Global Engage

PRINTED & FLEXIBLE ELECTRONICS CONGRESS 2017

— LONDON, UK —
21-22 February 2017

Examining the Latest Applications and Scientific, Technological and Business Trends to Advance the Field and Accelerate R&D to Commercialisation

www.global-engage.com/event/printed-flexible-electronics/
#GEPFE17
Thank you for your interest in the Global Engage Printed and Flexible Electronics Congress 2017, which will be held on February 21-22, 2017 in London, UK.

The meeting is part of our successful portfolio of events which includes innovative meetings on Synthetic Biology, Precision Medicine, Digital Pathology and Molecular Biology among others.globalengage.co.uk/events/

Designed to attract experts working in all areas of Printed and Flexible Electronics, from R&D, academia, supply chain to end user organizations in industries such as automobile, aerospace biomedical, consumer goods, electronics, health and wellbeing, packaging and retail to name a few. The conference will examine the latest applications as well as scientific, technological and business trends that will advance the field and accelerate R&D to commercialization.

With over 150 industry & academic experts expected this two-day interactive meeting will provide the opportunity to take home cutting edge strategies, case study examples and methods to allow you to fully develop your technical expertise and business projects in the field. This will be achieved through a vibrant exhibition room full of technology providers showcasing their technologies and other solutions, over 6hrs of dedicated networking time and expert led case study presentations examining topics during four separate tracks covering the areas below.

**EXPERT SPEAKERS** Include:

- **TON VAN MOL**
  Managing Director,
  Holst Centre, Netherlands

- **MANABU YOSHIDA**
  Team Leader, Printed Electronics Device Team, Flexible Electronics Research Center, AIST, Japan

- **SOLENN BERSON**
  Head of the Laboratory of Organic Photovoltaic Modules, Photovoltaic Module Division, Department of Solar Technologies, CEA, France

- **THOMAS KOLBUSCH**
  Vice President, Coatema Coating Machinery, Germany
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Also Hear From

PRINTED AND FLEXIBLE ELECTRONICS CONGRESS 2017
**PLenary Sessions**

- Global market analysis, Business Strategies and Start Up/Adopters
- Current and future end user requirements
- Next Generation techniques, technologies and devices

**Track One Day 1 & 2**

**A) Advanced Manufacturing Processes**
- Increasing efficiency and cost reduction through the manufacturing process
  - Innovative techniques
  - Advancements in manufacturing processes
- Overcoming manufacturing challenges
- 3D Printing developments and trends
- Printing and non-printing manufacturing and capability improvement

**B) Material Advancement**
- Materials for Printed and Flexible Electronics
- New product development for the market / Unmet needs
- Satisfying technical and commercial requirements
- Conductors, Insulators & Semiconductors
- Conductive & Functional Inks
- Transparent Conductive Films
- ITO & Replacement technology
- Graphene, Carbon Nanotubes & 2D Material research
- Integration of ICs on flexible, stretchable substrates

**Track Two Day 1 & 2**

**Applications & End User Showcases**

**A) Flexible Displays**
- Applications, showcase and case study examples
- Emerging display technologies and latest developments
- OLED and Electrophoretic Technologies
- Quantum Dot Display and Lighting Technologies

**B) OLED Applications & Lighting**
- Applications, showcase and case study examples
- Technology enablement
- Solid state lighting OLED v LED
- OLED lighting applications
- Quantum dot lighting

**C) Wearables and IoT Sensors**
- Applications, showcase and case study examples
- Technology enablement
- Thin film technology
- Advancements in smart labels / sensors / packaging / RFID
- Low power sensors / energy harvesting / Next generation batteries
- IoT sensors

**D) Future of Photovoltaics**
- Applications, showcase and case study examples
- Technology enablement
- Challenges on the journey to primary energy source
- Developing novel types of photovoltaics technology and cells
- Energy harvesting
- Thin film technology / solutions / thin film solar cells
- PV Applications
- International quality standard for manufacturing photovoltaic (PV) modules

