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Perspectives on Lab Automation: Past, Present and Future

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HITM: Please Tell Us a Little Bit About the History and Membership Composition of the ALA.

Dummer: The Association for Laboratory Automation (ALA) was set up in 1996. The year also saw publication of the first issue of Laboratory Automation News (LAN), which in 1998, was rechristened as the Journal of the Association for Laboratory Automation (JALA).

ALA's aim was to bring together the best, brightest and most motivated lab automation professionals from all walks of life governments, universities, multinational corporations, and of course, the entrepreneur community – all of who endorsed one of the ALA's principal tenets - that staying a step ahead of today's rapidly changing technology and trends is not just their key to success; it's the key to what unlocks their mind's eye.

That founding spirit continues today - through world-class conferences, a highly regarded scientific journal, formal networking programs, and informal alliances. ALA continues to offer a living, thriving and multifaceted platform for lab automation professionals to compare practical notes, share achievements as well as disappointments, and learn and grow together.

Our members come from all levels (company presidents with Ph.D.s and M.D.s to entry-level lab techs with associate degrees), and from many camps (biopharmaceutical, agricultural, forensic and security sciences, molecular diagnostics, academia, manufacturing, and more).

In 1998, as you know, we introduced the Euro Lab Automation conference, at Keble College in Oxford. That launch session attracted about 150 attendees.

HITM: What Would You Consider to be ALA's Main Achievements in 2006, and its Priorities/Strategic Goals for 2007?

Dummer: ALA is in a constant state of change to continually meet the needs of our membership, which is now over 7,250, and growing by some 200 each year. As a multidisciplinary, international forum of scientists and business professionals devoted to education and advancement of technology in the laboratory, we continue to develop programs, priorities and benefits that deliver real value to our members. ALA's membership base now comprises three key constituencies: Academia and Government; Technology Users; and Technology Providers.

Each constituency represents the diversity of our field:

pharmaceutical, biotechnology, molecular diagnostics, food and agriculture, forensics and security, energy sciences and more. Of course, such a wide range brings many points of change – which is why ALA is constantly evolving. During the past year, we unveiled a number of new initiatives, including:

- î The award-winning e-newsletter LabSnap— A Fast Read on the Latest in Lab Automation
- î The scientific knowledge, experiential learnings and dry wit of The Lab Man Forum
- î Pod casts of “Ask The Lab Man”
- î Innovation AveNEW, a cost-sensitive program for startup, entrepreneurial companies in the laboratory automation and technology field
- î The ALA New Product Award (NPA) Designation, recognizing outstanding new products in laboratory automation
- î A new, member-savvy and interactive ALA Web site These programs join an already impressive inventory of member offerings.

Topping the list is LabAutomation, the world’s leading exhibition for laboratory automation technology, held each January and attended by thousands from across the globe at the Palm Springs Convention Center in the US.

Additionally, we have annually published six peer-reviewed issues of our award-winning scientific journal, the Journal of the Association for Laboratory Automation (JALA), which is also available in an online version.

To ensure our programs meet our members’ needs, all initiatives are developed under expert guidance from our member- elected Board of Directors, combined with the expertise of our professional team; this process makes certain our organisation continues on the right path.

The ALA Strategic Plan sets a clear direction for continued growth with regard to fulfilling our educational mission and reaching out to new audiences across multiple disciplines and industries.

ALA is now looking at conducting vital market research and potentially partnering with industry and sister organizations to produce high-quality workshops around the globe.

HITM: What are the Most Beneficial IT Innovations Implemented in Laboratories During the Past 5 Years ?

Verpoorte: I am most familiar with the research lab environment, namely the use of micro- and nanotechnologies for analytical chemistry, pharmaceutical analysis, and cell biology. Certainly in this environment, we have benefited over the last few years from more sophisticated computer programs and systems for the automation of instrument control and data acquisition.

