



Munich, February 26, 2018

Press Release

Trend report – Future Lab / analytica 2018

Barbara Kals
PR Manager
Tel. +49 89 949-21473
Barbara.Kals@
messe-muenchen.de

Digital transformation: Towards the laboratory of the future

The laboratory world is changing. Against the background of increasing digitization, various processes and structures must be rethought for the laboratory of the future. Indispensable for the beginning of the new era are networked laboratory devices with intelligent and smart functions, complex holistic automation concepts and efficient interface solutions. In the age of personalization, the continuous availability of vast amounts of data places new demands on data handling and secure data storage.

Digitization has arrived in the laboratory, and with it, a paradigm shift is emerging.

Driven by increasing complexity of laboratory processes and the surge in legal regulations, efficient and safe work in the laboratory is becoming ever more important. Automated laboratory steps and optimized work processes make significant contributions to meeting these goals. It is necessary to create a flexible laboratory environment that is individually tailored to the users' current needs. At the same time, the aim is to increase the quality of the analysis results, combined with the possibility of recording, organizing and automatically evaluating larger amounts of data.

In the intelligent laboratory of the future, analyzers and measuring devices, sensors, processes and data are networked with each other. Automation and laboratory information management systems regulate and control this network. Such integration requires appropriate interfaces in hardware, electronics and software.

The devices must be able to communicate with one another via suitable network accesses and drivers for integrated laboratory automation systems. With the requirement of permanent availability, for example with regard to remote control and remote maintenance, automation and needs-based networking solutions become indispensable.

Messe München GmbH
Messegelände
81823 München
Germany
www.messe-muenchen.de





Press Release | February 26, 2018 | 2/2

Laboratory automation as an innovation driver

The basis for successful automation and LIMS networking is a functioning IT structure. Only in this way can the diverse processes be sustainably controlled and monitored. In addition, reliability in evaluation, storage and management can be guaranteed, which will be of central importance today and in the future: **In tomorrow's lab, the data volumes will be gigantic.** The resulting torrent of data is a major challenge not only for laboratory data handling but also for the entire laboratory management. **Laboratories will become veritable data mills, and with regard to regulations and standards, the issue of "Big Data" is becoming increasingly important.**

Today, in the SiLA Initiative (Standardization in Lab Automation) renowned institutions such as the Fraunhofer IPA are developing communication interfaces, software solutions and standards for tomorrow in order to easily integrate device components and laboratory utensils or laboratory supplies and consumables from various manufacturers.

Optimally developed automation levels and integrated device modules for dynamic application capabilities allow efficient and reproducible – i.e. validatable – process design with integrated data management. **It is imperative to transform manual into automated processes, and to integrate existing laboratory information management systems in order to make the laboratory think tank even more efficient.**

Intelligent laboratory systems and individual networking, as well as sustainable integration of the laboratory into the corporate structure, increase not only the flexibility but significantly also the economic viability of a company.

Especially in the growth-oriented industrial laboratory, the priority is to improve efficiency, optimize structures, and increase flexibility. Decisive prerequisites and success factors for achieving these objectives are state-of-the-art, high-resolution, communication-capable analysis systems and functional automation solutions to ensure reaction parameters and product quality, as well as rapid data availability and efficient data management.

Digital transformation from an industry perspective

There is no large-scale application yet, but the research potential is great. An abundance of genetic and biological processes still remain to be elucidated, molecular structures and switches to be deciphered, and mechanisms of gene expression understood, in order to successfully use further bespoke therapy



Press Release | February 26, 2018 | 3/3

concepts. The way there is going to be very research-intensive. Validation and implementation of disease-specific biomarkers also pose a challenge to scientists, not only from a regulatory perspective.

analytica: the meeting place for life Sciences and personalized medicine

Novel developments in biotechnology, genetic engineering and diagnostics, as well as high-performance analysis methods and high-throughput procedures, will drive innovation and challenges in the Life Sciences and especially in personalized medicine. The latest trends will be presented to the experts at the analytica 2018. The industrial fair comprehensively presents cutting-edge technologies and future-oriented methods. Internationally renowned specialists like Dr. Friedrich von Bohlen and Halbach, Managing Director and co-founder of dievini Hopp BioTech holding GmbH & Co KG, and global players will meet in Munich for an exchange of experience, where the expertise of the industry and the latest state of the art will be exemplarily demonstrated.

What future-oriented developments in the life Sciences are going to be presented at the analytica 2018?

From sample preparation techniques and liquid handling through single-use systems and disposables to the full gamut of instrumental analytics with appropriate linkage to mass spectrometry and imaging techniques – the trade fair visitors can get an idea of the developments. Methods in immunology and molecular biology, bioreactors, assays and chip technologies are trade fair highlights just as much as high-throughput screening, sequencing, and laboratory automation are. In a well-structured and comprehensive manner, practical system solutions are presented to the used that allow achieving shorter analysis and assay times, as well as better interpretation of the measurement results and central availability of meaningful data.

Next-generation technologies will provide new impetus in diagnostics as well as in tissue and organ research. The goal is to enable previously unimaginable therapeutic approaches in general and vascular surgery, tumor therapy or even dermatology. How can this be achieved? The patient's immune system is to be



Press Release | February 26, 2018 | 4/4

directed to react specifically to the individual tumor. Endogenous repair mechanisms ought to be specifically activated. Faster diagnoses and better therapies are expected to increase treatment successes in medicine and make therapy more reliable.

