ASMS LC-MS & Related Topics Workshop and Interest Group Meeting Summary, 2013

Presiding: Helene L. Cardasis, Ph.D. (Sr Field Application Scientist, Thermo Fisher Scientific)
Date: Wednesday, June 12, 2013 (5:45 pm)
Attendance: Approximately 200 (center seats in auditorium empty, but stairway steps on either side full with people sitting on floor)

Workshop Summary:
The agenda for the 2013 Workshop for the LC-MS & Related Topics Interest Group at ASMS in Minneapolis was as follows:

5:45-5:55 pm: Introduction
5:55-6:45 pm: Symptom troubleshooting exercises and discussion
6:45-7:00 pm: Presentation on freeware available for preventative instrument performance tracking

Panelists:
Susan Abbatiello, Ph.D. (Research Scientist, Broad Institute)
Amanda Berg (Sr Application & Development Chemist, New Objective)
Brent Dixon, Ph.D. (Chief Scientist, Physicians Choice Laboratory Services)
Michael Bereman, Ph.D. (Staff Scientist, University of Washington)
Scott McClung (Field Service Engineer, Thermo Fisher Scientific)

Workshop Topic: "Fundamentals in LC-MS Troubleshooting"

In an attempt to stimulate discussion earlier in the workshop this year, we chose to bypass student presentations and start immediately with guided discussion. A brief introduction highlighted the complexity of the platforms we work on, from multiple major components to multiple variables per component, with data that represents the summation of all variables. We suggested that by approaching troubleshooting in a systematic way, one can reduce instrument down time. Even for those new to the field or with service contracts, the more information that can be communicated to the service engineer when putting in the call, the more prepared the engineer can be on arrival, and in turn the quicker the problem should be solved. We recommended that the first, most fundamental question to ask was what "type" of symptom was being observed. We defined two possible options: a "primary symptom" and a "secondary symptom". We proposed that a primary symptom is one that points to the source of the problem (peak tailing, TIC instability, mass accuracy drift, etc), whereas a secondary symptom is vague and cannot be localized to any component or set of variables ("reduced sensitivity", "reduced PSM count", "high background", etc).

The audience was then presented with a variety of symptoms to which they were asked to determine whether the symptom was primary or secondary. If primary, we discussed what particular components should be checked/replaced/cleaned/etc. If secondary, we discussed what experiments would need to be done or what one would look at in the data to identify the primary symptom. We aimed to stress a couple main themes throughout the exercise:

1) Steps taken to identify a primary symptom or source of problem should begin with the simplest checks requiring the least hardware manipulation, and end with the more complex steps involving the most hardware manipulation.
2) There are often many ways to describe the same problem (especially secondary symptoms), and care should be taken to chose simple and accurate descriptions when communicating problems to a service engineer or co-worker. Attempting to do so will likely lead to identification of more primary symptoms. For example: "noisy data" vs. "high background" vs "TIC instability". These could all be describing the same problem or very different ones. Similarly, "loss of sensitivity" slowly over time points to a very different set of causes relative to acute loss of sensitivity. Communication is key.

Overall reception to the exercise was positive. Questions to the panel and other members of the audience arose during discussion of each symptom. The panel provided valuable insight and took opportunities to stress the central themes of the workshop. Approximately 50% of the audience reported to be working on nano-flow applications, and many of the questions/discussions focused on how to make proper fused silica connections, how to troubleshoot loss of peaks from one portion of the chromatogram, nanospray-compatible mobile phases, etc.

Lastly, we highlighted the benefit of pro-actively tracking instrument performance by monitoring primary symptoms and documenting observed symptoms and subsequent fixes. We discussed the use of simple instrument log books and "problem tracker" excel sheets to aid labs with multiple instruments and fast employee/student turnover. Michael Bereman gave an excellent overview of QC freeware he has developed that works with Skyline. This provided an example of how some labs are monitoring instrument performance and the tools available to incorporate system suitability and platform performance testing into any lab.

Discussion maintained a steady flow throughout the workshop with an even mix of audience comments/questions and panel comments/suggestions/questions. Many came to talk directly with the panel after the workshop ended and there seemed to be a keen interest in Michael's presentation on system suitability testing. I believe that a more even focus between reactionary troubleshooting and preventative platform performance tracking would greatly benefit the general audience in next year's workshop.