

## EPIC Events Report



IMEC TECHNOLOGY FORUM BRUSSELS 2014, JUNE 4-5

# SHARING IDEAS SHARING THE FUTURE



### Prepared by:

Dr. Alexios Paul Tzannis  
Business Development  
IMT Masken und Teilungen AG  
Tel: +41 44 943 19 66  
Email: atzannis@imtag.ch

### About the EPIC Members Event Reports

Initiated by the founder of EPIC Dr. Thomas Pearsall in 2003, these reports are prepared by members of EPIC to the benefit of the wider community. If you did not have a chance to attend the event but would like to know some key highlight, this report is for you. Emphasis is placed on exploring technical and business opportunities for the members of EPIC.



ITF Brussels is imec's premier technology event. This annual Technology Forum gathers experts and visionaries in a two-day event to present key developments of the different departments of imec in collaboration with its industrial partners and discuss the potential future impact of these technology developments.

Imec is a leading research institute in advanced nanotechnology. Imec focus in open innovation, bringing together companies from the semiconductor eco-system to create next-generation IC technology. Imec's R&D offering focuses among others on CMOS scaling, heterogeneous integration, electronics for healthcare and life sciences, wireless communication, image sensors and vision systems, large area flexible electronics, energy and sensor systems for industrial applications. Imec performs world-leading research in nanoelectronics. The focus of this year's ITF was to present how nano-enabled solutions will allow people to have a better life in a sustainable society/environment.

The 2014 ITF focused on collaboration and open innovation. The theme of ITF 2014 was "Sharing". Sharing of ideas, costs and risks to arrive at a better technology. Presentations were given from leaders in the respective industry providing an insight in market trends, evolutions and latest breakthroughs in semiconductor technologies, smart imaging and communication systems, photovoltaic and other technologies for sustainable energy harvesting and consumption and insights in emerging technologies in healthcare.

The opening talk was held by Luc Van den hove - President and CEO of imec. Mr. Van den Hove showed how imec started, how it grew together with the industry and finally how imec took over the challenges in order to position itself as the enabler of the technology roadmap.

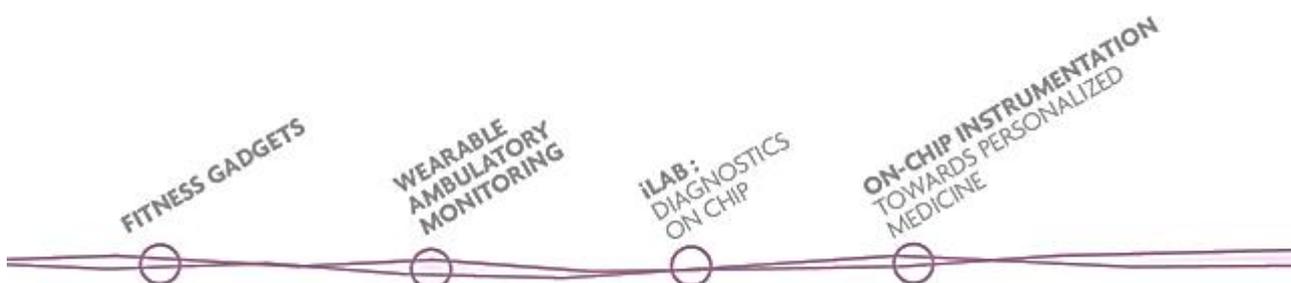
Mr. Van den Hove made the argument that rising R&D costs, increasing technological barriers and the rapidly changing environment pose a significant risk for the semiconductor fabs. The risk can be mitigated by sharing risks, by bringing together prime partners, e.g. INTEL, TSMC, Samsung, Micron and Global Foundries, in joined precompetitive dedicated R&D programs.

The internet of things and the increased need of immediacy provide great growth opportunities for companies in the fields of data storage, packaging and logistics, e.g. smart RFID tags, automotive, e.g. smart mobility, energy, e.g. smart grid, consumer electronics, e.g. wearable fitness gadgets or healthcare monitoring.

