CMM
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in this issue

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treatment status and enable warning systems to improve the entire process chain.

The German company microsensys will debut its RFID sensor data logger for seamlessly monitoring temperature during steam sterilisation in autoclaves at +134°C and 3 bar. The company has provided the patented mic3 technology since the mid-1990s. This technology allowed for the realisation of the smallest RFID transponder with an integrated coil on the chip at a size of approx. 1.5 mm^3. mic3 transponders are highly reliable and offer sufficient storage capacities of 64 bit read only to 64 Kbit read/write and temperature resistance of minus 45˚C to plus 200˚C.

Nano coatings

Micro and nano technologies (MNTs) are a key focus at COMPAMED. The Dutch company Surfix develops and supplies bespoke nano coatings based on chemical surface modifications for the MNT market. It has extensive expertise in organic, physical and biochemical surface research.

Surfix is involved in the BIOCDx programme, which was started in January 2017 and is funded by the EU's Horizon 2020 programme. In this project, partners from four different countries are developing a miniaturised, highly sensitive and reliable point of care device with a disposable microfluid cassette to monitor cancer biomarkers. The device supports the recognition of primary tumours and metastases with a focus on breast cancer, hormone-resistant prostate cancer and melanoma. As part of the project, Surfix will supply the nano coatings necessary to immobilise the various biomarkers on the surface.

DeviceMed and IVAM forums

In addition to the exhibition, there will be two established forums. In Hall 8a, the COMPAMED High-Tech Forum, presented by the IVAM Association for Microtechnology, will focus on microsystem technologies, nanotechnologies and production technology and process control.

In Hall 8b, the COMPAMED Suppliers Forum, held by the magazine DeviceMed, will focus on the entire medical technology process chain. This year, particular areas of focus are AM, cyber security, regulatory affairs and wearables.

COMPAMED 2018
www.compamed-tradefair.com

COMS 2018

The Swiss town of Montreux by Lake Geneva.

THE 22ND EDITION OF COMS (COMMERCIALISATION OF EMERGING TECHNOLOGIES) TOOK PLACE ON SEPTEMBER 24–26, 2018, AT THE SUISSE MAJESTIC GRAND HOTEL IN THE HISTORIC AND PICTURESQUE CITY OF MONTREUX, ON THE SHORE OF BEAUTIFUL LAKE GENEVA.

DAVID TOLFREE, VP, MICRO, NANO AND EMERGING TECHNOLOGIES COMMERCIALISATION EDUCATION FOUNDATION (MANCEF)

The

Prof. Dr Volker Saile, of the Karlsruhe Institute of Technology (KIT) and MANCEF, delivers a welcome address at the COMS 2018 opening.

The conference was co-organised by MANCEF and the Swiss Foundation for Research in Microtechnology (FSRM). It was opened with welcome addresses from: the conference chair, Prof. Dr Volker Saile, chief science officer at the Karlsruhe Institute of Technology (KIT) and president of MANCEF; the co-chair Philippe Fischer, director of FSRM; and the programme chair Dr Todd Christenson, CEO of HT MicroAnalytical, on behalf of the organisers, sponsors, exhibitors and speakers. Edward Byrne of FSRM, the conference co-ordinator and exhibition manager was thanked for his hard work. A welcome text from the Office of Economic Affairs and Innovation of the canton of Vaud was screened to the delegates.

All COMS international conferences present formidable challenges and sets of tasks that require a dedicated team of experienced people to make them successful. The MANCEF-FRSM team have spent much time throughout the last year planning and organising the event at a time when global political and economic situations produced uncertainties that delayed commitments to sponsor and attend the conference.

COMS, unlike many other international conferences, brings leaders in academia, business, government and industry across the globe together in a convivial atmosphere to share, review and discuss common issues associated with accelerating the commercialisation of emerging technologies, in particular novel micro-nanoproducts and processes.

A traditional pre-conference entrepreneurial workshop (bootcamp) took place on September 24 with expert entrepreneurs who were available to advise and assist startup companies or individuals wishing to acquire funding and guidance to make their companies commercially successful. This is an essential first step on the path to commercialisation.

