



The IMI Europe Inkjet Winter Workshop 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.

## Inkjet Academy

Theory of inkjet technology

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 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 Malvern Panalytical, ImageXpert and KRÜSS.

## 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 Dr Simon Daplyn of Sensient Imaging Technologies (formerly Xennia Technology) and Dr Andy Hancock of Mexar.

## Inkjet Printing Software

Printheads, images & colour

For any digital imaging technology, software is fundamental as the printed image is defined by data. This course gives an in-depth overview of the fundamental aspects of digital imaging applications and the software functions needed for this, presented by leading companies in the field including Meteor Inkjet, ColorGATE and Inèdit.

## Inkjet Inks: Materials & Applications

Inks and materials for digital applications

The course gives an overview of the different ink platform technologies in use today, with an emphasis on practical aspects of materials selection and optimisation for the low viscosity requirement of inkjet printing. The course is led by inkjet ink expert Dr Mark Bale, formerly of Sun Chemical.

## Single Pass Inkjet System Design

High speed system design & process development

Led by Rob Rogers of Print3 Technologies, this course provides an introduction to the challenges of single pass inkjet printer design and process development. It gives a proven framework for development plus practical recommendations on key design areas, testing and solutions to common development mistakes.

# Inkjet Academy

## The Theory of Inkjet Technology

Monday 21 – Tuesday 22 January 2019

### COURSE FOCUS

Understanding the basics is essential to any industry's development. The Inkjet Academy one-and-a-half day course covers the theory behind the many types of inkjet technology used today and aims to give your understanding of the industry an expert start.

The course will show you how printheads work, the materials used in their fabrication and the theory of their operation. You will also learn how inks are formulated and used, as well as about ink supply and support systems.

The course examines how drops are formed, travel and behave on the substrate surface. Fundamental aspects of printer operation such as nozzle maintenance and print quality are also covered.

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.

### Monday 21 January 2019

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

#### Drop production

- Thermal inkjet
- Piezo inkjet
- Continuous inkjet
- Bulk piezo
- Si-MEMS/TFP
- Deposition requirements
- Drop ejection frequency
- Crosstalk
- Reliability
- Life issues

#### Inkjet inks

- 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 22 January 2019

08.30 Course begins

#### Drops in flight

- Drop placement accuracy
- Drop break-off
- Drop impact and spread
- Mist control

#### 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

#### System design issues

- Ink supply
- Nozzle maintenance
- Mist control

#### Substrate & interactions

- Papers and coated papers
- Films, rigid substrates
- Bleed and intercolour bleed
- Pre and post coatings
- Adhesion
- Requirements versus applications
- Drying
- UV curable materials
- Monomers
- Oligomers
- Photoinitiators
- UV curing
- e-beam curing

12.30 – 13.30 Lunch

13.30 Session begins

#### Print & image quality

- Factors affecting print quality
- Printhead-ink-substrate
- Greyscale methods
- Drop detection
- Banding, single pass issues
- Drying effects
- Missing nozzle detection
- Missing nozzle compensation

#### Inkjet applications

- Coding, marking, mailing, addressing
- Wide format graphics
- Industrial decoration – décor & 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

### COURSE LEADERS

#### Mike Willis, Managing Director

Pivotal Resources, UK

Mr 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. Mr Willis was a founding 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. Mr Willis graduated from the Polytechnic of Central London with an honours degree in Photographic Sciences.

#### Dr Alan Hudd, Director

Alchemie Technology, UK

Dr Hudd is Director and co-founder of Alchemie Technology Ltd, 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.



# Inkjet Printing Software

## Printheads, Images & Colour

Monday 21 – Tuesday 22 January 2019

### COURSE FOCUS

For any digital imaging technology, software is fundamental as the printed image is defined by data, rather than by a physical object like a roller or screen. Inkjet printing software accepts design image files as its input and needs to transform this into data understood by the printheads as an instruction either to fire, or not to fire, a nozzle actuator at a given time. This complex task requires image handling and colour management to ensure consistent colour, especially for advanced decorative applications. The printing software also needs to split the data into

suitable channels directed to each printhead in the system. It also needs to handle extremely high data rates to drive today's high resolution, high speed printheads, especially in single pass printing applications with multiple colours and large image sizes.

