

Digital Printing

Summer Camps-2003



**Digital Printing Summer
Camp East**
July 28-August 1, 2003
Grand Summit Hotel
Sugarloaf/USA
Kingfield, Maine



**Digital Printing Summer
Camp West**
August 4-8, 2003
Treasure Mountain Inn
Park City, Utah

Modern Colorant Chemistry **July 28-29, 2003**

A course describing the chemistry of dyes and pigments & their requirements for ink jet & electrophotographic printing led by Professor Peter Gregory of Avecia

From Formulation To Fill **July 30-31, 2003**

A course describing the issues of ink jet ink testing, scale-up for manufacturing and manufacturing technology led by Dr. Alan Hudd of Xennia Technology

Keeping It Working **July 31-August 1, 2003**

A course describing the design issues of ink jet ink supply systems, maintenance systems and drop detection methods led by Mike Willis of Pivotal Resources

Information Management Institute

Information Management Institute, Inc. (IMI) and IMI Europe operate the largest and most comprehensive conference and seminar program series in the digital printing industry. Each year over 2000 industry technical and management personnel from over 600 companies attend IMI programs. IMI's 2003 Digital Printing Summer Camps - EAST & WEST offer six of the digital printing industry's leading technical courses.

The Ink Jet Academy: **Theory of Ink Jet Technology** **August 4-5, 2003**

A course describing the basics & latest advances in ink jet technology led by Mike Willis of Pivotal Resources and Dr. Alan Hudd of Xennia Technology

Surface Tension, Wetting & Capillarity - August 6-7, 2003

A course describing the issues surrounding the wetting of printhead materials & substrates led by Professor Abraham Marmur of Technion - Technical Institute of Israel

Image Quality: The Systems View **August 7-8, 2003**

A course describing the variables and tools of print and image quality from a systems perspective led by Peter Engeldrum of Imcotek

Photo by Park City Visitors Bureau

Photo by Mike Willis

IMI's 2003 Digital Printing Summer Camps – EAST & WEST

This year IMI is expanding its Digital Printing Summer Camp program (Sugarloaf/USA, Maine and Park City, Utah) to bring together six of the top courses available to the digital printing industry.

Conferences are a great way of staying up to date on the latest technology, market and application developments, but the IMI **2003 Digital Printing Summer Camps – EAST & WEST** are designed differently. Here, in the relaxed atmosphere of beautiful Maine and Utah, we offer courses to provide a deeper grounding in some of the key technology areas critical for success in today's digital printing industry.

The **2003 Digital Printing Summer Camp – EAST** features the three courses offered last year at IMI Europe's annual Digital Printing Summer School at Clare College, Cambridge, England:

Modern Colorant Chemistry will appeal to all ink, media and toner chemists and management with an interest in understanding much more about the colorants used in the digital printing industry. It is the dyes and pigments that we see when we look at a print, yet few people understand the chemistry of what is happening, not the tradeoffs required for practical systems.

The Ink Jet Academy: From Formulation To Fill is a course designed to help explain what is involved in taking ink jet ink from a basic formulation to a finished product. It will appeal not just to ink developers but also to managers who wish to understand the issues involved with in-house manufacturing or outsourcing of this lucrative consumable.

The Ink Jet Academy: Keeping It Working is a course devoted to the unglamorous business of ink system and printhead maintenance station design. With printheads and inks the main focus of the industry, we felt it was time to unveil the issues related to some of the more mundane, yet critical components of an ink jet system.

The **2003 Digital Printing Summer Camp – WEST** features three highly acclaimed digital printing industry courses that provide timely information on key industry topics.

The Ink Jet Academy: Theory of Ink Jet Technology has been running for 5 ½ years and well over 1000 registrants have attended the course thus far. Both technical and marketing personnel will appreciate and benefit from the insightful introduction to ink jet printhead and ink technology offered by this course.

Surface Tension, Wetting & Capillarity focuses on all the important solid/liquid/air interfaces that contribute to the behavior of both ink in printheads and ink on substrates. Think of it as an advanced ink jet course on the various modes of wetting and capillary penetration – the basic processes underlying ink jet printing processes.

Image Quality: The Systems View is designed to provide a comprehensive understanding of the concept of image/print quality. Engineers, managers and others will learn, among other things, to understand the basic requirements for image measurements, write image quality product specifications and relate image measurements to visual perceptions.

We urge you to take advantage of these unique opportunities to expand your knowledge of digital printing by registering for one or more of these courses which are not regularly available for public participation.

We look forward to seeing you in Maine or Utah this summer at IMI's **2003 Digital Printing Summer Camps – EAST & WEST**.

Alvin Keene, President
Information Management Institute, Inc.

Digital Printing Summer Camp -EAST Week at a Glance

| | 7am | 8 am | 9 am | 10am | 11 am | 12 noon | 1 pm | 2 pm | 3 pm | 4 pm | 5 pm | 6 pm | 7 pm |
|----------------------------|-----------|---------------------------|------|------|-------|---------|---------------------------|---------------------------|------|------|------|------|--------------------|
| Monday July 28, 2003 | | | | | | | | Modern Colorant Chemistry | | | | | Reception & Dinner |
| Tuesday July 29, 2003 | Breakfast | Modern Colorant Chemistry | | | | Lunch | Modern Colorant Chemistry | | | | | | |
| Wednesday July 30, 2003 | Breakfast | From Formulation To Fill | | | | Lunch | From Formulation To Fill | | | | | | Reception & Dinner |
| Thursday July 31, 2003 | Breakfast | From Formulation To Fill | | | | Lunch | Keeping It Working | | | | | | Reception & Dinner |
| Friday August 1, 2003 | Breakfast | Keeping It Working | | | | Lunch | Keeping It Working | | | | | | |

2003 International Digital Printing Industry Directory

IMI is pleased to announce its **2003 International Digital Printing Industry Directory**. This directory focuses on the needs of the digital printing industry of the 21st Century for a comprehensive listing of hardware/supplies manufacturers and consultants active in digital printing arenas.

The **2003 International Digital Printing Industry Directory's** emphasis is to give individuals working within the digital printing industry "one-stop-shopping for the contacts needed to help them obtain/assess products, expand business, solve problems, secure industry information, etc., in the rapidly changing and expanding digital printing industry."