The two-day technical programme was divided into four main sessions covering manufacturing, sensors, industry 4.0 and digital health, and commercialisation, each with plenary talks given by eight invited keynote speakers.

A total of forty-six speakers from nine countries focused on the latest developments in customised and new smart manufacturing methods and processes, robotics, new sensor systems, smart networks, data analytics, digital health, bioinformatics, and barriers to commercialisation in the marketplace.

highlights

Summaries of keynote presentations

Manufacturing

Keynote: Dr Martin Hermatschweiler, co-founder and CEO of Nanoscribe, Germany.

Talk: 3D printing of microscale parts for prototyping, tooling and production

Summary: 3D printing is a key emergent technology that is having a profound influence on the manufacture of a range of products across many sectors of industry. This talk highlighted some of the latest achievements and breakthroughs, particularly in the fields of optics and photonics, and specifically relating to the production of precision components for photonic circuits and MEMS devices.

Keynote: Dr Gereon Meyer, head of strategic projects in the Future Mobility and Europe Department, VDI/VDE Innovation + Technik, Germany.

Dr Gereon Meyer, VDI/VDE Innovation + Technik.

Talk: Connected, automated and electric: speeding up the transformation of mobility

Summary: This talk focused on the topical subject of future trends in transportation and the enabling role played by smart microsystems. It raised economic, environmental, legalist and social concerns about the use of electric and autonomous vehicles on the mobility of road transport systems. Before such autonomous transport can be safe and effective, key technologies—for example, camera, lidar sensors, smart electronic systems, artificial intelligence and big data analytics—must be developed, integrated and connected to power networks and digital platforms. The presentation also covered some of the highlights of EU projects and roadmaps on the electrification of road transport and smart systems for automated driving.

Keynote: Dr Srinivas Tadigadapa, professor and chair of the Electrical and Computer Engineering Department, Northeastern University, US.

Talk: Micromachine resonators: the new wave in sensing

Summary: In this talk, a detailed explanation of micromechanical resonators and the range of sensor applications was given. Micromachined resonators are used in sensors that include optical resonators, which can span a frequency range from a few hundred kilohertz to terahertz. Crystal resonators have dominated the timing device market and been adopted by smart phone manufacturers, whereas MEMS resonators find utility in integrated circuits timing systems. In addition to examining the role of resonators in sensors, the talk reviewed future market applications in the design of biomedical and point of care sensors.

Keynote: Dr Susana Cardoso de Freitas, professor at INESC-Microsystems and Nanotechnologies (INESC-MN), Portugal.

Talk: Spintronic sensors: a successful path from magnetic storage to biochips

Summary: This talk described spintronic sensor development and their commercialisation challenges. The development of magnetic field sensors—and, in particular, magneto resistive sensors and spintronic devices—has been advanced by their applications in computers and storage systems. The role of research institutes in supporting industry to commercialise this emerging technology was addressed.

Industry 4.0 and digital health

Keynote: Dr Eric Moore, lecturer in analytical chemistry at University College Cork, Ireland, and academic member of the Tyndall National Institute, University College Cork.

Talk: Innovative approaches towards commercialisation of integrated systems

Summary: This talk provided an overview of the various European-based projects and collaborative structures and networks set up to help SMEs move towards commercialising smart systems. Details of some of these were given with examples. The Collective European Union Trademark for Smart Systems Integrated was considered an excellent tool for giving visibility to smart systems.

Keynote: Dr Gregory Auner, Paul Strauss endowed chair professor in the Department of Surgery and Biomedical Engineering and director of the smart sensors and integrated microsystems (SSIM) programme, Wayne State University (WSU) School of Medicine, US.

Talk: Recent advances in wearable biomonitoring and bioimplant devices

Summary: Advances in the manufacture of low-cost flexible sensors have enabled them to be used in wearable systems to monitor human performance, particularly in sports medicine. The development of ultra-thin, flexible electronics-based stretchable sensors for real-time precision measurements is revolutionising our understanding of human performance. Contrasts with implantable devices were highlighted. The development of a central nervous system implant for vision was described.

