

Digital Fabrication 2007



Preliminary Programs

**September 16-21, 2007
Anchorage, Alaska**



NIP23

**23rd International Conference on
Digital Printing Technologies**



Sponsored by the

Society for Imaging Science and Technology (IS&T) www.imaging.org

Imaging Society of Japan (ISJ) <http://psi.mls.eng.osaka-u.ac.jp/~isj/>

Table of Contents

Tutorial Program	3
Technical and Social Programs	16
Conference Week At-a-Glance	18
The Venue: Anchorage, Alaska	30
Tours Program	32
Hotel Registration	35
Conference Registration	36

Digital Fabrication 2007 Conference Committee

General Chair Ross Mills imaging Technologies international (iT <i>i</i>) ross@inkjetsys.com 303/443-1036	Program Chair (Europe/Middle East) Liisa Hakola VTT-Technical Research Centre of Finland liisa.hakola@vtt.fi +358-20-722-7206	Interactive Paper Chair Greg Herman, Hewlett-Packard Co. GS.Herman@hp.com 541/715-0891
Publications Chair Linda Creagh FUJIFILM Dimatix Corp lcreagh@dimatix.com 940/565-0027	Publicity Chair (The Americas) Al Keene Information Management Institute, Inc. al@imiconf.com; 207/235-2225	Exhibit Co-Chairs Laura Kitzmann Sensient Imaging Technologies laura.kitzmann@sensienttech.com 760/741-2345 ext. 1303
Program Chair (The Americas) Greg Herman, Hewlett-Packard Co. GS.Herman@hp.com 541/715-0891	Publicity Chair (Asia/Oceania) Shin-ichi Nishi, Konika Minolta shin-ichi@konicaminolta.jp +81-42-589-8461	Cindy Morgan imaging Technologies international (iT <i>i</i>) cindy.morgan@inkjetsys.com 303/433-1036
Program Chair (Asia & Oceania) Akira Suzuki, Ricoh Company, Ltd. akira.al.suzuki@nts.ricoh.co.jp +81-45-474-9312	Publicity Chair (Europe/Middle East) Reinhard Baumann Technische Universitat Chemnitz pminfo@mb.tu-chemnitz.de +03-71-531-35-843	Advisory Chair James Stasiak, Hewlett-Packard Co. james_stasiak@hp.com 541/715-0917

NIP23 Conference Committee

General Chair Ramon Borrell Hewlett-Packard Española SL ramon.borrell@hp.com +34 39 582-2725	Publicity Chair (The Americas) Eric Stelter, Eastman Kodak Co. Eric_Stelter@kodak.com 585/726-7430	Sponsorship Chair David Weiss, Eastman Kodak Co. david.weiss@kodak.com 585/726-7280
Publications Chair Detlef Schulze-Hagenest Kodak Digital Printing Solutions detlef_schulze-hagenest@kodak.com +49 431 99089-152	Publicity Chair (Asia/Oceania) Yusuke Takeda, Ricoh Co. yusuke.takeda@nts.ricoh.co.jp +81 3-3778-8660	Interactive Session Chair Hugh Allen, Sunjet, a division of Sun Chemical hugh.allen@eu.sunchem.com +44 1761-408-546
Program Chair (The Americas) Huoy-jen Yuh, Xerox Corp. Huoyjen.Yuh@xerox.com 585/422-4684	Publicity Chair (Europe/Middle East) Alan Hodgson Alan Hodgson Consulting Alan.Hodgson@ntlworld.com +44 1625 57-5756	Print Gallery Chair Dinesh Tyagi, Eastman Kodak Co. tyagi@kodak.com 585/726-7060
Program Chair (Asia & Oceania) Makoto Omodani, Tokai University omodani@keyaki.cc.utokai.ac.jp +81 463-58-1211	Tutorial Chair Scott Silence, Xerox Corp. scott.silence@xerox.com 585/422-5182	AV Chair Steve Korol, Xerox Corporation steven.v.korol@office.xerox.com 503/685-2140
Program Chair (Europe/Middle East) Gerhard Bartscher Felix Böttcher GmbH & Co. gerhard.bartscher@boettcher.de +49 221-490-7509	Exhibit Co-Chairs Laura Kitzmann Sensient Imaging Technologies laura.kitzmann@sensienttech.com 760/741-2345 ext. 1303	Advisory Committee Eric Stelter, Eastman Kodak Co. Rita Hofmann, ILFORD Imaging Switzerland GmbH Andronique Ioannidis, Xerox Corp. Toshihiko Oguchi, Morimura Chemicals, Ltd.
Program Chair: Invited Papers Gaurav Sharma, Univ. of Rochester gaurav.sharma@rochester.edu 585/275-7313	Cindy Morgan imaging Technologies international (iT <i>i</i>) cindy.morgan@inkjetsys.com 303/433-1036	IS&T Conference Vice President Robert Buckley, Xerox Corp. robert.buckley@xerox.com IS&T Executive Director Suzanne Grinnan, sgrinnan@imaging.org

Join us in Anchorage for NIP23 and Digital Fabrication 2007!

Welcome to **THE** conferences on
digital printing and digital fabrication!

NIP—covering all aspects of non-impact printing—and the premier conference on digital fabrication, DF2007, are once again offered in one convenient place at one convenient price. Co-location offers the unique opportunity for attendees to take advantage of two great conferences by mixing and matching technical sessions of interest under a single registration fee.

The total number of papers submitted for presentation this year reached an all time record and up to four parallel tracks will run Monday through Thursday, with a special single track session on Friday (see below). This year we have taken great pains to structure the tracks to allow maximum “session-hopping.” Letting you change tracks more easily and thereby hear a greater array of papers, will encourage more “cross-fertilization” of ideas and make your time spent in Anchorage even more worthwhile.

This alteration to the program from last year, combined with a single venue for all technical events, makes it easier for attendees of both conferences to listen to papers on a wide variety of topics and expand their professional horizons to innovative fields. Collocation of the conferences also allows IS&T to provide participants with a greater range of features, including:

- a richer array of informative tutorials
- high-quality exhibits
- five timely keynotes
- a new NIP interactive panel:
“Future and Limitations of Ink Jet and Electrophotographic Printing”
- a special panel on Intellectual Property
- new NIP sessions on “Fusing, Curing, and Drying” and “Advanced Materials and Nanoparticles”
- Welcome and Conference Receptions, the latter held at the Anchorage Museum of Art and History
- a Print and Digital Art Gallery
- a joint Thursday afternoon Interactive Paper Session
- a special single-track session on Environmental Issues held Friday morning; the session begins with a Breakfast Plenary and ends with a panel discussion

When you register for either conference, you gain admission to the other. We are also offering special rates on tutorials, through a specially-priced series, which includes a mix ‘n’ match option. **Series save attendees at least 25% off the price of tutorials purchased singly.** In addition, this year we are offering tutorials to students for only \$50 per course. See details on pages 3 and 36.

You may ask, “Why Alaska?” and your supervisor may want to know as well. It’s simple. Alaska offers a unique, affordable location that we thought would appeal to attendees. “Affordable?” you say. While we understand that airfare will probably be slightly higher than traveling to a mainland US location, hotel room rates are \$125/night. We worked hard to get low room rates so that your total travel budget will remain about the same as it is for a meeting held in the “lower 48.” And while there is 12% occupancy tax on hotel rooms, there is no other sales tax in Alaska (including at restaurants).

If you work in the fields of non-impact printing, digital fabrication, or any related technology, and you are looking for the best training, exposure to cutting edge technology advances, and/or expand your professional network, NIP23 and Digital Fabrication 2007 are the conferences to attend! We look forward to seeing you in Anchorage!

—Ramon Borrell, General Chair NIP23, and Ross Mills, General Chair DF2007

NIP 23/Digital Fabrication 2007 Exhibitors*

The exhibit hall will be open on Tuesday, September 18th from 9:00 am to 5:00 pm and
Wednesday, September 19th from 9:00 am to 4:00 pm.

Please visit these exhibitors:

7-SIGMA, Inc.
Baker Petrolite Polymers Group
Buhler Inc.
Cabot Corporation
Ciba Specialty Chemicals
Clariant Corporation
Degussa AG
Digital Print CIC
Epping GmbH
Esprit Technologies
FUJIFILM Dimatix, Inc.
Hodogaya Chemical (USA) Inc.
Hosokawa Micron Powder Systems
Huntsman Corporation
ImageXpert, Inc.
INEOS Silicas
Integration Technology Ltd.
Kyocera Industrial Ceramics Corp.

Membrana
Orient Chemical Industries, Ltd.
Powdertech International Corp.
Quality Engineering Associates (QEA), Inc.
Roger's Hill Associates Inc.
Saint-Gobain Performance Plastics
Schlegel Systems, Inc.
Sensient Imaging Technologies
SunJet
Tayca Corporation
TREK, Inc./TREK Japan KK
Wacker Chemie AG
Winfield Industries, Inc.

For further information about exhibiting at
NIP23 contact Donna Smith at dsmith@imaging.org
or 703/642-9090 x107

*as of June 11, 2007

NIP 23/Digital Fabrication 2007 Conference Sponsors*

SUSTAINING CORPORATE MEMBER

Adobe Systems, Inc.
Canon USA Inc.
Eastman Kodak Company
Hewlett-Packard Company
Lexmark International, Inc.
Xerox Corporation

SUPPORTING CORPORATE MEMBER

Fuji Photo Film Company, Ltd.
Konica Minolta Holdings, Inc.
Pitney Bowes
TREK, Inc./TREK Japan KK

CONFERENCE SPONSOR

Océ Printing Systems GmbH
Wilhelm Imaging Research, Inc.

SESSION SPONSOR

HP - Large Format Printing Division
(Industrial Printing Session)
ILFORD Imaging Switzerland GmbH
(Image Permanence Session)
Ricoh Company Ltd.

EVENT SPONSOR

INGEDE *(Welcome Banner)*
Felix Schoeller Service GmbH & Co. KG
(Wednesday Speaker's Breakfast)
ImageXpert
(Internet Cafe)

CONTRIBUTOR

FUJIFILM Corporation
L. B. Schein
Morimura Chemicals, Ltd.
Pitney Bowes

ADVERTISER

Buhler Inc.
Epping GmbH
FUJIFILM Dimatix, Inc.
HP - Large Format Printing Division
INGEDE
Kyocera Industrial Ceramics Corp.
Quality Engineering Associates (QEA), Inc.

*as of June 11, 2007

Tutorial Program

This year's NIP/DF Tutorial Program offers a wide range of introductory and advanced topics in the fields of nonimpact printing and digital fabrication. Most of the tutorial instructors are internationally recognized experts in their field and are dedicated to promoting the understanding and advancement of imaging science and technology. Attendees have found these condensed courses to be of high value as an introduction, a refresher, or an in-depth information source for their technology of interest. Over the years, IS&T has received a great deal of positive feedback from attendees as illustrated by the comments found throughout the tutorial descriptions. These as well as other comments by attendees validate the usefulness of the courses. In addition being able to ask questions during the oral presentation, every attendee will receive a copy of the instructors' notes/slides to take home. IS&T members and non-members are encouraged to sign up in advance to ensure that courses run.