2003 International Digital Printing Industry Directory features:

- **Over 500 Digital Printing Hardware/Supplies Manufacturers & Consultants with Complete Contact Information**
- **One-Stop Shopping for Digital Printing Industry Contacts**
- **Inquiry Service**
- **Hard Copy & Electronic Version**
- **All for \$500**

For Complete Information: Visit our web site www.imiconf.com

OR

Call +1-207-235-2225 Fax +1-207-235-2226 Email: imi@imiconf.com

Digital Printing Summer Camp - WEST Week at a Glance

| | 7am | 8 am | 9 am | 10am | 11 am | 12 noon | 1 pm | 2 pm | 3 pm | 4 pm | 5 pm | 6 pm | 7 pm |
|-----------------------------|-----------|---|------|------|-------|---------|---|----------------------------|------|------|------|-----------------------|-----------------------|
| Monday August 4, 2003 | | | | | | | | The Ink Jet Academy | | | | | Reception & Dinner |
| Tuesday August 5, 2003 | Breakfast | The Ink Jet Academy | | | | Lunch | The Ink Jet Academy | | | | | | |
| Wednesday August 6, 2003 | Breakfast | Surface Tension, Wetting & Capillarity | | | | Lunch | Surface Tension, Wetting & Capillarity | | | | | Reception & Dinner | |
| Thursday August 7, 2003 | Breakfast | Surface Tension, Wetting & Capillarity | | | | Lunch | Image Quality: The Systems View | | | | | Reception & Dinner | |
| Friday August 8, 2003 | Breakfast | Image Quality: The Systems Veiw | | | | Lunch | ImageQuality: The Systems View | | | | | | |

MODERN COLORANT CHEMISTRY

July 28-29, 2003
Sugarloaf/USA, Maine

Course Focus

One could argue that the colorant is the most important component of any printing system, as it actually forms the visual image. Yet the issues concerning colorant behavior and choice are often less well understood than the "delivery" systems themselves.

This course is intended for ink jet chemists, system developers and anyone specifying inks or just curious about colorant chemistry issues. An understanding of chemistry will be useful but not essential to understanding the properties of colorants and how they can be selected and used within modern electrophotographic toners and ink jet inks.

This course will be led by Professor Peter Gregory of Avecia Ink Jet Printing Materials. Peter is recognized as one of the world's experts in this field and is credited with many of the technology advances made in recent years that have resulted in Avecia becoming an industry leader.

Monday, July 28, 2003

12:00 Noon Registration

1:00 p.m. Opening Session

WELCOME & INTRODUCTIONS

Alvin G. Keene, President, Information Management Institute, Inc., Carrabassett Valley, Maine, USA

DEVELOPMENT OF DYES: NATURAL DYES AND PERKIN ERA

- Natural Dyes: Origin, Structure & Chemistry
- Synthetic Dyes: Major Discoveries and Serendipity
- Natural Vs. Synthetic Dyes: Pros & Cons

AZO DYES: SYNTHESIS AND PROPERTIES

- Synthesis Of Azo Dyes: Diazotisation and Coupling
- Azo/Hydrazone & Azonium/Ammonium Tautomerism
- Color – Structure Relationships

PHTHAOCYANINE DYES AND PIGMENTS

- Serendipity Strikes Again
- Nature's Porphyrins Vs. Man-made Phthalocyanines
- Color – Structure Relationships
- Traditional & Hi-tech Applications

MISCELLANEOUS DYES

- Indigoid Dyes: Color-Structure Relationships and Properties
- Anthraquinone Dyes: Color-Structure Relationships & Properties
- Other Important Dye Classes, e.g. Vats, Triphendioxazines & Benzodifuranones

6:30 p.m. Reception & Dinner

Tuesday, July 29, 2003

7:00 a.m. Continental Breakfast

8:00 a.m. Session 2

PIGMENTS

- History Of Pigments
- Pigment Properties/Uses
- Inorganic Pigments
- Organic Pigments
- Special Effect Pigments
- Organic Vs. Inorganic Pigments

COLORANT TYPES, TOXICOLOGY AND REGISTRATION

- Historical Perspectives
- Dyes & Pigments: Similarities & Differences
- Classification Of Dyes, i.e. Acid, Reactive, Disperse, Solvent, Etc.
- Colorant Nomenclature
- General & Future Trends Of Colorants
- Toxicology & Registration Of Dyes: Including Carcinogens & Their Mode Of Action

COLORANT APPLICATION AND FASTNESS PROPERTIES

- Substrate Types & Structures
- Colorant-Substrate Interactions
- Water Fastness
- Light Fastness/Photo Fading Mechanisms Of Major Colorant Classes
- Photochromism/Metamerism

COLOR PHYSICS

- Origin & Language Of Color
- Measurement Of Color
- Colors Of Dyes: Explanation Of
- Brightness & Dullness Of Dyes: Relationship To Chemical Structure

12:00 Noon Lunch

1:00 p.m.

Session 3

NON-IMPACT PRINTING APPLICATIONS OF DYES AND PIGMENTS

- Ink Jet Printing (Accidental) Discovery
 - Process
 - Colorants/Inks
- Electrophotography
 - Process
 - Toners/Organic Photoconductors (OPCs)
 - Colorants
- Thermal Printing
 - Color Formers
 - Developers
 - Sensitisers
- Thermal Transfer Printing
 - Wax
 - D2T2

HI-TECH USES OF COLORANTS (EXCLUDING NIP)

- Infrared Absorbers In Optical Data Storage and Security
- Singlet Oxygen Generators In Photodynamic Therapy
- Electronic Materials
 - Flat Panel Displays
 - Light Emitting Diodes
 - Small Molecules
 - Organic Semiconductors

FUTURE COLORANT CHEMISTRY TRENDS AND OPPORTUNITIES

4:00 p.m. Adjournment

COURSE LEADER

Professor Peter Gregory, Group Leader/Company Research Associate, Avecia Ink Jet Printing Materials

Professor Gregory is a recognized world expert on color chemistry, particularly for high technology applications. He was the first industrial chemist to receive the Royal Society of Chemistry's Interdisciplinary Award in 1996.

