



Inkjet Summer School 2016

**Print Media Academy
Heidelberg, Germany**
20 - 24 June 2016

The IMI Europe Inkjet Summer School is the ideal way to learn more about key aspects of inkjet technology, from the basics through to advanced courses on inks, printheads and applications. Discounts are available for attending more than one course, or if your company is sending more than one person to the event. On the evening of Tuesday 21 June, course delegates are invited to a tour of the Heidelberg R&D Labs.

Inkjet Academy

Theory of Inkjet Technology

This one-and-a-half day course has been attended by over 3,000 people in the past 17 years. Presented by Mike Willis of Pivotal Resources and Dr Alan Hudd of Alchemie Technology, the course covers all of the basics of inkjet technology.

Digital Textile Printing

Applications, Ink Chemistry & Integration

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, University of Ghent and Dr Claire Glénat of Sensient Imaging Technologies.

Inkjet Ink Manufacturing

Manufacturing Inks for Performance & Reliability

This course covers the issues of inkjet ink design, development and testing, scale-up for manufacture and manufacturing itself. It also covers ink plant design and commercial considerations. The course is led by Vincent Wright and John Tardrew of Sensient Imaging Technologies.

Fluid Dynamics & Acoustics

How Inkjet Printing Really Works

The aim of this course is to couple the characteristics of droplet formation and landing, spreading and permeation to the acoustics of the fluidics of the printhead. The course leader is Prof Dr Frits Dijkman, University of Twente, Netherlands.

Inkjet Ink Characterisation

Viscosity, Dispersions, Jetting & Surfaces

This course covers rheology and surface tension measurements, particle and dispersion assessment, as well as drop visualisation and print quality analysis. Course leaders include Prof Long Lin of the University of Leeds, Dr Anne Virden and Gérald Chabanis of Malvern Instruments and Kyle Pucci of ImageXpert.

Jetting Functional Fluids

Rheology, Deposition, Process & Development

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

Inkjet Academy

Theory of Inkjet Technology

Monday 20 - Tuesday 21 June, 2016

COURSE FOCUS

This one-and-a-half day course has been attended by over 3,000 people in the past 17 years. Presented by Mike Willis of Pivotal Resources and Dr Alan Hudd of Alchemie Technology, the course covers all of the basics of inkjet technology.

Understanding the basics is essential to any industry's development. The Inkjet Academy one-

and-a-half day course covers the basic theory behind the many types of inkjet technology used today and aims to give you understanding of the industry an expert start.

On the course you'll learn how printheads work, the materials used in their fabrication and the theory of their operation. You'll also find out

about how inks are formulated and used as well as ink supply and support systems.

The course assumes a basic scientific knowledge and is designed to provide useful background information for anyone entering the inkjet industry, seeking an update on today's technology or looking for further fields of development.

COURSE PRESENTERS

Mike Willis

Managing Director
Pivotal Resources, Cambridge, UK



Mike Willis founded Pivotal Resources, a consultancy in the digital printing industry, in 1995. He has experience in a wide range of technologies and markets including drop-

on-demand and continuous inkjet printing, electro-photographic technology, greyscale and colour reproduction methods and light sensitive materials.

Prior to founding Pivotal Resources, Mike was Director of Electronic Printing at Meta Generics. He was a founder member of Xaar - a spin-off company from Cambridge Consultants where he spent ten years working in a number of roles, culminating as Group Leader of Non-Impact Printing. Before that, he spent six years at Gestetner developing photocopiers.

Mike graduated from the Polytechnic of Central London with an honours degree in Photographic Sciences.

Dr Alan Hudd

Director
Alchemie Technology, Cambridge, UK



Dr Hudd is Director and co-founder of Alchemie Technology Ltd. Alchemie is an independent contract development and consultancy company to the industrial inkjet industry. Alchemie is also developing and commercialising a range of novel printhead technologies through its joint venture company, Jetronica. Jetronica specialises in supplying solutions to selectively pattern liquids and powders capable of using a wide range of chemistries from graphene through textile pre-treatments and 3D printing of metal powders to drugs for implantable drug devices.