**E) Other Applications**
- Applications, showcase and case study examples
- Technology enablement
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<td><strong>REINHARD R. BAUMANN</strong></td>
<td>Professor, Department of Digital Printing and Imaging Technology, Technische Universität Chemnitz; Fraunhofer Institute for Electronic Nano Systems ENAS, Germany</td>
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<td>Associate Professor, Department of Materials, University of Oxford, UK</td>
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<td>Professor, Department of Applied Physics, Aalto University School of Science, Finland</td>
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<td><strong>JACQUES KOOLS</strong></td>
<td>Founder and CEO, Encapsulix, France</td>
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<td><strong>MAIKEL VAN HEST</strong></td>
<td>Senior Scientist, Materials Science Center, Department of Energy, National Renewable Energy Laboratory (NREL), USA</td>
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<td><strong>GEORGE ADAMOPOULOS</strong></td>
<td>Senior Lecturer in Electronic Materials and Devices, Lancaster University, UK</td>
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<td>Senior Scientist, Research &amp; Technology Development, Cambridge Display Technology, UK</td>
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<td><strong>ANDREA FERRARI</strong></td>
<td>Professor of Nanotechnology; Director, Cambridge Graphene Centre, University of Cambridge, UK</td>
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<tr>
<td><strong>THOMAS ÖSTERBERG</strong></td>
<td>Research engineer, Department of Physics, Chemistry and Biology (IFM)/Biomolecular and Organic Electronics (BIORG), Linköping University, Sweden</td>
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PRINTED AND FLEXIBLE ELECTRONICS CONGRESS 2017
CONFIRMED SPEAKERS

IYAD NASRALLAH  
(Track Chair)  
Research Associate at the Optoelectronics Group, Cavendish Laboratory, Cambridge University

OLIVER FENWICK  
(Track Chair)  
Lecturer in Materials Science, Queen Mary University of London, UK

CHRISTIAN BECH NIELSEN  
Research Fellow, Queen Mary University of London, UK

ALASDAIR CAMPBELL  
Professor of Solid State Physics, Faculty of Natural Sciences, Department of Physics, Imperial College London

MAXIM SHKUNOV  
(Track Chair)  
Lecturer in Nano Electronics, Advanced Technology Institute, Electrical and Electronic Engineering, University of Surrey, UK

STAN FARNSWORTH  
Chief Marketing Officer, NovaCentrix

AARON FRANKLIN  
(Track Chair)  
Associate Professor Department of Electrical & Computer Engineering (ECE), Department of Chemistry, Duke University, USA

PETER FISCHER  
Chief Operating Officer, Thin Film Electronics

AHMED BUSNAINA  
William Lincoln Smith Professor and Director, NSF Nanoscale Science and Engineering Center for High-rate Nanomanufacturing, Northeastern University, USA
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<td>KEYNOTE ADDRESS: ANDREA FERRARI</td>
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**Global Engage Welcome Address and Track Chair Introduction:**

**TRACK CHAIR:** Iyad Nasrallah, Research Associate, Optoelectronics Group, Cavendish Laboratory/Research Fellow, Wolfson College, Cambridge University, UK

**KEYNOTE ADDRESS:**

**TON VAN MOL**
Managing Director, Holst Centre, Netherlands

**Next Generation techniques, technologies and devices**

Based on a new generation of flexible electronics, new possibilities in health care and automotive industry are discussed, such as continuous on-body ECG monitoring, integrated dashboards, and flexible X-ray imaging. This new generation has been made possible with on-going developments in flexible IGZO backplanes, stretchable inks allowing for thermoforming, and multilayer printing of circuitry.

