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MedTech

G. Dubois
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Biography
BIOGRAPHY GUY DUBOIS

GDCL MANAGEMENT

Guy Dubois, graduated from the French Engineering school Conservatoire National des Arts et Métiers, started his career in 1968 and embodies more than 40 years of worldwide level Management experience on Manufacturing and Research and Development in semiconductor industry.

After 10 years spent on process and components research with CII and Thomson Central research Laboratory, he took the lead of the process engineering development of EFCIS, then Thomson Semiconducteurs.
Then, within STMicroelectronics, he is successively Divisional Quality Director, Rennes plant Manager, Grenoble Operation Manager in charge of a major site restructuring.
In 1997 he is promoted Group vice-President and creates the Wafer Foundry organization, then in 2005 takes in charge the Manufacturing Strategic Projects.
From early 2007 to mid 2008 he is the Office Director of the cluster EUREKA MEDEA where he actively participates to the definition of CATRENE and to the ENIAC launching.
In April 2008 he came back to STMicroelectronics as Technology R&D Group Vice-President, Alliances and Technologies Intelligence and IP & Licensing Group Vice-President.

In June 2009 he starts his own consulting company: GDCL Management, now GD Technology where he supports several semiconductors and equipment companies.

Guy is a technical/economical expert for European Community and for the French support to SME organization BPI.
He is one of the writers of European Commission study SMART 2010/0062 on 450mm.

Guy Dubois holds several patents, including the VIAS patent used in all semiconductors processes with critical dimensions below 0.5µ.

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MEMS sensors for cells, and exosomes characterization, a new paradigm for cancer diagnosis

V. Agache
Researcher
CEA/LETI, DTBS, Grenoble, France

Abstract
Cancers figure among the leading causes of mortality worldwide, with approximately 8.2M cancer related deaths in 2012. The Circulating Tumor Cells (CTCs) and exosomes are among the circulating biomarkers accessible from bodily fluids that could be used for early diagnosis of cancer. Today, existing techniques either suffer from lack of specificity or resolution to detect these objects in body fluid while preserving their integrity.
In this talk, I will illustrate the developments undertaken at LETI for the implementation of MEMS sensors compatible with measurement in fluid medium, and allowing the mechanical flow-through sensing of these objects individually. The concept is based on SMRs (Suspended Microchannel Resonators) enabling individual counting and weighing of particles in a fluid , without any labeling. The SMR, pioneered by Scott Manalis at MIT, consists of a micromechanical resonator with a buried channel so that the fluid circulates inside the device while the resonator is oscillating in a dry surrounding medium. With this configuration, the mass of individual particles can be measured by continuously monitoring the SMR frequency fluctuations as a particle flows through the channel. This measurement is not destructive so that the particle can be routed to other measurement methods and complete the information on their nature.
Different incarnations of SMRs will be exposed in this talk, including plate and cantilever types (jointly developed with the Manalis Lab at MIT), as well as examples of application to illustrate their potential for point of care applications: characterization of cells, and exosomes.

Biografie
Dr Vincent Agache is a senior R&D engineer with experience in the sensors and MEMS/NEMS for Microfluidics, Biology, environmental and Healthcare applications. He received his M.Sc. degree in EE from ISEN at Lille (France) in 2000, and a Ph.D. degree in electrical engineering from the Université des Sciences et Technologies de Lille, France, in 2003. In 2016, he received the "Habilitation à Diriger les Recherches" in Physics from University of Grenoble Alpes. From 2003 to 2006, he was appointed as a Japan Society for Promotion of Science post-doctoral Fellow at the University of Tokyo. In 2006, he joined the CEA-LETI, where he is currently in charge of MEMS/NEMS sensors development for life sciences and environmental applications. He has authored and co-authored more than 50 peer-reviewed publications in international journals and conference proceedings, and is an inventor on 8 issued patents.

Promote a passive thin film to intelligent implant

E. Young
senior principal engineer
Medtronic, Eindhoven (MEDC), Eindhoven, Netherlands

Abstract
Promote a passive thin film to intelligent implant
Edward Young, Peter Knapen, Albert Gootzen, Juan Ordonez Orellana