Dr Nico de Rooij, École Polytechnique Fédérale de Lausanne (EPFL).

Commercialisation

Keynote: Dr Nico de Rooij, professor emeritus at École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, and previously VP of the Swiss Center for Electronics and Microtechnology (CSEM), director of the Institute of Microengineering at EPFL, and head of the Sensors, Actuators and Microsystems Laboratory (SAMLAB) at EPFL.

Talk: Opportunities and challenges of MEMS in an increasingly connected world

Summary: In this talk, given by Dr Rooij—an internationally known and distinguished practitioner of microengineering—the past activities at CSEM and EPFL's SAMLAB were reviewed. It focused on product innovation that exploited MEMS as the key technology. Many examples were cited in a wide range of applications and industry sectors.

Keynote: Alain le Loux, partner of the Cottonwood Technology Fund, the Netherlands.

Talk: Valorisation: from innovation to a successful startup

Summary: This presentation outlined the importance of valorisation in helping startup companies to succeed in the market when using new technologies. Ten top reasons as to why startups fail and recommendations for success were given.

Highlights of some other presentations

Four speakers gave talks in each of the six technical sessions. I have briefly summarised a selection of the presentations.

Session—Customised manufacturing

Speaker: Dr Steven Walsh, distinguished professor and creative enterprise professor at the University of New Mexico (UNM).

Talk: Internet of Things (IoT), Industry 4.0, photonics and emerging markets

Summary: This talk covered issues associated with the use of the IoT in relation to new devices and products resulting from the emergent technologies within Industry 4.0. A business model paradigm was presented for the success of IoT products in emerging markets.

Speaker: Prof. Dr Aard Groen, dean of entrepreneurship at University of Groningen, the Netherlands.

Talk: Developing competences for high growth: the VentureLab International method

Summary: This talk highlighted the importance of awareness and business competence needed for entrepreneurs to succeed in business. The University of Groningen Centre of Entrepreneurship (UGCE) has developed a method to support early stage entrepreneurs based on experiences of 350 cases.

Session—New manufacturing processes

Speaker: Justin Eisenach, CEO of Bayotech, US

Talk: Emerging technology-based steel manufacturing

Summary: This interesting talk related to a new technology-based steel manufacturing process. The objective of the emerging technology is to assess a pathway to utilising hydrogen in a novel industrial ironmaking technology. This would achieve transformative changes in steel-making and hydrogen production, increase energy productivity and reduce CO_2 emissions compared with blast furnace ironmaking.

David Tolfree, MANCEF.

Session—Sensor systems, data analytics and smart networks

Speaker: David Tolfree, VP of MANCEF, UK.

Talk: The building of smart cities with emergent technologies

Summary: The greatest challenge facing humanity is creating a sustainable living environment to accommodate an increasing global population while utilising the new technological advances to bring abundance to everyone. This can be achieved by building smart cities designed for autonomous transport systems and intelligent manufacturing. In this talk, examples of such cities already in existence and those for the future were shown and described.

Session—Commercialisation of emerging sensor technologies

Speaker: Roger Grace, president of Roger Grace Associates, US.

Talk: Commercialisation challenges for printed, flexible, stretchable and functional fabric sensors and sensor-based systems.

Summary: This talk gave an overview of printed, flexible, stretchable and functional fabric sensors and accompanying electronics as well as the applications they are currently enabling and future possibilities. Examples were also given of existing suppliers and highlights from work being done by leading research organisations.

Speaker: Dr Georges Kotrotsios, VP business development at CSEM, Switzerland

Talk: Edge computing

Summary: This talk outlined the topical issue of how computing systems and data extraction, collection, transmission, processing and exploitation can be adapted to deal with the expected petabyte volume of smart data from a wide range of sensors that will drive the IoT.

Session—Commerialisation marketplace

Speaker: Dr Robert Mehalso, president of Microtec Associates, US.