IMI Europe's Inkjet Printing Software course gives an in-depth overview of the fundamental aspects of digital imaging applications and the software functions needed for this, presented by leading companies in the field.

### Monday 21 January 2019

12.30 – 13.30 Registration  
13.30 Course begins

#### Selecting and driving inkjet printheads

David Heath, Meteor Inkjet

- Printhead selection based on application
- Fundamentals of printhead driver hardware and software
- Hardware requirements for datapath
- Data throughput
- Scanning and single pass applications
- Practical examples

17:00 Session ends

18:00 - 19:00 Reception

Join us for beers, wines and good company!



### Tuesday 22 January 2019

09:00 Session begins

#### Image and colour management

Gerrit Andre, ColorGATE

- Building a robust colour management workflow for digital printing
  - Colour management basics
  - ICC profiles and how they work
  - Colour measurement
  - Colour models, rendering intents, spot colours
  - Differences of the colour workflow between traditional and digital printing
  - Impact of the different input settings
- Pros and cons of different file types
  - PDF subsets (PDF/X, PDF/VT, upcoming PDF 2.0)
  - What kind of information can be communicated with the different file types?
- Accurate spot colour communication
  - Spot colour reproduction in digital printing
  - How spot colours can be defined
  - Communication of spot colour definitions
  - Current and future standards: CxF4 and PDF 2.0

12.30 – 13.30 Lunch

13.30 Session begins

#### Software for decorative applications

Oriol Martínez Riba, Inèdit

- What to consider when preparing a file for digital print:
  - Editing, designing and repeating
  - Layer separations - channel workflows, why separate for digital? Colour control or colour variations?
  - What are the benefits over an image manipulation workflow when you're colour critical?
  - Linearisation, profiling and soft proofing - checking and rechecking your colour match
  - Printing - through AVA or third party RIPs
  - Managing your digital print- how to monitor the variables
  - Image handling and colour management
  - Why image & non-specialised workflows are not ideal for high-end decorative printing

17.00 Course ends

### COURSE LEADERS

#### David Heath, Technical Sales Manager

Meteor Inkjet, UK

David has been involved with digital printing for over a decade, supporting and bringing to market a variety of industrial solutions including large web, ceramics, direct to textile and ink delivery systems. Joining TTP in 2014, David soon moved to TTP Meteor, now Meteor Inkjet Ltd. Prior to Meteor Inkjet, David began his career in the RAF as a Ground Radio Electrician working on advanced radar systems, infrastructure and communications.



#### Gerrit Andre, Trainer and Product Specialist

ColorGATE, Germany

Gerrit has joined ColorGATE in 2007 and has initially served in the technical service team. Since 2012 he is a member of the business development team and performs pre-sale services and consultancy. As a FOGRA certified Digital Printing Expert he acts as a consultant and trainer for workflow and colour management requirements of partners and customers for commercial and industrial digital printing applications.



#### Oriol Martínez Riba, Business Developer

Inèdit, Spain

Oriol Martínez joined Inèdit in 2008. Initially, he was serving in the technical department although since the very beginning he got involved in consolidating the market in South America, doing consultancy and training. Consequently, Oriol changed his career to be a part of the sales department, expanding the market area to new countries, building a distribution network, and managing customer requirement requests worldwide. Nowadays he is the Business Developer & Product Owner of the Development team.





# Inkjet Ink Characterisation

## Viscosity, Dispersions, Jetting & Surfaces

Wednesday 23 – Thursday 24 January 2019

### 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 23 January 2019

08:00 - 09:00 Registration

09:00 Course begins

#### Monitoring and controlling pigment particle size

Dr Sarennah Longworth-Cook, Malvern Panalytical

- Understanding the links between particle size and ink performance
- Overview of light scattering techniques for measuring particle size
- Pros and cons of different measurement techniques and approaches
- Practical examples

#### Monitoring and controlling pigment particle size

Dr Shona Murphy, Malvern Panalytical

- Understanding stability mechanisms for ink dispersions
- Factors controlling stability – particle size, steric effects, zeta potential and viscosity
- How to make stable dispersions – selecting the right approach for your ink
- Practical examples

