



Inkjet Age of Materials Conference 2019 (p 2)
September 4-5, 2019

Inkjet Innovation Academy
Inkjet Inks: Materials & Applications Course (p 3)
Inkjet for Industrial Print Course (p 4)
Inkjet Design & Operational Issues Course (p 5-6)

September 6, 2019
Embassy Suites Chicago Lombard/Oak Brook
Lombard, Illinois

IMI's **Inkjet Age of Materials Conference 2019** along with learning opportunities at the **Inkjet Innovation Academy** courses are designed to provide improved understanding of and the ability to capitalize on the business opportunities being generated by inkjet materials and related technologies advancements. **If you are interested in speaking opportunities at the Inkjet Age of Materials Conference 2019 - contact al@imiconf.com**

IMI's programs are designed to enable attendees to obtain the latest technical, market and application information while allowing time to network with other attendees in a time and cost efficient manner. Attendance at IMI programs enables attendees to meet with the industry's leading experts in a single location in a short time period maximizing information transfer efficiency and minimizing travel and time expenses.

While conventional printing declines, the transition from an analog to digital world accelerates – which is being reflected in the growth of inkjet applications and opportunities, both within the printing industry and increasingly in manufacturing applications. IMI provides programs and formats to obtain timely updates and understanding of key digital printing related technologies, markets and applications - **keys to your future success.**

Complimentary Displays & Suppliers' Forum and Sponsorships

IMI's **Inkjet Age of Materials Conference 2019** and **Inkjet Innovation Academy** provide opportunities to have complimentary display space to exhibit your products, technology or services. And the **Inkjet Age of Materials Conference 2019** provides the opportunity to give a commercial 5-minute Suppliers' Forum presentation.

IMI will cooperate with all interested parties to provide appropriate space so products can be displayed and demonstrated throughout the programs. **There is no fee in addition to the standard program registration fees to have a display and/or give Suppliers' Forum presentations. To reserve your display space and Suppliers' Forum presentation slots, please register online and check off the boxes indicating your participation OR complete the registration form in this flyer and fax to +1-207-560-9119 OR email al@imiconf.com**

For details on sponsorship opportunities, contact Al Keene al@imiconf.com



Inkjet Age of Materials Conference 2019

Embassy Suites Chicago Lombard/Oak Brook
Lombard (Chicago), Illinois

September 4-5, 2019

IMI's **Inkjet Age of Materials Conference 2019** is designed to assess the current and needed developments in inkjet materials necessary to realize the full potential for inkjet technologies in current and new applications.

The inkjet industry has made great strides in developing successful inks and functional fluids for many applications, yet continued ink and fluids development is considered by many to be the most essential component for inkjet's continued applications diversification and market growth.

IMI's **Inkjet Age of Materials Conference 2019** addresses the challenges, options, and opportunities associated with future inkjet materials requirements, technology choices, drivers & barriers, and other issues required to effectively implement inkjet ink and fluids technologies for applications expansion and diversification. This strategic conference for the inkjet industry provides high value information on innovations, trends, and issues for senior executives, commercial managers, development teams, end users, and others looking to expand their knowledge and understanding of materials developments, products, and technologies shaping the future of inkjet as well as exchanging ideas with industry experts and peers. This two day event features the following elements:

- Updates & Views from Inkjet Pacesetters
- New Technology Needs & Introductions
- Complimentary Display Space
- I.T. Strategies Report: "Digital Document & Industrial Print Beyond the Office"
- Market/Opportunity Perspectives from industry experts
- Networking Lunches, Breaks, & Reception
- Suppliers Forum Presentation Opportunities

Get a "Jump Start" in The Future of Inkjet!

Wednesday, September 4, 2019

8:00 a.m. Registration
9:00 a.m. Opening Session

Welcome & Introductions

Alvin G. Keene, President, IMI, Carrabassett Valley, Maine

Inkjet Materials: Key to Market & Application Expansion

- Inkjet printing industry structure & dynamics
- Inkjet inks & fluids marketplace
- Inks & fluids market size & structure
- Substrate interactions & importance
- Industrial print applications driving new materials requirements and development

12:30 pm Networking Luncheon
1:30 p.m. Session 2

Inkjet Materials: Key to Market & Application Expansion

- Colorants, resins, polymers, additives, etc.
- Dispersants & dispersion techniques
- Aqueous & solvent inks
- UV inks
- Functional materials: electrical, graphene, drugs, reactive, etc.
- Competitive digital alternatives: thermal, thermal transfer, toner, etc.
- Material processing & analytical techniques

Suppliers' Forum 1: 5-Minute Presentations Related To Ink Jet Technology, Capabilities, Services, New Product Introductions, etc. Suppliers' Forum is open to all Conference Registrants.