As our ability to generate information has improved, there have been parallel developments in IT technologies for data processing, particularly for bioinformatics applications related to the emerging areas of proteomics and biomarker discovery, metabolomics and systems biology. I think generally IT technologies have had a major impact as far as increasing the level and reliability of automated laboratory analysis systems, and well as on the management of information.

HITM: What Laboratory IT Innovations and Advancements are Currently Being Developed that Have the Greatest Potential to Improve Safety and the Quality of Service Provided to Patients?

Verpoorte: As a researcher in the micro- and nanotechnologies field, the advances in IT that I now encounter most often - and which will impact healthcare generally - are related to the development of a new generation of micro and nano chip-based medical sensors and implants. These devices are designed to generate information about, and for the patient, outside the centralised laboratory, namely directly at the point-of-care in the doctor’s office or the patient’s home.

The interesting thing about IT is that these technologies are chip-based, and thus can be used to realise both information- generating and information-processing micro systems. This enormously facilitates the integration of both sensing and information handling systems. It becomes possible to produce portable instrumentation for monitoring the health and activities of individuals in their home environment, monitoring various functions in the home itself, and providing information and the possibility to more easily communicate with external healthcare professionals as well as direct family and other potential care givers.

Wireless information transfer certainly will play a large role here as well. Patients will become more informed about their own illnesses or conditions and how to manage these, and be empowered to live more independently. These types of developments are gaining in importance as our populations continue to age.

HITM:What are the Biggest Challenges Facing the Laboratories of the Future?

Verpoorte: Let’s consider clinical labs. With a rapidly growing ability to generate patient data, one of the challenges which will need to be dealt with is how that information is handled, in my view.

Making information easier to generate and process, as well as more accessible to users, carries with it the danger, of course, that patient privacy will be more easily violated. Securing laboratory data systems, particularly those based on wireless technologies, is becoming increasingly important, a fact which is being recognised by developers of such systems. Another challenge with respect to patient monitoring systems is related to the user interface of these systems. Ease of use is paramount, ultimately, to the successful implementation of IT for these applications.

A greater and more general challenge, however, facing today's clinical labs will be their changing role in the healthcare system. As new IT enable increased point-of-care treatment, the clinical laboratory as such will become increasingly decentralised and reduced in size. More flexibility with respect to healthcare management will be required, particularly when it comes to accessing and handling data at home and in a medical environment. IT will certainly provide the necessary technology platforms to make this possible.

HITM: Please Give Us an Overview of the Main Themes Covered at ALA's Conference, LabAutomation2007.

Verpoorte: A wide range of scientific topics were on the agenda at LabAutomation2007, offering exceptional insight into the full spectrum of laboratory technologies and tools. The scientific program featured five parallel tracks whose themes are listed below.

Detection and Separation

Detection and separation, two important and frequently related operations in the laboratories of today and tomorrow, were bundled into this track. Session topics included mass spectrometry and other label-free techniques, the latest separation technologies, in conjunction with detection and analytical technologies in pharmaceutical development.

Micro- and Nanotechnologies

This track broadly encompassed new and emerging technologies based on micro- and nanotechnologies. Sessions were devoted to lab-on-a-chip technologies for cell analysis, as well as nanotechnology for drug discovery, and molecular diagnostics.

High-Throughput Technologies

This track focused on the innovative tools, technologies, and techniques that enable high-throughput activities or shorten operational cycle times. Emphasis was placed on new high through put technologies and their application to leadingedge automation-assisted research and development. This year's conference featured high-throughput technologies for chemistry and biology.

Informatics

Today's automation solutions often require more informatics than hardware. Whether developing a controller for a new instrument, designing an integrated solution, scheduling a complex assay, tracking samples, or integrating data from multiple systems, success in automation relies on developing hardware and software that work harmoniously. This track offered a platform for showcasing unique, technically innovative applications in the automation arena.

Emerging Areas in Laboratory Automation

This track spotlighted the rising impact of leading-edge automation technologies in leading industries. Featured topics included lab automation and food safety, influenza surveillance, developments in biosensors, and automation for household application formulations.

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