Alan Hudd was the Founder and Managing Director of Xenica Technology from 1996 to 2012.

MONDAY 20 JUNE, 2016

12:30 - 13:30 Registration
13:30 Course begins

INTRODUCTION TO INKJET

- Course overview
- Types of inkjet technology
- Drop on demand technologies
- Thermal and piezo inkjet
- Evolution of inkjet markets
- Inkjet patents

INKJET INK TECHNOLOGIES

- Ink types: aqueous, solvent, oil, phase change & UV cure
- Dyes & pigments
- Inkjet ink formulations

DOD PRINthead TECHNOLOGIES

- Thermal inkjet
- Piezo inkjet
- Piston mode designs
- Roof mode actuators
- Stacked piezo technology
- Shear mode designs
- Silicon printheads

INKJET INK DESIGN

- Inkjet ink design
- Understanding the inkjet printing process
- Drop formation
- Properties influencing piezo inkjet ink performance
- Testing an ink for reliability: methods & characterisation

17:30 Session ends

18:00 - 19:00 Reception
Join us for beers, wines and good company!

TUESDAY 21 JUNE, 2016

08:30 Session begins

PRINthead OPERATIONAL ISSUES

- Drop placement accuracy
- Drop ejection frequency
- Crosstalk
- Reliability
- Life issues

INKJET INK MATERIALS AND DISPERSIONS

- Range of materials and ink chemistries
- Evolution of inkjet inks
- Evolution of dyes
- Pigments and dispersion technology
- Dispersion theory
- Polymers and additives
- Processes and manufacturing

PRINT AND IMAGE QUALITY

- Factors affecting print quality
- Printhead-ink-substrate
- Greyscale methods
- Drop detection
- Missing nozzle compensation

UV INK CHEMISTRY AND CURING

- UV curable materials
- Monomers
- Oligomers
- Photoinitiators
- UV curing
- e-beam curing
- Print quality issues with UV inks

12:30 - 13:30 Lunch

SYSTEM DESIGN ISSUES

- Industrial ink supplies
- Bubble control
- Nozzle maintenance
- Mist control

INKJET APPLICATIONS

- Coding, marking, mailing, addressing
- Wide format graphics
- Industrial decoration - decor & laminates
- Ceramic tiles
- Textiles
- Commercial printing
- Labels & packaging
- Printed electronics, bio-medical & 3D printing

EMERGING TECHNOLOGIES

- Kodak Stream
- Memjet
- HP PageWide technology
- Landa Nanography
- Lead-free piezo
- Speed & resolution trends

17:30 Course ends

Fluid Dynamics & Acoustics

How Inkjet Printing Really Works

Monday 20 - Tuesday 21 June, 2016

COURSE FOCUS

Inkjet printing is a process of depositing on demand small droplets with a specified volume onto a precise location on a substrate. This definition covers a wide variety of applications like document printing, label printing, 3D printing, and functional applications like patterning of displays and biosensors. During the course we follow the ink all the way through the printhead, through droplet formation and on to landing on the substrate.

The course is mainly restricted to piezo-driven printheads jetting Newtonian inks, although the issue of viscoelastic inks will be discussed.

A piezo-driven printhead is a set of acoustic cavities, the characteristics of which will be presented in the time (response to waveforms) and frequency domain.

The course is based on precise descriptions of the physical phenomena involved and on the derivation of the mathematical framework needed to solve the governing equations. Where possible the outcomes will be compared with experimental findings. Different mathematical methods will be presented to calculate the responses of different systems in the frequency and time domain. To describe correctly the behaviour of a printhead

with a large number of narrow pitched nozzles, the long duct theory will be presented.