He has published over 100 patents and numerous papers on dyes, including color-structure and structure-toxicological relationships. He is the author of the book "High Technology Applications of Organic Colorants," co-author of the book "Organic Chemistry in Colour" and editor of the book "Chemistry and Technology of Printing and Imaging Systems." He is also author of several chapters on various aspects of dyes. Professor Gregory regularly speaks at and chairs international conferences on colorants.

Professor Gregory received his degree in chemistry from Salford University and has spent his working life in the Research Department at Blackley, initially for ICI, followed by Zeneca, Astra Zeneca and currently Avecia. His early research was on novel dyes for textiles, followed by four years in a non-colors area (biocides) before resuming research into dyes for high technology applications in 1984. He has considerable experience with all of the non-impact printing technologies, particularly in the three major ones (electrophotography, thermal transfer and ink jet). He has successfully led the research for thermal transfer dyes for electronic photography, electrophotographic chemicals and infrared absorbers and is now leading the research for ink jet dyes.



The Ink Jet Academy

From Formulation to Fill

Ink Jet Ink Development & Manufacturing

July 30-31, 2003
Sugarloaf/USA, Maine

Course Focus

The popular course, The Ink Jet Academy: Theory of Ink Jet Technology, provides a good background on the types of ink jet inks and materials that are used in today's ink jet printers. But how are inks actually made? Why does colored water cost up to \$2,000 per liter? Is pigmented ink really more expensive to make than dye-based ink? What is involved in manufacturing advanced ink jet ink?

The Ink Jet Academy: From Formulation to Fill is designed for those wishing to develop and manufacture or outsource the development and manufacture of ink jet inks. It will help you understand the issues of development and testing, scale-up for manufacture and the manufacturing process itself. As well as being of interest to ink jet technologists, managers will benefit from an understanding of the ink jet ink manufacturing process in order to set realistic project and revenue plans and to decide whether to manufacture in-house or source it externally. This 1½ day course is presented by Dr. Alan Hudd of Xennia Technology Limited.

Wednesday, July 30, 2003

7:00 a.m. Registration & Continental Breakfast

8:00 a.m. Opening Session

WELCOME & INTRODUCTIONS

Alvin G. Keene, President, Information Management Institute, Inc., Carrabassett Valley, Maine, USA

INK JET INK REVIEW

- Design
- Requirements
- Critical Materials

DEVELOPMENT STRATEGIES

- Formulation Process
 - Dyes
 - Pigments
 - Polymers
 - Additives
 - UV Cure
- Development Process
 - Pragmatic Vs. Systematic
 - Applications
 - Examples Of Ink Development
- Optimization & Testing
 - Test Schedules
 - Protocols
 - Testing For Reliability & Robustness
- Relationship With The Printer
 - Printhead
 - Color Tables
 - Ink Management Systems

- Resources
 - Large Team Vs. Small Team
 - Equipment
 - Cost Of Investment
 - Automation & Measurement

12:00 Noon Lunch

1:00 p.m. Session 2

MANUFACTURING

- Scale Up For Manufacture
 - Lab Processes
 - Pilot Plant Trials
 - SPC Parameters
- Manufacturing & Ink Plant Requirements
 - Layout
 - Manufacturing Practices
 - Quality Standards
- Processes
 - Materials
 - Incoming Quality
 - Purification Processes
- Mixing Regimes
 - Water Based
 - Solvent Based
 - UV Cure Based
 - Dyes
 - Pigments

6:30 p.m. Reception & Dinner

Thursday, July 31, 2003

7:00 a.m. Continental Breakfast

8:00 a.m. Session 3

MANUFACTURING (Continued)

- Dispersion Processes
- Milling Processes
- Filtration Processes
- Degassing
- Quality Control
- Supply Specification
- Customer Acceptance Specification
- Warranties
- Ink Vs. Printhead Quality

COMMERCIAL CONSIDERATIONS

- Cost Structures
- Ink Pricing
- Positioning

12:00 Noon Adjournment

COURSE LEADER

Dr. Alan L Hudd, President & Chief Technical Officer, Xennia Technology Limited, Royston, Hertfordshire, England

In April 1996, Dr. Hudd co-founded Xennia Technology; the world's first independent contract ink jet technology house dedicated to developing new ink jet inks for both the industrial and office ink jet industries.

In 1987, he joined Domino Printing Sciences and spent eight years as the Fluids Technology Manager, developing a wide range of ink jet ink for diverse applications and is credited with a number of patents and significant innovations within the industrial ink jet industry. He spent almost eight years with the Ministry of Defence and Royal Ordnance in the UK, developing new solid polymer rocket propellants for air to air missiles.

Dr. Hudd graduated with B.Sc. Honours degree in Chemistry and Physics, M.Sc and Ph.D research degrees in Polymer Chemistry from Manchester University

The INK JET ACADEMY

Keeping It Working Ink Supply & Printhead Maintenance

July 31-August 1, 2003
Sugarloaf/USA, Maine

Course Focus

This course is designed to give a broad overview of ink supply and printhead maintenance techniques. Printer developers, as well as others wanting a better understanding of ink supply and printhead maintenance issues, will find this course most valuable and informative. The course is mainly based on extensive patent research, combined with observation and experience with some major ink jet product vendors. The course will explain many of the design rules and issues involved in ink supply and maintenance station design, illustrated by many of the ideas that have been commercially implemented and those that have not! Course attendees should leave with a good understanding of the issues involved and be able to work toward practical design solutions for their own products.