Tutorial Series at Special Rates: Save a minimum of 25%

At NIP23/DF2007, IS&T will again be offering several series of tutorials focused on a particular topic or set of related topics that allow the attendee to significantly broaden their knowledge base. Prices for series and individual courses are found on the registration form (see page 35).

General Technology Series: T1, T11 & T16

Introduction to Electrophotography; Imaging Science/Image Quality Seminar; and Evaluating Ink Jet Technology

- Provides a comprehensive introduction to key aspects of non-impact printing technologies and is of great value to attendees who are new to or reentering the field of non-impact printing

Electrophotography Series: T1, T7 & T18

Introduction to Electrophotography; Fusing Technology and Toner Material Relationships; and Liquid Toner Printing: Technology and Applications

- Serves well as an introduction or an update for those interested in learning about dry powder and liquid-based electrophotography

Electrophotographic Materials Series: T5, T10, T17 & T22

Introduction to Toner Technology; External Additives for Xerographic Toners; Chemically Prepared Toners; and Chemistry and Physics of Organic Electrophotographic Photoreceptors

- Provides a sound introduction to electrophotographic consumables and specialized courses in two of the most active areas of research in electrophotographic materials today, as well as summarizes recent activity in the rapidly changing universe of electrophotographic materials

Ink Jet Technology Series: T6, T12, T16, & T20

Desktop Ink Jet Performance Study; Fabrication Materials and Processes of Ink Jet Print Heads; Evaluating Ink Jet Technology; and Ink (post) Jet: Drying and Curing in Ink Jet

- Slightly more advanced in that it assumes a basic knowledge of ink jet, the series provides a sound foundation for those interested in competitive product evaluation, an overall understanding of ink jet technology, considerations in the drying and curing of inks, and material and processes for print head fabrication

Image Quality Series: T4, T11 & T15

Papermaking, Coating Fundamentals, and Media for Digital Printing; Imaging Science/Image Quality Seminar; and The Top-Ten Myths of Digital Color Management

- Provides the attendee with a solid foundation for understanding digital image quality from inception to finished output

Digital Fabrication Series: T2, T8 & T14

An Introduction to Industrial Inkjet: Printing and Fabrication; The Future of Digital Fabrication: Mainstream or Niche; and Direct-Write Technologies for Prototyping Applications,

- Find out what all the buzz is about and how today's analog manufacturing processes being converted by the digital revolution!

Business and Technology Series: T3, T13 & T21

Predicting the Future of Inkjet: Technology vs. Demand; Business in China; and Digital Technology, Security of Documents and Brand Protection

- Learn how potential markets are sized, how to protect the security of your documents and your brand, and all about doing business in today's hot market, China

Series have been scheduled such that there is no overlap in time so that each attendee will be able to attend the full set. IS&T is offering a special discounted price for members and non-members who sign up for any complete series. In addition, attendees may construct their own series of any three tutorials that do not overlap and receive the same special discount. Please refer to the registration form for details.

This year IS&T is also pleased to offer students the opportunity to take any tutorial for \$50.

Note: IS&T reserves the right to cancel tutorials in the event of insufficient advance registration. Please indicate your interest early. Any prerequisites are noted in the description.

Sunday, September 16, 2007

T1: Introduction to Electrophotography

Sunday 8:00 am to 12:00 noon (4 hours)
Instructor: Lawrence B. Schein, Consultant

Electrophotography, the technology in copiers and laser printers, continues to evolve. In this tutorial, the basis of the technology—from the basic six steps to the underlying physics of the process—is discussed, as is the physics of development and transfer, current understanding of toner charging, and challenges of color electrophotography.

Benefits

This course will enable the attendee to:

- Understand the basic principles of the electrophotographic process
- Explain the more important advances that have occurred in electrophotography historically
- Compare the architecture of several mid-range copy machines
- Describe how a copier is converted to a printer
- Understand the physics of toner development, toner charging, and the transfer process
- Appreciate the technical challenges in making a color copier or printer
- Summarize color copier and printer architectures

Intended Audience: anyone working in the field of non-impact printing.

Lawrence B. Schein received his PhD in solid state

experimental physics from the University of Illinois (1970). He worked at Xerox Corporation from 1970 to 1983, and at IBM Corporation from 1983 to 1994. He is now an independent consultant. Schein has helped implement development systems in IBM laser printers, proposed theories of most of the known electrophotographic development systems, and contributed to the understanding of toner charging, toner adhesion, and charge transport mechanisms in photoreceptors. He is the author of Electrophotography and Development Physics, a Fellow of IS&T and the American Physical Society, recipient of the Carlson Memorial Award (1993), a Senior Member of IEEE, and a member of the Electrostatics Society of America.

T2: An Introduction to Industrial Ink Jet: Printing and Fabrication

Sunday 8:00 am to 12:00 noon (4 hours)
Instructor: Alan Hodgson,
Alan Hodgson Consulting

This course is conceived as a bridge between the NIP and Digital Fabrication conferences and therefore covers both traditional printing and emerging fabrication applications. It achieves this by first giving an overview of current industrial ink jet technology, followed by present and future fabrication applications. Using case studies, it considers the commercial and technical drivers and their contribution to the future direction of application development. It compares and contrasts the developments in printing and fabrication areas, but shows the interdependence between them. It also illustrates areas where the two applications may yet converge in the longer term.

Benefits

This course will enable the attendee to:

- List and explain the market drivers for industrial ink jet for both printing and digital fabrication application areas
- Identify the shows and conferences to attend to gain further awareness
- Gain an overview of current and future applications of industrial ink jet technology
- Review the technology of ink jet printing and how it can be leveraged to best effect technology in the future
- Understand how new technology is affecting both fabrication and “traditional” printing applications
- Look out for the opportunities this presents!

Intended Audience: an introductory course for engineers or scientists working in organizations considering accessing new

opportunities in industrial ink jet either as a supplier or a user. The course is particularly appropriate for participants considering the further potential of ink jet who would like a holistic overview of ink jet in both traditional printing and fabrication applications. As such it aims to be equally accessible to the target audiences of both conferences.

Alan Hodgson is an independent consultant with 25 years experience in printed hard copy and a background in radio frequency electronics and image science. With a combined marketing and technical background, he gives technical issues a commercial perspective. Hodgson previously managed R&D and Technical Services groups active in industrial ink jet application development. He is currently working on ink jet consultancy projects in both traditional printing and fabrication applications and is a regular conference speaker and instructor.

T3: Predicting the Future of Ink Jet: Technology vs. Demand

Sunday 8:00 am to 12:00 noon (4 hours)

Instructor: Mark Hanley, IT Strategies, Inc.

The objective of this semi-technical tutorial is to provide a projection of ink jet's future in the areas of high volume solutions in pure graphics print (display, decorative, packaging and document printing), as well as of ink jet's use as a deposition and manufacturing mode (printed electronics, materials deposition, etc.). This is a revised and improved version of a tutorial given at last year's conference, incorporating suggestions for improvements made by attendees.

The thesis is that where demand is perceived to exceed current ink jet technology capabilities, the technology can still satisfy some of the immediate needs, gain a commercial beachhead, and evolve into a more complete solution. This leads to a development and maturing of markets that could not otherwise have been predicted by more traditional linear projection methods.

While quantifications and models of the possible future are provided in consistent and detailed fashion during the tutorial, an equal objective

behind it is to explain and illustrate the correct methods appropriate to this analysis in order to confer credibility on it. These methods require a close knowledge of user markets, ink jet technology itself, and the core technical and economic factors that drive both from an independent point of departure through an increasing interdependence as the involvement of

"I was amazed at the depth and breadth of the instructor's knowledge of the topic."

users with technologies moves forward over time. Such analysis is capable of credibly predicting where technology and investment can, and probably will, be directed in the future.

Benefits

This course will enable the attendee to:

- Understand for all ink jet's projected future markets where demand (including economic conditions) and technology capability meet both now and prospectively over the next five plus years
- Access a quantified model and rationale for specific market development
- Assess realistic goals for ink jet technology development over the next five years
- Review the competitive positioning of available ink jet technologies

Intended Audience: those who wish to gain an understanding of the status of competitive ink jet technology offerings—as well as of the potential demand for available technology in new markets over the next five years—and a methodology that may be applied to gain this understanding.

Mark Hanley is President of IT Strategies, Inc. (ITS), which he founded in 1992 as a strategic consultancy specialized in industrial digital printing, ink jet technology, and early market development practices. The company, based in Boston and Tokyo, operates on a private partnership basis. ITS is a confidential practice with no publishing function and is expert in technology and market analysis based on a wide factual knowledge base. Prior to the inception of ITS, Hanley worked for BIS Strategic Decisions and founded their operations in Europe. He came to consulting through the paper industry where he began his career in Germany, subsequently working in most of the major European continental countries. Hanley is fluent in German, French, and Italian and has an honors degree in History from the University of Manchester, UK.

T4: Papermaking, Coating Fundamentals and Media for Digital Printing

Sunday 8:00 am to 12:00 noon (4 hours)

Instructor: Sen Yang, International Paper

This tutorial includes an introduction to papermaking and coating technologies and a discussion on media requirements for digital printing with an emphasis on

electrophotographic and ink jet printing applications. Paper attributes that are important for color electrophotographic and ink jet printing are reviewed and discussed.

Benefits

This course will enable the attendee to:

- Describe the basics of papermaking and paper coating processes
- Understand paper property and testing methods
- Comprehend key media properties for achieving good color printing performance for electrophotographic and ink jet printing

Intended Audience: anyone seeking an introduction to papermaking and paper coating fundamentals and who want a better understanding of the relationship of media properties and performance for electrophotographic and ink jet printing. No working knowledge of papermaking or coating techniques is presumed or required.

Sen Yang, senior manager of Product Research at the corporate research center of the International Paper Company in Loveland, Ohio, received his PhD in polymer science from Brown University. Since 1990, he has worked in the field of specialty paper and film coatings for digital imaging applications. Prior to joining International Paper, Yang worked for Océ-Arkwright and Champion International Corporation where he led and contributed to a number of successful specialty paper and coated film products, both for private label and OEM businesses. He holds several patents in the area of coated papers for ink jet and electrophotographic printing applications.

“I learned more in four hours than I had in three months of internet and library work.”

T5: Introduction to Toner Technology

Sunday 8:00 am to 12:00 noon (4 hours)

Instructor: George Marshall,
Lexmark International, Inc.

This course includes an introduction to electronic printing technologies and defines the place of electrophotography in its various embodiments. One common element—toner—is discussed in terms of architecture, formulation, and implementation in each of these embodiments, as will various toner design criteria and performance requirements. Analytical and measurement techniques are surveyed including size, shape, charge, and rheological attributes. Recent

product introductions and future trends in toner technology are reviewed and presented. A glossary and bibliography for future reference is provided.