**KEYNOTE ADDRESS:**

**ANDREA FERRARI**
Professor of Nanotechnology; Director, Cambridge Graphene Centre, University of Cambridge, UK

**Graphene and Related Materials for Printed and Flexible (Opto)electronics**

Background on graphene and related materials Key properties and opportunities applications

**SOLUTION PROVIDER PRESENTATION:**

**PETER FISCHER**
Chief Operating Officer, Thin Film Electronics

**Connecting Physical Objects to the Digital World with Printed Electronics**

Printed electronics and NFC extend the traditional boundaries of the IoT to bring intelligence to food, clothing, medicine, and other products we use every day. Thinfilm's unique NFC technology and end-to-end solutions allow brands to address authentication needs while empowering them to engage with consumers through the simple tap of a smartphone. As the digital marketing arena becomes more fragmented, brands see NFC as a way to eliminate intermediaries and connect directly with customers. Item-level connectivity together with cloud-based analytics allows organizations to better understand user behavior. Consumers can receive contextual and dynamic content concerning proper usage of a product, expiration dates or repurchasing options. For the diverse market opportunities possible with NFC, Thinfilm delivers ultra-high volume production capabilities through a unique roll-to-roll manufacturing process.

**PRINTED AND FLEXIBLE ELECTRONICS CONGRESS 2017**

**THINFILM**

**TRACK 1 - ADVANCED MANUFACTURING PROCESSES**

**REINHARD R. BAUMANN**
Professor, Department of Digital Printing and Imaging Technology, Technische Universität Chemnitz; Fraunhofer Institute for Electronic Nano Systems ENAS, Germany

**Printing Beyond Color - entire inkjet fabrication of TFTs towards industrial manufacturing**

During the improvement of printing technologies printers gained competences, which enable them to extend their scope to applications, addressing functionalities beyond color. By printing inks giving the functionalities insulation, conductivity and semi-conductivity on top of each other a 4 layer pattern can be manufactured which results in active electric circuitry. The adaption of the existing printing technologies and processes towards the manufacturing of functional layers and devices are topics of the paper that have high relevance for the future industrial manufacturing. The paper will discuss process stability and reliability of printing electronic devices and further opportunities and challenges of printing functionalities beyond color.

**TRACK 2 - TECHNOLOGY, APPLICATIONS & END USER SHOWCASES**

**WHILK GONÇALVES**
Head of Innovation in Lighting and Signalisation, PSA Peugeot Citroën, France

**Automotive applications of OLED in rear light signalization**

OLED represent a new opportunity for OEMs achieving new and seductive light renderings, welcome light and animations. However, this new component brings along new design rules and requests for electronic wiring and connections, compatible to the automotive industry reliability standards. We are going to present the main defies linked to some PSA Group concepts using the component.
HAZEL ASSENDER
Associate Professor, Department of Materials, University of Oxford, UK

Roll-to-roll manufacture of all-evaporated organic circuits for flexible electronics

The breakthrough of flexible electronics depends upon suitable large-scale manufacturing routes, likely requiring very low cost, high-throughput processing techniques. Our approach to development of organic electronics considered high-speed roll-to-roll processes already employed industrially to consider their applicability in creating transistors and circuits. This paper will consider the advantages and challenges of a vacuum-deposition approach, and then discuss the development of organic field effect transistors like coating, printing and laminating. A deeper look is taken into processes like UV nanoimprint lithography and thermal nanoimprint Lithography, laser patterning and high accuracy registration control for these processes.

JONG WON
Research Staff Member, Organic Materials Lab, Samsung Advanced Institute of Technology (SAIT), Korea

Recent Progress in Printed and Flexible Electronics

Flexible and printed electronics with soft materials are an attractive approach for achieving free-form factor and low-cost for potential electronic applications. In order to manufacture flexible electronic products in large quantities, the device performance, reliability and manufacturing cost must be competitive as well. In this presentation we will report on recent progress and current issues of printed and flexible electronics as well as other components for various applications, provide an overview of their materials, devices, processes and discuss the status of commercialization in flexible display and other flexible electronic applications. Although platforms are required for various possible applications of flexible electronics, it is very likely that the combination of conventional and novel technology will launch a new market in the near future.