### Nano-electronics enable disruptive innovations in health care

Today's society is challenged by increased chronicle diseases. The focus of medicine today is moving away from traditional care, reactive medicine, to prediction and prevention. Ultra low power multi-sensor platforms will enable measurement of medical quality data and true mobile health. The future will be the internet of healthy things by interconnecting players in the health industry. A vision was set for true mobile health multiple tests under \$10 on a Biochip in the size of a credit card for diagnostics for infectious diseases, DNA sequencing for routine diagnostics tests, cell sorting and single cell analysis.

The use of Silicon as basis material slightly contradicts the set opinion that polymer micro fluidic platforms are the answer for POC (point-of-care) and other markets. Nevertheless imec made a strong point of how high level integration of sensors and other components combined with a mass volume capabilities of a semiconductor fab can bring costs down for commercial applications in healthcare.



Young Sohn of Samsung stated that \$6.5 trillion was now spent a year on tellurian healthcare. The consultancy organisation IHS Technology recently foresee that a tellurian marketplace for fitness, sports and activity monitors would arise from \$1.9bn final year to \$2.8bn in 2018.



To face the challenge of health management Samsung developed Simband, an interesting open reference design for sensor modules with multiple wearable sensors on the wrist. The first module of its kind has been developed in partnership with imec, a world leading bio-sensing research institute. Simband encompasses today sensors for blood oxygen and CO2 levels, heart rate, hydration levels, skin temperature perspiration and motion.

Simband will work in tandem with a cloud-based open software platform called SAMI which securely stores data and can provide better insights into health issues. SAMI (Samsung Architecture Multimedia Interactions and APIs (application module interfaces) will soon be available for a cloud-based Sami information repository accessible by end of the year, so that this development platform can be used by third parties to build and create their own wearable platforms and devices.

Paul Jacobs of Qualcomm presented the digital 6th sense concept. The evolution of mobile technology will enable every usable object to know the user's location, sense the user's motion, see the user's environment, and hear the user's environment. This will provide us to achieve our goals easier, faster, anonymously when needed, e.g. healthcare, and effectively.

Aart J. de Geus, Chairman & co-CEO of Synopsys made a most entertaining, inspiring and factual presentation on the subject of semiconductor technomics: towards "smart everything". Mr. De Geus presented how this age of exponentials is empowered by smaller dimensions, enormous IP re-use, and a focus on the great potential of electronics systems. He made the case that all through the value chain from fab equipment manufacturers all the way up to the apps, where the real \$\$ are, is controlled from a simple rule of sooner, better, cheaper!



Mr. De Geus has a rather contrarian opinion on the pricing of semiconductor products: "so what if the price of semi goes up. It is nothing in comparison to the opportunities due to the opening of new technical possibilities."

***"An interesting statement I collected was that mobile Healthcare will probably take place in developing countries due to regulatory constraints in developed countries."***



[www.itf2014.be](http://www.itf2014.be)

Peter Peumans together with other imec employees and Dr. Annastasiah Mhaka of Johns Hopkins presented the challenges and chances in the way to a sustainable healthcare system. A focus was given on how silicon nanotechnology can contribute in healthcare. The key theme in today's healthcare research is highly individualized diagnosis and treatment. We need better tests, and many more of them, that are more sensitive than anything we have today. We'll also need to make testing so fast and cheap that we can test and treat all patients whenever there is a need. And this without over-stretching the already heavily challenged healthcare budget. The past decades, mass-produced complex chips at ever greater performance for ever lower cost have been demonstrated. Imec has worked intensively to learn how to make silicon work with light, how to make silicon surfaces bio-compatible, or how to do micro-machining and micro-fluidics. All using the same cost-efficient manufacturing processes. Today, we can scale silicon components to the same scale as cells and biomolecules. The results imec demonstrated are picked up by companies and are already integrated in the first commercial products for DNA sequencing machines, miniaturized diagnostic tests using disposable photonic chips, accurate body monitoring sensors, brain stimulation probes ... The imec team presented in a very comprehensive description the next steps of downsizing by illustrating the logic device roadmap that imec has set out with its partners for the next years.