6:00 p.m. Networking Reception in Display Area

Thursday, September 5, 2019

8:30 a.m. Session 3

Inkjet Materials Requirements & Trends for Growth Markets

- Consumer Goods
- Decorative laminates, flooring, wallcoverings, etc.
- Glass
- Home decor
- Packaging
- Pharmaceuticals
- Printed electronics
- Security & brand protection
- Surface & product decoration
- Textiles
- & more!

12:00 Noon Networking Luncheon
1:00 p.m. Session 4

Inkjet Materials Future Trends & Opportunities

- 3D printing
- Bioprinting
- Food grade inks/fluids/coatings
- Nanomaterials
- Reactive inks/fluids
- Sustainable & bio-based raw materials
- Processing technologies innovations
- & more!

4:00 p.m. Adjournment

Call for Papers

**Submit Proposed Presentation Titles
& Brief Outlines to
Al Keene al@imiconf.com**



Inkjet Innovation Academy

Inkjet Inks: Materials & Applications (Inks & Materials for Digital Applications)

Embassy Suites Chicago Lombard/Oak Brook
Lombard (Chicago), Illinois

September 6, 2019

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

IMI's **Inkjet Inks – Materials and Applications Course** provides an insightful overview of the different ink platform technologies in use today, with an emphasis on practical aspects of materials selection and optimization for the low viscosity requirement of inkjet printing. Looking from the applications viewpoint, potential ink solutions are compared and contrasted. Key issues surrounding the integration of inkjet ink technologies into industrial printing within a production environment are also considered.

Led by Dr. Mark Bale, founder of DoDxAct, the **Inkjet Inks – Materials and Applications 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.

Friday, September 6, 2019

8:00 a.m. Registration
8:30 a.m. Course Session Begins

Introduction & course overview

- Evolution of inkjet
- Sustainability & the drive back to water
- The modern process: Inkjet as an enabling technology
- Market considerations
- Basic ink chemistry comparison: What's inside and printhead influence
- Making sure it's right: Checking the basic properties

Inkjet ink types materials choices

- Radiation curable
The ubiquitous all-rounder
Focus on free radical UV
- Aqueous
Function tales over from simple colors
- Solvent
From hard CIJ inks to 'eco' graphics
- Oil
Good option for absorbing substrates
- Hot melt
Great route to process resilience
- Hybrid
Clever chemistry as the best of both worlds

12:00 Noon Networking Lunch



1:00 p.m. Course reconvenes

Application examples: Ink selection by application area

- 3D printing
- Ceramics
- Corrugated board & paper packaging
- Decor
- Electronics
- Flexible (plastic) packaging
- Production print
- Textiles
- Wide format graphics

4:00 p.m. Course adjournment



**Inkjet Inks: Materials & Applications
Course Leader**
Dr. Mark Bale
Director and Founder
DoDxAct
Somerset, UK

After working many years for a leading ink company, Dr. Mark Bale founded DoDxAct Ltd, an inkjet technology consultancy in 2017. Based in Somerset UK, DoDxAct offers bespoke training and practical assistance in support for all aspects of inkjet R&D from ink formulation and manufacture through jetting & process integration to final application optimization. Working with start-ups to large companies with global reputations, his inkjet applications experience takes in production inkjet, wide-format graphics, labels & packaging, decorative surfaces, print-to-shape, electronics manufacturing, product coding, and 3D printing. Dr. Bale earned his undergraduate degree and PhD in Physics from the University of Birmingham UK and is a published author of academic papers, patents, and online content on topics ranging from microfabrication, OELD devices to inkjet printing.

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Inkjet Innovation Academy

Inkjet Technology for Industrial Print

Embassy Suites Chicago Lombard/Oak Brook
Lombard (Chicago), Illinois

September 6, 2019

It's hard not to notice that the world is going digital, and that inkjet's current growth is being driven by manufacturing or "industrial print" applications. Leading market forecaster IT Strategies has the industrial print market vendor revenues (hardware & consumables) growing to \$10B in 2020 - yielding over \$40B of retail revenue to print providers for the printed output. This includes applications such as décor, product and surface decoration, deposition and incorporation of functional materials into products, complex multi-process 3D product manufacturing applications, security, packaging, and labeling.