Benefits

This tutorial will enable the attendee to:

- Understand the various implementations of electrophotographic printing and the role that toner plays in each
- Recognize the design criteria and performance requirements of toner in an electrophotographic printing subsystem
- Comprehend toner manufacturing alternatives for commercial devices
- Compare the market implementation of the various toner technologies and the potential for future market domination

Intended Audience: anyone seeking an introduction to electrophotography, electrophotographic printing, supplies technology, or related development activities; an interest in toner or carrier is helpful, but no working knowledge of electrophotography is presumed nor required.

George P. Marshall is a member of senior technical staff at Lexmark International’s Boulder, Colorado facility. He has been involved in many aspects of printer and copier development, including development of toner formulations for IBM and Lexmark printers, and is a recognized figure in the area of electrophotography and supplies-related disciplines. Marshall received a PhD in organic chemistry from the University of Arizona (1978), and worked for IBM’s Office Products Division, from 1978 until 1991, at which time a divisional sale created Lexmark. He has worked in the toner development group since 1978. Marshall has served on the IS&T Board of Directors, edited several IS&T books, and is a member of the Particulate Science and Technology: An International Journal Editorial Review Board. In 1996, he received Lexmark’s highest employee honor: the Customer for Life Award.

T6: Desktop Ink Jet Products Performance Study

Sunday 1:30 to 3:30 pm (2 hours)

Instructor: Rob Beeson, Hewlett-Packard Company

This tutorial examines products from HP, Canon, Epson, Lexmark, Sony, Brother, Fuji-Xerox, and Kodak, including the new Kodak printers. Print head performance parameters and ink/media interactions are discussed, with appropriate reverse engineering data from the HP labs. A few examples of how ink jet compares with competing technology, such as dye diffusion thermal transfer, is also addressed.

Benefits

This course will enable the attendee to:

- Understand print head firing frequency, drop volume, velocity, and drop shape tradeoffs from the principal desktop ink jet printer manufacturers
- Examine key differences in piezo and thermal ink jet print head performance characteristics
- Look at some patents for future direction

Intended Audience: for those somewhat familiar with ink jet printing technology that want a better understanding on the differences in the print head output parameters from popular manufacturers.

Rob Beeson is a senior member of the technical staff in the ink jet technology Platforms Unit of Hewlett Packard. He has held several management and engineering positions in thermal ink jet technology since 1985, and is currently the R&D Competitive Intelligence Team Leader. Beeson holds 12 ink jet patent, has a BS/MS in Mechanical Engineering from Colorado State University, and has worked with several divisions in HP since 1966. He has presented many ink jet papers worldwide since 1998.

T7: Fusing Technologies and Toner Materials Relationships

Sunday 1:30 to 5:30 pm (4 hours)

Instructors: Donald Bott, Xerox Corporation, and Dinesh Tyagi, Eastman Kodak Company

Most conventional electrophotographic printing systems require a fusing subsystem, which takes the discrete toner particles and both fuses (coalesces) them together and fixes them to the media. This process is required to produce an attractive, durable image bonded tightly to the substrate. The first part of this course reviews the fundamental functions of fusing, and details past and current fusing technology trends in the electrophotographic industry. The physics of each technology is discussed, with a specific focus on their strengths and weaknesses. In the second part, the influence of toner components on fusing performance is described, including the underlying polymer architecture and viscoelasticity concepts that govern resin binder. Effect of pigments and other toner additives are explained. In the third part of the course, the focus is on the two to three most-common fusing technologies, covering the critical parameters and failure modes that govern each technology's operation, and discusses the scientific and engineering challenges faced during both

the technology- and product-development cycles of a fuser.

Benefits

This course will enable the attendee to:

- Identify and comprehend advantages and disadvantages of different fusing technologies that have been developed and used throughout the industry
- Understand the polymeric concepts that influence fusing and various considerations necessary in toner formulations
- Analyze the critical parameters that define the fusing process and latitude for common fusing technologies
- Determine the critical failure modes and the critical parameters that govern them, for conventional fusers

Intended Audience: scientists and engineers desiring to learn more about toner design, as well as the selection, analysis, and evaluation of the numerous fusing technologies used in today's electrophotographic engines. A basic understanding of the electrophotographic process is assumed; familiarity with the basics of heat transfer and mechanics are beneficial, but not required.

Donald Bott manages the Marking Elements and Integration Laboratory within the Xerox Research Center Webster, New York. He joined Xerox in 1996 and has worked on fusing and solid ink jet activities for both product-development and R&D programs. He received a PhD in heat transfer and fluid mechanics from Stanford University and has degrees in thermofluids and mechanical engineering from the University of Cambridge and Michigan State University, respectively.

Dinesh Tyagi received his PhD from the Department of Chemical Engineering at Virginia Tech (1985) with a thesis titled "Structure-Property Relationships in Segmented Polymers." After a one year post-doctoral position, he joined Eastman Kodak Company as a Research Scientist and continues to work there in the area of toners formulations and electrophotography. In 1994, Tyagi was inducted into Kodak's Distinguished Inventors Gallery. In 1999, he joined NexPress Solutions, which was later absorbed back into Kodak. Tyagi has more than 80 patents worldwide.

T8: The Future of Digital Fabrication: Mainstream or Niche

Sunday 3:45 to 5:45 pm (2 hours)

Instructor: James W. Stasiak, Hewlett-Packard Company

Over the past decade, digital and non-impact printing technologies have enabled new fabrication methods, new printable

“My manager made me sign up and now I realize he’s a little smarter than I thought.”

materials, and inspired a broad range of applications. By exploiting both traditional non-impact printing approaches and new printing approaches, it is now possible to pattern and print two- and three-dimensional structures at physical scales ranging from nanometers to meters. Recent work has shown that it is possible to digitally fabricate a wide variety of devices including electronic circuits, MEMs and NEMs structures, architectural components, and even biologically-engineered structures. These methods are finding applications in all areas of prototyping, fabrication, and commercial applications—from the laboratory bench to the manufacturing floor. This tutorial is intended to provide an introduction to this emerging science. It covers established and new digital fabrication methods, new materials and processes that enable fabrication, and manufacture a broad range of devices, systems and structures. Finally, the tutorial gives a snapshot of the growing market and applications addressed by this new technology.

Benefits

This tutorial will enable the attendee to:

- Identify different digital fabrication methods and materials
- List and compare different digital fabrication applications that range from printed electronics to the life sciences
- Evaluate the technological issues and challenges of digital fabrication processes and materials
- Understand the technology landscape, key players, and practitioners
- Recognize the market opportunities addressed by this emerging technology

Intended Audience: engineers and scientists working or interested in entering the areas of digital fabrication and printed electronics.

James W. Stasiak, senior scientist in Hewlett-Packard’s Advanced Materials and Processes Laboratory, is actively involved in developing new digital fabrication methods and applications. In a career spanning more than 30 years, he has made contributions in the fields of device physics, molecular electronics, non-impact printing technologies, and, more recently, in the emerging fields of flexible electronics and digital fabrication. In 2005 and 2006, Stasiak served as General Chair for IS&T’s

Digital Fabrication Conference and now serves on the Digital Fabrication Conference Advisory Committee. He holds more than 10 issued US patents and is the author or editor of numerous technical articles and proceedings.

T9: Colorant Chemistry

Sunday 1:30 to 5:30 pm (4 hours)

Instructor: Jeffery Banning, Xerox Corporation

Very little work is being conducted in the area of new chromophore research in the dye industry. Instead, most dye research effort is being conducted in the modification or “tuning” of existing dyes, or dye classes in terms of shade, solubility and/or reactivity. This tutorial assists in the understanding such tuning processes. Using color (in presentations and handouts), the instructor teaches students about color chemistry with the aforementioned goal in mind. Starting with the concept of a light interacting with a prism, the instructor guides the students from an understanding of additive and subtractive coloration, further explaining the cause of coloration of a dye or pigment, and continues to the area of structure/property (color) relationships. An understanding of how one develops strategies for tuning/tailoring the shade and other physical and chemical properties of a dye emerges through the course of the tutorial.

Benefits

This course will enable the attendee to:

- Understand the concept of additive and subtractive coloration
- Recognize the common terms employed by color chemists and their literature
- Understand the four classes of dyes based on the electronic origin of the color
- Explain the concept of structure/color relationship, in the major classes of colorants
- Predict shifts in shades (bathochromic/hypsochromic) based on structural changes/modifications within the chromophore
- Discuss the major classes of chromophores employed in making dyes of various hues
- Locate commercially available dyes and preps for synthetic strategies to many of them
- Employ the aforementioned benefits in order to expand one’s understanding (and capability) in developing strategies to tune/tailor dyes

Intended Audience: scientists, engineers,

technicians, or technical marketing persons with a chemistry/science background who need to know about the chemistry of colorants and who are likely to be new to the field; a year of general and organic chemistry is recommended.

Jeffrey Banning is a Xerox Fellow in the Xerox Office Group (XOG), formerly Tektronix Color Printing and Imaging Division. He has worked in the areas of dye, polymer, and organic synthesis, as well as coatings and ink formulation at Milliken Chemicals, the BIC Corp., Tektronix Inc., and Xerox Corp. He holds more than 75 US patents in these areas and has scaled-up many dye intermediates and dyes, leading to many commercial products and several product lines. Banning began his career in color chemistry at Milliken Chemicals. It was there that he learned the “tricks of the trade” under many outstanding organic dye and textile chemists, as well as with frequent interactions with two world renown dye consultants: Max Weaver of Eastman Chemicals (retired) and John Griffiths of the University of Leeds. His educational background includes a BS in chemistry from Mankato State University (1983) and a PhD in organic chemistry from the University of North Dakota (1987).

T10: External Additives for Xerographic Toners

Sunday 1:30 to 5:30 pm (4 hour)
Instructor: Robert J. Nash, consultant,
Hafren Associates

With few exceptions, present-day xerographic toners are surface-coated with sub-micron particulates, such as fumed silicas, titanias, etc. These surface additives, which are typically dry-blended onto the toner particles in the final stage of toner production, enhance toner performance in key process steps such as development and transfer. In particular, external additives are especially important in full-color toner applications, for performance optimization of four individual toner types. This course provides an overview of toner external additives and their effective application to single and dual-component toners.

Benefits

This course will enable the attendee to:

- Review the range of materials currently used as external additives
- Identify future trends in external additive technologies and applications
- Understand the impact on toner performance of key additive properties such as size and surface composition
- Compare the various processes used to blend external additives onto toner surfaces

- Identify and quantify the effect of toner external additives on key toner development characteristics such as charge level, polarity, charging rate, powder flow, etc., and developer properties such as conductivity
- Evaluate the effect of toner external additives on the response of xerographic developers to changes ambient humidity
- Describe the impact of external additives on toner charging in terms of a simple model

Intended Audience: intended to provide a quantitative review of toner external additive effects, the course should be of interest to scientists involved in pure xerographic materials research, and to scientists and engineers active in applied toner concept development or toner manufacturing technologies.