Talk: The pathway for emerging product commercialisation

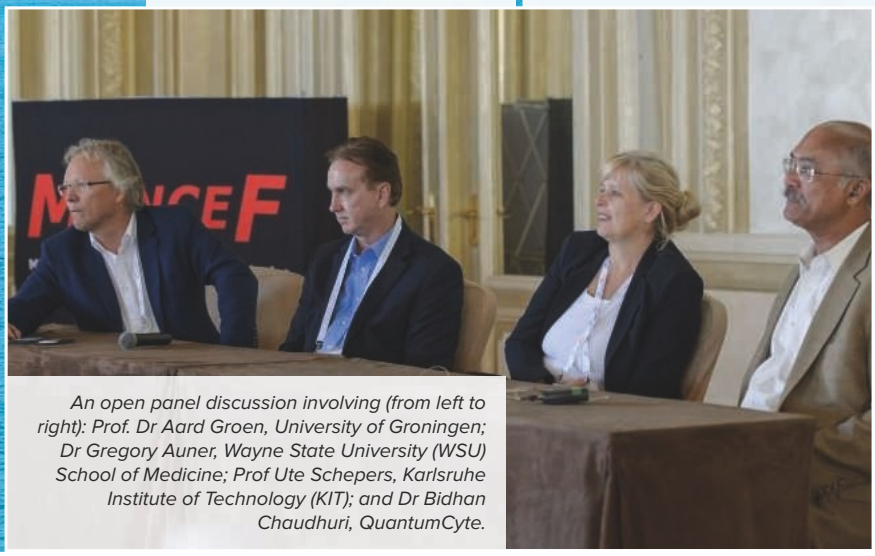
Summary: In this talk, the issue of how companies progress along the pathway to commercialisation was outlined. The challenges this presents within academia, industry and government and the need for coordinated roles in developing a commercialisation pathway for micro and nano-based products were discussed.

Session—Barriers in commercialisation

Speaker: Robert Giasolli, co-founder, CTO and VP R&D at Cagent Vascular, US.

Talk: Strategies for getting through regulations and methods for commercialising advanced technologies

Summary: This talk gave insights into how Robert Giasolli and his two partners built three commercially successful biomedical companies. He explained where it made sense to spend money, how to navigate through reviews and regulations and ways to capture the interest of investors and potential customers.



An open panel discussion involving (from left to right): Prof. Dr Aard Groen, University of Groningen; Dr Gregory Auner, Wayne State University (WSU) School of Medicine; Prof Ute Schepers, Karlsruhe Institute of Technology (KIT); and Dr Bidhan Chaudhuri, QuantumCyte.

Open panel sessions

There was an open panel session on each day of the conference, each with four selected experts. Chaired respectively by David Tolfree and Roger Grace, these sessions were well attended and gave all delegates the opportunity to ask questions relating to the topics covered in the presentations. This, in turn, afforded valuable discussion, which highlighted some concerns, most notably the need for more relevant courses on emerging technologies at colleges and universities, particularly in the UK and US, to ensure the supply of future engineers and technologists.

Dr Volker Saile closed the conference at 5pm on the last day with final remarks and thanks to everyone involved.

A guided tour of the world-famous CERN accelerator centre took place after the conference on September 27. Ten delegates took the opportunity to visit the centre. They were given a talk on the history of CERN and taken to see parts of the Large Hadron Collider (LHC), the world's largest and most powerful particle accelerator. To construct the LHC, which consists of a 27-kilometre ring of superconducting magnets, new cryogenic engineering and other technologies had to be developed. It is interesting to note that such a massive structure is required to produce beams of high energy protons with a diameter of approximately one-millionth of a nanometre, six orders of magnitude smaller than some of the nanoproducts that were being discussed at COMS 2018.

COMS 2018
www.coms2018.ch

Acknowledgements

I wish to thank Edward Byrne for some of the photographs, which are always useful reminders of who was present at the conference, as well as the speakers and delegates who provided valuable feedback.