#### Assessing the impact of polymer structure on ink performance

Dr Stefan Cairns, Malvern Panalytical

- Understanding the role of polymers for inkjet applications
- Correlating polymer properties with polymer solution behaviour including viscosity
- Measuring molecular weight, molecular structure and intrinsic viscosity
- Practical examples

12:30 - 13:30 Lunch

13:30 Session begins

#### Optimising ink rheology for printing applications

Dr Shona Murphy, Malvern Panalytical

- Understanding the importance of fluid rheology for inkjet printing
- Basic rheology theory - viscosity and viscoelasticity
- Rheological test methods for inkjet inks and processes
- Practical examples

#### Basic property measurements - surface tension

Dr Thomas Willers, KRÜSS

- Surface tension - introduction
- Relevance to droplet formation and spreading in inkjet printing
- Interplay of surface tension and viscosity in drop formation
- Impacts on wetting
- How to optimise ink-substrate adhesion and spreading
- Interfacial rheology and its relevance to drying
- Theories and methods of measurement - compared and contrasted
- Application examples from inkjet industry

17:00 Session ends

18:00 - 19:00 Reception

Join us for beers, wines and good company!

### Thursday 24 January 2019

09:00 Session begins

#### Jetting and print quality analysis

Kyle Pucci, 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

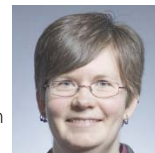
12:30 Course ends

### COURSE LEADERS

#### Dr Sarennah Longworth-Cook, Product Technical Specialist - Laser Diffraction

Malvern Panalytical, UK

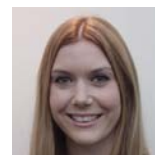
Sarennah Longworth-Cook has a PhD in Materials Science from the University of Cambridge. After graduation, she spent 9 years working in particle characterisation labs for multinational manufacturers of fine chemicals, catalysts and foods. She provides high-level technical support across the business, to users, product management, marketing and sales functions.



#### Dr Shona Murphy, Product Technical Specialist - Rheology

Malvern Panalytical, UK

Shona is a Product Technical Specialist for Malvern's rheometry products based in the UK headquarters. She has completed a PhD in Polymer Science from the University of Birmingham studying the rheological characterisation of the influence of supercritical carbon dioxide on polymer reptation time.



#### Dr Stefan Cairns, Product Technical Specialist - Separations

Malvern Panalytical, UK

Dr Stefan Cairns is a Product Technical Specialist for GPC/SEC at Malvern Panalytical. He completed a PhD at the University of Edinburgh, specialising in ring opening polymerisation, where he became an expert in monomer, polymer and catalyst synthesis, and characterisation. He has a first-class honours degree in Chemistry from University College Dublin and previous industrial experience working at Akzo Nobel.



#### Dr Thomas Willers, Head of Applications & Science

KRÜSS, Germany

Dr. Thomas Willers studied physics in Cologne and Barcelona. He received his PhD degree in experimental physics at the University of Cologne. In 2012 he joined KRÜSS GmbH at its headquarters in Hamburg where he is now head of the department for Applications & Science. He is responsible for the KRÜSS Application Labs as well as teaching activities and now has more than five years' experience in teaching surface science.



#### Kyle Pucci, Applications Engineering Manager

ImageXpert, USA

Kyle is Applications Engineering Manager at ImageXpert Inc. and lives in Nashua, NH USA. He graduated in 2014 from Villanova University with a BS in Mechanical Engineering. He specialises in integrating controllers and hardware with the JetXpert dropwatcher and offering support, installation, and training.



# Inkjet Inks: Materials & Applications

## Inks and Materials for Digital Applications

Wednesday 23 – Thursday 24 January 2019

### COURSE FOCUS

Building on the back of the success of wide format graphics applications, industrial inkjet printing has penetrated many market areas by utilising a wide range of different ink chemistry approaches.

The course gives an overview of the different ink platform technologies in use today, with an emphasis on practical aspects of materials selection and optimisation for the low viscosity requirement of inkjet printing. Looking from the application viewpoint the potential ink solutions are compared and contrasted. Key issues surrounding the integration of inkjet ink technology into industrial printing within a production environment are also considered.

