SEMICON® EUROPA CONNECT
14–17 NOV, 2017 MESSE MÜNCHEN, MUNICH, GERMANY

Innovation Village: Start-Up Pitches

Roll to Roll CVD Graphene Technology for Transparent Electrode and Flexible Display

Y.Y. Jung
CEO
Nanotech Digital GmbH, Manage & Marketing,
Dresden, Germany

Nanotech Digital GmbH

Abstract
As a result of significant scientific research and progress over the past, the commercialization of graphene material has attracted tremendous attentions from various industries seeking new materials.
When graphene was first introduced, it was immediately recognized as the “wonder material” of the future, as it has multifunctional and unrivalled combination of tensile, electrical, thermal, and optical properties. Opportunities and potentials for commercializing graphene technologies are extensive however there are many technological challenges to overcome.
The process of mass producing graphene technology is called Roll to Roll CVD graphene.
Nanotech Digital GmbH has introduced the foremost advanced method of Roll to Roll CVD graphene production.

Biografie
About the presenter:

The founder/CEO of the company has a Master’s Degree in semiconductor and display engineering as well as an AICPA MBA degree.
He has worked as an OLED mass production and micro mass production engineer. He has extensive knowledge in the thin film process, and equipment process.
With his expertise in various display and semiconductor equipment process, he established

“Nanotech Digital GmbH,” to develop various Roll to roll CVD graphene and applied graphene technology products.

About Nanotech Digital GmbH:

Our goal is to make mass production of transparent electrode film with Roll to Roll CVD graphene possible by utilizing our deep experience in semiconductor and display equipment engineering and integrating our extensive networks. Our product can be adapted for application fields as flexible display, electric vehicle, solar, super capacitor, etc.
We are now seeking for partners and investors to capitalize on our roll to roll CVD grapheme technology in developing new products and applications.

Engineered Si-based Substrates for the State-of-the-art RF Devices - A Characterization Perspective

M. Emam
CEO
Incize, Louvain-la-Neuve, Belgium

Abstract
The market of wireless devices continues to grow very rapidly. Today, as the Internet-of-Things is getting closer to a daily life reality, a whole new era of devices communicating wirelessly is taking place in the very near future. Wireless communication depends on RF technologies that have specific requirements at different technology levels, starting from substrates on which devices and circuits are developed. These requirements need to be measured, validated and improved. Traditional characterization techniques are not satisfactory any more and a need has emerged for new and innovative characterization approaches that meet increasing industry requirements in terms of operation frequency and power. Quality, precision and rapidity of tests are also critical for the time-to-market industrial cycle. This talk addresses the new techniques developed at Incize to characterize the new-engineered Si-based substrates and devices (active and passive) targeting the continuously growing wireless market.

Biografie
Mostafa Emam received the Diplôme d'Ingénieur degree in electronics and signal processing, and the M.Sc. degree in design of microelectronics circuits and systems, both from the Institute National Polytechnique, Toulouse, France, in 2005. He received the Ph.D. degree in engineering sciences from the Institute of Information and Communication Technologies, Electronics and Applied Mathematics (ICTEAM), Electrical Engineering, Université catholique de Louvain (UCL), Louvain- la-Neuve, Belgium, in 2010. From 2006 to 2010, he was a researcher at UCL where he worked on wideband characterization and modeling of MOSFETs.
Since 2011, he is the founder of Incize, a company providing an innovative characterization and modeling service for devices and materials in all fields of operation. Incize focuses on the characterization and modeling of SOI devices in dc, RF, large-signal, and high- frequency noise, for harsh-environment applications and under mechanical-stress conditions as well as the design and simulation of RF SOI circuits.
Dr. Emam is IEEE senior member, the author and co-author of more than 35 scientific articles and book chapters, a reviewer for several IEEE journals and the technical chair of the SubVt division of the IEEE International S3S Conference since 2015.

Opportunities for in-rubber electronics

H. Michaud
Founder
Feeltronix, Geneva, Switzerland

Abstract
Can rubber be “smart”? Current wearable devices rely on rubber as a structural material as it offers a natural skin-like feel and excellent mechanical properties. However, the smart electronic sensing and communication functions are still restricted to a rigid casing, essentially repackaging a printed circuit board. Feeltronix breakthrough platform technology provides design and manufacturing solutions to distributed standard electronic circuits into rubber that can withstand repeated and extreme mechanical deformations (flex, twist, stretch, fold).