The aim of this course is to couple the characteristics of droplet formation and landing, spreading and permeation to the acoustics and microfluidics of the printhead. The knowledge conveyed during the course will enable the participants to analyse the behaviour of a wide variety of existing printheads and to support the development of new printheads and inks from a physics point of view.

MONDAY 20 JUNE, 2016

12:30 - 13:30 Registration

13:30 Course begins

- General introduction
- Introduction on physics & mathematics
- Basic concepts (single degree of freedom system)
- Waveforms
- Fluid dynamics
- Mathematics
- Different piezo designs
- Helmholtz theory and waveforms (two and five degree of freedom systems)
- Single nozzle printheads
- Multi-nozzle devices

17:30 Session ends

18:00 – 19:00 Reception
Join us for local beers, wines and good company!

TUESDAY 21 JUNE, 2016

09:00 Session begins

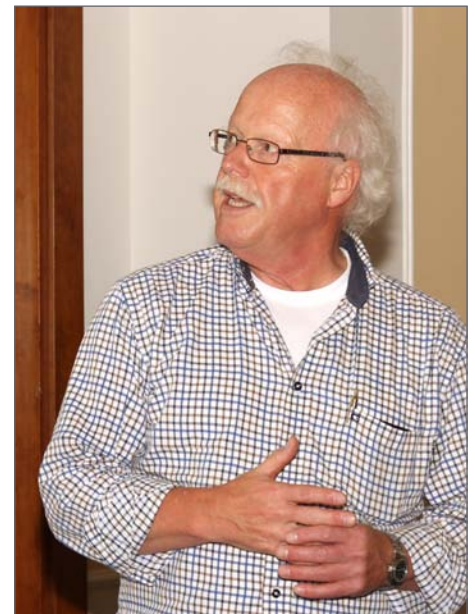
- Long duct theory
- Droplet formation
- Speed of sound
- Damping
- Refilling

12:30 - 13:30 Lunch

13:30 Session begins

- Maximum jetting frequency
- Drag on droplets
- Droplet impact and spreading
- Jetting of viscoelastic inks
- Examples: PolyLED display printing, printing of biomolecules (co-authored by Dr. Anke Pierik, Philips Research)

17:00 Course ends



COURSE PRESENTER

Prof Dr Frits Dijkstra
University of Twente, Netherlands



Prof Dr Frits Dijkstra is professor of biomedical applications of inkjet technology at the University of Twente in the Netherlands.

He has worked with Philips Research for more than 30 years and his main area of interest has been inkjet technology for consumer and non-consumer applications, such as PolyLED display manufacturing and the printing of biomolecules.

HEIDELBERG R&D LABORATORY TOUR

On the evening of Tuesday 21 June, course delegates are invited to a tour of the Heidelberg R&D labs, just a short walk from the PMA building where the courses are being held.



There will be a short presentation by Jason Oliver of Heidelberg, followed by a 30 minute tour of their inkjet development laboratories.

We will then return to the Print Media Academy for a beer and wine reception sponsored by Heidelberg.

HEIDELBERG



Digital Textile Printing

Applications, Ink Chemistry & Integration

Wednesday 22 - Thursday 23 June, 2016

COURSE FOCUS

Over the last decade, digital textile printing using inkjet technology has been introduced and is growing rapidly, especially for apparel printing. Many of the technical and material challenges have been overcome, and the increasing emphasis on cost saving, manufacturing flexibility and following market trends is generating a surge of interest.

The course will give an overview of the industry - the markets, applications and technology. The overall market dynamics and technology requirements for each digital textile application will be described. The required ink chemistries will be reviewed, and their use in inkjet printheads, and

pre- and post-processing requirements detailed. Integration of inkjet technology within a production environment will also be considered, as well as the challenges of inkjet system design to make the process production-compatible.

