Inkjet Development Conference 2018

17-18 April 2018

Mövenpick Hotel Frankfurt City | Frankfurt | Germany

New developments in digital printing chemistry and engineering

Inkjet Development Conference

Tues 17 - Weds 18 April 2018

The IMI Europe Inkjet Development Conference is a two-day technical conference devoted to digital printing solution development. The event is aimed at inkjet developers across applications including packaging, textiles, graphics, industrial and functional printing. The conference gives access to key suppliers, technology and advances from the inkjet industry.

Who should attend: inkjet development chemists and engineers wishing to understand the latest developments in materials, techniques and products across the industry.

Technical Advisory Board

Prof Reinhard Baumann
Technische Universität Chemnitz

Dr Phil Bentley
Tonejet

Dr Andy Hancock
Mexar

Dr Tim Phillips
IMI Europe

Conference Speakers

Hugh Allen | Sun Chemical
Dr Simon Daplyn | Sensient Imaging Technologies
Dr Mark Bale | DoDxAct
Frank De Jonge | Armor Industrial Inks
Dr Kalyan Yoti Mitra | Technische Universität Chemnitz
Dr Casey Dixon | Epivalence
Dr Ralf Zichner | Fraunhofer Institute for Electronic Nano Systems
Dr Thiago Martins Amaral | Leibniz Institute for New Materials
Yair Kipman | ImageXpert
Dr Will Eve | Inca Digital Printers
Dr Phil Bentley | Tonejet
Dr Ilaria Valenti | System
Jakko Nieuwenkamp | Reden
Dr Sarah Driver | Global Inkjet Systems
Clive Ayling | Meteor Inkjet
Dr Thomas Benen | Microtrac
Dr Enrico Sowade | Zschimmer & Schwarz
Dr Roberto Bianchi | Rahn Group
Dr Iurii Gnatiuk | Tiger Coatings

For more information see **www.imieurope.com**

IMI Europe Inkjet Development Conference 2018

Tuesday 17 – Wednesday 18 April 2018

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Tuesday 17 April 2018

09.00 – 10.00 Conference registration

10.00 Morning session begins

Energy curing inks - future directions

Hugh Allen
Development Manager Inkjet Inks, Sun Chemical

UV-curing inkjet inks are well established in graphics, label and industrial decoration and beginning to be utilised in packaging applications. However, with the advent of increasingly capable LED curing devices there are now three options available for curing the inks: mercury, LED or ebeam. This presentation will consider the implications these curing methods have on ink design and their relative pros and cons. Additionally, the impact that printhead choice has on curing as well as regulatory, food safety in the area of packaging and image quality considerations will be discussed.

Textile inks for direct printing - the challenges of drop control and material selection

Dr Simon Daplyn
Marketing Manager, Sensient Imaging Technologies

Textiles offer a significant challenge to printers in terms of achieving the colour, sharpness and application performances expected from major brands on a porous and absorbent 3D structure. This challenge can be increased with ever tighter controls on materials that can be used and evolution of new printheads and equipment driven to increase production speeds. This talk will focus on the technical challenges of drop control, requirement for pre-treatment and how materials selection impacts on sustainability and brand compliance.

Importance of hybrid print processes in the digital evolution

Dr Mark Bale
Director, DoDxAct

As digital print continues to penetrate industrial applications beyond wide format, the role of hybrid processes has become prominent. Despite early scepticism, offline pre-coating or inline priming of difficult surfaces has become accepted to deliver the required image quality and functionality, particularly in single-pass printing. We review examples from across proven applications and look to the future of the still-evolving landscape in textile and packaging markets.

Refreshment Break

Requirements and challenges in aqueous inks for flooring and packaging

Frank de Jonge
Business Development Director, Armor Industrial Inks

The presentation will examine the opportunities for water-based inkjet inks for key applications like flooring and packaging. In these cases the requirement for application performance and jettability presents significant formulation challenges based on the need for significant pigment loading and binder concentration. These challenges, along with substrate compatibility, pre- and post-treatment methods and suitable curing technologies will be discussed for each application, and latest developments presented.

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Panel discussion: Inks for packaging - what is missing?

- UV versus aqueous inks
- UV, LED, EB curing
- Migration and regulatory issues

The panel will be chaired by Dr Andy Hancock, Technical Director, Mexar, and include industry experts from the conference Technical Advisory Board and conference presenters.