SOLUTION PROVIDER PRESENTATION:
STAN FARNSWORTH
Chief Marketing Officer, NovaCentrix

Merging Design and Function through Conductive Inks and Photonic Curing

From Wearables to IoT, emerging high-growth applications are challenging the typically-rigid form factors of traditional electronics. As more designers explore adding enhanced functionality to their products, there is a need for electronics to be designed for new shapes and with improved flexibility. This in turn requires utilizing new substrates, conductive materials, and fabrication technologies. This discussion will highlight examples of current state-of-the-art conductive inks along with the use of photonic curing to create high-performance electronics which are printed on flexible and low-cost materials.
MAIKEL VAN HEST
Senior Scientist, Materials Science Center, Department of Energy, National Renewable Energy Laboratory (NREL), USA
Synthesis and roll to roll processing of renewable energy materials

ESKO KAUPPINEN
Professor, Department of Applied Physics, Aalto University School of Science, Finland
Dry printing of carbon nanotube thin films for transparent, flexible and stretchable electronics applications

JACQUES KOOLS
Founder and CEO, Encapsulix, France
Manufacturing Technology for OLED encapsulation by Ultrafast Atomic Layer Deposition

TONY MAINDRON
Senior Scientist, OLED, LETI - Laboratoire d'électronique et de technologie de l'information, France
OLED and thin-film encapsulation technologies for microdisplays

FRANCO CACIALLI
Professor, London Centre for Nanotechnology and the Department of Physics and Astronomy University College London, UK
Novel NIR “high-efficiency” emitters and devices in the 700 - 1000 nm band

NIR YAACOBI-GROSS
Senior Scientist, OLED, LETI - Laboratoire d'électronique et de technologie de l'information, France
OLED and thin-film encapsulation technologies for microdisplays

In order to make photovoltaics and other thin film materials affordable, roll-to-roll solution processing is a very attractive method. At the National Renewable Energy Laboratory we are working on scaling conventional and newly developed materials from lab scale towards commercialization using scalable methods. Computational design can accelerate the development of new renewable energy materials, of which many are metastable, have several polymorphs, undesirable defects or are alloy-based systems. Understanding nucleation and growth of metastable materials can potentially accelerate the transition of metastable materials towards roll-to-roll and deployability. Understanding the details of large area synthesis of targeted functional materials can lead to new approaches to roll-to-roll and ink based processing. We will give several examples of its use for renewable energy materials.

Flexible organic electronic devices require a thin film encapsulation to ensure adequate protection from degradation by water vapor from the atmosphere. Atomic Layer Deposition (ALD) is one of the most interesting technologies that has been developed to address this need, as the method allows the production of excellent barrier performance in ultrathin coatings (25-50 nm). However, a traditional drawback of ALD is the low deposition rate, and hence high cost of ownership.

Encapsulix has developed the Parallel Precursor Wave (PPW) ALD architecture, which allows to increase ALD deposition rate by a factor 30-100 with respect to traditional approaches. Equipment including this technology has been used in OLED manufacturing for more than 2 years.

In this talk, we will introduce the technology, review some of the manufacturing experience and provide an outlook towards the future.

The advantage of OPDs relative to their inorganic contenders

Tailoring the OPD device structure and performance towards specific applications (with an example of OPDs for low illumination level conditions)

Integration of OPD with other printed electronic devices such as OLEDs and OFETs. (with an example of a flexible Pulse-Oximeter)
### GEORGE ADAMOPOULOS
Senior Lecturer in Electronic Materials and Devices, Lancaster University, UK

**Solution processed metal oxide-based electronics for displays applications employing both inkjet and spray coating techniques**

The advances in the development of metal oxide semiconductors that demonstrated with high optical transparency, high carrier mobilities, excellent mechanical properties and compatibility with organic materials, make them ideal candidates for applications in large-area electronics. Nevertheless, those high-performance metal oxide-based TFTs are usually manufactured using costly vacuum-based techniques. To address this issue, recent research has been focused on the development of TFTs using alternative deposition methods based on solutions.