WEDNESDAY 22 JUNE, 2016

08:00 - 09:00 Registration

09:00 Course begins

DIGITAL TEXTILE PRINTING MARKET & APPLICATIONS

Prof Dr em Marc Van Parys, Professor of Textiles University of Ghent

- Segmentation of the market - home textiles, apparel, industrial applications & soft signage
- Growth of digital textile printing in the different segments
- Applications and key players
- Market developments under the influence of digital inkjet printing technology
- Business drivers
- Sustainability
- Future drivers

12:30 - 13:30 Lunch

13:30 Session begins

DIGITAL TEXTILE INKS

Dr Claire Glénat, R&D Manager - Textile Inks, Sensient Imaging Technologies

- Materials selection
- Dyes vs Pigments
- Designing ink for industrial printheads
- QC and performance
- Application requirements
- Inkjet printing process
- Designing for digital
- Ink and fabric selection
- Processing requirements
 - Fabric preparation
 - Fixing
 - Washing
- Colour characteristics (ink and print)
- Ink maintenance and support requirements

17:30 Session ends

18:00 - 19:00 Reception
Join us for beers, wines and good company!

THURSDAY 23 JUNE, 2016

09:00 Session begins

INTEGRATION FOR DIGITAL TEXTILE PRINTING

Dr Tim Phillips, Founder & Director Catenary Solutions

- Hardware integration
- Printhead technologies
- Printhead choices
 - Suppliers
 - Performance
 - Life issues
- System design
 - Ink supply systems
 - Nozzle maintenance
 - Designing for reliability
- Architecture options
- Printhead motion systems
- Web handling and textile transport
- Testing
- Print quality

12:30 Course ends

COURSE PRESENTER

Prof Dr em Marc Van Parys

Professor of Textiles, University of Ghent Ghent, Belgium



Prof Dr Marc Van Parys is a Doctor in Chemistry and Professor of Textiles at University College Ghent and University of Ghent. He is Head of the Textile Department and the textile research Lab TO2C. Marc is also president of UNITEX (an SME association of Textile in Belgium and The Netherlands), organiser of international congresses and chief editor of the UNITEX journal.

Marc is also a senior consultant and member of the board at Centexbel, as well as being owner and founder of TexZeppelin - a consultancy company dealing with emerging technologies including digital printing, UV-LED coating/printing, plasma and laser treatment and nanotechnology.

Dr Claire Glénat

R&D Manager, Sensient Imaging Technologies, Morges, Switzerland



Dr Claire Glénat has more than 15 years' experience in the printing industry with the world's leading companies and is currently the Head of the "New Technologies" R&D Department at Sensient Imaging Technologies dealing with the entire Sensient portfolio of textile products. Claire joined Sensient in 2009 as Technology Manager for the textile application supporting all the technology from formulation to customer application.

Prior to joining Sensient, Claire graduated with an MSci in Polymer Science and Formulation. She then worked at Sicpa as R&D lead in the field of UV inks for labels and sensitive packaging applications.

Dr Tim Phillips

Founder & Director, Catenary Solutions Ltd Cambridge, UK



Dr Tim Phillips gained extensive experience in inkjet integration projects while working at Xenia Technology Ltd, the leading inkjet solutions company that was acquired by Sensient in 2015. Technology development projects covered applications including textiles, ceramics, packaging and décor. Tim has also presented IMI Europe courses including the Inkjet Academy and Inkjet Ink Manufacturing, and founded Catenary Solutions in 2015.

Tim has an MA Honours degree in Natural Sciences from the University of Cambridge, a PhD in liquid crystal physics and chemistry from the University of Bristol and an MBA from the University of Warwick.

Inkjet Ink Characterisation

Viscosity, Dispersions, Jetting & Surfaces

Wednesday 22 - Thursday 23 June, 2016

COURSE FOCUS

Development of high quality inks and fluids for inkjet applications requires state-of-the-art characterisation equipment and techniques. From fundamental ink properties such as viscosity and surface tension, which have a crucial impact on jetting performance, through analysis of particulates dispersed within the ink, understanding these properties is key to getting the best out of an ink development project. In addition, it is vital to understand how the developed ink actually

behaves, both on ejection from the printhead and when landing onto the substrate of choice.

