consultant for XO Associates LLC. Dr. Klee is an inventor on over 13 issued patents and over 20 pending patent applications in the field of analytical instrumentation. He has authored over 85 publications in various areas of separation science, chemometrics, and spectroscopy. He is the author of monthly articles in *GC Solutions* e-Journal and regularly teaches all levels of GC related short courses for Separation Sciences, ACS, Agilent, and now the Minnesota Chromatography Forum. Dr. Klee is a recipient of the Chromatography Forum of the Delaware Valley Award, Society for Technical Communication Merit Award, and the Atlanta Chromatography Discussion Group Student Award.

Dr. John Dolan is a Principal Trainer and consultant for LC Resources, Inc.. John received his Ph.D. from the University of California at Davis in 1976 and has more than 30 years of HPLC experience. After finishing graduate school, he did postdoctoral work at Northeastern University and then joined Technicon Instruments Corporation, where he worked for three years developing clinical HPLC technology. He moved to IBM Instruments, where he was involved in design and support of LC, IR, and UV products. As a columnist for LC/GC magazine, he has written over 300 installments of the "LC Troubleshooting" monthly column since 1983. In 1984, John and Lloyd Snyder founded LC Resources, which offered support to the separations community via teaching, software, consulting, and laboratory services. In 2002, LC Resources sold its software products to Rheodyne, the laboratory to Bioanalytical Systems, and retained the training business. After acting as General Manager of the BASi Northwest Laboratory for three years, John now spends full time teaching and consulting. He has written more than 100 scientific papers on LC theory, instrumentation, and applications as well as a book on troubleshooting LC instruments and methods. John is the 2002 recipient of the MCF Palmer Award.

Dr. John McConville is President of Polymer Standards Service-USA (PSS_USA) in Amherst, MA. John received his B.Sc and Ph.D. from Sheffield City Polytechnic, UK in 1977 and has more than 35 years of experience in the field of GPC/SEC. After graduation he worked at the Rubber and Plastics Research Association (RAPRA), UK, where he was responsible for the operation of the national GPC analysis service funded by the Science Research (SRC) Council that supplied GPC data to UK Universities. He joined Polymer Laboratories in 1980 and spent almost 30 years working on the development of all aspects of GPC development including packing materials for columns, polymer standards, GPC software and instrumentation. From 2009 to 2011 he was General Manager of Brookhaven Instruments a company that specializes in particle analysis where he oversaw the development of DLS and zeta potential instruments, software and applications for a wide variety of sub-micron particles. John has been taught over 50 GPC training courses and currently collaborates with Prof. Wayne Reed at Tulane University to offer twice yearly 3 day residential GPC training courses.

Dr. Robert Kobelski, Lead Chemist, serves as the Laboratory Chief of the Laboratory Response Network for Chemical Threats (LRN-C). In this capacity, Dr. Kobelski provides guidance and leadership for a network of 54 emergency response labs located in public health laboratories across the country. Before assuming his current role, Dr. Kobelski was a Research Chemist in DLS's Volatile Organic Compounds Laboratory. Previously, Dr. Kobelski worked in the private sector in the following capacities: chemist (Dupont), senior analytical research chemist (Buffalo Color Corporation), senior research chemist/principal scientist (Johnson and Johnson Personal Products Company), applications engineer/consultant (Hewlett-Packard, Analytical Product Group), manufacturing/hardware design engineer (Hewlett-Packard, Inkjet Supplies Business Unit), and director of analytical chemistry (MetaMetrix Clinical Laboratory). Dr. Kobelski obtained his doctorate in analytical chemistry from the State University of New York at Buffalo in 1986. He obtained his master's degree in organic chemistry from the University of Vermont in 1973 and his bachelor's degree in chemistry from Fordham University in 1970. He began teaching MS interpretation classes in the previous millennium and continues to expand and refine the course material as mass spectrometry evolves.