The key to successful entry and participation in the industrial inkjet arena is a comprehensive knowledge and understanding of inkjet technologies and how they enable successful industrial inkjet applications. IMI's **Inkjet Technology for Industrial Print Course** covers the inkjet system, its components plus the issues and coming developments that will shape the future of inkjet.

Whether you are an inkjet industry supplier or in any current or future end use industry, whether you are already deeply involved in industrial print or you plan to be in the future: IMI's **Inkjet Technology for Industrial Print Course** provides an understanding of and an ability to recognize what is possible in the near term; the limits of current technologies; and insights into the breakthroughs necessary to achieve ultimate success. Led by recognized inkjet industry expert Dr. Alan L. Hudd, Director & Founder of Alchemie Technology (and co-presenter for popular **Inkjet Academy**, this course will give your understanding of the industrial inkjet industry an expert start or a timely update.

Friday, September 6, 2019

- 8:00 a.m. Registration
- 8:30 a.m. Course Session Begins

Introductions & Course Overview

The inkjet system: How components work & roles they play

- **Printheads: Types, operation principles, design parameters, etc.**
- **Drive electronics & data management**
- **Ink management system**
- **Ancillary technologies: Substrate/material handling, motion control, finishing, etc.**
- **Understanding the inkjet printing process**

Inkjet inks

- **Ink types: Aqueous, solvent, oil, phase change & UV cure**
- **Inkjet ink design & formulation**
- **Dyes, pigments & specialty additives**
- **Drop formation**
- **Substrate interactions**
- **Drying & Curing**
- **Properties influencing piezo inkjet ink performance**
- **Testing inks for reliability: methods & characterization**
- **Establishing suitability for applications**

Print quality

- **Establishing requirements**
- **Factors affecting print quality**
- **Printhead-ink-substrate**
- **Grayscale methods**
- **Drop detection**
- **Banding, single pass issues**
- **Drying & curing effects**

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Why inkjet?

- **Versatility & customization: Digital print proposition**
- **Materials, energy & time savings = improved ROI**
- **Print plus deposition, coating, additive manufacturing and other unique applications**
- **Integration into existing production environments**
- **Marketing advantages**
- **Brand identity**
- **Inkjet as a disruptive technology**

12:00 Noon Networking Lunch

1:00 p.m. Course reconvenes

Major industrial inkjet applications: Status, challenges and expectations

- **Architectural: Glass, wall coverings, etc.**
- **3D printing/additive manufacturing**
- **Flooring: ceramic tiles, laminates, wood, etc.**
- **Packaging: Containers, corrugated, flexible**
- **Printed electronics**
- **Product decoration**
- **Textiles**

Material advancements = new industrial print applications

- **Anisotropy, flakes**
- **Bioengineering materials (Cells, tissue, organs, etc.)**
- **Composites**
- **Drugs/pharmaceuticals**
- **Food grade inks/fluids**
- **Functional fluids: reactive, electrical, biofunctional**
- **Graphene & 2D materials**
- **Metals, powders & dispersions**

Competitive & available application techniques

- **Driven by societal transition to digital**
- **Inkjet**
- **3D printing/additive manufacturing techniques**
- **Digital dispensing**
- **Hybrid approaches**

Developing your digital implementation roadmap

What can be expected in the next few & ten years?

4:00 p.m. Course adjournment



Inkjet Design & Operational Issues

Inks, Substrates & Subsystems

Real World Experiences on System Tuning, Debug & Development

Embassy Suites Chicago Lombard/Oak Brook

Lombard (Chicago), Illinois

September 6, 2019

Successful inkjet printing applications result from the marriage of inks, substrates, and printer. IMI's **Inkjet Design & Operational Issues - Inks, Substrates & Subsystems** course addresses the real world trade-offs that are required to make the end user customer successful.

The course will be helpful for senior executives, commercial managers, development teams, end users, and others looking to expand their knowledge and understanding of

- Printer design and common design mistakes that can appear to be ink related
- How inks constrain the printer and printhead design. In other words, what are the trade-offs the engineers and system developers make and how does it affect ink requirements
- Pictures of real world print defects, common causes, and debug methods
- How new generation ink supply systems can degrade inks or remove certain ink additives
- Successful printhead maintenance methods and how ink formulation can help
- Real world experiences of course leader Rob Roger's 20 years of inkjet experience in all aspects of system design, program management, field service, and printhead technical support roles in a variety of markets and printer types.