The Inkjet Ink Characterisation course gives an excellent introduction to these essential areas of study, presented by industry experts from leading suppliers and institutions in the field. The course will give you the basic foundations as well as a more detailed understanding of the vital equipment and techniques.

WEDNESDAY 22 JUNE, 2016

08:00 - 09:00 Registration
09:00 Course begins

BASIC PROPERTY MEASUREMENTS - RHEOLOGY

Gérald Chabanis, Rheology Customer Support Specialist, Malvern Instruments

- Rheology - introduction
- Basic techniques
- Pros and cons
- Theory of measurement
- Rheology in action

SURFACE TENSION - WHAT, WHY AND HOW?

Prof Long Lin, Head of Department of Colour Science, University of Leeds

- Surface tension - definition and variations
- Relevance to inkjet printing
- Relation to rheology
- Impacts on wetting, spreading, drying and adhesion
- Theories and methods of measurement - compared and contrasted
- Examples of application

12:30 - 13:30 Lunch

13:30 Session begins

PARTICLE ANALYSIS

Dr Anne Virden, Product Technical Specialist, Malvern Instruments

- Particle analysis - introduction
- Basic techniques
- Pros and cons
- Light scattering - the science
- Practical examples

17:30 Session ends

18:00 - 19:00 Reception
Join us for beers, wines and good company!

REGISTER ONLINE AT
WWW.IMIEUROPE.COM

THURSDAY 23 JUNE, 2016

09:00 Session begins

JETTING AND PRINT QUALITY ANALYSIS

Kyle Pucci, Applications Engineer, ImageXpert

- Introduction to drop analysis
- How is in-flight analysis used
 - Drop formation
 - Reliability
 - Misting
 - Nozzle-to-nozzle consistency
 - Drop measurement
- Simple application examples
- Overview of techniques
- Fundamental measurements
- Practical demonstration
- Introduction to print quality analysis
- How is print quality analysis used
 - Dot properties
 - Line properties
 - Solid area quality
 - Colour registration
 - Ink interaction
- Overview of techniques
- Practical examples

12:30 Course ends



COURSE PRESENTERS

Gérald Chabanis

Rheology Customer Support Specialist
Malvern Instruments, Herrenberg, Germany



Gérald Chabanis gained a degree in chemistry at FH Münster in Germany. He joined Bohlin Instruments in 2001, moving to Malvern Instruments with the company's acquisition of Bohlin in 2003. Gérald is fluent in German, English and French, with extensive rheological experience of customer and applications support. He is now Customer Support Specialist covering technical and application support as well as rheology training and seminars.

Prof Long Lin

Head of Department of Colour Science
University of Leeds, UK



Long Lin, a Professor of Colour and Polymer Science, is the Head of Department of Colour Science and the Founder and Director of the Digital Print Centre of Industrial Collaboration, and of the Colour and Textile Science Centre, at the University of Leeds. Long has over 25 years of industrial collaborative R&D experience. His current research interests include functional materials for printed electronics, security, energy storage and medical applications.

Dr Anne Virden

Product Technical Specialist
Malvern Instruments Ltd, Malvern, UK



Anne Virden is a Product Technical Specialist for Diffraction and Analytical Imaging at Malvern Instruments. She supports customers using Malvern's laser diffraction and analytical imaging systems to measure particle size and shape in dry powders, suspensions, emulsions and sprays. Anne joined Malvern Instruments in 2007 with a PhD in Physics from the University of York, and has built up a wide ranging experience of particle characterisation, and is a particular expert in the measurement of spray systems.

