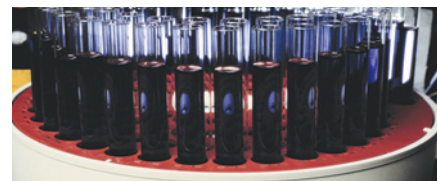


Laboratory automation

Automated technologies are well established in biomedical research in industry, and are becoming increasingly common in academic institutions. This month, we feature the presidents of two of the major societies in the field of laboratory automation.



Marc Feiglin, Chief Technology Officer, Tecan Group, Männedorf, Switzerland, and President of the Society for Biomolecular Sciences.

Two decades ago, the potential of automated technologies to enhance throughput in drug discovery research was beginning to be recognized. At the time, Marc Feiglin — now Chief Technology Officer with Tecan, a company that develops and supplies automated technology for life sciences — entered this nascent field.

“My first experience with laboratory automation was in 1989 when I was working in a lab that had just purchased a liquid-handling system to automate the set-up of protein crystallization solutions,” recalls Feiglin. “My job was to program the system, and although many steps in the process were still manual, the instrument enabled us to dramatically increase the number of crystallization experiments that we could perform.”

A couple of years later, Feiglin joined Merck as an enzymologist and became responsible for an assay to discover antiparasitic agents — a tedious process involving a huge amount of hand pipetting, and moving of microplates in and out of readers for measurements, limiting throughput to ~100 compounds a day. However, the department had an automated liquid handler that no-one was using. “Remembering the efficiencies that such a liquid handler had provided for crystallography, I took the unit and programmed it to automate the assay set-up, which enabled us to double our daily throughput,” says Feiglin.

Feiglin became more interested in laboratory automation than in the wet bench research he had been hired to Merck for. “My job role changed and I became responsible for designing and establishing the new automation facility for our department,” he says. Working mainly in-house, since many important tools were not yet commercially available, his team opened a facility at the beginning of 1995 with the capacity to screen tens of thousands of compounds a day. They were soon asked to establish larger facilities to serve the entire site, increasing the capacity a further tenfold.

As the group became established, Feiglin’s interests shifted from its tactical operation towards developing automation solutions that integrated both hardware systems for performing assays and software systems for capturing and analysing data. With a growing selection of commercially available automated technologies it became less necessary for companies like Merck to create and integrate solutions internally. In 2001, Feiglin moved to Tecan to focus on developing novel laboratory automation solutions.

“It is very interesting to have a position where one of your main responsibilities is to think about how the laboratory automation market will evolve, and strategies for dealing with this,” says Feiglin. Consequently, he has had to become knowledgeable in areas such as clinical diagnostics, proteomics and cell culture, as well as business development. Feiglin feels that the key to achieving this has been the people he has met across these fields, something that is also true in the evolution of his career overall. “Networking has been a critical part of my career,” he says. “Interactions with different people have provided me with new opportunities for both expanding my career as well as understanding where new opportunities for laboratory automation may lie.”



James D. Sterling, Ph.D., Associate Professor, Keck Graduate Institute of Applied Life Sciences, Claremont, California, USA, and President of the Association for Laboratory Automation.

The need to automate sample preparation steps was, and continues to be, a major bottleneck for many laboratories. For example, in the area of biomedical diagnostics, there are very few true sample-to-answer systems, says James Sterling. “Based on these observations, and in an effort to ensure that my research was relevant to real-world applications, I grew more involved in laboratory automation,” he explains. Now, he co-directs a microfluidics group at the Keck Graduate Institute (KGI), in Claremont, California, working on projects such as the development of automated technologies to accelerate the diagnosis of infectious diseases.

Sterling’s research experience reflects the diversity of fields involved in laboratory automation. Following a Ph.D. in mechanical engineering at the California Institute of Technology, Pasadena, USA, he worked as

a systems engineer in product research and development for the technology companies TRW and Advanced Projects Research, both based in Southern California, specializing in fluid mechanics and thermophysics. He returned to academia as a lecturer at the California Institute of Technology in the mid-1990s before making the transition to applied life sciences as a founding faculty member at KGI in 2000.

Established just over a decade ago to educate leaders for the biotechnology, pharmaceutical, health-care and bioagricultural industries, KGI now provides several interdisciplinary programmes, which Sterling is closely involved with. “Getting innovative technologies to the market is a very complicated, multi-faceted endeavour that goes well beyond the science,” he says. “I’ve really enjoyed being a part of two organizations that focus on important aspects of this challenge: KGI through its unique hybrid education that combines technical, business and regulatory affairs education in the Master of Biosciences programme, and the Association for Laboratory Automation (ALA) through its journal, conferences and exhibitions. It is gratifying to see technologies mature as they move from scientific presentations at the ALA to commercially marketed products a year or two later.”

Sterling is also excited by the growth of academic involvement in the science and application of laboratory automation, which have traditionally been driven by industry. “I’ve heard many times that labs don’t need automation because graduate students are great at pipetting, and I realize that the budgetary constraints of many academic labs don’t enable purchase or use of automated liquid handlers,” he says. “However, I like to emphasize that beyond simply avoiding tedious repetition for researchers, automation opens doors to use design of experiment approaches for optimization and for directed evolution processes.”

For those considering pursuing a career related to laboratory automation, Sterling emphasizes the importance of interdisciplinary collaboration. “It’s rare that one person will automate a laboratory process and use it as well,” he says. “I think the best advice I can give would be to learn to work together well with experts from other areas, and build one’s own skill set to include capabilities that help bridge the gap between technology users and technology providers.”

WEB SITE

Career snapshots: http://www.nature.com/naturejobs/magazine/career_snaps.html