Thursday, July 31, 2003

12:00 Noon Registration

1:00 p.m. **INK SUPPLY**

WELCOME & INTRODUCTIONS

Alvin G. Keene, President, Information Management Institute, Inc., Carrabassett Valley, Maine, USA

INK JET TECHNOLOGY OVERVIEW

- Printhead Types
 - Thermal Ink Jet
 - Piezo Ink Jet
- Ink Types
- Product Examples

INTRODUCTION TO INK SUPPLY DESIGN

- Basic Requirements
- Variables
- Problems
- Components
- Active & Passive Supplies

BASIC OPTIONS

- On-Board Ink Supplies
- Off-Board - Service Station
- Off-Board - Connected

INK STORAGE

- Ink Containment
- Connection
- Venting
- Maintenance Of Head Pressure
- Pressure Regulation
- Continuous Flow Through
- Deaeration
- Multiple Printheads

SUPPLY LINE

- Damping
- Gas Diffusion

SYSTEM ISSUES

- Bubble Removal
- Pressure Purging
- Filtering
- Purging

INK LEVEL DETECTION

- Capacitive
- Acoustic
- Inertial
- Optical
- Memory Chips
- Out Of Ink Detection

6:30 p.m. Reception & Dinner

Friday, August 1, 2003

7:00 a.m. Continental Breakfast

8:00 a.m. **PRINTHEAD MAINTENANCE**

INTRODUCTION TO MAINTENANCE STATION DESIGN

- Basic Requirements
- Variables
- Problems
- Components
- Active & Passive Purging
- Laws Of Housekeeping

CAPPING

- Decap Time & Latency
- Vented & Sealed Caps
- Cap Types
- Wet Capping

WIPING

- Blade Types
- Multi-Blade Designs
- Lubrication

NON-BLADE CLEANING METHODS

- Cleaning Tapes
- Vacuum Cleaning
- Washing

RECOVERY SYSTEMS

- Passive
 - Spitting
 - Spittoon Design
 - Spit-Shine
 - Mopping
- Active
 - Suction Purging
 - Washing

OPERATING SEQUENCES

- Desktop Printers
- Industrial Printers
- Adaptive Housekeeping

EXAMPLE DESIGNS

- Scanning Heads
- Fixed Heads
- Arrays

12:00 Noon Lunch

1:00 p.m. **DROP DETECTION**

DROP DETECTION METHODS

- Optical
- Acoustic
- Electrostatic
- Pressure Sensing
- Printed Patterns

3:00 p.m. Adjournment

COURSE LEADER

Mike Willis, Managing Director, Pivotal Resources Limited, Cambridge, England

Mr. Willis is Founder and Managing Director of Pivotal Resources, an international marketing technical consultancy specializing in electronic printing and the graphic arts. In addition, he is the publisher of *Directions*, a service which monitors patents, research papers and significant product launches in the electronic printer market.

During the past twenty years, Mr. Willis has been based in Cambridge working as an engineer and consultant for a large number of clients in a variety of roles. For eight years, he was Consultant, then Group Leader of Digital Printing at Cambridge Consultants, a subsidiary of Arthur D. Little. He has led several major development contracts for electrophotographic printers, based on LED and light valve imaging systems, and for the development of a major new office ink jet technology.

In May 1990, Mr. Willis was a founder member of Xaar, a company set up to exploit high resolution piezo ink jet technology. He graduated from the Polytechnic of Central London with Honours in Photographic Sciences.

Digital Printing Summer Camp - EAST Hotel & Area Information

July 28-August 1, 2003

HOTEL INFORMATION

IMI's 2003 Digital Printing Summer Camp - EAST is being held at the Sugarloaf Grand Summit Hotel located at the Sugarloaf/USA base village. The 120 rooms and suites offer modern comfort in natural splendor and appeal of the Western Maine Mountains.

Hotel reservations are the responsibility of each registrant. To receive the special meeting rate of \$80 for single or double occupancy, you must identify yourself as a registrant to **IMI's Digital Printing Summer Camp**. Early booking is advised as the reduced rate is guaranteed only until July 7, 2003. **Phone +1-800-527-9879 and to make hotel reservations.**

All Sugarloaf Grand Summit Hotel rooms are air conditioned, equipped with TV and VCRs, and the hotel has its own health club facility. The Sugarloaf Sports and Fitness Center, outdoor pool and tennis courts are also available for guest use at no additional charge. Outdoor recreation possibilities such as golf, hiking, canoeing, mountain biking, rafting, moose watching, etc. abound in the area.

THE LOCATION

Sugarloaf/USA is a major eastern ski resort and summer recreational area located in Carrabassett Valley in the western mountains of Maine. Celebrating over 50 year of operation, Sugarloaf/USA offers a wide range of summer activities including golf, hiking, mountain biking, fly fishing, swimming, white water rafting, canoeing or just relaxing in a beautiful, natural environment. It is a great place to combine your learning experience at the **2003 Digital Printing Summer Camp - EAST** and a family vacation where you can experience the wonders of nature and healthy outdoor activities such as:



Photo by Mike Willis

Golf

The Sugarloaf Golf Club is the number one rated course in Maine and Golf Digest rated the course one of the top 75 resort courses in the United States. Designed by Robert Trent Jones, Jr., the 18-hole course is known for its quality of play and scenery. It plays through the valley with mountains overhead and winds over and around the Carrabasset River.

The awe-inspiring 18-holes that make up the Sugarloaf Golf Club & Golf School have proven, for so many golfers, an unforgettable experience. An experience punctuated by the rugged, demanding terrain that is the hallmark of mountain golf.

Golf Digest called Sugarloaf Golf Club a "top 10 for memorability" and a "top 10 for aesthetics." And its legendary designer, Robert Trent Jones, Jr., calls it "One of the most spectacular courses I've ever been associated with."

Hiking

Hiking opportunities abound in the Western Maine Mountains. You can hike the 4,237 foot summit of Sugarloaf right outside the hotel or to one of the surrounding mountains in the Bigelow Range. You can also connect with the Appalachian Trail. Hiking trails for all abilities provide wilderness beauty on many miles of alpine terrain.

Mountain Biking

Sugarloaf/USA maintains over 50 miles of mountain bike trails featuring some of the choicest single track in New England, wide open dirt roads, the historic Narrow Gauge Railroad bed (don't worry-the tracks and ties have been removed) along the picturesque Carrabasset River and a trail network that has supported one of the biggest mountain bike races in the East - The Widomaker Challenge.



Photo by Greg Thomas

White Water Rafting

The Kennebec River is one of the most popular whitewater rafting runs in the country. It combines a beautiful wilderness setting with Class 5 rapids and narrow passages. A full day Kennebec trip is a great family or group adventure for ages 12 and up. Trips can be arranged with numerous rafting companies and Sugarloaf/USA has an exclusive partnership with Northern Outdoors, a premier whitewater outfitter.

Moose Watching

Maine's infamous moose love the Carrabasset Valley. Hotel staff can direct you to spots where you will have a good chance of seeing moose or you can join organized "Moose Cruises." At the very least, you'll enjoy great wilderness scenery and the setting sun over Crocker Mountain.