The course is aimed at developers wishing to adopt inkjet technology in their industrial production processes, or those who are already skilled in one area and are looking to understand the wider potential of inkjet chemistries available.

### Wednesday 23 January 2019

08:00 - 09:00 Registration

09:00 Course begins

#### Introduction & context

- How inkjet ink has evolved
  - Sustainability & the drive back to water
- The modern process
  - Ink as the enabling technology
- Market considerations
  - OEM versus aftermarket supply
- Basic ink chemistry comparison
  - What's inside
  - The influence of the printhead
- Making sure it's right
  - Checking the basic properties

12:30 - 13:30 Lunch

13:30 Session begins

#### Ink types & materials choices

- Radiation-curable
  - The ubiquitous all-rounder
  - Focus on free radical UV
- Aqueous
  - Function takes over from simple colours
- Solvent
  - From hard CIJ inks to 'Eco' graphics
- Oil
  - A good option for absorbing substrates
- Hot-melt
  - A great route to process resilience
- Hybrids
  - Clever chemistry as the best of both worlds

17:00 Session ends

18:00 - 19:00 Reception

### Thursday 24 January 2019

09:00 Session begins

#### Application examples – ink selection

- Practical examples of ink selection by application area, e.g.
  - Wide format graphics
  - Production print
  - Textiles
  - Ceramics
  - Decor
  - Corrugated board & paper packaging
  - Flexible (plastic) Packaging
  - Electronics
  - 3D printing
  - Electronic Materials

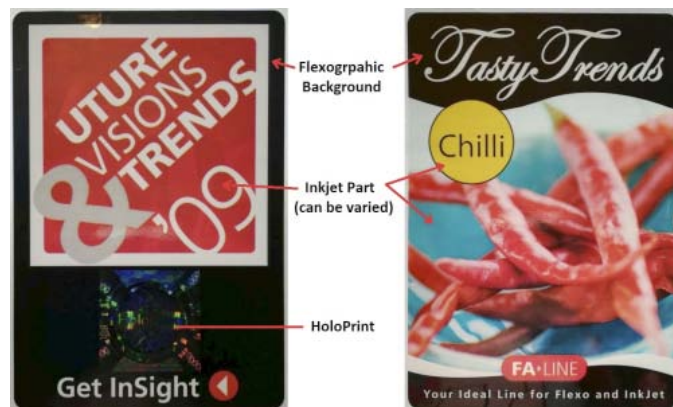
12:30 Course ends

### COURSE LEADER

**Dr Mark Bale, Director**

DoDxAct, UK

Mark Bale is the director of DoDxAct, an inkjet technology consultancy specialising in process engineering, head-fluid optimisation and laboratory prototyping of inkjet processes for a range of industrial applications. He received his MPhys in Physics (1997) and his PhD in Nanoscale Physics (2001) both from University of Birmingham. Having worked in Sun Chemical's UK Inkjet R&D Labs for 10 years he brings ink expertise and process knowhow to the application of ImageXpert laboratory equipment to solve real life inkjet printing challenges.



Join us for beers, wines and good company!



# Inkjet Ink Manufacturing

## Manufacturing Inks for Performance & Reliability

Thursday 24 - Friday 25 January 2019

### COURSE FOCUS

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.

### Thursday 24 January 2019

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

17:00 Session ends

18:00 - 19:00 Reception

Join us for beers, wines and good company!

### Friday 25 January 2019

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

13:30 Session begins

#### 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



### COURSE LEADERS

#### Dr Simon Daplyn, Product Manager Inks

Sensient Imaging Technologies, UK

Dr Simon Daplyn has been at Sensient (formerly Xenxia Technology) since 2008 and is currently Product Manager for Sensient's ink products globally including textile and industrial applications. As part of the team that commercialised the Xenxia textile products, Simon has a particular focus on textile solutions for decoration and functional finishing. Previously Simon was involved in the R&D group overseeing the development and scale-up of advanced industrial inkjet solutions across a wide range of applications including biomedical, electronics and functional printing along with innovative product decoration inks. Simon has been involved with inkjet for 12 years starting with a PhD on Digital Printing for Textile Decoration. After this he joined Nanojet Ink as a Technical Manager involved in design, development and manufacture of a number of inkjet inks and innovative coatings for various applications.