Our platform is highlighted by: intrinsically stretchable wires, allowing for simple, generalized design; high wire conductivity (between 0.05 and 0.5 Ω/sq); and reliable integration of standard components (PCBs and flex PCBs modules, packaged components). In addition, Feeltronix-enabled devices are sweat and water-resistant. Importantly, our processes are derived or adapted from the standards used in the manufacture and assembly of electronic circuits, so are therefore designed to scale to high throughput production with high cost-effectiveness.

We are focusing our efforts to market our innovation for wearable electronic devices for which new form factors, high mechanical compliance, and skin-like feel are needed. Our current focuses are within the sports, AR/VR, healthcare, and watchmaking industries.

Biografie
Hadrien Michaud received an engineering degree from École Polytechnique (Palaiseau, France) and an MsC in microengineering from EPFL (Lausanne, Switzerland), both in 2013. He then joined the laboratory of Prof Stéphanie Lacour at EPFL and obtained his PhD in 2017 for his work on stretchable metallization technologies for skin-like wearable transducers. He is a founding member of Feeltronix.

Semiconducting carbon nanotubes and their application in sensors

V. Bezugly
Research leader
Life Science Inkubator Sachsen GmbH & Co.KG,
Project SmartNanotubes, Dresden, Germany

Abstract
For the development of the semiconductor industry and applications, there is an urgent need of new materials which allow further miniaturization of active elements and enable increased energy efficiency and reliability of devices operation. Semiconducting carbon nanotubes (s-CNTs) have extraordinary electronic properties and are very attractive materials for the use in computer chips of new generation. Moreover, their use as active material in sensors opens new areas of sensor applications thank to their outstanding sensitivity and low power consumption. SmartNanotubes is a start-up project at Life Science Inkubator Sachsen. The team produces tailored semiconducting carbon nanotubes for applications in biosensors, gas sensors, nanomedicine, electronics and photonics. We also test our s-CNTs in first prototype devices. The founding of a new company is planned after finalizing the development and validation phase in 2020. At the moment the team is looking for partners for the development and validation of s-CNT-based devices. Several applications of s-CNTs like gas sensors, biosensors and photodetectors are presented.

Biografie
Viktor Bezugly obtained his PhD in Physics at Max-Planck-Institute for the Physics of Complex Systems, Dresden (Germany) in 2004. After this he worked as a research associate at the Max-Plank-Institute for Chemical Physics of Solids, Dresden and since 2010 at TU Dresden where he led a research group "Nano- and Mesoscopic Systems". In 2015-2016 he was CRO and a co-founder of ProNT GmbH. Since 2017 he is the research leader of the group SmartNanotubes at Life Science Incubator Sachsen. There he works on synthesis and chemical functionalization of s-CNTs for their application in gas sensors, biosensors, electronic and photonic devices.

Minimal Fab: revolution technology for microelectronics

D. Yurkovets
Deputy of General Director
Tokyo Boeki (RUS) LLC, Department of Scientific and High-Tech Equipment, Moscow, Russian Federation

Abstract
Minimal^{tm} is a revolutionary approach to customized or small-volume chips production. Minimal^{tm} is a concept aimed to reduce the investment necessary to establish a semiconductor factory by 1000 times comparing to conventional factories (we call them "Mega Fabs"). Minimal^{tm} implies production based on 0.5 inch wafer transported from one production unit to another one in so-called Minimal Shuttle^{tm} maintaining clean environment inside. All of Minimal^{tm} production units have standardized body design and loading mechanism with particle locked air-tight docking unit. More than 70 types of different production and inspection units have been already developed in accordance with Minimal^{tm} standard. Currently, there are commercially available systems for mask-less lithography, substrate surface cleaning, oxidation, coating and washing of resist, development, etching, metal coating etc.

Biografie

Tokyo Boeki is a Japanese company founded in 1947. It distributes various kinds of scientific and high-tech instruments from Japan, including new and refurbished equipment for semiconductor industry. The business of Tokyo Boeki is very much diversified and covers not only sales but also production under the name of Tokyo Boeki, establishing of new licensed manufactures, consulting, spare parts and service support.

Inline Wafer Edge Inspection - Start-Up Pich - Innovation Village

R. Priewald
CTO
Bright Red Systems GmbH, R&D, Graz, Austria

Abstract

Company tagline

We develop an Inline Wafer Edge Inspection Metrology to be integrated into semiconductor production equipment for saving inspection time, optimising processes and increasing yield.