13.00 – 14.30 Lunch

14.30 Afternoon session begins

An overview on the development of inkjet printed thin-film-transistors based on materials, architectures, deposition technology as function of performance, reliability and their implementation in flexible electronics

Dr Kalyan Yoti Mitra
Department of Digital Printing and Imaging Technology, Technische Universität Chemnitz, with Sunil Kapadia, Maxim Polomoshnov, Reinhard R. Baumann and Ralf Zichner (Fraunhofer Institute for Electronic Nano Systems, Department of Printing Functionalities)

All inkjet printed thin-film transistors (TFTs) are state of the art devices, which find their use in various switching, amplifying and sensing applications, in flexible/micro-electronics. These TFTs often exhibit several deficiencies e.g. low channel currents (ISD), switching ratios, operational instabilities, charge mobilities (μ) etc. Hence, a thorough investigation is performed to exploit these problems and find suitable solutions. This is accomplished by implementing novel architectures, source/drain electrode geometries, polymeric/inorganic functional material inks and scaling up of the deposition process. The results show a comprehensive improvement e.g. I_{SD} in mA, μ to 0.1 $cm^2/V{\cdot}s$, on/off ratio 10^4 and manufacturing yield ~80%.

Development of nanoparticle inks with active matrix materials

Dr Casey Dixon
Research Chemist, EpiValence, with Simon Rushworth (Epivalence), Josh Turner, Helen Aspinall and Kate Black (University of Liverpool)

The challenge of reducing the thermal treatment conditions required for metal oxide thin films to enable deposition on flexible, plastic substrates has proven to be a significant barrier to creating novel devices using inkjet printing. In this talk the use of preformed crystalline nanoparticles in active matrix will be discussed and results from the development of two active matrices presented. Properties of a variety of formulations including modified metal alkoxides in functional alcohol with and without glyme stabilisers will be reviewed to highlight the optimum compositions of inks for future testing. Some printed pattern results using the highest potential inks will also be included to demonstrate the advantages of the approach that have been achieved to date.

Innovation of series production by digital printing processes like inkjet and dispensing for printed electronic applications

Dr Ralf Zichner
Head of Department Printed Functionalities, Fraunhofer Institute for Electronic Nano Systems ENAS, with Robert Thalheim, Reinhard Baumann, Thomas Otto

Across industries, the demand for innovative, individualised components is growing. Producing these efficiently down to a quantity of one requires the use of digital production processes like inkjet and dispensing processes. One strategy for realising component customisation is to digitally apply functional material (e.g. electrically conductive pattern) on top. With this for example printed paths on planar and 3D objects could be realised. The advantages and applicability of digital printing technologies (inkjet and dispensing) will be described by an automotive application: printed wiring harnesses.

Refreshment Break

Improvement of the thermal stability of inkjet printed silver grids by wet chemically deposited TCO coatings

Dr Thiago Martins Amaral
INM - Leibniz Institute for New Materials, with Sabine Heusing, Peter König, Peter W. de Oliveira

Wet chemically deposited ITO (In_2O_3:Sn) was used to improve the thermal stability of inkjet printed silver grids. The printed conductive grids consisted of densely packed silver nanoparticles with an average diameter of 55 nm. After several heat treatments above 250 °C, the sample's conductivity deteriorated. The nanoparticles were sintered together, dewetted the substrate and formed isolated islands with an average diameter of 1 μm. On the other hand, in the ITO coated grids, the oxide layer prevented silver dewetting and islands formation, which preserved the grid's conductivity even after heat treatments at 550 °C. Similar results were obtained using other In-free transparent conductive oxide coatings such as AZO (ZnO:Al), offering the possibility to decrease costs of hybrid transparent conductors.

Panel discussion: Functional printing and printed electronics

- Technology barriers
- Latest developments
- What more can the industry do?

The panel will be chaired by Prof Reinhard Baumann, Technische Universität Chemnitz, and include industry experts from the conference Technical Advisory Board and conference presenters.

Imaging of inkjet drops in flight

Yair Kipman
President, ImageXpert

With the help of cutting-edge machine vision technology, inkjet research and development is becoming faster, more comprehensive, and more automated. In this presentation, the latest tools and techniques for studying drop formation, waveform optimization, operating frequency, and other aspects of ink characterization will be discussed.

Sponsors' Forum

18.30 – 19.00
Hear short presentations from the event sponsors

Reception

19.00 – 20.30
Join us for wine, beer, canapés and good company!