In this presentation, the Medtronic thin film device technology for medical implants will be discussed. The merits of embedding intelligence in the thin film will be illustrated with examples.
Medtronic has developed a biostable and biocompatible thin film technology. The manufacturing process is wafer based and applies standard semiconductor manufacturing technologies, high resolution structures can easily be manufactured.
As a demonstrator, a high resolution brain stimulation probe for Parkinson's disease was developed in this thin film technology. In this well-known treatment for Parkinson's disease, a probe delivers electrical pulses in the brain. The device is powered by a battery driven pulse generator. The generator is located in the chest.
The current demonstrator consists of 40 electrodes. All electrodes can be individually addressed to provide a tailored stimulation field to the brain of the patient. In this steering brain stimulation application the beneficial effect of the stimulation can be optimized and side effects can be suppressed.
The addressing of the individual electrodes requires intelligence. Currently, this intelligence, a switch matrix ASIC, is integrated into a classical hermetic Titanium can. This hermetic can, with a multi-pin feedthrough connection, connects to the pulse generator at one hand side with few contacts and the thin film brain probe at the other hand side it with its 40 contacts.
The next level of maturity of thin film technology for implants will be an integration of the electronics in a biocompatible and bio-stable package directly on the thin film. The film becomes the device.

Biografie
Edward W.A. Young

1976-1981 University Utrecht (NL)
Inorganic chemistry

1981-1986 University Utrecht (NL)/TU Delft (NL)/Harwell Research (UK)
PhD Corrosion/Surface and Interface Analysis

1986-2000 Philips Research Eindhoven (NL)
Research Scientist, opto-electronics, display, lighting

2000-2003 Philips Semiconductor, CTO office, IMEC Leuven (BE)
Senior Assignee International Sematech/Team leader (TX, USA)
High K front end technology

2003-2008 Philips Research Aachen (GE)/Eindhoven (NL)
Principal Research Scientist, OLED technology

2008-2012 Holst/TNO centre for open innovation; System in Foil (NL)
Principal Researcher, Foil technology

2011-2015 SapiensNeuro; steering brain stimulation
Microfabrication Engineer

2015-present Medtronic MEDC
Senior Principal Engineer, thin film technology

The Future of Electronic Noses

T. Rousselle
CEO
Aryballe Technologies, Grenoble, France

Abstract
… It will soon be possible to get numerical about smells
New technologies are currently being developed which will allow the manufacturing of small portable and universal electronic noses. This will enable the acquisition of numerical information about smells. These Sensors will initially be launched in the industry for Environment, Flavor Fragrances & Food, but also for medical Diagnostics and Security issues. A specific device also be dedicated to people who have lost de sense of smell, a disease called anosmia. But this technology will unveil all it’s potential when it will be accessible to all publics …

Biografie
Tristan Rousselle holds a Ph.D. in cell biology from the University Joseph Fourier in Grenoble. He co-founded in 2000 the recombinant proteins company called PX'Therapeutics and has been it’s CEO until 2012 when the company joined the Aguettant Laboratory group. In 2014 he co-founded Aryballe Technologies with a group or multidisciplinary scientists and entrepreneurs. The company’s main objective is to develop, manufacture and sell the first universal and portable electronic Nose.

Automation & Connectivity applied to Medical Devices – Benefits for the patients

R. VOMSCHEID
Director of Development
EVEON, Montbonnot, France

Abstract
There is a growing trend in the medical device industry toward wirelessly connected and automated devices, showing great benefits for the patients and all stakeholders in general. This presentation will review recent technological trends and new products in the market, as well as challenges that need to be tackled to develop such devices. An entrepreneurial point of view will be given on these subjects, as Eveon address unmet needs of patients, doctors and nurses, by automating the preparation of treatments, facilitating the administration of drugs, and enabling the patients to stay connected.

Biografie
Remy Vomscheid, Ph.D., has been working in the healthcare industry for the last 14 years, mostly with Johnson & Johnson, as Business Development Manager, EMEA, Medical Devices & Diagnostics, and as Regional Business Manager for LifeScan, J&J's diabetes franchise. Prior to this, he was Business Development Manager for Genopole, the largest French incubator dedicated to Life Sciences. As Development Director for Eveon, he leads a cross-functional team of people with different technological competencies (electronics, software, fluidics, polymer engineering & mechanics) dedicated to the development of innovative medical devices.

gas sensing on chip

J. Klootwijk
Senior Scientist
Philips Group Inovation, Research, MicroSystems & Devices, Eindhoven, Netherlands

Abstract
At Philips, we strive to make the world healthier and more sustainable through innovation. Improve the quality of people's lives through technology-enabled meaningful innovations – as co-creator and strategic partner for the Philips businesses and complementary open innovation ecosystem participants.

Today, Philips is a diversified health and well-being company. This diversity is also reflected in our organization, and allows us to address the challenges and needs of people in a unique way. We touch so many aspects of people's lives that the true impact of our innovations is in the combination of our solutions.