Robert Nash received his PhD in Physical Chemistry from the University of Bristol, England. In 1970, he joined Xerox Corporation. His research and modeling studies at Xerox were focused on the design and evaluation of xerographic toners, carriers, and developers, with especial emphasis on “aging” mechanisms and additive effects. From 1998 until the end of 2000, Nash served an expatriate assignment at Fuji Xerox, Takematsu, Japan, as the Senior Manager, resident for the Xerox Supplies Development, Manufacturing, and Supply Chain Operations organization. He retired from Xerox in early 2002, and currently provides a consulting service on a variety of subjects, ranging from xerographic materials to cross-cultural interactions with Japan. Starting with NIP4 in 1988, he has presented the results of his studies yearly at this conference. In 1990, he served as Publication Chairman for the NIP6, and in 1992 was Chairman of IS&T’s Honors & Awards Committee. In 1999, Nash was named a Fellow of IS&T and in 2002, he jointly received the Chester Carlson Award with his long-time colleague, J.T. Bickmore.

T11: Image Science and Image Quality Seminar

Sunday 1:30 to 5:30 pm (4 hours)
Instructor: Bror Hultgren, Image Integration

The central focus of this tutorial is to explain the process by which high-quality images are obtained and the techniques for measuring that quality. While individual parametric equations may be specific to photographic print images, the process can be generalized to other image display modalities. Hence the emphasis is placed on the ‘why’ and ‘how’ of image science, and less on the ‘what’ of digital printing. Worked examples will be furnished.

Benefits

This course will enable the attendee to:

- Learn how to measure psychovisual image quality using category scaling techniques
- Identify the fundamental relations between image science and image quality
- Gain an overview of aspects of image science; and its integration into the product development cycle
- Understand the components of image quality; the characterization of color and micro image content and their reproduction in the image
- Recognize the role of the observer in the imaging process
- Discover how psychovisually based metrics are constructed from image system primitive measurements such as SFR, NPS, and CIE Lab color errors

Intended Audience: designed to provide critical information for both technical and non-technical project managers and engineers, familiarity with integral calculus and Fourier analysis is helpful, but not required.

Bror Hultgren is currently the President and Chief Scientist of Image Integration, a consulting firm providing tools and services to digital imaging manufacturers. He has 32 years of professional experience, 26 years of which were spent in the Research Division of Polaroid. In this capacity, Hultgren was responsible for the implementation of image science based product development analyses for both photographic and digital imaging systems. He has made significant contributions to film and thermal media programs, digital still camera, scanner, and printer hardware programs. At his retirement, he held the position of Distinguished Scientist. Hultgren has authored or co-authored more than 10 technical papers and presented numerous conference talks. He holds four patents in areas of digital image processing and degrees from MIT and Boston University.

Monday, September 17, 2007

T12: Fabrication Materials and Processes of Ink Jet Print Heads

Monday 10:00 am to 12:00 noon (2 hour)
Instructor: Hue Le, PicoJet, Inc.

In recent years, enormous progress has been made in the design, fabrication, and commercialization of ink jet printing systems. This tutorial describes the materials and processes that have been used to produce various ink jet print heads, which are the core component of the printing sys-

tems. Methods of forming ink jet nozzle, anti-wetting coated nozzle surface, ink channel and chamber, and various bonding methods are reviewed. Materials of thin film resistor (for thermal ink jet) and piezoelectric ceramic (for piezoelectric ink jet) are discussed. This tutorial concludes with a review of the current status of MEMs technology in the ink jet print heads from various manufacturers.

Benefits

This course will enable the attendee to:

- Understand the basic science and technology in manufacturing methods of various types of thermal and piezoelectric ink jet print heads
- Assess the current development in fabrication materials and processes of ink jet print heads
- Evaluate insights into the potentials and limitations of different types of print heads

Intended Audience: scientist, engineers, product managers, and others charged with development or manufacture of ink jet printing systems.

Hue Le is the CEO/President of PicoJet, Inc., which designs and fabricates fluid jetting devices for industrial printing applications. He has more than 26 years of experience in developing and commercializing ink jet printing systems. Le holds 20 US patents in the field of ink jet printing technology. Prior to forming PicoJet, Inc. in 1997, Le held the position of Director of Technology Development for Tektronix, Inc.'s Printing and Imaging Division. He received his BS degree in Chemistry from the University of Iowa (1979) and MS degree in Chemistry from New Mexico State University (1981).

T13: Business in China: Whys and Wherefores

Monday 10:00 am to 12:00 noon (2 hours)
Instructor: Graham Galliford,
Galliford Consulting and Marketing

The course considers and explains the reasons for entering into business in China. Opportunities for business and different options of how to enter into business in China are discussed with reference to the objectives of doing so. Detailed discussion of considerations regarding doing business as a visitor, joint ventures, wholly owned foreign enterprises (WFOE), personnel considerations, cultural differences,

“I enjoyed the interactive nature and openness of the class.”

and dealing with local and national government are among the topics covered.

Benefits

This course will enable the attendee to:

- Learn about getting started and conducting business in China
- Understand the special needs for getting into business, including how to make decisions on structuring, developing, managing, and controlling a business in China as a foreign concern

Intended Audience: non-Chinese managers and specialist without experience working in foreign business environments destined to work in China either as visitors or on an expatriate basis.

Graham Galliford founded Galliford Consulting & Marketing, a techno-commercial consulting business concerning toner-based digital printing in May 1994. GC&M operates from a unique facility for digital printing materials, R&D, and has created new printing materials and assisted in design, testing, and qualification of raw materials for printing. Galliford, a regular speaker at conferences worldwide on the toner business from technology to marketing to manufacturing, has recently focused upon the global shifts in business from Western Markets to Asia in particular the Peoples Republic of China.

T14: Direct-Write Technologies for Rapid Prototyping Applications: Sensors, Electronics, and Power Sources

Monday 1:30 to 5:30 pm (4 hours)

Instructor: Douglas B. Chrisey,
Rensselaer Polytechnic Institute

Direct writing describes any technique or process capable of depositing, dispensing, or processing (including removing) different types of materials over various surfaces following a preset computer-generated pattern or layout. Direct writing allows designers and manufacturers to bypass the traditional staged assembly process and/or part specific tooling and “grow prototypes” that will operate as a final product. There is a strong need in the electronics industry to reduce product design and development times and to adaptively produce small lots at a competitive cost. Conventional thick film techniques like screen printing and low resolution lithography often require several iterations of the development cycle—circuit design, mask fabrication, prototype manufacture, testing and evaluation, iterate design, repeat—before a new electronic device or subsystem can go to market. Direct write offers an alternative to this.

The materials, processes, and systems for direct write are at various stages of maturity with some off-the-shelf, fully integrated systems available, but in many cases further development is required before implementation in a production line. This course gives an overview of direct-write technology with examples of its benefits and barriers, especially in terms of how it is affecting the world of electronics, sensors, and powersources.

Benefits

This tutorial will enable the attendee to:

- Understand attributes of different direct write techniques
- Compare direct-write materials and substrates
- Gain an overview of the technological issues and challenges of direct writing
- Recognize market issues in electronic direct writing
- Learn about examples of direct writing electronics, sensors, power sources, and biomaterials

Intended Audience: engineers and scientists working or interested in entering the areas of direct-writing conformal electronics, sensors, and power sources.

Douglas B. Chrisey received a BS (Honors) from SUNY at Binghamton (1983) and PhD in Engineering Physics from the University of Virginia (1987). He joined the US Naval Research Laboratory as a staff member and became head of the Plasma Processing Section. He was the deputy director of the Center for Nanoscale Science and Engineering at North Dakota State University before joining the Materials Science Department of Rensselaer Polytechnic Institute. His past research has focused on novel laser fabrication of thin films and coatings of advanced electronic, sensor, and biomaterials. More recently his research interests have focused on novel approaches, materials, and devices fabricated by direct-write fabrication. He holds 18 patents, has edited or co-edited 10 books, written eight book chapters and more than 400 publications, and has 5,000 citations.

T15: The Top-Ten Myths of Digital Color Management

Monday 1:30 to 5:30 pm (4 hours)

Instructor: Thomas Madden,
Eastman Kodak Company

Myths often evolve to explain what seems otherwise inexplicable and to support ideas people wish to believe. Color itself can seem quite inexplicable at times, and people strongly want to believe color images can be interchanged freely among imaging

systems. So it is not surprising that numerous myths have arisen regarding digital color management.

While a few of these myths are relatively harmless, many have been detrimental to making real progress within the color-imaging industry. Persistent myths have led to compromised systems and undesirable results that could have been avoided, and disagreements on relevant conceptual and technical issues have frequently derailed discussions on standards for color interchange.

In this tutorial, a number of the more persistent and persuasive-sounding color-management myths are considered. The intent is to set forth sound principles that can help avoid pitfalls and unnecessary complexity in color-imaging systems.

Benefits

This course will enable the attendee to:

- Explain the distinction between colorimetry and color appearance
- Describe the relationship between original-scene and reproduced color images
- List and describe the physical, psychological, and psychophysical effects that must be accounted for in color-managed systems
- Compare visual adaptation transformations with standard colorimetric calculations
- Understand perfect whites, whiter-than-whites, and media whites and their encodings in color-managed systems
- Define the necessary features of a color-encoding specification's encoding method and metric
- Understand the capabilities and limitations of device-independent and device-dependent color encodings

Intended Audience: scientists, engineers, and others interested in and involved with color imaging or color-management products, devices, or systems. Participants should have some familiarity with basic colorimetry and color-imaging systems.

Thomas Madden is a Senior Principal Scientist in the Consumer Digital Image Science Group at Eastman Kodak Company. The holder of numerous color-imaging patents, he is co-author of Digital Color Management: Encoding Solutions and a contributing author to several textbooks in the field. Madden, an award-winning instructor in color and image science at Kodak, has served as an adjunct instructor at Rochester Institute of Technology. He is a contributor to numerous publications and a frequent lecturer at technical symposia, universities, and industries in the US, Canada, and Europe.

TI6: Evaluating Ink Jet Technology

Monday 1:30 to 5:30 pm (4 hours)

Instructors: Ross N. Mills, imaging Technology international (iTi) Corporation, and James W. Stasiak, Hewlett-Packard Company

The background needed for evaluating and selecting ink jet and the correct type of ink jet technology for digital materials deposition in printing, scientific, and manufacturing applications is covered in this course. In addition to an advanced introduction to different types of ink jets, the fundamental advantages and disadvantages of each type is addressed. Topics such as the influence of throughput parameters, morphology, ink and substrate physical properties, maintenance, and reliability on print head selection for the noted applications is presented. Business and technical issues such as make or buy, do-it-yourself or hire-it-done, availability and cost of print heads, and time-cost tradeoffs are also covered.