Kyle Pucci

Applications Engineer, ImageXpert, Nashua, USA



Kyle is an Applications Engineer at ImageXpert Inc. He graduated in 2014 from Villanova University with a B.S. in Mechanical Engineering. He specialises in integrating controllers and hardware with the JetXpert dropwatcher and offering support, installation and training.

Inkjet Ink Manufacturing

Manufacturing Inks for Performance & Reliability

Thursday 23 - Friday 24 June, 2016

COURSE FOCUS

The popular Inkjet Academy course provides a good background to the types of inks and fluids that are used in inkjet printers. But how are inks actually made? Why does coloured water cost up to \$2,000 per litre? Is pigmented ink really more expensive to make than dye-based ink? What is involved in manufacturing advanced inkjet inks?

This course is designed for those wishing to develop or source inkjet inks, or interested in commissioning their development and manufacture. It will help you understand the issues of development and testing, scale-up for manufacture and the manufacturing processes themselves, as well as covering the potential business models for an

ink formulation or manufacturing company. As well as being of interest to inkjet technologists, managers will benefit from an understanding of the inkjet ink manufacturing process to set realistic project and revenue plans and decide whether to develop and manufacture in-house or source externally.

COURSE PRESENTERS

Vincent Wright

Global Ink Pilot Manager
Sensient Imaging Technologies
Letchworth, Hertfordshire, UK



Vincent Wright joined Sensient (formerly Xennia) in July 2011 and is the Global Ink Pilot Manager, responsible for the initial introduction of pilot scale batches of R&D formulations and development of products through to full scale production. In his role Vincent has a particular focus on process and quality optimisation.

Prior to joining Xennia, Vincent graduated with a M.Phil. in the Chemistry of UV Curable Monomers and Oligomers from the University of Kent. Vincent then worked for Akzo Nobel UV Resins in Manchester as a Technical Service Chemist and then for Fujifilm Sericol in Kent as a Research and Development Section Head, developing inkjet inks for new applications. Vincent is also a Fellow of the Oil & Colour Chemists' Association.

John Tardrew

Product Development Manager, Speciality Inks
Sensient Imaging Technologies
Letchworth, Hertfordshire, UK



John has a decade of experience in the inkjet industry and has been at Sensient (formerly Xennia) for 5 years. He has extensive knowledge of the full ink development process from formulation design for specific applications through to full scale commercial production. His expertise is the integration of complete printing solutions, bringing together engineering, electronics, software and chemistry in order to tackle the complex challenges of cutting edge inkjet innovation.

After graduating from the University of Bristol with an MSci in Chemical Physics he worked at Domino Printing Sciences in Cambridge as a Development Chemist.

THURSDAY 23 JUNE, 2016

12:30 - 13:30 Registration
13:30 Course begins

CRITICAL ASPECTS OF INKJET SYSTEMS DESIGN

- Printheads
- Ink
- Ink systems
- Motion control

INK FORMULATION CONSIDERATIONS FOR MANUFACTURING

- Inkjet ink ingredients
- Inkjet ink design & requirements

CREATING ROBUST MATERIAL SPECIFICATIONS

- Dyes
- Pigments
- Polymers
- UV cure materials
- Functional materials
- Solvents
- Additives

17:30 Session ends

18:00 - 19:00 Reception
Join us for beers, wines and good company!



FRIDAY 24 JUNE, 2016

09:00 Session begins

TESTING PROTOCOLS & VALIDATION FOR MANUFACTURING

- Optimisation & testing
- Test schedules & protocols
- Testing for reliability & robustness
- Relationship with printer
 - Printhead
 - Colour tables
 - Ink management system

INK MANUFACTURING

- Quality control processes
 - QC laboratory infrastructure
 - QC laboratory equipment
- Scale up for manufacture
- Lab processes
- Pilot plant trials
- SPC parameters

INKJET INK REQUIREMENTS

- Jet break-up
- Nozzle plate inspection
- Drop velocity & volume
- De-cap & latency
- Expanding printing & lifetime
- Image quality analysis