An important example is Indoor Air Quality. Philips has developed products for air purification, in particular in the developing countries to improve IAQ. One of the initial challenges in order to introduce the air purifiers amongst local population was creating the awareness of the IAQ problem. The most logical way to do this is by showing the VOC problem. This requires devices that can actually show the dangerous VOC levels, i.e. monitoring IAQ. When considering commercial solutions, we find sensors that are either sensitive or selective. However, sensors with combination of sensitivity and selectivity that can be integrated are not available yet. Philips has worked on nanowire sensor, in cooperation with TUD (Prof. Ernst Sudholter), Yale University (prof. Mark Reed) and WIMS2 center (Prof. Y. Giachandani) in order to develop a nanowire platform for sensitive and selective detection of VOCs, in particular Formaldehyde. In parallel other solutions are considered as well.
Now the question arises whether these sensor platforms can be modified such that they can be used for breath analysis? Like cantilevers, E-Noses or Miniaturize gas chromatographs? Standard GC is already used, but is far too expensive. Can we therefore further miniaturize existing platforms/technologies to use for gas/breath detection to measure/predict human health: gas detection on chip?

Biografie
Dr. Johan H. Klootwijk received his M.Sc. and Ph.D. degrees in electrical engineering from the University of Twente, Enschede, The Netherlands, in 1993 and 1997, respectively. In October 1997, he joined the Philips Research Laboratories, Eindhoven, The Netherlands.

Johan's research activities have included development and characterization of Si and SiGe bipolar transistors, non volatile memories (EEPROMs), SOI/SOA technologies, reliability of thin dielectrics, development of InP based HBTs wideband RF applications, development, characterization and integration of high-density 3D devices, in particular capacitors and all solid-state batteries, EUV spectral purity filters, new materials for direct conversion CT scanners, nanowire sensors and miniaturized GC.

Currently, he is responsible for technology and teststructure development of several projects in the Micro Systems and Devices group, where part of his work is on (nano-)sensors and part of his work is leading a project on EUV membranes.
Johan has authored or co-authored several scientific publications and conference contributions, holds several patents and he is a senior member of the IEEE. He has been a senior lecturer on semiconductor devices at the CTT from 1999 to 2008. He received the Best Paper Award for his

contribution on the ESSDERC Conference in 2001 and a best poster award on the NATO-ASI summercourse on ALD in 1995. For part of this work he received a Bronze Award for the ‘NXP Invention of the Year 2007’ and a Bronze invention award in 2015. He served as the Tutorial Chairman of the International Conference on Measurement and Teststructures, ICMTS, 2002, 2008 and 2011 and as the Technical Chairman in 2014.

Towards the Next Generation Smart Catheters

R. Dekker
Research
Philips Research, Microsystems, Eindhoven, Netherlands

Abstract
Smart catheters and instruments add “eyes and ears” to minimally invasive instruments. Many clinical studies have underlined their value in improving the outcome of interventions, and in reducing cost. However, originating from traditional catheter manufacturers, these devices are without exception made with outdated 20th century technology, requiring extensive costly manual assembly.

The next generation Smart Catheters will be characterized by: digitization at the tip, best in class sensors and (ultra-sound) transducers and lower cost. Furthermore they will use open platform technologies that are steered by roadmaps and implemented on dedicated pilot lines.

The Flex-to-Rigid (F2R) interconnect technology is an example of such an open platform. It was developed in the ENIAC project “INCITE” and is designed to squeeze complex electronic functionality like AD conversion, integrated passives and (ultra-sound) MEMS devices into extremely small form factors such as in the tip of catheters, guide-wires or implants.

The INCITE project is the first in a row of initiatives aimed at realizing an open pilot line infrastructures for medical devices, in particular smart catheters. The ECSEL project “InForMed” connects essential technologies from many European manufacturers in an integrated pilot line to bring the concepts developed in INCITE to a higher TRL level. The new project “POSITION” that is under preparation at the moment, brings together a number of European catheter manufacturers and technology providers to develop smart catheter applications using the platform technologies and the pilot line manufacturing infrastructure.

Biografie
Ronald Dekker received his MSc in Electrical Engineering from the Technical University of Eindhoven and his PhD from the Technical University of Delft. He joined Philips Research in 1988 where he worked on the development of RF technologies for mobile communication. Since 2000 his focus shifted to the integration of complex electronic sensor functionality on the tip of the smallest minimal invasive instruments such as catheters and guide-wires. In 2007 he was appointed part time professor at the Technical University of Delft with a focus on Organ-on-Chip devices. He published in leading Journals and conferences and holds in excess of 50 patents