Benefits

This course will enable the attendee to:

- Understand how to balance throughput parameters, materials physical properties, and operating environment with print head selection for a given application
- Select measurement and development tools and for process and performance analysis on ink jet print heads
- Recognize the basics of how to integrate a print head technology into an application
- Make technical and business assessments for program and product planning

Intended Audience: those who have a basic understanding of ink jet technology and who wish to expand their knowledge base in both technology and applications.

Ross N. Mills, founder, chairman of the Board, and CTO of imaging Technology international (iTi) Corporation, received his PhD and Masters in Engineering Science from the University of California, Berkeley, and his BS in Aerospace Engineering from the University of Texas at Austin. Since 1978, he has worked as a research, development, and manufacturing engineer in both staff and management capacities in the areas of piezoelectric and thermal ink jet printers and electrophotographic

“The tutorial program prepares you for future career development.”

printers for IBM, Lexmark International, and Topaz Technologies, as well as iTi. Mills founded iTi in 1992 in Boulder, Colorado, as an ink jet consulting and development firm, as well as an integration facility for advanced applications in ink jet and imaging technology. He holds 12 patents in this field and is the inventor of iTi's proprietary ESIJET™ technology.

James W. Stasiak: see bio under T8.

T17: Chemically Prepared Toners

Monday 1:30 to 5:30 pm (4 hours)

Instructor: Grazyna Kmiecik-Lawrynowicz,
Xerox Corporation

This course on chemically prepared toners (CPT) enables participants to understand the nature of chemical toner technology in comparison with conventional grinding processes for making xerographic toners. It covers different chemical processes and the raw materials used for preparation of chemical toners, as well as the history of CPT development. The course discusses current products with chemically prepared toners that are on the market and points out advantages and disadvantages of chemical toners compared with pulverized toners in their performance and interaction with the xerographic systems.

Benefits

This course will enable the attendees to:

- Understand the nature of the chemical toner process in comparison with the conventional grinding process
- Distinguish chemically prepared toners from pulverized toners
- Make judgments and assessments as to the best toner technology for a given xerographic application based on the advantages and disadvantages of each
- Understand the current scenario of chemically prepared toner on the market and its potential future applications

Intended Audience: an introduction to chemically produced toners, this course is directed toward anyone seeking an understanding of the nature of chemically prepared toner (CPT) and its potential xerographic application; some knowledge of xerography and chemistry is helpful, but not essential.

Grazyna Kmiecik-Lawrynowicz is a Principal Scientist for Xerox Corporation in Webster, New York. Her field is materials and process technology where she is responsible for design and delivery of chemical toners for color printers and the design of polymeric carrier coatings. She

received her MS in chemistry and chemical engineering from Warsaw Technical University in Poland and her PhD in chemistry from Rutgers University (1987). After completing postdoctoral studies at the University of Toronto, Kmiecik-Lawrynowicz joined Xerox Research Center of Canada (XRCC) in 1988. During her years at XRCC, she worked on a variety of projects related to chemical toners. In 1992, she pioneered work on emulsion aggregation (EA) toner for future color xerographic applications. In 1996, Kmiecik-Lawrynowicz transferred with EA toner technology to Supplies Development & Manufacturing in Webster, where she worked on development of EA toner and the start-up of the manufacturing facility for commercial production of EA toners. She has authored 90 publications, including 73 US patents, is a recipient of three Xerox Eagle Awards for the highest number of patents (1994, 1997, and 1998), is a member of the American Chemical Society, and a Fellow of IS&T.

T18: Liquid Toner Printing: Technology and Applications

Monday 1:30 to 5:30 pm (4 hours)

Instructor: George Gibson,
Xerox Corporation

Liquid toner technologies have long been held as versatile methods for imaging in a variety of applications. Known for high image quality, especially high-quality color, liquid toners are undergoing a renaissance. Applications of current import include not only document printing, but a number of industrial printing, display, and fabrication applications. This course covers the variety of liquid toner processes that are and have been used, including the strengths and limitations of each and the major application areas in which these techniques are employed. The course includes an analysis of improvements of liquid toner systems found in recent technical literature and patents. Much of this material is new and has not been included in previous versions of this course.

Benefits

This tutorial will enable the attendee to:

- Recognize the fundamentals of five generations of liquid toner device architectures
- Appreciate the composition and preparation methods for liquid toners
- Describe how the components of the toner and characteristics of the process drive print properties
- Identify the major market applications where liquid toners are used today
- Learn about recent innovations in liquid toner technology

Intended Audience: technical professionals who want to become more knowledgeable about liquid toner printing technology

George Gibson is manager, Research & Development Portfolio in the Xerox Innovation Group. Previously, he held research and manufacturing management positions for Savin and AM Graphics. Gibson holds more than 45 patents in non-impact printing and has published 20 papers. He holds an MS in chemistry from Binghamton University and an MBA from the University of Rochester's Simon Graduate School of Business.

T19: Contemporary Photography: Digital Prints

Monday 1:30 to 5:30 pm (4 hours)
Instructors: Franziska Frey, Rochester Institute of Technology, and Martin Jürgens, photograph conservator

This course focuses on the materials, identification, and stability of digital prints used by contemporary artists. The aim of the course is to provide attendees with the knowledge and tools to handle the issues surrounding the acquisition and preservation of prints made from digital files, as well as an understanding for the trends in imaging technology and artists' use of modern photographic printing techniques.

Benefits

This course will enable the attendee to:

- Describe the various digital printing processes used by photographers today
- Understand the materials used for the different processes
- Explain the permanence issues associated with the different processes
- Assess storage requirements for digital prints
- Identify some of the digital preservation issues connected to digital photography

Intended Audience: for those in the archive, library, and museum communities who are creating, using, or preserving digital prints and for technologists wanting to get an understanding of the issues surrounding digital prints in contemporary art collections.

Franziska Frey is a Professor at the School of Print Media at Rochester Institute of Technology. She received her PhD in Natural Sciences (Concentration: Imaging Science) from the Swiss Federal Institute of Technology in Zurich, Switzerland (1994). Before joining the faculty of the School of Print Media, she worked as a research scientist at the Image Permanence Institute at RIT. Frey publishes, consults, and teaches in the US and around the world on various issues related to establishing digital

image databases and digital libraries. She is also involved in several international standards groups dealing with technical metadata and digital photography.

Martin Jürgens studied photography and design at the Technical University in Dortmund, Germany. He holds an MS from Rochester Institute of Technology and a Master of Art Conservation (MAC) from Queen's University in Kingston, specializing in paper conservation. Since 2001, Jürgens has been working as a photograph conservator in private practice in Hamburg, Germany. His areas of research and teaching include historic and contemporary photography, and the materials, chemistry, and preservation of digital prints.

Tuesday, September 18, 2007

T20: Ink (post) Jet: Drying and Curing in Ink Jet

Tuesday 1:30 to 3:30 pm (2 hours)
Instructor: Molly Hladik, Hewlett-Packard Company

This course provides an overview of water, solvent, and UV based inks and their applications. General ink formulation, the chemistry and physics of drying of solvent/water and curing of the UV inks is discussed along with the interactions of the media, both at the surface and in the bulk.

Benefits

This course will enable the attendee to:

- Define the basic components of an ink jet ink
- Explain/discuss the effects of the different components in the ink on drying/curing of ink jet inks
- Breakdown the process of drying/curing of the different types of inks
- Assess the technology that is required for their application

Intended Audience: both technical personnel and end users

Molly Hladik is a Product Development Chemist at Hewlett-Packard Company. She has used her expertise in waterborne, solvent, and UV curable polymer systems in the development of traditional ink jet inks and media as well as new product development. She received a PhD in chemistry with an emphasis in polymers and UV polymerization from the University of Southern Mississippi (2002), a Masters of polymer science and engineering (1999), and bachelors in chemistry (1996).

"If I had known the value before attending, I would have signed up for more."

T21: Digital Technology, Security of Documents, and Brand Protection

Tuesday 1:30 to 5:30 pm (4 hours)

Instructor: Annette Jaffe, Annette Jaffe Consulting

This tutorial covers the field of security devices ranging from optical security features to classic features such as watermarks. It explores how they protect documents and packaging, and their effectiveness. It also explores how digital technology has changed the problems involved with security and explores solutions for the future. Recent developments in color print technologies are reviewed. Use of security devices for brand protection are used as examples.

Benefits

This course will enable the attendee to:

- Learn the basics of security devices
- Explore the advantages and disadvantages of security devices
- Learn how digital technologies such as ink jet and electrophotography interact with security and security features
- Explore new inks, toners, etc. being used for security
- Speculate on the future

Intended Audience: scientists and engineers interested in security and implications for digital printing

Annette Jaffe received a BA in chemistry and a PhD in physical chemistry. For more than 30 years, she has worked on printing technologies at IBM Research, Apple Computer, and Texas Instruments. She is currently a consultant in digital color imaging, security printing, and digital anti-counterfeiting.

T22: Chemistry and Physics of Organic Electrophotographic Photoreceptors

Tuesday 1:30 to 5:30 pm (4 hours)

Instructor: David Weiss,
Eastman Kodak Company

Organic photoreceptors are large-area photoelectric devices that are at the heart of today's digital electrophotographic printers. This tutorial provides the attendee with a comprehensive understanding of organic photoreceptors in this important technology. Topics include photoreceptor architecture, formulation chemistry, manufacturing technologies, physics, system functions and requirements, system interactions, failure modes, and testing. Discussions include current trends in organic photoreceptor technology and the unique requirements of digital printing that must be satisfied.

“Very interesting and diverse coverage of different types of security features and documents.”

Benefits

This course will enable the attendee to:

- Understand the design and function of organic photoreceptors in an electrophotographic printer
- Appreciate photoreceptor interaction issues in the design of an electrophotographic system
- Value the interplay between photoreceptor architecture and electrophotographic function
- Identify the relationship between chemical make up and the function of the various layers in an organic photoreceptor
- Explain the technologies involved in the manufacturing and testing of organic photoreceptors
- Describe how organic photoreceptors are studied and characterized
- Discuss the mechanisms of charge generation and transport in organic photoreceptors
- Clarify photoreceptor failure modes and diagnose problems

Intended Audience: students, sales and marketing personnel, technicians, engineers, and scientists interested in understanding organic photoreceptors and how they function in modern digital electrophotographic printers will benefit from this course. A general background in chemistry, physics, and the electrophotographic process is helpful, but not essential.

David S. Weiss, scientist fellow at Eastman Kodak Company, received his PhD in chemistry from Columbia University (1969). His work focuses on electrophotographic technologies with an emphasis on organic photoreceptors. He holds 17 US patents and has authored more than 90 publications. Weiss is co-author of Organic Photoreceptors for Imaging Systems (Marcel Dekker, Inc., 1993) and Organic Photoreceptors for Xerography (Marcel Dekker, Inc., 1998), and is co-editor of the Handbook of Imaging Materials, Second Edition (Marcel Dekker, Inc., 2002). He has been an Associate Editor of the Journal of Imaging Science and Technology since 1988 and has served as General Chair of NIP17 and in many other NIP committee assignments. In 1999, Weiss received the Carlson Memorial Award; in 2004 he was named an IS&T Senior Member; and in 2006, he was elected to the IS&T board as a vice-president.