Planning Your Supplemental Recreation

We could go on about fly fishing, canoeing, swimming in a crystal clear mountain stream, relaxing wilderness picnics, etc. but we think you get the idea that combining some outdoor, wilderness related activities with IMI's 2003 Digital Printing Summer Camp - EAST would be fun and easy to do. Most of these activities can be done on your own or you can make arrangements by contacting Lynn Sundelin at Sugarloaf/USA at 207-237-2000.

When you register for one or more of the courses at IMI's 2003 Digital Printing Summer Camp - EAST, we will provide you with an information package covering summer activities and recreational opportunities at Sugarloaf/USA and in the adjacent areas.

Getting to Sugarloaf/USA

To access all this wonderful natural beauty, it is obvious that Sugarloaf/USA is not located in an urban center! However, it is closer than you think.

For those flying into the Northeastern U.S., we recommend flying into one of the following airports and renting a car so that you can enjoy the wonderful scenic auto routes throughout New England as you travel to Sugarloaf/USA.

Portland International Airport, Portland, Maine:
2 ½ hour drive
Bangor International Airport, Bangor, Maine:
2 ½ hour drive
Manchester Airport, Manchester, New Hampshire:
3 ½ hour drive
Logan International Airport, Boston, Massachusetts:
4 hour drive

For those of you located in the Northeastern U.S. or once you've rented your car, you will want to plan your trip to and from Sugarloaf/USA to pass by such places as L.L. Bean in Freeport, Maine, the Old Port Waterfront District of Portland, Maine, numerous small coastal and lake communities and many of the other attractions of Maine - that's why it says "Vacationland" on our license plates.

Again, when you register for one or more of the courses at IMI's 2003 Digital Printing Summer Camp - EAST, we will provide you with an information package with detailed directions and options for enhancing your trip, whether it be just for a brief visit or more extended vacation.



Photo by Greg Thomas

Useful Web Sites for Sugarloaf/USA Area Information

Sugarloaf/USA - www.sugarloaf.com
Town of Carrabasset Valley, Maine
www.carrabassetvalley.org
Sugarloaf Area Chamber of Commerce
www.sugarloafareachamber.org
The Stanley Museum
www.stanleymuseum.org
University of Maine at Farmington
www.umf.maine.edu
State of Maine www.state.me.us

The INK JET ACADEMY

Theory of Ink Jet Technology

August 4-5, 2003

Park City, Utah

The Ink Jet Academy Focus

Understanding the fundamentals is a prerequisite to any development. **The Ink Jet Academy: Theory of Ink Jet Technology** offers a one and one-half day course covering the basic theory of all the diverse types of ink jet technology in use today. Learn how the printheads work, what materials are used in their fabrication and the theory of operation. Learn about inks and media used, how they are formulated and the supply and support systems used. This course assumes a basic scientific knowledge and will provide a useful background to anyone entering the ink jet industry or seeking an efficient update of ink jet technology.

Communicating Experience and Expertise To Those Who Want To Know

Ink jet printing is the fastest growing imaging technology for both office and industry. New applications are opening up for materials suppliers, media developers, consumables manufacturers, systems suppliers and others. But entering the ink jet market or just branching out into new parts of it can present a considerable technical challenge and a barrier to commercial success. The development of printhead technology and inks is advancing at a rapid pace - around 100 patents in this field are published each month. So getting up to speed is not easy. Until now.

The Ink Jet Academy: Theory of Ink Jet Technology provides a program and format to get an expert start in the ink jet field, to get an update or to open up new ink jet fields.

Monday, August 4, 2003

12:00 Noon Registration
 1:00 p.m. Opening Session

WELCOME & INTRODUCTIONS

Alvin G. Keene, President, Information Management Institute, Inc., Carrabassett Valley, Maine, USA

INTRODUCTION

- Course Overview & Brief History
- Types Of Ink Jet Technology
- Drop On Demand Technologies
- Thermal & Piezo Ink Jet
- State Of The Art
- Office & SOHO Markets/Applications

INDUSTRIAL APPLICATIONS

- Industrial Drop On Demand
- Continuous Ink Jet
- Industrial Applications

INK TECHNOLOGY

- Evolution Of Ink Jet Inks
- Ink Jet Ink Formulations
- Ink Types & Properties
 - Aqueous Based
 - Oil Based
 - Polymers
 - Solvent Based
 - Phase Change
 - UV Curable

DOD PRINthead DESIGNS AND VENDORS

- Thermal Ink Jet
- Piezo Ink Jet
- Moving Wall Technology

6:00 p.m. Reception & Dinner

Tuesday, August 5, 2003

7:00 a.m. Continental Breakfast
 8:00 a.m. Session 2

MATERIALS FOR INK JET INKS

- Critical Materials
- Colorants
- Polymers
- Solvents & Additives
- Vendors & Ink Distribution Chain

DOD PRINthead DESIGN CONSIDERATIONS

- Drop Ejection Frequency
- Crosstalk
- Life
- Temperature Control
- Drop Placement Accuracy
- Considerations For Page Arrays
- Greyscale Techniques
- Drive Waveforms

MEDIA & PRINT QUALITY

- Paper & Coatings
- Drying Mechanisms
- Light & Waterfastness
- Non Paper Media
- The 3 Factors Affecting Print Quality
- Technologies To Improve Print Quality
- Improving Print Quality

12:00 Noon Lunch
 1:00 p.m. Session 3

UV CURING TECHNOLOGY

- Chemistry Of UV Curing
- Ink Formulation Issues For Piezo DOD
- UV Curing Systems

SYSTEM DESIGN ISSUES

- Nozzle Maintenance
- Drop Detection
- Filling/Bubble Removal
- Ink Supply & Replacement

INSTRUMENTATION FOR INK JET DEVELOPMENT

- Reliability
- Jet Characteristics
- Quality Control

FUTURE DEVELOPMENTS

- Evolution Of Current Technology
- New Developments
- Status & Developments Of Ink Technology

5:00 p.m. Adjournment

During the past twenty years, Mr. Willis has been based in Cambridge working as an engineer and consultant for a large number of clients in a variety of roles. For eight years, he was Consultant, then Group Leader of Digital Printing at Cambridge Consultants, a subsidiary of Arthur D. Little. He has led several major development contracts for electrophotographic printers, based on LED and light valve imaging systems and for the development of a major new office ink jet technology.