Paul Stoffels of Johnson and Johnson pledged to implement extreme collaboration in order to accelerate innovation in health care. The motivation is simple: usually for a new product a 3-5 billion \$ / product investment is required with low guarantee on success due to FDA regulation. It is a regulated market since government decides on pricing. J&J is an integrator of technology to provide innovative solutions in the health care market. 30% of J&J's cash goes into R&D. The half of it goes to international collaborations: collaborations, licencing, incubators etc. Organizations such as new generation of pre-competitive consortia, including TransCelerate, the Biomarker Consortium and others are successfully advancing the pace and reducing the cost of R&D, and creating new opportunity for innovation. This is achieved by sharing knowledge, expertise, and data, organizations can focus on value creation in innovation.

Donald Jones took up the known Tricorder from Star Trek to make the case how digital medicine can/should be like. He presented in an entertaining manner how mobility, connectivity and open networks contribute today in the mobile health market. He walked us through all the available "tricorders" available in the market today: there are really many! Mr Jones pointed out that we saw a \$4B VC investment the last two years in mobile health making this the fastest growing VC market!

***"A nice statement I picked up: Systemic complexity is the multiple of the individual successes factors."***

Mostafa Ronaghi, CTO of Illumina showed how the application of a variety of scientific technologies contributed to reduce costs of DNA sequencing. Today, a human genome can be sequenced for 1000\$, therefore scientists can systematically test how genetic variations can bring about specific traits and diseases, rather than using trial and error. Mr Ronaghi provided an interesting vision where silicon chip for IGV integrated sequencing on a relatively low-cost desktop unit could be available in about 5 years improving treatments by matching treatments to patients.

The concept of a smart connected world was presented where the interaction of a huge variety of devices with advanced logic through the internet of everything in order to provide service to the users and optimise as well as simplify our lives is a tempting vision though apparently already ready for realisation today: Ever woke up grumpy? Awake way too early because you know you have to attend an early meeting. And then learn the meeting has been cancelled. In the not too far future, unseen technology will help us to avoid these situations. We will wake up at the right time in a living, intelligent building. Sunny light, pleasant temperature, and a strengthening breakfast will welcome us. In the background, there will be low-power wireless connections that use context information as your agenda, the weather outside, the traffic information, what is in your fridge and even your emotional and physical state. Using this information to wake you up at the right time and in the right atmosphere. When we visit convenience stores, a local wireless broadcasting system will give us personalized information: from the shortest shopping route to a personal discount on exactly those products we love. In picking our goods, a hyper-spectral imaging device will help us selecting this one mango that is perfect for eating the day after tomorrow. Mm-wave radars, 5G networks and intelligent imaging will facilitate a smooth and much safer ride home. Home again we surround ourselves with friends and family, projected and connected from their own homes. With this vision in mind imec pursues collaboration with different companies to commercialise available technology.



*During the conference we had the possibility to attend DEMOS of different prototypes such as imec's Hyper-spectral imaging camera, smart lens, the imec iClink as well as solutions for life sciences.*

As a positive add-on to the conference a small exhibition was set-up in the entrance and lounge area. Subject of the exhibition was Nanotech for health. Exhibitors presenting their activities were: 2M, AnSem, atsharp, Biocartis, Cochlear, iCsence, iMinds, Maastricht Instruments, Mathworks, NXP Semiconductors, Pilipili, T&M Solutions, trinean, Unitron Group, VERHAERT, Xenics and Zenso NV.