Technical and Social Program

All papers are oral unless marked as focal or interactive. Program is subject to change.

Monday September 17, 2006

**8:30-9:30 AM
PLENARY SESSION**

Session Chair: Ramon Borrell,
Hewlett-Packard Española SL

Managing Complexity on Digital Printing Tech., Anthony Federico, Xerox Corp. (USA)

NIP TRACK 1

9:40 AM-5:00 PM

TONER BASED PRINTING PROCESSES

Session Chairs: Lawrence B. Schein, consultant,
Volkhard Maess, OPS, and Yusuke Takeda,
Ricoh Company, Ltd.

Improvement of Optical Unit of LED Printhead, Akihiro Yamamura, Oki Data Corp. (Japan)

New Technologies for High Durable/Reliable Photoconductor Unit in Color MFP,

Tadashi Kasai, Tokuya Ohjimi, Shinichi Kawhara, Takatsugu Fujishiro, and Jun Shiori, Ricoh Company, Ltd. (Japan)

Analysis of Image Defects at Solid Edges in Single Component Development Systems,

J. Yoo, Jeanman Sur, KiJae Do, and Jongmoon Eun, Samsung Electronics Co., Ltd. (South Korea)

Statistical Consequences of Toner Size and Charge Distributions, Inan Chen and

Ming-Kai Tse, Quality Engineering Associates (QEA), Inc. (USA)

Characteristics of Development (Focal),

Eric Stelter and Joseph Guth, Eastman Kodak Company (USA)

Estimation of Developed Toner Mass in Two-component Electrophotographic System by Large-scale Discrete Element Method,

Hiroshi Mio, Keihanna Interaction Plaza Inc.; and Yoshihiro Matsuoka, Atsuko Shimosaka,

Yoshiyuki Shirakawa, and Jusuke Hidaka, Doshisha University (Japan)

Simulating Motion of Toner Using the Discrete Element Method, Hong Ren,

Larry Stauffer, Thom Ives, and Santiago Rodriguez, Hewlett-Packard Company (USA)

Dynamics of Carrier Particles in Two-Component Magnetic Development System of Electrophotography (Focal), Hiroyuki Kawamoto,

Takashi Hiratsuka, Hideyuki Wakai, and Takashi Adachi, Waseda University (Japan)

Electrical Properties of a Magnetic Brush Using a High Resolution Field Probe,

SPECIAL EVENT

Kick off the conference by meeting friends and colleagues after a day of tutorials or tours at the

**NIP/DF Welcome Reception
Sunday, September 16
5:30-7:00 pm**

Michael D. Thompson, Paul W. Morehouse, Palghat Ramesh, and John G. Shaw, Xerox Research Center; and Helena Silva, University of Connecticut (USA)

Flow of Particulates, Toner and Developers in a Housing Cavity, Suresh Ahuja, Xerox Corp. (USA)

The Effect of Relative Humidity on Corona Discharge (Interactive), Song Jiang,

Jingchen Huand, and Yasushi Hoshino, Nippon Institute of Technology (Japan)

Effect of Charging Method on Charging Characteristics of Mono-component Toner (Interactive), K. K. Chamili Kumar, Song Jiang,

Tadasuke Ohtsuki, and Yasushi Hoshino, Nippon Institute of Technology; and Kueiyong Sheu and Jeng-Seng Huang, Trend Tone

Imaging, Inc. (Japan)

Innovative Polyurethane Materials for Use in Digital Imaging Equipment (Interactive),

Joseph Lovette, Ken Overk, and Peter Ferraro, Foamex International Inc. (USA)

Evaluations of Toner Supply Capabilities for Some Typical Two-component Developing Systems, Teruaki Mitsuya and Kaoru Kataoka,

Ricoh Printing Systems, Ltd. (Japan)

Optimizing Laser Print Quality: Phase Space Modeling, Dror Kella and Amiran Lavon,

Hewlett-Packard Company (Israel)

A Numerical Simulation Method of Toner Transfer Considering Voltage Distribution of Transfer Belt, Shinji Aoki, Masaki Sukesako,

and Masami Kadonaga, Ricoh Company, LTD. (Japan)

NIP TRACK 2

9:40 AM-4:40 PM

INK JET PRINTING MATERIALS

Session Chairs: Carolyn Hayes, Cabot Corp., Stephen Yeates, University of Manchester, and Hiroyuki Onishi, Seiko Epson Corporation

Paper Compatibility with Pigment Ink Controlled in Penetration and Viscosity,

Michihiko Namba, Akiko Bannai, Toru Oshima,

Masayuki Koyano, Akihiko Gotoh, and Kiyofumi Nagai, Ricoh Company, Ltd.; and Tomohiro Inoue, Hitachi, Ltd. (Japan)
Effect of the Interaction Between Pigmented Inks for Photo Print Quality, Takehiro Tsutsumi, Isao Tsuru, and Ryuma Mizushima, Kao Corp. (Japan)

Alleviating Ink-Jet Mottle and Strike-Through in Uncoated Fine Paper, Daniel F. Varnell, Hercules Incorporated (USA)

High-Temperature Component Interactions in Pigment-Based Thermal Ink Jet Printing Inks, Mark E. Irving, Eastman Kodak Company (USA)

Nobel Aqueous Inkjet Ink Set Realizing High Speed and High Image Quality (Focal), Takatsugu Doi, Kunichi Yamashita, Manabu Numata, and Ken Hashimoto, Fuji Xerox Company, Ltd. (Japan)

Universal Black Inks Based on New Polymeric Carbon Black Dispersions, Gary L. House, Eastman Kodak Company (USA)

Use of Novel Polyetheralkanolamines as Pigment Dispersants, Duy Nguyen, Huntsman Corp. (USA)

Inkjet Printing of Concentrated Polymer Solutions (Focal), Stephen Yeates, Desheng Xu, Veronica Sanchez Romaguera, Silvia Barbossa, and Will Travis, University of Manchester (UK)

Cationic Fumed Silica as Inkjet Recording Materials, Tienteh Chen, Eric Burch, Tony Pidding, and Raj Vaidyanathan, Hewlett-Packard Company (USA)

A Novel Photoinitiator for UV Curable Digital Applications, Andrew Naisby, Rosanna Telesca, and Amalia DiMatteo, Ciba Specialty Chemicals (USA)

Ink Jet Pigments: The Triple S Concept (Interactive), Hans-Tobias Macholdt, Clariant Produkte (Deutschland) GmbH (Germany)

Wicking Process of an Inkjet Ink on Printing Media (Interactive), Heungsop Park, Sung W. Kang, and Seungmin Ryu, Samsung Electronics Co., Ltd. (Korea)

Pigments & Dispersions for Energy Curable Inkjet Inks (Interactive), Mark Ortalano, George Robertson, and Stanislav Vilner, Sun Chemical Corp. (USA)

SPECIAL EVENT

The Print Gallery will open with the Monday morning coffee break and will be available for viewing until Thursday afternoon.

To participate, see information on page 23.

Interpreting the Schedule

By knowing the amount of time allotted for each type of presentation, you can get a rough estimate of when a particular presentation will occur. Exact times will be published in the conference proceedings. On most days, coffee breaks will occur from 11–11:30 am and 3:30–4:00 pm, and lunch is from 12:40–2:00 pm. Presentation length includes time for Q&A at the end of the talk.

Plenary: 60 minutes

Focal: 30 minutes

Oral: 20 minutes

Interactive (preview): 5 minutes

To facilitate planning, we've color coded the technical session as follows:



NIP22 Session/Focus



Digital Fabrication 2006 Session/Focus

Reactive Silanes in Cationic UV Jet-inks,

Alexander Grant, SunJet (UK)

Photocurable Inkjet Ink for Printing on Metallic and Plastic Substrates,

Mitsuru Ishibashi, Yasuyuki Hotta, and Tohru Ushiroguchi, Toshiba Corp.; and Ryoza Akiyama, Kazuhiko Ohtsu, Hiroshi Kiyomoto, and Chiaki Tanuma, Toshiba TEC Corp. (Japan)

NIP TRACK 3

9:40 AM-12:00 PM

THERMAL PRINTING

Session Chairs: Wendell Brattlie, Eastman Kodak Company, and Hiroto Terao, Alps Electric Co., Ltd.

Study of Thermal Analysis for Full-color Thermal Print, Hiroto Terao, Alps Electric Co., Ltd. (Japan)

Various Investigations in Thermal Dye Transfer System, Masafumi Hayashi, Daisuke Fukui, and Kazuya Yoshida, Dai Nippon Printing Co., Ltd. (Japan)

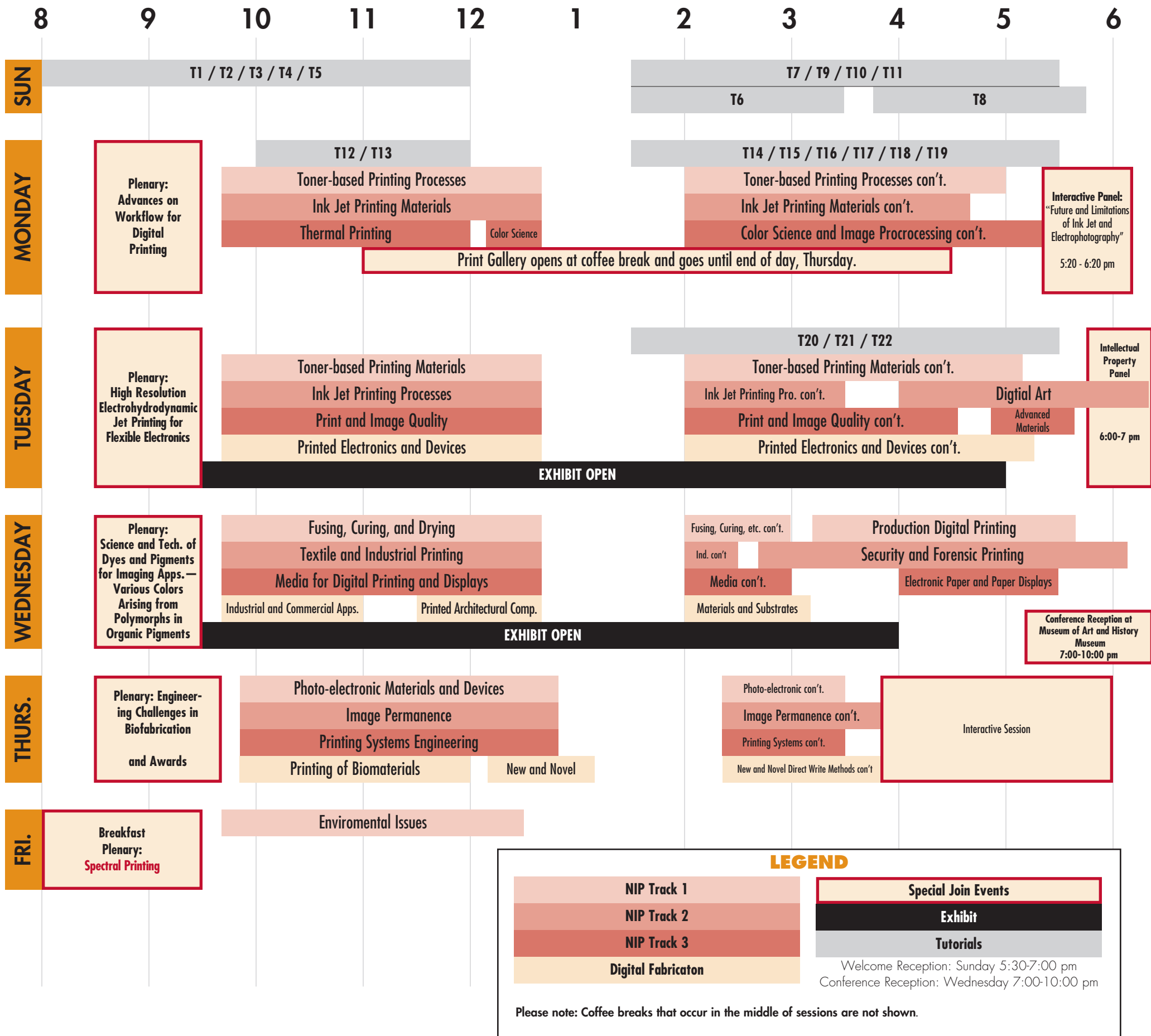
Maximized Performance of Thermal Printhead (Focal), Hidekazu Amatatsu, Naoto Matsukubo, Yoshihiro Inokuma, Takashi Aso, and Kazuya Shindo, Kyocera Corp. (Japan)