#### Dr Andy Hancock, Director

Mexar, UK

Andy is the co-owner and co-founder of Mexar Limited, an inkjet development company based in the North of England. Andy has been developing aqueous inkjet inks for industrial applications for nearly 20 years. After completing his BSc in Colour and Polymer chemistry from the University of Leeds, Andy took a technical role in industry working for Akzo Nobel, before returning to Leeds to carry out his PhD. His PhD was sponsored by Xenxia with the title "Preparation and Characterisation of Radiation Curable Inkjet Printing Inks". After completing his PhD in 2004, Andy continued to develop aqueous inkjet inks for a number of applications in industry before starting Mexar Ltd in 2007. Mexar specialises in developing novel inkjet fluids for the inkjet industry – with specialities in pigment based inks for textile applications, flooring and décor. Mexar have also been active in smart label applications and healthcare applications. Andy is a regular speaker at conferences such as IMI, FESPA, InPrint, TIARA group and Printwear & Promotion discussing inkjet ink development and formulation.





# Single Pass Inkjet System Design

## High Speed Inkjet System Design & Process Development

Thursday 24 – Friday 25 January 2019

### COURSE FOCUS

This course provides an in-depth introduction to the real world challenges of high speed single pass printer design. The course focuses on five key areas:

Printer Development Process  
 Jetting Process  
 System Integration & Design Process  
 Printhead & Ink Selection to Match Printing Application  
 Application Process Development

High speed single pass production printer development is very challenging. This course provides a proven framework for printer development plus practical recommendations on key design areas, testing and solutions to common development mistakes. The course will assist those undertaking design or implementation of inkjet systems by providing critical insights to the design and implementation process. It also provides the knowledge and understanding to ask the right questions of vendors in the inkjet system selection and installation process.

### Thursday 24 January 2019

12:30 - 13:30 Registration

13:30 Course begins

#### High speed printer development: Challenges & markets

- Why digital printing?
- Inkjet vs. conventional printing: the secret is the cost curve
- Current & emerging single pass markets

#### Printer development process: Key areas of focus

- Overview of product development: key points system architectures
- Process development basics: marriage of printhead, system, ink formulation & substrates to meet market requirements
- Market requirements & engineering specifications

#### Jetting process & effect of ink properties

- Slow motion video of jetting
- Printhead inputs & outputs diagram
- Rectified diffusion: what is it & why does it result in reliability issues?
- Flow-through vs. non-flow through printheads
- Jetting effects of critical variables

#### Overview of drop placement error budgets

- Common sources of errors
- Error budgets concept
- Banderly Curve: Determining drop placement errors
- Printhead mounting errors
- Substrate transport errors
- Statistical method to calculate system errors
- Sample calculation for single pass system (An Excel spreadsheet will be provided with sample calculations)

17.00 Session ends

18.00 - 19.00 Reception

Join us for beers, wines and good company!

### Friday 25 January 2019

09:00 Course begins

#### Sub-system design

- Encoder design
- Printhead mounting
- Print electronics integration
- Drying/curing
- Technical areas: key points

#### Ink supply design

- Non-recirculating
- Vacuum feed
- Pump feed
- Ink recirculating systems
- Constant pressure
- Recirculating pump feedback systems
- Low cost systems
- White ink and high pigment load inks

#### Design of transport systems

- Belt-based systems
- Web-based systems
- Sheet-fed systems
- Printing on 3D parts

#### Printhead selection to match printing application

- Common printhead specifications
- Application requirements: rotary printing, large print gap, interstation drying, substrate movement, etc.
- Known constraints / issues for specific printheads
- Fit between printheads and applications

12:30 - 13:30 Lunch

13:30 Session begins

#### Ink selection to match printing application

- Ink types and vendors
- Recently developed ink types
- Application requirements; open time, pigment loading, drying time, etc.
- Method to identify potential vendors and select best vendor
- Ink price negotiation strategies and risks
- Recommended ink testing

#### Process development: The marriage of printhead, system, ink formulation and substrates

- Common process variables that are tuned for an application
- Process testing & equipment
- Ink/substrate interaction
- Process development: key points