Data as a driver of personalized medicine

Computer-aided drug design and next-generation ultra-high-throughput sequencing methods quickly generate massive amounts of data. Meaningful evaluations and sustainable interpretations, rational data handling and the need for archiving and storage of sample materials, raw data and results, as required by applicable laws and established standards, pose particular challenges for researchers. In the laboratory of the future, apart from the “actual” research project the focus will be on fast data availability, a significant increase in efficiency and safety. Here, biobanks and peptide libraries are indispensable tools, especially against the background of increasing digitization. According to Tom Hudson, the director of the Ontario Institute for Cancer Research, this development has long been overdue, as he explains in an interview with the *Süddeutsche Zeitung* about the decoding of the human genome: „If I could turn the clock back to the year 2001, I would invest much more into the development of databases with detailed case histories and long-term observations.”

Digital transformation from an industry perspective

“For Mettler-Toledo, the development towards Laboratory 4.0 is already in full swing. With digital, software-based systems and direct data networking, it is already possible to optimize essential processes in the laboratory on the way to the ‘lean lab’. Here the focus is on data integrity, automation of repetitive activities for greater efficiency, economical use of resources, and user safety”, as Dr. Michael Schreiber, Head of Marketing Central Europe Mettler-Toledo GmbH, explains.

Smart laboratory devices will simplify the users’ laboratory routine. Their integration into sustainable networks will massively alter the laboratory world.

Laboratory 4.0 – Bridge between Smart Lab and Life Science

The research group SmartLab Systems at TU Dresden deals with the development of the smart laboratory of the future. “This is crucially influenced by



Press Release | February 26, 2018 | 5/5

three trends”, explains Dr.-Ing. Felix Lenk, head of this research group, “namely digitization, miniaturization and automation”. “We have various ongoing projects concerning these three topics, and we will present at least three exhibits at our analytica booth A3.528, the joint booth ‘Research for the Future’.”

An example of the miniaturization in Laboratory 4.0 is the Sens-o-Spheres measuring system. “This is the world’s smallest wireless online temperature sensor. We have developed this temperature sensor, which is only the size of a pea, in a BMBF-funded collaborative project. It was awarded the bionection-Transfer Trophy 2017”, as Dr. Felix Lenk informs.

<https://bioeconomie.de/video/mini-messkugeln-fuer-bioreaktoren> and <https://bioeconomie.de/smart-spuersonden-im-bioreaktor>

The Pandora system is an example of digitization in Laboratory 4.0. “This enables automatic generation, measurement and characterization of biological samples using automatic multi-perspective image analysis”, emphasizes Dr. Lenk. “For the first time, complete 3D models of biological samples are generated, and these are evaluated non-invasively using automatic image analysis methods.” This trendsetting system will be presented at the analytica in Hall A3.

As an example for automation in Laboratory 4.0, the PetriJet platform technology is to be mentioned. “Fully automated inspection of biological samples in culture dishes opens completely new perspectives for routine laboratory applications, such as drinking water testing for legionellae and the like”, Dr. Lenk informs.

<https://cloudstore.zih.tu-dresden.de/index.php/s/fzA5kRptI3vqHvW>

analytica 2018: Experience the future of the laboratory live

Laboratory 4.0 revolutionizes the lab world from sample logistics to data management and enables novel approaches to personalized processes. Big Data, Cloud Computing, the Internet of Things, and the mobile Internet as next-generation technologies will all play key roles in ensuring future growth.

Learn more about the latest developments in smart laboratory systems and about Laboratory 4.0 at the analytica.

The analytica presents solutions for the laboratory world of tomorrow already today. Opportunities and risks of digital transformation in the laboratory are presented by experts. The analytica maps the future trend on the three pillars of its trade fair concept:

Invert order (start with exhibition)



Press Release | February 26, 2018 | 6/6

- **analytica Conference:**
 - Big Data Tools for OMICS
 - Bioinformatics and Big Data Applications in Microbiome Analysis
 - From Big Data to Smart Data
 - Large analytical data sets – Chemometrics as a tool for evaluation and assessment
- **analytica supporting program:**
 - Personalized Medicine (from Big Data to Smart Data in Personalized Medicine)
 - Separate forum “Digital Transformation”
- **Exhibition:**
 - More than 80 manufacturers show solutions in the field of digitization, automation, robotics, LIMS and networking, etc.
- **Find solutions for the world of tomorrow already today – at the “Digital Transformation” forum area in Hall B2**
 - **Current and future topics for laboratory decision-maker are contemplated at the forums:**
 - What will the laboratory of the future look like? (Keynote presentations)
 - New developments from the fields of automation and robotics
 - Advantages of digital networking (interfaces / LIMS). What does this mean for manufacturers and users?
 - How to make my lab even more effective? How to optimize laboratory processes?
 - How to manage data diversity and, above all, its security?
 - How to ideally implement regulations and standards?

Using trend reports for editorial purposes is free of charge if the source is acknowledged as "analytica/Messe München". We would be pleased to send you high-resolution photographic materials upon request. Voucher copy requested.