New Erase Head for RFID Thermal Rewritable Media (Interactive), Jiro Oi and Hideo Taniguchi, HIT Devices Ltd. (USA)

Thermal Print Head Technology for Each Application (Interactive), Tadashi Yamamoto, Masatoshi Nakanishi, and Takaya Nagahata, ROHM Electronics USA, LLC (USA)

Slipping Layer for Thermal Donor (Focal), David G. Foster, Eastman Kodak Company (USA)

NIP23/Digital Fabrication 2007 Week At-a-Glance



**12:10-5:20 PM
COLOR SCIENCE AND
IMAGE PROCESSING**

Session Chairs: Chai Wah Wu, IBM,
Alan Hodgson, Alan Hodgson Consulting, and
Yasushi Hoshino, Nippon Institute of Technology

**Total Measurement Uncertainty Analysis
in Color Measurement**, Jack A. Ladson and
Hugh S. Fairman, Color Science Consultancy
(USA)

**Press Proofing and ICC Profiles: Generating
Output Profiles for a Xerox Docucolor 12
Digital Printer and a Shinohara Offset Press
(Interactive)**, Laura Ann Kraft, Kate Mary Blout,
and Paul D. Fleming III, Western Michigan
University (USA)

**A Psychophysical Evaluation of a Gamut
Expansion Algorithm Based on Chroma
Mapping II: Expansion within Object Color
Data Bases (Interactive)**, Tomotaka Hirokawa,
Masao Inui, Toyoshi Morioka, and Yoshihiko
Azuma, Tokyo Polytechnic University (Japan)

**Fundamental Considerations Related to
Chromatic Adaptation (Focal)**,
Nobuhito Matsushiro, OKI Electric. (Japan)

**Cross Platform Soft Proofing (Mac OS,
Windows, and Linux)**, Reem El Asaleh and
Paul D. Fleming III, Western Michigan
University (USA)

Image Type Dependent Color Scanning,
Yousun Bang, Minki Cho, Se-Eun Kim, and
Heui-Keun Choh, Samsung Advanced Institute
of Technology (South Korea)

**A Method of Restoring the Shadow Distortion
in a Bounded Book Scanned Image by Using
Non-Edge Segment (Interactive)**,
HyungSoo Ohk, HyeonSeok Seo, KiMin Kang,
and DonChul Choi, Samsung Electronics Co.,
Ltd. (Korea)

**Parameter Optimization for Content-based
Image Enhancement (Interactive)**,
Mohamed N. Ahmed and Ahmed Eid,
Lexmark International (USA)

**Processing the Shadow of a Hand Image
(Interactive)**, Ping Lu and Shigeru Kitakubo,
Nippon Institute of Technology (Japan)

Color Conversions in the Transform Domain,
Yue Qiao, Joan L. Mitchell, and Nenad Rjavec,
IBM Corp. (USA)

**Hybrid Resolution Enhancement Technique
Using LookUp Table of Dual Structure for
Multi-bit Printing**, Jongok Lee, Byongtae Ryu,
and Choon-Woo Kim, Inha University; and
Sang Ho Kim, Samsung Electronics Co., Ltd.
(Korea)

**Suppression of Automoiré in Multi-Level
Supercell Halftone Screen Designs**,
Kenneth R. Crouse, Monotype Imaging Inc.
(USA)

SPECIAL EVENT

Join us for a special
Interactive Panel discussing the
"Future and Limitations of Ink Jet
Printing and Electrophotography"

**Monday, September 17
5:20-6:20 pm**

Moderator: Sen Yang, International Paper

Panelists (as of 6/11/07):
Jeff Folkins, Xerox Corporation
James Chwalek, Eastman Kodak Co.
Marcel Slot, Océ Technologies BV
John Stoffel, Hewlett-Packard Co.

**Image Synthesis Method for Integral
Photography Using Hexagonal Fly's Eye
Lens**, Kazuhisa Yanaka, Hidetoshi Nii, and
Hideo Kasuga, Kangawa Institute of Technology
(Japan)

5:20-6:20 pm

INTERACTIVE PANEL
"Future and Limitations of Ink Jet
Printing and Electrophotography"

See above

Tuesday September 18, 2007

8:30-9:30 AM

PLENARY SESSION

Session Chair: Ross N. Mills,
imaging Technology international (iTi) Corp.

**High Resolution Electrohydrodynamic Jet
Printing for Flexible Electronics**, John A. Rogers,
University of Illinois (USA)

NIP TRACK 1

**9:40 AM-5:10 PM
TONER BASED PRINTING
MATERIALS**

Session Chairs: Detlef Schulze-Hagenest, Kodak
Digital Printing Solutions, Gerhard Bartscher,
Felix Böttcher GmbH & Co., Manabu Takeuchi,
Ibaraki University, and Scott Silence, Xerox Corp.

Extending Toner Shape Analysis to 3D,
Kevin Lofftus, Eastman Kodak Company (USA)
**Particle Size Dependence on Toner Charge in
Two-Component Developer**, Youichi Nakamura
and Yutaka Terao, Nippon Institute of Technology
(Japan)

**Toner Charging Effect by CCA Particles at the
Interface between Toner and Carrier**,
Atsushi Suka, Manabu Takeuchi, Keiki Suganami,

SPECIAL EVENT

NIP/DF Exhibit

Be sure to visit the
more than 30 exhibitors on

Tuesday (9–5) and
Wednesday (9–4)

and Toshihiko Oguchi, Morimura Chemicals Ltd. (Japan)

A Study on the Charge-control Mechanism, Jin Mizuguchi, Akio Hitachi, Yohei Sato, and Kazuya Uta, Yokohama National University (Japan)

Toner Aging: Causes and Effects (Focal), Robert J. Nash, Hafren Associates (USA)

The Excellent Fusing Toner by Controlling Polyester Crystallinity, Norihiro Fukuri, Eiji Shirai, and Katsutoshi Aoki, Kao Corp. (Japan)

Crystal Structure of a Charge-control Agent of the Tetra-alkyl Ammonium Salt and its Temperature Dependence of the Electrical Conductivity (Interactive), Kazuya Uta, Yohei Sato, and Jin Mizuguchi, Yokohama National University (Japan)

Crystal Structure of a Fe-containing Charge-control Agent of the Azodyestuff and its Temperature Dependence of the Electrical Conductivity (Interactive), Yohei Sato, Kazuyuki Uta, and Jin Mizuguchi, Yokohama National University (Japan)

Toner Charge Distribution Change on Mixing Time after Adding New Toner (Interactive), Tadasuke Ohtsuki and Yasushi Hoshino, Nippon Institute of Technology (Japan)

Application of Scanning Transmission X-ray Microscopy for Observation of Organic Compounds in Toner Particles (Interactive), N. Iwata, K. Tan, and A. Watada, Ricoh Co Ltd. (Japan); H. Ikeura-Sekiguchi, RIF, AIST (Japan); and T. Araki and A. P.Hitchcock, McMaster University (Canada)

Concerning the Formation of Chemical Toners using a Latex Aggregation Process (Focal), Michael A. Hopper, Copperas Consulting (Canada)

Preparation of Polymer Microspheres by Phase-Separation/Aggregation (PSA) Technique for Color Toner Applications, Chen-Jen Yang and Ming-Huei Liu, Sinonar Corp. (Taiwan)

Control of Particle Shapes by Adjusting Solidification Rates in Aggregation of Dispersed Gels (Interactive), Ming-Huei Liu and Chen-Jen Yang, Sinonar Corp. (Taiwan)

Specialty Low Molecular Weight Polyolefins for Digital Printing Applications (Interactive), Elizabeth Yuan, Baker Petrolite (USA)

Polyester-based Chemically Prepared Toner for High-speed Digital Production Printing (Focal), Dinesh Tyagi, Eastman Kodak Company (USA)

Performance Analysis of Pulvized "Rounding" Surface Treated Toner (RST-toner) vs. Chemically Prepared Toner (CP-toner) (Interactive), Shyi-Shyang (Robert) Li, Everlight USA Inc., and Jian-Sheng Hung, Tren Tone Imaging Inc. (USA)

Investigation of Factors that Impact Toner Mass Transfer in Electrophotographic Processes Using the Discrete Element Method (Interactive), Hong Ren, Larry Stauffer, Thom Ives, and Santiago Rodriguez, Hewlett-Packard Company (USA)

Colloidal Silica Particles for Toners: Treatment Chemistry, Dmitry Fomitchev, Hairuo Tu, Adam Mackay, Jincheng Xiong, William Williams, Joachim Floess, and Doug West, Cabot Corp. (USA)

New Fumed Mixed Silica-Titania (FM-SiTi) Core Materials for a New Class of External Toner Additives, Masanobu Kaneeda, Paul Brandl, and Akira Inoue, Nippon Aerosil Co., Ltd. (Japan); and Maria Nargiello-Tetreault, Degussa Corp. (USA)

Process Design and Optimization of External Additive Blending on to Toner Surface, Samir Kumar, Xerox Corp. (USA)

NIP TRACK 2

9:40 AM-3:30 PM

INK JET PRINTING PROCESSES

Session Chairs: Paul Benning, Hewlett-Packard Company, Werner Zapka, Xaar, and Mineo Kaneko, Canon Inc.