Elevator Pitch

While the semiconductor industry is growing it faces big challenges to reduce production losses of ~12 billion $ each year due to broken wafers. Our patented and fully automated Inline Wafer Edge Inspection helps to optimise processes and to enhance yield while simultaneously reducing inspection costs.

Target Market / Customers

Wafer Edge Screeners of BRS support semiconductor and equipment manufacturers to increase yield through Inline Wafer Edge Inspection. By profiling the wafer edge thickness, during common wafer pre-alignment processes, precious inspection time is saved and production processes and equipment responsible for wafer edge defects can be identified immediately.

Current Company Stage

Pilot installations are now being prepared with lead customers.

Funding and future Funding Needs

BRS was founded in August 2011 and made a cumulative revenue of 600k€ until the end of 2016. About 2 million € will be invested into the R&D of the patented Inline Wafer Edge Inspection Technology until 2019, when the first pilot installations will be accomplished successfully. The worldwide market introduction of the Wafer Edge Screener will then need another 5 million € until the end of 2022.

IP & Freedom to operate

Freedom to operate analysis done, patent granted in 2012 (Patent# AT510605) and also filed at the European Patent Office in 2013.

Competition & Competitive advantage

Competitors in the field of wafer inspection are: Kobelco, Rudolph technologies, KoCos, HSEB

and KLA Tencor among others. Instead of integrating inspection metrology into production equipment, all competitors sell stand-alone inspection tools only. For this reason BRS is the first company making automated wafer edge defect detection and classification inline.

Biografie
Robin Priewald .....

.... he has been running BRS for five years now.

Superresolution multi-layer optical imaging of semiconductor samples using SMAL

S.L. Stanescu
Technical Manager
LIG Nanowise Ltd, Manchester, United Kingdom

Abstract
Super-resolution optical imaging is one of the most difficult tasks in materials science and especially in semiconductor industry where the sample does not present any fluorescence and conventional optical super-resolution methods like STED (Stimulated emission depletion microscopy) or STORM (Stochastic Optical Reconstruction Microscopy) do not work. SEM (Scanning Electron Microscopy) is an alternative method of achieving super-resolution but it presents many drawbacks (expensive, time consuming, vacuum is needed, no multi-layer imaging). Therefore, we created SMAL (Super-resolution Microsphere Amplifying Lens) to compensate the drawbacks of existing super-resolution microscopy techniques. SMAL is the ideal choice for fast quality control in the semiconductor industry which allows the user to see multiple layers through the microchip and analyse features down to 70nm dependant on sample. Moreover, due to the fact that SMAL acts as an amplifier for both evanescent and propagating waves and performs an overlapping of these two, one can obtain naturally coloured super-resolution images.

Biografie
Sorin Laurentiu Stanescu is the Technical Manager of LIG Nanowise Ltd, the company which created Nanopsis - the first super-resolution optical microscope in the world. He obtained his PhD in novel laser laser devices for nanotechnology and he had a PostDoc position in nano optics at The University of Manchester (Laser Processing and Research Center, School of Mechanical, Aerospace and Civil Engineering). His research is focused now in optical super-resolution microscopy techniques. He has also a lot of expertise in laser cleaning.

Speed up Wafer-level Magnetic Test

L. LEBRUN
CEO
Hprobe, Grenoble, France

Abstract
Hprobe offers a 3D magnetic field wafer tester for all types of magnetic devices :
- Planar and perpendicular Magnetic Tunnel Junction (MTJ)
- STT-MRAM - SOT-MRAM
- TMR sensors

Hprobe has developed a unique patented technology of multidimensional magnetic field generator for magnetic devices and sensors wafer level characterization and testing. With our 3D generator technology, each magnetic field spatial axis is driven independently. User can apply and control the magnetic field in any direction of space, as well as generate rotating fields.

The Hprobe equipment is a plug and play 100mm to 300mm automated wafer tester for magnetic devices and sensors.

Our wafer tester is the preferred tool for wafer level characterization and testing under magnetic field. It uses a patented 3D magnetic field generator and state of the art, customizable, commercial hardware to bring a full test solution for all magnetic devices, from sensors to MRAM.

A full software for wafer level testing automation is available which includes the magnetic sources generation, a set of pre-defined tests for electro/magnetic parameter extraction on thin films materials, MRAM and sensors.

Biografie
Laurent LEBRUN – CEO – « Arts et Métiers » engineer, PhD

High throughput 3D topography measurements

J. Parent
Head of material science applications
LyncéeTec SA, LyncéeTec SA, Lausanne, Switzerland

Abstract
Current 3D topography measurement technologies don't meet the requirements of automated wafer inspection equipment : high-throughput measurement in presence of surrounding vibrations.