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09.00 Morning session begins

Ink mist in single pass printing

Dr Will Eve
Director of Technology, Inca Digital Printers

Ink mist is a particular concern with single pass printing. Ink mist can contaminate nozzle plates and cause jetting reliability issues, and single pass printing requires very high reliability. The very large amounts of ink printed by a single pass system means there is the potential for large amounts of mist, so that systems are needed for extracting and separating the mist. The factors affecting mist generation will be described, as well as looking at mist entrainment in airflows in the print gap.

Electrostatic printing of industrial packaging: New developments in direct-to-shape metal beverage can printing

Dr Phil Bentley
Head of Fluids, Tonejet

A revolution is afoot in the requirement for printed metal beverage cans. Small craft brewers require short print runs of around ten thousand cans, much smaller than the minimum order from a traditional can printer. A digital direct-to-shape solution is thus required to unlock the growing demands of short-run can printing. The beverage can is an extremely demanding surface, being non-porous and of low surface energy. The ink layer must be low cost, vanishingly thin yet withstand the rigours of the shipping process. Furthermore, beverage cans have an awkward shape requiring novel engineering solutions to achieve high throughput in a digital printer without substrate damage. This talk will discuss these challenges in detail and present some of the novel approaches Tonejet has taken in building a solution.

Improvement of printing quality through satellite formation control

Dr Ilaria Valenti
Physical Engineer, System

This work describes a method to improve printing quality, through the control of satellite formation mechanism, which is a direct consequence of drop formation process. The method is based on a model presented and experimentally verified in a previous study, relating drop velocity to satellite number, through tail length at the detachment from nozzle. A brief presentation of the model for single event condition is introduced, then the model is here generalised including frequency effects. A parameter to evaluate printing quality a priori, from ink and printhead properties, is introduced and the dependence from single relevant quantities is highlighted. An actual example of tuning of ink properties is presented and the effect on drop formation are experimentally analysed. A very general method to improve printing quality is proposed, which is applicable to each printing system, opening the way to the possibility to create modellable fluids with the best printing performances.

Refreshment Break

Efficient modelling of substrate behaviour and design rule extraction

Jakko Nieuwenkamp
Reden

Print quality is affected by many factors. The positioning and the temperature of the substrate are two of them. A model has been made that is able to calculate the temperature in a sheet of paper while travelling through the paper path system. The efficiency of the calculation method is such that the temperatures can be calculated real time and integrated in the control loop. Print quality is badly influenced when the substrate wrinkles. Models have been made to predict the wrinkling of the substrate. Based on these models design rules are made for efficient use in the design process of new print applications.

Software – key application and print quality enabler

Dr Sarah Driver
Application Specialist, Global Inkjet Systems

A huge number of factors contribute to achieving and maintaining image quality, such as inks, process, mechanical, encoders, substrate, curing etc. Most of these are now well understood, enabling larger and wider inkjet presses to be built, but also increasing is the probability of a shorter mean time between failures. This presentation will concentrate on one of those key factors – software – firstly focusing on certain aspects which are becoming increasingly critical as the number of printheads per system grows. Missing nozzle strategies, printhead linearisation and advanced stitching techniques will be discussed. This presentation will also discuss how software is the critical enabling tool to unlocking new applications for inkjet, in particular, for printing onto complex shapes.

Electronics – essential components for high performance inkjet printing

Clive Ayling
Managing Director, Meteor Inkjet

The talk will explain the differences between electronics needed for different printhead types and why they differ for the same head in different applications. Recent trends in industrial reliability and in print quality have driven changes in drivers in their analogue hardware, digital hardware and embedded software functionality. These changes will be discussed and the impact of improved electronics and software technology on the production of the latest high-performance inkjet machines.

12.30 – 13.30 Lunch

13.30 Afternoon session begins

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A new combination instrument to monitor pigment size and shape

Dr Thomas Benen
Sales Manager D-A-CH, Microtrac

As printhead and inkjet technology are progressing, the demand for characterisation of inks regarding their pigment size, single oversized grains and colloidal stability is increasing. The size of pigments has an impact on factors like printability, printhead blockages, sharpness of texture, optical density and color gamut. Microtrac introduces a new technology which combines, for the first time, data from laser diffraction and dynamic image analysis. The size distribution of the inkjet ink is measured by the laser technology, while the optical image detects size and shape of larger particles. This enables users to monitor the milling process, to assess the final product and to detect single oversized particles or clumps which cause a risk for blockages.