MANUFACTURING & INK PLANT REQUIREMENTS

- Layout
- Equipment selection
- Manufacturing practices
- Quality standards

12:30 - 13:30 Lunch

MANUFACTURING PROCESSES

- Mixing regimes
 - Water based inks
 - Solvent based inks
 - UV-cure inks
- Milling processes & filtration systems
- Degassing & purification
- Bottling & packaging

COMMERCIAL CONSIDERATIONS

- Markets & Strategies
- Costs
- Positioning
- Value chain

17:00 Course ends

Jetting Functional Fluids

Rheology, Deposition, Process & Development

Thursday 23 - Friday 24 June, 2016

COURSE FOCUS

There is no doubt that digital deposition of fluids containing functional materials, using inkjet heads is an extremely attractive proposition: being able to place a tiny and highly controlled amount of fluid to within a few microns of placement accuracy has the potential to transform conventional manufacturing processes. Whether the functional fluids have electronic, pharmaceutical or other attributes, the challenges of getting them to "jet" with suitable performance and to "functionalise" on the target substrate are common headaches for the material deposition community.

In this course we will focus on the practicalities of inkjet printing of these challenging fluids. We will consider in detail the basic building blocks of a material deposition inkjet system: the inkjet printheads, the ink or fluid, the motion platform and the substrate. We will look at the methods available to create printed structures that deliver the required performance. In addition we will provide a background to fine-tuning inks and their jetting waveforms to improve performance. The course will also provide a sometimes salutary background on the conventional manufacturing capabilities that must be matched for material deposition by inkjet to move into large scale production environments.

COURSE PRESENTER

Dr Neil Chilton

Technical Director
Printed Electronics, Tamworth, UK



Neil has more than twenty years' experience in the field of electronics and electronic components. After completing his BSc and PhD in Physics, his technical career took him to

Japan where he worked for four years at the advanced materials research division of Nippon Steel Corporation.

After returning to the UK he joined Europe's then largest printed circuit board manufacturing company where he was later part of an MBO team and technical director. In 2006 together with co-founder Dr Steve Jones, he started Printed Electronics Limited to focus on the practical use of inkjet for manufacturing electronic interconnects, devices and systems.

Discounts for multiple delegates and courses - see back page for details



THURSDAY 23 JUNE, 2016

12:30 - 13:30 Registration
13:30 Course begins

THE BASIC COMPONENTS OF AN INKJET SYSTEM FOR FUNCTIONAL FLUID DEPOSITION

HEADS

- Choice of inkjet heads
- Material compatibility
- Drive electronics and systems
- Selection criteria for inkjet heads

INKS

- Basic tests for potential inkjet inks and re-formulation options
- Jetting methods to evaluate ink performance

INKJET PLATFORM

- Buy or build?
- Fundamental choices when deciding on a system
- Accuracy and compensation methods
- Control software considerations

SUBSTRATE

- Fundamentals of substrates – ink interaction
- Practical substrate characterisation
- How to optimise your patterning
- Surface treatment options

FUNCTIONALISING

- Making the printed fluid into the printed "thing" you need
- Thermal vs photonic methods for nano-metal materials
- UV methods for dielectric type materials

17:30 Session ends

18:00 - 19:00 Reception
Join us for beers, wines and good company!

FRIDAY 24 JUNE, 2016

09:00 Session begins

INKJET IMAGE FUNDAMENTALS

- A primer on printing bitmap images (when you really want a nice vector)
- What is a bitmap?
- Encoders and drive systems
- Resolution and image conversion
- Dealing with image artifacts
- Software techniques

INK DELIVERY AND INK MANAGEMENT SYSTEMS

- Filtration, heating/cooling, degassing and ink delivery
- Customised and commercial ink delivery systems