In May 1990, Mr. Willis was a founder member of Xaar, a company set up to exploit high resolution piezo ink jet technology. He graduated from the Polytechnic of Central London with Honours in Photographic Sciences.

Dr. Kevin Hall, Business Support Manager, Xennia Technology Limited, Royston, Hertfordshire, England

Dr. Hall joined Xennia Technology in 1998 and as Business Support Manager is responsible for new business development and project support.

From 1996 Kevin was the Technical Manager of Imation's European Research Centre in the UK with responsibility for development of new photographic media (Trimax™ and Scotch™ film brands). He has also worked in the field of liquid toner electrophotography. Kevin joined 3M in 1984 working as an emulsion scientist at the 3M UK research facility. His work in the areas of antistatic coatings, high contrast and contact emulsions led to graphic arts products such as 3M Excelerate™ and DRC™ with the antistatic technology being used in a range of film products. He holds over 13 patents and has presented at a variety of industry conferences.

Dr. Hall graduated with a 1st class BA Honors degree in Chemistry and a D.Phil in Gold Chemistry from Oxford University, UK. He is a Fellow of the Royal Society of Chemistry.

COURSE LEADERS

Dr. Alan L Hudd, President & Chief Technical Officer, Xennia Technology Limited, Royston, Hertfordshire, England

In April 1996, Dr. Hudd co-founded Xennia Technology; the world's first independent contract ink jet technology house dedicated to developing new ink jet inks for both the industrial and office ink jet industries.

In 1987, he joined Domino Printing Sciences and spent eight years as the Fluids Technology Manager, developing a wide range of ink jet ink for diverse applications and is credited with a number of patents and significant innovations within the industrial ink jet industry. He spent almost eight

years with the Ministry of Defence and Royal Ordnance in the UK, developing new solid polymer rocket propellants for air to air missiles.

Dr. Hudd graduated with B.Sc. Honours degree in Chemistry and Physics, M.Sc and Ph.D research degrees in Polymer Chemistry from Manchester University.

Mike Willis, Managing Director, Pivotal Resources Limited, Cambridge, England

Mr. Willis is Founder and Managing Director of Pivotal Resources, an international marketing technical consultancy specializing in electronic printing and the graphic arts. In addition, he is the publisher of *Directions*, a service which monitors patents, research papers and significant product launches in the electronic printer market.

SURFACE TENSION, WETTING & CAPILLARITY

August 6-7, 2003
Park City, Utah

Course Focus

This course will present the concepts and measurement techniques that are required in order to understand how surface tension, wetting and capillarity affect printing processes. The first goal will be to develop the understanding of surface tension and interfacial tension, which are essential properties of the materials involved in printing systems, (e.g. ink, plastic substrates, paper, etc.). Then, the various modes of wetting and capillarity penetration, which are the basic processes underlying most printing operations, will be discussed.

This course is directly relevant to anyone working in the fields of ink jet in formulation and development, substrate development – such as papers, films, coatings as well as metal, glass or other nonporous substrates – and the development of ink jet printheads.

Wednesday, August 6, 2003

7:00 a.m. Registration & Continental Breakfast

8:00 a.m. SURFACES AND INTERFACES

WELCOME & INTRODUCTIONS

Alvin G. Keene, President, Information Management Institute, Inc., Carrabassett Valley, Maine, USA

SURFACE TENSION AND INTERFACIAL TENSION

- Models Of Interfaces
- Units & Typical Values
- Temperature Dependence

SHAPES OF DROPS AND BUBBLES

- The Young-Laplace Equation
- Applications Of The Young-Laplace Equation
- Very Small Drops & Bubbles

SURFACE TENSION MEASUREMENT

- Force Methods
- Maximum Bubble Penetration
- Shape Method

12:00 Noon Lunch

1:00 p.m. **WETTING ON SURFACES**

CONTACT ANGLE: THEORY AND MEASUREMENT

- Contact Angle On Ideal Surfaces
- Contact Angle On Real Surfaces
- Contact Angle Measurement

CONTACT ANGLE HYSTERESIS

- The Hysteresis Concept
- The Mechanism Of Contact Angle Hysteresis
- Implications To Measurement

DYNAMIC WETTING PHENOMENA

- Phenomenology
- Kinetics Of Wetting
- Wetting By Liquid Mixtures
- Wetting By Surfactant Solutions
- Wetting Of Rough Surfaces

6:30 p.m. Reception & Dinner

Thursday, August 7, 2003

7:00 a.m. Continental Breakfast

8:00 a.m. WETTING IN POROUS MEDIA

LIQUID PENETRATION INTO CAPILLARIES

- Mechanism Of Penetration
- Height Of Rise & Kinetics Of Penetration
- Penetration Of Small Drops

LIQUID PENETRATION INTO POROUS MEDIA

- Height Of Rise
- Penetration Of Small Drops Into Paper

CHARACTERIZATION OF POROUS MEDIA

- Kinetics Of Horizontal Flow
- Kinetics Of Vertical Flow

12:00 Noon Adjournment



Photo by Park City Visitors Bureau

COURSE LEADER

Professor Abraham Marmur, Department of Chemical Engineering, Technion – Israel Institute of Technology, Haifa, Israel

Professor Abraham Marmur received his Ph.D. in 1974 from Technion – Israel Institute of Technology. Then he spent two years as a postdoc at the State University of New York at Buffalo. Later he was a visiting professor at the University of Wisconsin – Madison and a visiting scientist at the IBM Almaden Research Center.

Professor Marmur has been working in the field of interfacial phenomena and wetting for over twenty-five years. He has published many papers on the theory and practice of wetting processes and has been consulting for major companies involved in the design and utilization of ink jet printing systems.

He has also participated in many international conferences and has been active in lecturing on interfacial phenomena in universities and industrial sites in many countries. In addition, Professor Marmur was an Editor of Reviews in Chemical Engineering and was on the advisory committee of the Journal of Colloid and Interface Science and the Journal of Adhesion Science and Technology.