The digital revolution in textile printing – requirements and trends for inkjet inks and textile chemistry

Dr Enrico Sowade
Textile Auxiliaries Division, with Andreas Schönfeld, Zschimmer & Schwarz

Screen printing was the initial choice for the textile printing industry. During the last years, digital textile printing based on inkjet printing technology is attracting increasing interest and the market is growing rapidly. In some textile market segments, there is already a clear transition from the traditional screen printing technology to digital printing technologies. Due to the rising customisation trend, smaller production batch sizes, requests for faster product availability and higher ecological requirements, digital textile printing is becoming more and more mainstream. Different digital textile inks focusing on pigment-based ink formulations and their interaction with the textile fibres will be introduced as well as special pre- and post-treatment chemistry dedicated to digital textile printing with high performance. This talk will also introduce functional features for textiles and casts a glance on the potential digital application of these functions.

Stabilisers for UV curing inkjet formulation

Dr Roberto Bianchi
Head of Research & Development RadLab, Rahn Group

UV curable inkjet inks are designed to be very reactive so the printed droplets can be cured quickly and efficiently when exposed to UV, LED or e-beam radiation. Ethylenically unsaturated bonds react to any free radical (generated for instance by photoinitiators) when exposed to UV or LED lamps, polymerising to provide a cured film. The ink needs to be protected against unwanted polymerisation or gelation, which can happen in the ink container, in the dark, and will render the ink unsuitable for printing. In addition, unwanted polymerisation inside the printhead can occur, causing clogging and damaging the printhead. In this paper some explanation for this is provided. Strategies to protect the ink both during its shelf life and inside the nozzle are presented.

Refreshment Break

Water-based inkjet inks for industrial applications

Dr Iurii Gnatiuk
Product Manager Technical, Tiger Coatings

The distinct wish of industry to work with water-based ink solutions in customised digital decoration of surface for sensitive applications, like non-direct food contact, pharma, skin contact, interior, etc. is becoming more and more obvious. The practical realisation of these processes with water-based ink solutions is connected with a number of challenges, among them: interaction of water-based inks with absorbing and non-absorbing substrates, control of drop spread and colour-to-colour interactions, water-based ink properties and availability for jetting at the required time (decap time) at high printing speed. In the talk our approaches for the realisation of single pass printing with water-based inkjet inks with different final ink fixation on the substrate (thermal or UV-curing) will be presented and discussed.

16.00 Conference ends

Upcoming IMI Europe Events

Inkjet Summer School

11-15 June 2018

Novotel Ghent Centrum, Ghent, Belgium

A selection of high quality 1.5 day technical courses on topics of interest within inkjet printing, including the world-famous Inkjet Academy. The IMI Europe Inkjet Summer School is the ideal way to gain a more detailed understanding of a specific technology area, with six courses presented by experts in their field. A brief summary of each course is shown below:

Inkjet Academy

Theory of Inkjet Technology

Monday 11 - Tuesday 12 June 2018

Understanding the basics is essential to any industry's development. The Inkjet Academy covers the basic theory behind the many types of inkjet technology used today and aims to give your understanding of the industry an expert start. The course is presented by Mike Willis of Pivotal Resources and Dr Alan Hudd of Alchemie Technology.

Inkjet Colour Management

Technology & processes for colour reproduction

Monday 11 - Tuesday 12 June 2018

Accurate reproduction of colour is an essential aspect of printing, and the need to ensure true colours can be a limiting factor in digital adoption. This course introduces the key technology and processes required for colour reproduction, presented by Gerrit Andre of Colorgate.

Digital Textile Printing

Applications, ink, chemistry & integration

Wednesday 13 - Thursday 14 June 2018

This course gives an introduction to digital textile printing markets and technology. The main applications for digital textile printing are reviewed, along with the key ink chemistries and integration considerations. Course leaders include Prof Marc Van Parys of University of Ghent and Dr Simon Daplyn of Sensient Imaging Technologies.

Inkjet Ink Characterisation

Viscosity, dispersions, jetting & surfaces

Wednesday 13 - Thursday 14 June 2018

This course covers rheology and surface tension measurements, particle and dispersion assessment, as well as drop visualisation and print quality analysis. The course features contributions from industry leaders Malvern Panalytical and ImageXpert.

Inkjet Drying & Curing

Hardware & chemistry for fixing inkjet inks

Thursday 14 - Friday 15 June 2018

This course provides all the information you need about fixing inkjet inks, covering near-IR drying, UV curing and electron beam curing hardware, as well as the required chemistry. The course includes contributions from Adphos, Phoseon, Ebeam Technologies and IGM Resins.