This course will provide unique understanding of inkjet's capabilities, idiosyncrasies, and functionality. If you are faced with developing, implementing or operating state-of-the-art inkjet systems, you want to take this course – it can provide knowledge and insights simply not available elsewhere as well as saving time and financial resources in your development and implementation efforts! **Don't Miss Out!**

Friday, September 6, 2019

8:00 a.m. Registration

8:30 a.m. Course Session Begins

Introductions & Course Overview

Real world experience overview: System tuning, debugging, and development

- Printhead selection
- **Jetting Process: Tuning of jetting parameters to increase reliability & print speed**
- Maintenance methods
- Common print defects, causes, & debug process

Process development: Marriage of ink, substrate, printhead, & printer

- Suppliers & users must understand constraints/problems of others!
- **Key issues: Jetting requirements, drop spread issues, stitch, nozzle compensation, surface tension challenges**
- Why printhead stitch and nozzle compensation are difficult
- Trade-offs that are made to optimize the system: It takes the ink, substrate, printhead, and printer suppliers to make a viable system. In a new & emerging field, it normally takes sacrifices in all areas.

Jetting Process: How it works and real-world methods to improve reliability & jetting speed

- Physics of jetting process explained with videos
- Common questions answered: What limits jetting frequency, best real word drop shape, why printheads degrade, etc.

Printhead Selection

- Printhead types & list of suppliers
- List of common printing & deposition application
- Advantages/Disadvantages of printheads:
- "Things the printhead companies won't tell you"
- Opinion of best printheads for specific applications: Group discussion encouraged

12:00 Noon Networking Lunch

1:00 p.m. Course reconvenes

How to fine tune jetting parameters for reliable, high speed performance

- **Dual tuning method: Drop shape & reliability testing**
- **Difference in ink supply systems & printhead electronics can make a big difference in tuning methods & resulting wave form**
- **Avoiding jetting frequencies when possible**
- **Basic effect of ink properties on tuning**
- **Long term reliability testing methods**

Printhead maintenance: Strategies to maintain print quality

- **List of various printhead maintenance strategies: wiping, firing nozzles in gutter, vacuum purge, sub-jetting to oscillate meniscus, etc.**
- **Videos & pictures with explanation of successful systems**
- **Ink formulation types that make the process easier**
- **Nozzle compensation challenges & methods: Using neighboring nozzles to compensate for nozzle outages.**

Ink supply functions/design choices that stress & potentially degrade inks/fluids

- **Common recirculating & direct ink supply design/operation**
- **Causes of ink degradation**
- **Bubble formation/foaming during recirculation that may appear to be ink problem**
- **Ink degradation from improper degas methods**

Course Outline Continues on Next Page

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Image Quality Problems: Common image defects & causes with debug method

- Pictures of real-world image quality problems with causes
- Recommended debug method for common types of issues for quick diagnosis

Problems with printer design that look like ink problems

- Printhead maintenance systems: Why it often looks like the ink is the problem but it's really a system design issue
- Printhead to substrate height or air turbulence that looks like misting/satellite drop problem.
- Poor fire pulse shape causing jetting issues
- Ink cooling during high coverage printing (heaters can't keep up) resulting in lower ink temperature and poor jetting (very common)
- Nozzle contamination/poor printhead maintenance procedures/design
- & more

Printer design problems or users' factory conditions that look like substrate issues

- Time to cure/dry is too long so it causes retraction and small circular areas without ink ("fish eyes")
- Mold release on molded parts
- Silicon spray in factories (very common)
- & more

Group roundtable on common questions & discussion of attendees' projects

- Nozzle compensation challenges
- How does an encoder work?
- Common field issues: Causes & solutions
- Course registrants will be requested to submit their questions both prior to and during the course

Course Leader Rob Rogers will be available after the course for private discussion on specific projects

4:00 p.m. Course adjournment



Inkjet Technology for Industrial Print Course Leader
(Agenda page 3)
Dr. Alan L. Hudd
Director and Founder
Alchemie Technology
Cambridge, UK

Dr. Hudd is Director and 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.

Dr. Hudd was the Founder and Managing Director of Xennia Technology from 1996 to 2012. During this period, he built Xennia to become a world leading Inkjet developer and solutions provider to industrial inkjet markets.

Dr. Hudd is credited with being one of the pioneers to successfully inkjet print UV curable materials. In one case, high aspect ratio UV curable printing was achieved to create fine 3D tooling for the use of injection moulding. A number of other projects followed that have sown the seeds for many current UV cure applications.