#### Vendor & outside resource management

- Key vendors
- Advice & services vendors provide – an under-utilised resource
- Overall design & development management plan

#### Discussion of attendee's projects

- Attendee's projects & issues they are experiencing
- Rob Rogers will be available after the course for private discussion on specific projects

17:00 Course ends

### COURSE LEADER

#### Rob Rogers, Founder & President

Print3 Technologies, USA

Rob Rogers is the Founder and President of Print3 Technologies, a one stop shop for contract engineering and technical consulting, assisting clients to rapidly bring world class inkjet products to market.



Rob has been involved in the inkjet industry for over 15 years, where he has been responsible for a wide range of inkjet production printing systems including high speed on-press variable data printers, an inkjet label printing press, a one hundred part per minute container printer, flooring printers, a solar cell deposition system and many others.

He has consulted for Heidelberg, Mark Andy, and many confidential clients. His team has recently designed and built a print engine for a confidential Fortune 500 company that was demonstrated at the DRUPA trade show.

Rob graduated from Kansas State University with a degree in Mechanical Engineering.



## How to register

Please register on-line via our website:  
[www.imieurope.com](http://www.imieurope.com)

Registration for the IMI Europe Inkjet Winter Workshop is priced per person, per course, with discounts available if more than one ticket is 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.

We will check availability and email your registration confirmation together with an invoice with payment details.

| 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             |

On-site registration is possible, with payment taken in cash and with a €200 addition to the ticket prices above.

## Discounts

If you would like a quotation please email [enquiries@imieurope.com](mailto:enquiries@imieurope.com) with your requirement. Where multiple discounts apply we will allocate the two largest discounts to the total.

## 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 7 January 2019). 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 Winter Workshop 2019 will be held at the SH Valencia Palace Hotel, Valencia, Spain. Located between the prestigious Palau de la Música and the "City of the Arts and Sciences" a scientific museum of international renown.

The SH Valencia Palace is only a short 7 minute bus journey or 20 minute walk from the city centre. It is also just 3 kilometres from the seaside walkway (paseo marítimo) and Malvarrosa beach.



The IMI Europe Inkjet Winter Workshop is a non-residential course, so accommodation is the responsibility of individual delegates. We have reserved a block of rooms at the SH Valencia Palace Hotel at a preferential rate for event delegates of €139 per night. Rates include breakfast, WiFi and tax.

To book your accommodation at the hotel with the special rate please see the [venue page](#) on our website for instructions.



### SH VALENCIA PALACE HOTEL

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|                                | 08:00        | 09:00                                 | 10:00 | 11:00 | 12:00 | 13:00        | 14:00                                 | 15:00 | 16:00 | 17:00 | 18:00     |
|--------------------------------|--------------|---------------------------------------|-------|-------|-------|--------------|---------------------------------------|-------|-------|-------|-----------|
| <b>Monday</b><br>21 January    |              |                                       |       |       |       | Registration | Inkjet Academy                        |       |       |       | Reception |
| <b>Tuesday</b><br>22 January   |              | Inkjet Academy                        |       |       |       | Lunch        | Inkjet Academy                        |       |       |       |           |
| <b>Wednesday</b><br>23 January | Registration | Inkjet Printing Software              |       |       |       | Lunch        | Inkjet Printing Software              |       |       |       |           |
| <b>Thursday</b><br>24 January  |              | Inkjet Ink Characterisation           |       |       |       | Lunch        | Inkjet Ink Characterisation           |       |       |       | Reception |
| <b>Friday</b><br>25 January    |              | Inkjet Inks: Materials & Applications |       |       |       | Lunch        | Inkjet Inks: Materials & Applications |       |       |       |           |
|                                |              | Inkjet Ink Characterisation           |       |       |       | Registration | Inkjet Ink Manufacturing              |       |       |       | Reception |
|                                |              | Inkjet Ink Manufacturing              |       |       |       | Lunch        | Single Pass Inkjet System Design      |       |       |       |           |
|                                |              | Single Pass Inkjet System Design      |       |       |       | Lunch        | Single Pass Inkjet System Design      |       |       |       |           |