Jetting Functional Fluids

Rheology, deposition, process & development

Thursday 14 - Friday 15 June 2018

This course shows you how to develop an inkjet functional printing application, including printhead selection, formulating an ink with functional materials and jetting functional fluids onto a substrate. The course is led by Dr Neil Chilton & Dr Clare Conboy of Printed Electronics Ltd.

Upcoming IMI Europe Events

Digital Print Europe

17-20 September 2018

Novotel Barcelona City Hotel, Barcelona, Spain

The IMI Europe Digital Printing Conference 2018 is the strategic business and technical conference for the digital inkjet printing industry. With market briefings from leading analysts, updates and views from industry pacesetters, perspectives from key end users and new technology introductions from inkjet innovators. Our flagship strategic event is the ideal place to find out the latest news from major companies, while exploring business opportunities by networking with top executives across the industry.

Market Reports Live briefings will give you the opportunity to hear the latest developments in key technologies and applications.

The world famous Inkjet Academy will cover the basic theory behind the many types of inkjet technology used today and aims to give your understanding of the industry an expert start.

Inkjet Printing India

4-5 October 2018

Courtyard Marriot International Airport Hotel, Mumbai, India

Inkjet Printing Conference

New developments in digital printing solutions

The Inkjet Printing India Conference is a one-day conference devoted to digital printing solution development across key applications including packaging, flooring, graphics, industrial and functional printing. The conference gives access to key suppliers, technology and advances from the inkjet industry.

Inkjet Ink Manufacturing Seminar

Manufacturing inks for performance and reliability

This course covers the issues of inkjet ink design, development and testing, scale-up for manufacture and manufacturing itself. It also gives an introduction to ink plant design and commercial considerations. The course is led by Dr Tim Phillips of Catenary Solutions (formerly of Xennia Technology).

Digital Print Japan

TBD 2018

Location to be confirmed

Come to Digital Print Japan to get an update on trends and technology in the commercial and industrial inkjet printing markets.

Inkjet Winter Workshop

21-25 January 2019

SH Valencia Palace Hotel, Valencia, Spain

A selection of high quality 1.5 day technical courses on topics of interest within inkjet printing, including the world-famous Inkjet Academy. The IMI Europe Inkjet Winter Workshop is the ideal way to gain a more detailed understanding of a specific technology area, with six courses presented by experts in their field.

For all the latest information visit:
www.imieurope.com

IMI EUROPE

Inkjet Development Conference 2018

Registration fees

- Attendance at all sessions
- Presentation pdf files
- Two lunches
- One evening reception
- Coffee breaks
- IT Strategies "The Numbers" report

Standard fee: €995
Under 25s & Academia fee: €695
On-site registration: €1,195

Discounts

We have a discounted ticket price of € 695 for those in academia as well as under 25s.

We also offer a 20% discount for additional registrations from the same company. For a quotation please email enquiries@imieurope.com with your requirements. Where multiple discounts apply we will allocate the two largest discounts to the total.

Hotel Reservations

Hotel reservations and charges are the responsibility of each conference registrant. As the special offer reduced rate cut-off period has passed, hotel bookings and prices are subject to availability. Please find instructions on our website www.imieurope.com

How to register

Please register on-line via our website:
www.imieurope.com
We will check availability and email your registration confirmation together with an invoice with payment details.

Booking policy

Cancellations will receive a 50% refund if made more than two weeks prior to the start of the event (i.e. on or before 3 April 2018). After this time, no refunds can be made, but your registration may be transferred to another IMI Europe or IMI Inc event at no charge. Name changes for a registration may be made at any time, free of charge, but please let us know before the event so we can update our records.

Location and hotel information

The **IMI Europe Inkjet Development Conference** is being held at the Mövenpick Hotel Frankfurt City in Frankfurt am Main, Germany.

The Mövenpick Hotel Frankfurt City is a 4 star business hotel, located next to the exhibition grounds with fantastic connections to the city centre as well as to Frankfurt International Airport. The hotel offers 288 comfortable and modern rooms, a restaurant, an all-day bar and fitness centre.

The hotel accommodation booking rates are subject to availability and include breakfast and taxes. See our website for more details on the venue.

To book your accommodation at the hotel with the special rate please see the instructions on the venue page of our website.

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