Thus this talk will present the current state-of-the-art of metal oxide-based electronics processed from solutions. More precisely, the methodology as well as the role of the deposition conditions in respect to both nMOS and pMOS operating characteristics will be discussed. We will focus in particular to the dielectric’s choice and properties for high performance metal oxide-based electronics for displays applications.

### DAMIEN HAU
Industrial, Research, Development and Innovation Manager, Armor, France

**The influence of the process on the performance of OPV modules**

The large-scale development of markets for OPV is guided by minimum two important parameters. The high-performance materials and associated coating process. I’ll present a few cases development, however promising, that did not lead because not having integrated the sum of constraints including materials and process incompatibilities.

I will present, as examples of achievements, some materials developments or design changes of processes that have produced significant advances in order to start production of OPV modules for large scale R2R. We will also see differences in results between same pilot equipment and R2R production equipment and keys to explain these differences.

### AHMED BUSNAINA
William Lincoln Smith Professor and Director, NSF Nanoscale Science and Engineering Center for High-rate Nanomanufacturing, Northeastern University, USA

**Printing of Nano and Microscale Electronics and Sensors**

Inkjet, screen-printing and gravure are three printing technologies that are commercially used for printing electronics with the smallest features about 20 microns. This scale leaves it far behind today’s silicon electronics. The next generation of printed devices requires printing features at today’s silicon electronics line width, which is 1000 times smaller (about 20 nanometers). We introduce a new printing technology that utilizes directed assembly to print electronics at the nanoscale. This printing technology can print organic and inorganic metals, insulators and semiconductors (including III-V and II-VI), into micro and nanoscale circuits and structures (down to 20 nanometers) on flexible and rigid substrates. In this presentation, we show the applications of this technology in electronics, sensors and metamaterials applications.

### JEAN-CHRISTOPHE GABRIEL
Deputy Director, Nanoscience Transversal Program, CEA, France

**A multifunctional flexible electronic label prototype**

We will present a CEA joint effort that delivered a multifunctional label prototype that integrates flexibles: (i) photovoltaic cells; (ii) a nanoparticle based Li-battery; (iii) a battery management system; (iv) a tension regulator; (v) a temperature sensor; (vi) a light sensor; (vii) a silver nanowire based transparent capacitive touch sensor; (viii) four LEDs; (ix) an electronic motherboard integrating a micro-controller.

### ALASDAIR CAMPBELL
Professor of Solid State Physics, Faculty of Natural Sciences, Department of Physics, Imperial College London

**Contact printed organic TFTs and complementary circuits on plastic and novel circular polarized (CP) OLEDs**

Here I report our recent advances in the field of plastic electronic solution processed based displays.

In the first part of the talk I will consider the use of gravure contact printing as a method in the fabrication of flexible display components such as the TFT backplane and drive electronics. We have developed a large area batch process flow on plastic combining lithography, NIL and gravure printing. We have been able to construct TFT arrays with uniform hundred nanometre thick dielectric layers, high frequency self-aligned transistors with submicron gate lengths, and complimentary inverters and logic gates.

In the second part of the talk I will discuss our recent advances in circularly polarized (CP) OLEDs. Nearly all displays contain an antiglare CP filter, resulting in the loss of 50% of the emitted pixel light, reducing efficiency and display and battery lifetime. Directly CP emitting OLEDs allow us to recapture this loss. I will discuss our recent approaches involving the use of chiral small molecule dopants to change the emission in previously optimised light emitting polymers, and the use of triplet emitting molecules in CP PhOLEDs.
Recent advances in flexible electronics and related technologies in AIST-FLEC

- Organic-semiconductor based security circuits
- Highly stretchable large area sensors
- Printed millimeter wave circuits

AIST-FLEC has been conducting the research and development of large-area flexible electronic devices, as well as electronic devices that can be freely shaped. The aim has been to develop technology with a focus on printing-based manufacturing processes. Technologies developed so far include organic-semiconductor based circuits, RF tags, highly stretchable large area sensors, and printed millimeter wave circuits.