IMAGE QUALITY: THE SYSTEMS VIEW

August 7-8, 2003
Park City, Utah

Course Focus

Image, print, picture and display quality are often considered “subjective” and in the “eye of the beholder,” with the implication that image quality cannot be put on a quantitative footing. Compounding this confusion is that the concept of image quality depends on where you view the problem. A process engineer will feel that it is the process that controls the image quality. Developers of image processing algorithms feel that image processing is where the action is. Of course, both areas contribute to image quality.

Image Quality: The Systems View puts the various pieces together in a unified way—the systems perspective. Using the Image Quality Circle (IQC); this course paints the big-picture view of image quality. The IQC is a practical and useful tool that is used by major imaging hardware and consumables manufacturers.

The course goals are (1) to give participants a comprehensive understanding of the concept of image/print quality and (2) to help registrants use the Image Quality Circle as a process for managing and developing the image/print quality results of hardware and consumables products. Course participants will

- Understand image quality and how it fits into the Image Quality Circle framework
- Understand the basic requirements for image measurements
- Be able to conduct simple psychometric image scaling studies
- Connect image measurement to visual perceptions
- Be able to write image quality product specifications/requirements

Thursday, August 7, 2003

12:00 Noon Registration
1:00 p.m. Opening Session

WELCOME & INTRODUCTIONS

Alvin G. Keene, President, Information Management Institute, Inc., Carrabassett Valley, Maine, USA

THE IMAGE QUALITY CIRCLE: A PROCESS TO MANAGE IMAGE QUALITY

- What Is Print Quality
- Introduction To The Image Quality Circle

IMAGE SCALING: MEASURING HUMAN/CUSTOMER RESPONSE TO IMAGES

- Scale Types
- Scaling Methods
- Data Collection & Analysis

ATTRIBUTES OF IMAGE/PRINT QUALITY: THE “NESSES”

- Pictorial/Complex Image/Photographic Attributes
- Image Compression Attributes/Artifacts
- Text/Line/Graphics Attributes
- Illustrations Of Common Attributes

6:30 p.m. Reception & Dinner

Friday, August 8, 2003

7:00 a.m. Continental Breakfast
8:00 a.m. Session 2

IMAGE QUALITY MODELS

- Basic Considerations
- Generalized Weighted Mean Hypothesis Model

VISUAL ALGORITHMS: CONNECTING THE ATTRIBUTES TO IMAGE MEASUREMENT

- Human Visual System Properties
- Visual System Models For Algorithm Development
- Algorithm Construction

IMAGE MEASUREMENTS: PHYSICAL IMAGE PARAMETERS

- Machine Vision, a.k.a. Densitometry: Historical Review
- Spectral Response: Colorimetry
- Optical Considerations: Modulation Transfer Function
- Desktop Scanners & Digital Cameras As Image Measurement Instruments

1:00 p.m. Session 3

SYSTEM MODELS: CONNECTING IMAGE MEASUREMENTS TO TECHNOLOGY VARIABLES

- Macro (Large Area) Imaging Models
- Micro Imaging Models: Reflectance Mean, Variance

TECHNOLOGY VARIABLES: THE “NESSES” THEY INFLUENCE

APPLICATIONS, \$ AND SPECIFICATIONS WITH THE IQC

- Scale Overlay Concept
- Managing Image Quality & Image Quality Specifications
- An Image Quality Specification Process

4:00 p.m. Adjournment



COURSE LEADER

Peter Engeldrum, President, Imcotek, Winchester, Massachusetts

Peter Engeldrum, the inventor of the *Image Quality Circle* (IQC), will be the course instructor. He is president of Imcotek, a technical consulting firm that assists organizations in finding solutions to imaging system and image and color problems. With over 25 years of experience in imaging and color systems, he has worked with a wide variety of imaging and display technologies. Mr. Engeldrum has been active in the areas of image and color quality, color scanning, color printing, photography, and color imaging over the Internet. Mr. Engeldrum was a faculty member at the Center for Imaging Science, Rochester Institute of Technology, where he received his degrees. Peter is a member of several professional societies and is a Fellow of IS&T. He has also served on several corporate advisory boards and has several patents and patents pending in the areas of display calibration and Internet imaging.

Digital Printing Summer Camp - WEST Hotel & Area Information

August 4-8, 2003

HOTEL INFORMATION

IMI's **2003 Digital Printing Summer Camp - WEST** is being held at the Treasure Mountain Inn located on historic Main Street in the heart of Park City, Utah. The 56 studios and suites offer modern comfort in natural splendor and appeal of the Wasatch Mountains.

Hotel reservations are the responsibility of each registrant. To receive the special meeting rate of \$105 for one-bedroom suites (limited number of studio units available for \$75), you must identify yourself as a registrant to **IMI's Digital Printing Summer Camp - WEST**. Early booking is advised as the reduced rate is guaranteed only until July 13, 2003. Phone +1-800-344-2460 to make hotel reservations.

All Treasure Mountain Inn rooms are equipped with complete kitchens, TV and VCR or DVD, patio and balcony and are only steps from the heated outdoor pool and jacuzzi. Outdoor recreation possibilities such as golf, hiking, canoeing, mountain biking, etc. abound in the area along with visiting Winter Olympic venues, shopping and dining. Information on the Treasure Mountain Inn can be found on their web site at www.treasuremountaininn.com

Treasure Mountain Inn is located right on Historic Main Street with dining and shopping just steps away. Also, Park City operates a trolley on Historic Main Street and a FREE area-wide bus service from 7:30 a.m. to 10:30 p.m.

THE LOCATION

Park City is one of the west's premier winter resort towns and summer recreational areas located in the Wasatch Mountains of Utah. Park City and the entire area offers a wide range of summer activities including golf, tennis, hiking, mountain biking, fly fishing, swimming, boating, horseback riding or just relaxing in a beautiful, natural environment. It is a great place to combine your learning experience at the **2003 Digital Printing Summer Camp - WEST** and a family vacation where you can experience the wonders of nature and healthy outdoor activities such as:

Historic Sites

From silver mining to Olympic gold, Park City offers much history. From the Utah Olympic Park's Alf Engen Museum to The Museum & Old Territorial Jail, visitors can explore the mining-to-skiing history that makes Park City so unique. Park City was incorporated as a city in 1884. Sixty-four of Park City's buildings are listed on the National Register of Historic Places, many of which are located along Main Street, where the Treasure Mountain Inn is located.