12:30 - 13:30 Lunch
13:30 Session begins

PRACTICAL APPLICATIONS AND CASE STUDIES

- Examples and lessons learnt
- Hands on with inkjet components

MOVING FUNCTIONAL PRINTING TO INDUSTRIAL SCALE

- System considerations, yield requirements & cost modelling

AN OVERVIEW OF MATERIAL DEPOSITION AND PRINTED ELECTRONICS USING INKJET - THINGS THAT CAN (AND MAYBE CANNOT) BE DONE

17:00 Course ends

LIVE DEMONSTRATIONS

As part of the course, Neil will be carrying out demonstrations using a Dimatix DMP deposition system - your chance to see this deposition platform in action, including built in drop-watcher.



REGISTRATION

COURSE FEES

Registration for the IMI Europe Inkjet Summer School is priced per person, per course, with discounts available if tickets for more than one course are booked at the same time. The registration fee includes a lunch during the full day of your course, an evening reception and refreshments during breaks.

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 3rd June 2016). 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.

REGISTER ON-LINE

Fill in the form at www.imieurope.com. We will check availability and email back to you confirmation of your requirements and an invoice with details of how, when and where to pay.

PAYMENTS OPTIONS

Two payment options are available:

Invoice and bank transfer

We will email an invoice to you, payable within 14 days (or prior to the event if this is earlier) by bank transfer. Payment can be made in Euro (EUR), British Pounds Sterling (GBP) or US Dollars (USD). If your company requires a purchase order number on the invoice please add the number in the registration form.

Credit card

We will send you an email invoice with a link to our card processor's website. We use PayPal as our card processor – you do not need a PayPal account to make a payment. Payment can be made in Euro (EUR), British Pounds Sterling (GBP) or US Dollars (USD). We will not have access to your credit card details.

Due to EU regulations concerning conference registrations, 19% German VAT will be added to all payments.

QUESTIONS

If you have any questions, please contact Christine Reed on christine@imieurope.com or +44 1223 236920.

Number of Tickets	Price per ticket
1	€895
2	€785
3	€715
4	€665
5	€625
6	€590
7	€565
8	€540
9	€520
10	€500

VENUE & LOCATION

The IMI Europe Inkjet Summer School 2016 is being held at the Heidelberg Print Media Academy in Heidelberg, Germany.

PRINT MEDIA ACADEMY

The Print Media Academy is an extraordinary venue for events in the Rhine-Neckar metropolitan area. Its 12 glass-encased floors communicate openness and transparency, with numerous options for meeting spaces and full on-site catering. The building has six floors, a spacious lobby and an auditorium as well as two cylindrical towers - reaching from the lobby up to the 10th storey and containing meeting rooms - providing fascinating views.



Heidelberg Print Media Academy

Kurfürstenanlage 60
69115 Heidelberg
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ACCOMMODATION

The IMI Europe Inkjet Summer School is a non-residential course, so accommodation is the responsibility of individual delegates. For more information, see Heidelberg Tourist Information, or you can use the Heidelberg Hotel bookings website. The Print Media Academy is located centrally in the town, within easy walking distance of the train station, university, and historic castle and bridge.

Week at a glance

	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Monday 20 June						Registration	Inkjet Academy				Reception
							Fluid Dynamics & Acoustics				
Tuesday 21 June		Inkjet Academy				Lunch	Inkjet Academy				Heidelberg R&D Lab tour
		Fluid Dynamics & Acoustics					Fluid Dynamics & Acoustics				
Wednesday 22 June	Registration	Digital Textile Printing				Lunch	Digital Textile Printing				Reception
		Inkjet Ink Characterisation					Inkjet Ink Characterisation				
Thursday 23 June		Digital Textile Printing				Registration	Inkjet Ink Manufacturing				Reception
		Inkjet Ink Characterisation					Jetting Functional Fluids				
Friday 24 June		Inkjet Ink Manufacturing				Lunch	Inkjet Ink Manufacturing				
		Jetting Functional Fluids					Jetting Functional Fluids				