Printed Organic Electronics at Merck

Merck has been actively researching Organic Electronic materials since the year 2000 with the objective to enable mass production of plastic electronic devices. In this paper we present two selected activities: organic thin film transistors (OTFT) and organic photodetectors (OPD). We demonstrate how the co-development of organic semiconductors, passive materials and formulations together with process optimisation enable the manufacture of high performance OTFT arrays suitable for mass production of display backplanes. These materials can be either printed or patterned using photolithographic process to fabricate OTFT’s with mobilities exceeding that of amorphous silicon. In similar approach we present recent progress on materials for OPD devices, addressing applications such as x-ray detectors, blood oximetry and touchless interaction where they offer unique benefits over current solutions.

Printed Sensor Systems

The printability of inorganic and organic semiconductors offers many options for low-cost sensor systems. Over the past years our group has explored different devices and systems for sensing. The talk will review recent advances in the field of solution processed organic photodiodes. Using aerosol-jet printing, bulk heterojunction photodiodes with competitive detectivity values can be realized as individual devices and arrays. The talk will discuss the device properties as well as possible applications, e.g., in the field of lab-on-chip systems. The supply of energy to power sensor systems is a challenge on its own. Besides the possibilities given by printable photovoltaics, printed thermoelectric generators might offer a very versatile approach towards the realization of energy harvesting devices.
Development of Flexible and Highly Conductive Transparent Thin Film Electrodes for Plastic Electronics

The development of flexible and highly conductive transparent electrode materials has been attracting much research and commercial interest. This is because the conventional transparent electrode for rigid optoelectronic devices, namely indium tin oxide (ITO), is not well suited to the emerging plastic electronic devices owing to its inherent brittleness. In this talk, I will give an overview of our work on the development of transparent electrodes for plastic electronics including conducting polymers, single-walled carbon nanotubes and silver nanowires. In particular, my talk will cover the conducting polymer transparent electrode system fabricated by in-situ polymerisation of 3,4-ethylenedioxythiophene (EDOT) using an oxidant mediated by a complementary base. The resulting poly (3,4-ethylenedioxythiophene) has been demonstrated to be an especially promising conducting transparent electrode for flexible organic LEDs, solar cells and transistors, with thin film conductivities ≤ 4000 S/cm.

Challenges for printing hybrid light emitting diodes

Hybrid Light Emitting Diodes (HyLEDs) are novel electro-optic devices in which organic lumophores are combined with inorganic transition metal oxides that act as charge transport layers. The introduction of inorganic components permits performance under ambient conditions tackling the reduction in the number of production steps, which is one of the crucial bottlenecks that OLEDs need to overcome for a successful introduction into the lighting market. In this sense, the metal oxides act as charge transport layers and provide protection so the device retains the advantages of OLEDs emission such as planarity, flexibility or easy tuning of light emission. In addition, these devices are prepared by solution processing in air. The talk will be therefore focused on the challenges faced by HyLEDs and their printing processing.

Engineering organic semiconductors

Organic semiconductors are an incredibly exciting class of materials, which nowadays commonly achieve hole mobilities comparable to amorphous silicon in field effect transistors. Even though the device performances have constantly improved, the materials properties and ideal processing conditions remain poorly understood.

This talk will focus on the interplay of molecular structure and materials properties, thus highlighting how rational material’s design impacts processing conditions and device performance. I will highlight the importance of flexible alkyl chains in conjugated polymers and how those can be modified to alter either the molecular packing or the materials solubility. Whereby the molecular packing has a significant impact on the charge transport properties in organic field effect transistors, the material solubility is key to enable inkjet printing of semiconducting polymers.

Organic and perovskite solar cells for autonomous sensor network

In our work, we developed organic or perovskite solar cells for power supplies of autonomous sensors network. Hundreds of autonomous sensors scattered over a vast territory or in indoor environment could monitor several informations. They must be able to send regularly information during night and day and be low cost.