*This year imec celebrates its 30<sup>th</sup> birthday. A most enjoyable gala dinner was organised in Saint Hubertus Royal Gallery to celebrate this occasion with good food and wine as well as with a cultural inlay by four talented opera singers that sang known solos and duets from different operas. Thank you imec!*

**For additional information, please contact the author of this event report:**

Dr. Alexios Paul Tzannis  
Business Development  
Tel: +41 44 943 19 66  
Email: [atzannis@imtag.ch](mailto:atzannis@imtag.ch)  
IMT Masken und Teilungen AG  
Im Langacher, 8606 Greifensee, Switzerland



**IMT** is a foundry, development and out-sourcing partner for customized microstructures on and in glass such as micro-channels, wave-guides with gratings, flow-cells, microwells, sub- $\mu\text{m}$  dots in gold and other materials, diffractive gratings, reticles, gratings and resolution targets. Our core competences: Microstructures in the sub- $\mu\text{m}$  range, Coatings: metallic and optical and anti-reflection coatings, Structuring of coatings, Etching, Conductive microstructures, Photo-structurable protective coatings, Photomask: Master making. We employ a staff of 80 experts in the fields of optics, physics, microlithography, process development and quality assurance. Our production facility comprises 1300 m<sup>2</sup> clean-rooms including an automated line for processing 8" glass wafers. [www.imtag.ch](http://www.imtag.ch)

#### **175 EPIC Members (1 July 2014)**

ACREO, AFE, Advanced Packaging Center, Advanced Vacuum, AIFOTEC, AIM Infrarot-Module, AIXTRON, ALEDIA, ALPHA Route des Lasers, Alphanov, Alter Technology, AMO, Amplitude Systemes, AMS, art photonics, ASE, ASE, ANU, Avantes, Berlin Partner, Boschman, Bbright, Bright Photonics, CAILabs, CALIOPA, CD6, LETI, Centre for Nanophotonics, CPST, Chalmers University, CIP, CMC Microsystems, Cobolt, COBRA, CSEM, DAS Photonics, DELTA, DIAFIR, Dilas, DirectPhotonics, Dow Corning, DIT, eagleyard, EBARA, KIT, Mikrocentrum, Nanosystec, Photonics Cluster NL, SATRAX, SOFRADIR, TE Interconnect, FOTONIKA - LV, Fraunhofer, Fraunhofer, Fraunhofer, Fraunhofer, Fraunhofer, Fraunhofer, Glyndwr University, Hamamatsu, HE ARC , Heraeus, Hisilicon, Heriot-Watt University, Horiba, Huawei, ICFO, IDIL, IHP, IKO Science, Imagine Optic, IMT, INL, Innolume, IOGS, INTEC, International Laser Center, IPHT, IQE, IREC, ixFiber, JePPIX, KIT, Konica Minolta, LMDC, LayTec, Lionix, Lithuanian Laser Association, Luger Research, Laser World of Photonics, Microelectronics Institute of Barcelona, Mikrocentrum, Modulight, M Squared Lasers, MW Technologies, Multiphoton Optics, Multitel, Nanoscribe, Nanosystec, Nanovation, Next Scan Technology, nlight, NOVAE , Ocean Optics, Oclaro, Onefive, OPI Photonics, OpTecBB, Opticsvalley, PopSud, ORC, ORC, Phoenix, Photonics Bretagne, Photonics NL, Photon Lines, Photonics Marketplace, Pie Photonics, PI miCos, Plasma Therm, PNO, Politecnico di Torino, PolyPhotonix, Powerlase, Prima Electro, Quantel, Resolution Spectra Systems, Robert Bosch, Rofin Sinar Laser, SAES Getters, SAFC, SATRAX, Scuola Superiore Sant'Anna, See Fast Technologies, SensUp, SMART Photonics, Sofradir, SOITEC, SPI Lasers, SQS, STMicroelectronics, Suss MicroOptics, SWISSPHOTONICS, TU Berlin , Technobis, Technobis IPPS, Technospark Nanocenter, TE, TEMATYS, Thorn, TBP, TNO, Tridonic, University of Nottingham, u2t Photonics, Umicore, UCL, University of Barcelona, University "Mediterranea" of Reggio Calabria, University of Nottingham, University of Roma Sapienza, University of Sheffield , University Paderborn, Vario Optics, Vertilas, VI Systems, VLC Photonics, VTT, WJA Electron, Wroclaw University of Technology, XiO, YELO, Yenista, Yole, Zumtobel. [www.epic-assoc.com/membership](http://www.epic-assoc.com/membership)