Hiking, Mountain Biking & Cycling

Park City offers some of the best mountain biking and hiking available with the town's three ski resorts providing lift-served single and double track mountain bike trails. With over 200 miles of public trails plus scenic country roads meandering through farming country available (in addition to nontrail terrain), hiking and cycling enthusiasts will find many options in the Park City area.

Recreational Facilities

In addition to natural attractions, Park City and nearby resorts offer many recreational activities. From the area's eight golf courses, outdoor tennis courts in the City Park, a 20,000 square foot outdoor skateboard park to the Alpine Slide, ZipRider and Mountain sledding: your free time can easily be filled.

Planning Your Supplemental Recreation

We could go on and on, but we think you get the idea that combining some outdoor related activities or shopping/dining with IMI's **2003 Digital Printing Summer Camp - WEST** will be fun and easy to do.

When you register for one or more of the courses at IMI's **2003 Digital Printing Summer Camp - WEST**, we will provide you with an information package covering summer activities and recreational opportunities in the Park City area.

Getting to Park City

Here's the thing about Park City...it's accessible! It's less than 40 miles from Salt Lake City International Airport via a quick drive on I-80 (about 30 miles) and Route 224 (about 7 miles) right to Main Street, Park City.

Flying into Salt Lake City is convenient as it is a hub airport for Delta and Southwest and is served by Jet Blue as well as other airlines.

Useful Park City Areas Web Sites

Treasure Mountain Inn
www.treasuremountaininn.com
Park City City Chamber of Commerce & Visitors Bureau – www.parkcityinfo.com
Park City Mountain Resort
www.parkcitymountain.com
The Canyons – www.thecanyons.com
Deer Valley Resort – www.deervalley.com
State of Utah Travel Site – www.utah.com



Photo by Park City Visitors Bureau

Digital Printing Summer School

July 14-18, 2003

Clare College

Cambridge, England

Paper-Like Displays

The Technology That Threatens the Printing & Paper Industries
July 14-15, 2003

A 1 ½ day course describing the new technologies that may replace paper and signage in everyday life, with current research funding exceeding digital printing, led by Tom Ashley of Pivotal Resources USA

The Ink Jet Academy: Theory of Ink Jet Technology
July 16-17, 2003

A 1 ½ day course describing the latest advances in ink jet hardware and ink technologies, led by Mike Willis of Pivotal Resources and Dr. Alan Hudd of Xenica Technology

Ink Jet Deposition of Materials
Physics, Systems & Applications for Microdispensing
July 17-18, 2003

A 1 ½ day course describing in detail the physics of piezo actuator technology and how to use this technology in ink jet microdispensing applications, led by Dr. David Wallace of MicroFab Technologies, Inc.

For complete program and registration details on these courses,

Visit IMI Europe Web Site www.imieurope.com

Email christine@imieurope.com

Phone: +44-1223-236920 Fax: +44-1223-235901

REGISTRATION INFORMATION: 2003 Digital Printing Summer Camps – EAST & WEST

Registration Fee:

\$1095 per registrant per course

\$995 for second person and each additional registrant from same company to same course or for same registrant to additional courses when registered as a group.

The registration fee for each course includes attendance at all course sessions, all scheduled meals shown in the program agenda, coffee breaks and the course reference binder.

Cancellations will receive a 100% refund if made 72 hours prior to the start of the program. Substitutions may be made at any time. Cancellations made less than 72 hours prior to the start of the conference will be charged a \$300 cancellation fee.

To register for any of IMI's Digital Printing Summer Camp Courses – EAST or WEST, submit the registration form with payment to Susan Rundlett, Conference Administrator, Information Management Institute, Inc., 1106 Valley Crossing, Carrabassett Valley, ME 04947 USA. You may reserve space by calling +1-207-235-2225, sending a fax to +1-207-235-2226 or by sending an email message to imi@imiconf.com or visiting our web site www.imiconf.com

REGISTRATION FORM – 2003 DIGITAL PRINTING SUMMER CAMP – EAST Grand Summit Hotel, Sugarloaf/USA, Kingfield, Maine



Modern Colorant Chemistry

July 28-29, 2003



The Ink Jet Academy: From Formulation To Fill

July 30-31, 2003



The Ink Jet Academy: Keeping It Working

July 31-August 1, 2003

REGISTRATION FORM – 2003 DIGITAL PRINTING SUMMER CAMP – WEST Treasure Mountain Inn, Park City, Utah



The Ink Jet Academy: Theory of Ink Jet Technology

August 4-5, 2003



Surface Tension, Wetting & Capillarity

August 6-7, 2003



Image Quality: The Systems View

August 7-8, 2003

NAME _____

JOB TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____

PHONE _____ FAX: _____

EMAIL _____

Sugarloaf Grand Summit Hotel Sugarloaf/USA, Kingfield, Maine

IMI's 2003 Digital Printing Summer Camp - EAST is being held at the Sugarloaf Grand Summit Hotel located at the Sugarloaf/USA base village.

Hotel reservations are the responsibility of each registrant. To receive the special meeting rate of \$80 for single or double occupancy, you must identify yourself as a registrant to **IMI's Digital Printing Summer Camp**. Early booking is advised as the reduced rate is guaranteed only until July 7, 2003. **Phone +1-800-527-9879 and to make hotel reservations.**

Treasure Mountain Inn Park City, Utah

IMI's 2003 Digital Printing Summer Camp - WEST is being held at the Treasure Mountain Inn located on historic Main Street in the heart of Park City, Utah.

Hotel reservations are the responsibility of each registrant. To receive the special meeting rate of \$105 for one-bedroom suites (limited number of studio units available for \$75), you must identify yourself as a registrant to **IMI's Digital Printing Summer Camp - WEST**. Early booking is advised as the reduced rate is guaranteed only until July 13, 2003. **Phone +1-800-344-2460 to make hotel reservations.**

All checks should be in U.S. dollars drawn on a U.S. bank and made payable to Information Management Institute, Inc. An invoice with bank transfer details for IMI's U.S. or European bank account will be provided upon request.

Information Management Institute, Inc.
1106 Valley Crossing
Carrabassett Valley, ME 04947 USA