We will present efforts done at XLIM in order to fabricate such solar cells. We will present here the device conception of the world’s first polychrome organic solar module made in collaboration with Disasolar SME and CEA-INES (www.idtechex.com). Solutions including Ag nanowires in order to replace ITO and to allow all printed fabrication will be exposed. Our results on printed hybrid lead-halide perovskite solar cells will be also presented.

Flexible PV for integration into wristbands: the Wear-a-Watt project

No chargers and no wires anymore: The multidisciplinary project Wear-a-Watt builds on the strengths of CSEM in its five research programs to create ultra-low power wearable systems which can live off the energy harvested from their environment without requiring recharging or wiring. The programs involved in this project cover (i) the nano-textured flexible substrate used for the PV cells, (ii) the production and characterization of the PV cells and their optimization for low-illumination conditions, (iii) the development of an ultra-low-power chip for power management and (iv) the engineering of the complete system. We will report on the progress of this project which targets energy autonomous wearables and the endpoints of the IOT.

Thin-film perovskite for solar photovoltaics

• Introduce perovskite mineral as a solar photovoltaics absorber
• Introduce concept of 2-terminal perovskite-on-silicon tandem cell for solar energy generation
• Showcase possible future applications of perovskites for buildings integrated PV
Advanced characterisation for printed electronics

Reliable and advanced characterisation is key to enable the development of new technologies, to ensure product reliability and cost-effective manufacturing. In addition to that, standards are critical to ensure trust and facilitate trade in the growing printed and flexible electronics industry. This paper will discuss how advanced characterisation methods developed at NPL can be used to improve performance of printed electronics, ensure high quality advanced manufacturing and assess durability/reliability of materials and products. It will also highlight existing and upcoming standards for printed electronics and how companies can engage with international standardisation through VAMAS and IEC.

Computing with Carbon: Carbon nanotube composites for unconventional computing applications

Here we showcase recent work at Durham University which shows how carbon-based nanomaterials can be trained by external stimuli to perform useful computing functions without the use of transistors. The talk will begin with an overview of this method of computation, so called ‘Evolution-in-Materio,’ and how it differs from standard computing devices, before moving onto specific examples of static carbon-nanotube/polymer composites and dynamic liquid-crystal/carbon-nanotube composites.

Printable nano-materials based sensors for chemical and biological analysis, including early cancer diagnostics

Sensitive detection of volatile organic compounds (VOCs) for early stage cancer diagnostics and identification of biosubstances in blood for disease prevention and treatment are the key for future health screening. Here we target a development of a low-cost printed electronics sensor platform, based on functionalised nanowire transistors. Semiconducting nanowires are excellent building blocks for both gas sensing and liquid-based bio-sensing applications due to their one-dimensional transport properties and high surface-to-volume, offering excellent room temperature sensitivity at ppb level of VOCs, and single-molecule level detection for bio-molecules. In addition, solution processing of nanowires functional inks enables fast prototyping and sensors printing on flexible substrates. We discuss applicability of printing technologies for efficient nanowire assembly and functionalisation for the fabrication of reliable sensing platforms.

Digital Processing and Lifetime Study of Solar Technologies

The research at BIORGEL focuses on developing a low cost, highly scalable system for OPV production. We believe avoiding use of rare earth elements such as indium in ITO and vacuum steps in production is the only way for OPV to be competitive. Hence, we focus on a fully slot-die coated roll-to-roll system, using cheap and abundant materials. A novel module design keeps the geometric fill factor high while at the same time accommodating low resistance losses in the PEDOT electrodes.