He is a frequent speaker at inkjet industry events worldwide and is co-presenter of **The Inkjet Academy** which has been attended by over 3,000 participants in the US, China, Europe, Japan, and India. Dr. Hudd graduated with B.Sc. Honours degree in Chemistry and Physics, M.Sc and Ph.D research degree in Polymer Chemistry from Manchester University.



Inkjet Design & Operational Issues Course Leader

(Agenda pages 4 & 5)

Rob Rogers

President and Founder

Print3 Technologies

Shawnee, Kansas

Rob Rogers is the Founder and President of Print3 Technologies, an inkjet consulting and contract engineering firm, assisting clients with their digital printing and deposition needs.

Rob has been involved in the inkjet industry for over 20 years, where he has been responsible for the design, development, and field service of a wide range of inkjet production printing systems including: wide format printers, inkjet printing presses, solar cell deposition systems, direct to container printers, etc. Rob has worked with some of the largest companies including Heidelberg, EFI, HP, Mark Andy, SunPower, and many more confidential clients

Rob formerly worked at Dimatix where he assisted international customers with new product development. Rob was a Co-Founder and Principle Engineer of Jettrion that was acquired by EFI. While at Jettrion he was responsible for multiple custom ink jet production machines and the first commercially successful label press and direct to container printer. Rob graduated from Kansas State University with a degree in Mechanical Engineering.

Sponsorship Opportunities

Inkjet Age of Materials Conference 2019
and
Inkjet Innovation Academy

For details contact Al Keene al@imiconf.com

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REGISTRATION INFORMATION

Inkjet Age of Materials Conference 2019

Registration Fees: \$1095 per registrant
\$995 for each additional registrant from same organization when registered as a group

The registration fee includes attendance at all conference sessions, all scheduled conference functions, and an electronic copy of the conference reference materials plus I.T. Strategies' "The Numbers 2019: Production & Industrial Print Global Statistical Summary."

Inkjet Innovation Academy

Registration Fees: \$695 per registrant for single course
\$645 per registrant from same organization for two registrants
\$595 per registrant from same organization for three or more registrants
\$495 Academic rate per registrant per course

The registration fee includes attendance at all course sessions, all scheduled course functions, and an electronic copy of appropriate course reference materials plus I.T. Strategies' "The Numbers 2019: Production & Industrial Print Global Statistical Summary."

Cancellations will receive a 100% refund if made 5 days prior to the start of the program. Cancellations made less than 5 days prior to the start of the program will not receive a refund, but will receive an electronic copy of program materials. Substitutions may be made at any time.

To register, complete online registration at www.imiconf.com OR submit the registration form below to Susan Vandrey, Conference Administrator, Information Management Institute, Inc., 1106 Valley Crossing, Carrabassett Valley, ME 04947 USA. You may reserve space by phone +1-207-235-2225, fax +1-207-560-9119 or email imi@imiconf.com



Inkjet Age of Materials Conference 2019 and Inkjet Innovation Academy Registration Form

- Inkjet Age of Materials Conference 2019**
September 4-5, 2019
Inkjet Innovation Academy
- Inkjet Inks: Materials & Applications Course**
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September 6, 2019
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- Display Space**
- Suppliers' Forum slot**
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Embassy Suites Cicago - Lombard/Oak Brook

IMI's **Inkjet Age of Materials Conference 2019 & Inkjet Innovation Academy** are being held at the Embassy Suites Cicago - Lombard/Oak Brook - recipient of Trip Advisor's 2018 Certificate of Excellence Award. It is conveniently located 14 miles from O'Hare International Airport and 21 miles from Midway Airport. The group rate of \$149 per night (including wifi & full breakfast) is available until August 20, 2019. Reservations can be made by calling +1-800-362-2779 or +1-630-969-7500 (Reference "IMI Group Block-Group Code INK"). Make online reservations at <https://tinyurl.com/esimi919>.

To make reservations at the Group rate for nights before Sept 4th or after Sept 8th, you will need to contact Tina Diaz Tina.Diaz@hilton.com or +1-630-971-4233.

The Embassy Suites Cicago - Lombard/Oak Brook recommends Windy City Limousine for airport transfers. One way airport shuttle service is \$30 to or from O'Hare International Airport and \$35 to or from Midway Airport on Sunday through Friday (6:00 am to 8:00 pm). Prices outside of those hours Sunday through Friday and all day Saturday are approximately double. Shuttle reservations can be made at <https://www.windycitylimos.com/> or by calling +1-866-949-4639.

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