Digital Holographic Microscopy : DHM® is a stricly non-scanning technology. As a consequence the 3D topography is acquired within a single camera acquisition. The acquisition rate is limited by the camera, frame rate up to 200 fps are standard for the technology.

LyncéeTec introduce 3 industrial sensors based on the technology.

Biografie
Lynceetec

3D Macroscopy using digital holography

J. Parent
Head of material science applications
LyncéeTec SA, LyncéeTec SA, Lausanne, Switzerland

Abstract
LyncéeTec introduce the first 3D macroscope for fast 3D topography measurements within nano-metric vertical resolution.
The digital holographic macroscope DHM® combines intrinsic advantages of digital holography microscopy with a large field of view : 35mm by 35mm

Such system enables high throughput inspection of static samples for the semiconductor industry as flatness or defect inspection. Dynamic inspection are also possible as bow or surface wrap under thermal stress, characterization of mechanical oscillator and new applications to discover.

Biografie
Lynceetec

FeFET Memory - Ideal for High-Performance, Ultra-Low Power Embedded Applications

M. Mennenga
Business Development
Ferroelectric Memory Company GmbH, Dresden, Germany

Abstract
FeFET is the ideal embedded non-volatile memory (ENVM) for the Internet of Things. FeFET competes against Flash, the incumbant technology for ENVM. Flash faces challenges from several other new contenders such as phase change memory, magnetic RAM, and resistive memory. FeFET stands out against them with high performance, ultra low power, high temperature stability, and low cost - requiring, for manufacture, no capital expenses and only very low operating expenses. In addition, the FeFET gate material retains its memory properties down to 2.5nm - offering a scalability road map up to and beyond the next ten years.

Biografie
Menno Mennenga is a co-founder of FMC where he is responsible for business development. He worked for Advanced Micro Devices (AMD), Atmel, and, as a Freelance Consultant, for several other first tier semiconductor companies. His professional experience includes system architecture, engineering management, marketing, and sales. He holds electrical engineering degrees from Texas A&M University and Dresden University of Technology.

3D Vision for intelligent Automation and the next generation robots

C. Florin
CEO
Fastree3D SA, Ecublens, Switzerland

Abstract
Fastree3D SA is a fabless semiconductor company developing sensors to measure distances to surrounding objects to avoid collisions

Automotive safety, autonomous vehicles, drones or service robots requires position and motion sensing in order to navigate efficiently and safely. 3D vision is essential for safety. Collision avoidance requires:
- Faster spatial awareness: distance monitoring at vehicle velocity
- Safety:confidence level must be guaranteed, even under adverse light
- Smarter information: on-chip processing highlight relevant scene features and danger (speed, distance, directions)
Our innovation is a 3D camera that is fast (million points/sec to match driving speed), smart (calculate motion and data to achieve detection) and safe (90% confidence levels at 0.1% resolution) with industrial deployment scalability (< 100€/module and high volume)

We deliver 2 products
• integrated circuit system on chip (SoC), delivered to electronics suppliers. The output of the SoC is diverse: distance, intensity, speed, motion to be chosen depending on the problem
• camera modules (detector + laser illuminator) sold to automotive Tier or machine vision integrators.

Fastree3D goal is to establish our detector technology as the standard for automotive safety applications in urban driving conditions:
• Long range LIDARS are expensive (> 1'000$ due to MEMS or optical scanning)or detector materials (InGaAs). Scanning sensors require a laser illuminitating sequentially all the scene, point by point. This is slower and can cause latency problems.
• Affordable entry-level LIDARS cannot achieve urban driving pedestrian detection, due to low speed (<10fps latency = 15m distance) or to too low resolution (<16 lines).
• 2D stereoscopy: only effective under good illumination, precision is low at mid-range, imprecise in low contrast scene
• flow-imaging: continuous video-scene segmentation is derived from heuristic algorithm, ambiguity often arises in low light conditions, processing is expensive

Biografie
Summary

CEO and founder of Fastree3D developing laser ranging sensors for automotive safety and autonomous vehicles. He has been a co-founder of 3-startups and managed investments in over 12 early-stage ventures. His previous industry career lead to successful product launches based on video processing, image compression and embedded signal processing software.