Development of novel organic semiconductors with improved absorption and transport properties

Bulk heterojunction solar cells – vacuum and solution-processed

Technology transfer to solar foils for building integrated pv

Semi-transparent solar modules

All organic slot-die coated

Head of the Laboratory of Organic Photovoltaic Modules, PhotoVoltaic Module Division, Department of Solar Technologies, CEA, France

Printed and Flexible Electronics Congress 2017

Conferences and events at the University of London, UK

Thermoelectric energy harvesting

Flexible Organic Photovoltaic Modules

Digital Processing and Lifetime Study of Solar Technologies

Flexible and organic electronics are critical to ensure trust and facilitate trade in the growing printed and flexible electronics industry. This paper will discuss how advanced characterisation methods developed at NPL can be used to improve performance of printed electronics, ensure high quality advanced manufacturing and assess durability/reliability of materials and products. It will also highlight existing and upcoming standards for printed electronics and how companies can engage with international standardisation through VAMAS and IEC.
MAKING A POSTER PRESENTATION

Poster presentation sessions will take place in breaks and alongside the other breakout sessions of the conference. Your presentation will be displayed in a dedicated area, with the other accepted posters from industry and academic presenters.

We also issue a poster eBook to all attendees with your full abstract in and can share your poster as a PDF after the meeting if you desire (optional).

Whether looking for funding, employment opportunities or simply wanting to share your work with a like-minded and focused group, these are an excellent way to join the heart of this congress.

In order to present a poster at the forum you need to be registered as a delegate. Please note that there is limited space available and poster space is assigned on a first come first served basis (subject to checks and successful registration).

We charge an admin fee of €100 to industry delegates to present, that goes towards the shared cost of providing the poster presentation area and display boards, guides etc. This fee is waived for those representing academic institutions and not for profit organisations.

POSTER PRESENTATION EXAMPLES

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<td>*Department Physics and Astronomy and London Centre for Nanotechnology, University College London, London, WC1H 0AH (UK) *Advent Technology SA, Patras Science Park,Patra, 26504 (Greece) *Macromolecular Chemistry Department and Institut for Polymer Technology, Bergische Universitat Wuppertal, Wuppertal (Germany)</td>
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<td>Center for Micro-BioRobotics, Istituto Italiano di Tecnologia</td>
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| 13 | OLED emitters: predicting phosphorescent lifetimes with spin-orbit coupling TDDFT | a) Ryoka Systems Inc., Science and Technology Systems Division, Tokyo Skytree East Tower 1-1-2, Oshiage, Sumida-ku, Tokyo 131-0045, Japan  
  b) Software for Chemistry & Materials, Theoretical Chemistry, Vrije Universiteit, De Boelelaan 1083, 1081 HV Amsterdam, The Netherlands  
  c) College of Chemistry, Sichuan University, 24, South Section 1, Yihuan Road, Chengdu, P. R. China |
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  5Advanced Materials Laboratory, ETSIIAA, Universidad de Valladolid, Avenida de Madrid 44, 34004 Palencia, Spain |
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  1Escuela Técnica Superior de Ingeniería de Telecomunicación (ETSIIT), Universidad Rey Juan Carlos, 28933 Madrid, Spain  
  2Instituto de Ciencia de Materiales de Madrid (ICMM), Consejo Superior de Investigaciones Científicas, Cantoblanco, Madrid 28049, Spain  
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  1Escuela Técnica Superior de Ingenieros Industriales, Universidad Politécnica de Madrid, 28008 Madrid, Spain  
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  3Escuela Técnica Superior de Ingeniería de Telecomunicación (ETSIIT), Universidad Rey Juan Carlos, 28933 Madrid, Spain  
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  5CFisUC, Department of Physics, Universidade de Coimbra, Rua Larga, P-3004-516 Coimbra, Portugal |
| 18 | Development of printed interactive surfaces based on electroactive polymers | N. Castro1,2; S. Gonçalves3,4; J. Serrado Nunes1,2; N. Pereira1,2; V. Correia1,2; S. Lanceros-Mendez1,4  
  1Center of Physics1 and Center Algoritmi2, University of Minho, Portugal  
  2BCMaterials3, Spain  
  3Ikerbasque4, Spain |
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