Experience

2013- Fastree3D : prototype CMOS single photon detector arrays with system-on chip Lidar. Technology transfer from 3 Universities with 3.3M CHF venture financing and grants.
2008- Venture Concept : investor in 40 startups including Lemoptix (Head-up displays), Ukko (IOT / V2X), Green motion (EV charging). Partner at Polytech Ventures, President A3 Angels, Expert at Swiss CTI, and European Commission risk finance advisory board.
1996 HP Communications : innovation, M&A and ventures on video, VoIP (Pipebeach , Alcatel, Ericsson, Nokia, Cisco, 15 telecom providers)
1989 HP Medical / Philips : 7 EU R&D project, digital radiology (PACS), multi-media patient care systems, CEN TC251 medical communications.

Education

MSc. Electrical Engineering EPFL,
Executive education: IMD, MIT Sloane and Harvard Business School

Honours

300 most influential persons in Switzerland (Bilan Magazine) , 100 start-up experts (Handelszeitung). Winner: European Photonics Venture Summit 2016, SPIE Photonics Europe 2016, European Venture Summit 2016, Semi-finalist SPIE Photonics West 2017.

Energy Filter for Ion Implantation - A major Improvement in Semiconductor Power Device Manufacturing

B. Tom
CFO
mi2-factory GmbH, Business Administration,
07745, Germany

Abstract
mi2-factory GmbH from Jena/Germany develops, distributes and uses an innovative tool named

“Energy Filter for Ion Implantation“ (EFII). The application field of EFII is the processing of semiconductor
wafers. Amongst our customers are major semiconductor companies which use this
novel, unique and very precise technology for the production of power devices. At the moment the EFII technology focuses on the doping of silicon carbide (SiC) devices, such as SiC-Schottkydiodes
and SiC-Superjunction-MOSFETs. Another application field is the doping of Si-IGBTs.
Power devices based on the semi-conductor material SiC have superior properties over those consisting of silicon. In today’s chip production one can not exploit the advantages of SiC completely, since the epitaxially grown drift layer - which is the core element of all SiC power devices - has usually a relatively high doping inaccuracy of 20-25%. This directly translates into

larger and therefore more expensive power chips. Another problem with doping via epitaxy is the lack of possibilities to produce doped trench-structures in the epitaxial layer. Therefore, Superjunction-MOSFETs can not be produced in SiC.
Fortunately, mi2-factory offers a solution for the above described problems. The main feature is

the usage of high-energy ion implantation in combination with our innovative, in-house developed EFII. This tool, which is matched for every customer application, consists of a microstructured membrane which enables a highly precise distribution of foreign atoms in any semi-conductor material. Doping inaccuracy is only about 1%. EFII is the only evident technology which is scalable to production volume for SiC-SJ-MOSFETs.
mi2-factory offers EFII to semiconductor power device manufacturers, high-energy ion implantation foundries, ion beam accelerator manufacturers and end-station manufacturers. If you want to learn more about EFII, please contact us: info@mi2-factory.com.

Biografie
Benjamin Tom

Since 2016
Co-Founder and Chief Financial Officer at start-up company mi2-factory GmbH in Jena, Germany

2013 . . . 2015
Master studies in Industrial Economy at University of Applied Sciences Nordhausen, Germany

2010 . . . 2013
Bachelor studies in Production Technology / Engineering at University of Cooperative Education Eisenach, Germany

The Touchless Revolution

M. Migliore
COO
Touchless Automation GmbH, Biel/Bienne, Switzerland

Abstract
In microassembly, high precision handling of small objects is still an open challenge. The main issues are related to the component releasing, positioning, contamination and damaging.

Touchless Automation has developed a special tool that is able to manipulate micro components without touching them.

This solution levitates micro-components of any kind of material, offering at same time a placing precision that could go higher than conventional methods used today in pick-and-place operations.

Together with its customers, the device was implemented in different environments and was able to handle very different components. In many cases, results that are impossible for conventional contact-based tools were reached. As some of them said, this approach could mean a completely new world of opportunities to be unlocked.

Biografie
Maurizio has a Bachelor in Physical Engineering from Turin Politechnic and a Master Degree in Engineering for Micro and Nano Technologies from Turin Politechnic, Grenoble INPG and Lausanne EPFL. He completed his studies with an MBA from Collège des Ingénieurs.

He worked as Project Manager in FCA, with responsibility over multi-country automation projects for automotive, with budgets exceeding 50 millions €.
He then moved to Uber as Operations Manager in Italy, successfully managing and launching multiple products over different cities. In his last year at Uber he launched and managed Operations for UberEATS in Italy.

He has now joined Touchless Automation as COO, with the purpose of shaping its operations and look for business and financing opportuities.