Continuous Inkjet Drop Generators Fabricated from Plastic Substrates, Kathleen Vaeth, Deborah DeMejo, Emmanuel Dokyi, Mark Evans, Joseph Jech, Joseph Kaukeinen, Maria Lehmann, Robert Link, and John Sechrist, Eastman Kodak Company (USA)

FINE Printhead for Sub-picoliter Droplet, Mineo Kaneko, Canon Inc., (Japan)

Improvement in Printing Throughput for a Piezoelectric Line Ink Jet Print Head, Shin Ishikura and Ayumu Matsumoto, Kyocera Corp. (Japan)

Wide Print-Head with High-stiffness and Control Method of Drive, Takahiro Yoshida, Shino Maekawa, Shigeru Kinpara, Hirotochi Eguchi, and Yoshihisa Ohta, Ricoh Company, Ltd. (Japan)

Novel Micro Piezo Technology for Ink jet Printhead (Focal), Tomoaki Takahashi and Motonori Okumura, Seiko Epson Corp. (Japan)

Using Solid Mechanics to Evaluate the Capillary and Viscous Behavior of

Noncircular Tube Shapes, Robert W. Cornell, Lexmark International, Inc. (USA)

Performance Comparison of Square and Split Heaters (Interactive), Min Soo Kim, Bang Weon Lee, Yong Soo Lee, Dong Kee Sohn, Dong Sik Shim, and Keon Kuk, Samsung Advanced Institute of Technology (SAIT) (Korea)

Drop and Satellite Formation in Drop-on-demand Printing of Polymer Solutions (Focal), Steve Hoath, Graham Martin, Raphael Castrejon-Pita, and Ian Hutchings, University of Cambridge (UK)

Splashing of Droplets on Structured Surfaces, Jonathan Stringer and Brian Derby, University of Manchester (UK)

Studies on Inkjet Ink with Confocal Raman Microscopy (Interactive), L. Engisch, J. Örtengren, and W. Goedel, Print and Media Technology (Germany)

Inkjet Tubing with Enhanced Barrier Properties (Interactive), Donald G. Curran, Saint-Gobain Performance Plastics (USA)

Control System in Drop-on-Demand Applications (Interactive), J.M. Cittadino and E. Mendes, INPG-ESISAR and A. Soucemanadin, UJF-CNRS-INPG (France)

The Dynamic Ink-Jet Printing Analysis System with Addressable Waveform Trimming (Interactive), Kuo-Chiang Shang, Chieh-Yi Huang, Kuo-Hua Wu, Jeng-Han Lee, Tsu-Min Liu, Kevin Cheng, and Bing-Fei Wu, Industrial Technology Research Institute (Taiwan)

Robust, Reliable, and Repairable Print Head with Dynamic Drop Modulation Feedback for Printed Display Applications, Ty Chen, Trident (USA); and Chieh-Yi Huang, Tsu-Min Liu, Fu-Kung Chen, Eric Lee, and Kevin Cheng, Industrial Technology Research Institute (Taiwan)

**4:00-6:30 PM
DIGITAL ART**

Session Chairs: Steve Hoskins, University of Bristol, and Hitoshi Nakai, Brother Industry, Ltd.

Developments in the Digital Production of High Quality Original Art: A Case Study (Focal), Stephen Hoskins, University of the West of England (UK)

Advances in Reflection Transformation Imaging and Simultaneous Spectral Imaging (Focal), D. John Redman, Hewlett-Packard Company and Mark Mudge, Cultural Heritage Imaging (USA)

Six Years of Education in the Conservation of Digital Prints (Focal), Franziska Frey, Rochester Institute of Technology (USA), and Martin Juergens, photograph conservator (Germany)

TBA (Focal)

SPECIAL EVENT

Intellectual Property Panel

Session Chairs: Russell Barron, Rembrandt IP Management LLC, and Guarav Sharma, University of Rochester

NIPand DF are pleased to once again offer a panel discussion on Intellectual Property issues. Please join other attendees to discuss issues related to this topic.

The session will be moderated by Russell J. Barron

Panelists (as of 6/11/07):

John C. Cooper III, Foley & Lardner, Milwaukee, WI

Peter Crean, Xerox Corporation, Webster, NY

Joseph E. Root, Haynes, Boffel & Wolfeld, Half Moon Bay, CA

**Tuesday, September 18
6:00-7:00 pm**

NIP TRACK 3

9:40 AM-4:35 PM

PRINT AND IMAGE QUALITY

Session Chairs: Chung-hui Kuo, Eastman Kodak Company, Udi Chatow, HP Indigo, and Shigeru Kitakubo, Nippon Institute of Technology

Measurement of Differential Gloss Using a Micro-goniophotometer, Susan Farnand and Jonathan Arney, Rochester Institute of Technology; and Chung-hui Kuo, Eastman Kodak Company (USA)

The Effects of Color on Gloss Appearance and Measurement, Susan Farnand, Ling Ye, and Claire MacDonald, Rochester Institute of Technology (USA)

Print Quality of Dry-Toner Color Electrophotography for Production Printing and Its Comparison to Offset Printing, Renmei Xu, Hans Kellogg, Ed Cowgill, and Brian Overholt, Ball State University (USA)

Evaluating Image Quality of Printouts of Photo Printers (Interactive), L. Buczynski, D. Choromanska-Jasinska, L. Dabrowski, and B. Kabzinski, Warsaw University of Technology (Poland)

Analysis of Variation of Dot Size Printed by Offset, Flexography and Electrophotography (Interactive), Phichit Kajondecha, Hongmei Cheng, and Yasushi Hoshino, Nippon Institute of Technology (Japan)

Indigo Light Inks: Raising the Bar for Image

Quality (Interactive), KokWei Koh and Ehud Chatow, Hewlett-Packard Labs (USA)

Absolute Calibration of Gloss Measurements (Focal), J.S. Arney and Dave Nilosek, Rochester Institute of Technology (USA)

Image Fixing Quality Assessment: A Crease Test Apparatus, Charlie M. Mao, Research Laboratories of Australia (Australia)

Grain Profile of Printing Systems, Chunhui Kuo, Yee Ng, and Di Lai, Eastman Kodak Company (USA)

Effects of Atmospheric Pressure Plasma Activation on Inkjet Print Quality (Focal), M. Pykönen, L. Hakola, K. Eiroma, H. Sundqvist, O-V Kaukonen, and M. Tuominen, Åbo Akademi University; and J. Järnström, P. Fardim, J. Lahti, and M. Toivakka, Tampere University of Technology (Finland)

Effect of Number of Inks on Spectral Reproduction, Behnam Bastani, Hewlett-Packard Company, and Brian Funt, Simon Fraser University (USA)

Color Matching Capability of Digital Printers, Yu Ju Wu, Paul Dan Fleming III, and Alexandra Pekarovicova, Western Michigan University (USA)

A Study on Objective Instrumental Analysis of Text Quality, Ming-Kai Tse, Quality Engineering Associates (QEA), Inc. (USA)

Experimental Results on Human Visual Sensitivity for Spatial Frequency of Digital Halftone Images (Interactive), Shigeru Kitakubo and Yasushi Hoshino, Nippon Institute of Technology (Japan)

Optimizing Analysis of the ISO 19752 Test Page (Interactive), Anthony Peter Holden, Hewlett-Packard Company, and Prashant Mehta, ImageXpert Inc. (USA)

The Design of a Novel Portable Image Analysis Instrument and Its Applications, Ming-Kai Tse, Quality Engineering Associates (QEA), Inc. (USA)

Measurement and Analysis of MTF and its Contribution to Optical Dot Gain in Diffusely Reflective Materials (Interactive), Martina Atanassova and Jürgen Jung, Agfa Graphics NV (Belgium)

4:50-5:50 PM

ADVANCED MATERIALS AND NANOPARTICLES IN IMAGING

Session Chair: Robert Baydo, Sensient Imaging Technologies

Silica Sol-/Gel based Nano Structured Hard-coats (Focal), Hans Joseph Humpert, AEG Elektrophotografie GmbH; and Michael Dohle, Christoph Roth, Bernd Knackfurr, and Wolfgang Witt, Sensient Imaging Technologies GmbH (Germany)

Converting Nanoparticles by Surface Modification and Chemomechanical Processing (Focal), Steffen Pilotek, Buhler Inc. (USA); and Samuel Schär, Klaus Steingröver, and Frank Tabellion, Böhler PARTEC GmbH (Germany)

DIGITAL FABRICATION

9:40 AM-5:15 PM

PRINTED ELECTRONICS AND DEVICES

Session Chair: Gregory Herman, Hewlett-Packard Company, and John Rogers, University of Illinois-Urbana/Champaign

Inkjet-Deposited Interconnections for Electronic Packaging, Matti Mäntysalo and Pauliina Mansikkamäki, Tampere University of Technology (Finland)

Inkjet Printing of Metal-Dielectric-Metal Crossovers, Verónica Sánchez Romaguera and Stephen G. Yeates, The University of Manchester (UK)

Direct Write Methods for Low Cost Photovoltaics, Maikel van Hest, Alex Miedaner, Calvin Curtis, Sean Shaheen, and David Ginley, National Renewable Energy Laboratory; and Jennifer Nekuda, Ken Steirer, Ryan O'Hayre, and Reuben Collins, Colorado School of Mines (USA)

Maskless Patterning of Low-Temperature High-Mobility ZnO, Lee Tutt, Mitchell Burberry, Therese Feller, Diane Freeman, David Levy, Shelby Nelson, and Todd Spath, Eastman Kodak Company (USA)

Printed Conducting Polymer Strain Sensors for Textiles, Paul Calvert, Prabir Patra, Amit Sawhney, and Animesh Agrawal, University of Massachusetts Dartmouth (USA)

Nanowire Placement with Inkjet Heads, K. A. Bertness, L. M. Mansfield, P. T. Blanchard, N. A. Sanford, NIST; and Ross N. Mills, imaging Technology international (iTi) Corp. (USA)

Guidelines and Requirements for Direct Write Electronics in the Aerospace Industry, Joseph A. Marshall, The Boeing Company (USA)

PARTICIPATE IN THE DIGITAL PRINT/ART GALLERY

As in years past, NIP/DF will be hosting a digital print/art gallery, running from Monday morning thru Thursday afternoon.

Those interested in participating should contact Print Gallery Chair

Dinesh Tyagi
Eastman Kodak Company
tyagi@kodak.com
585/726-7060

Wednesday September 19, 2007

8:30-9:30 AM

PLENARY SESSION

Session Chair: Ramon Borrell,
Hewlett-Packard Española SL

Flexible Electrophoretic Display with Inkjet Printed Active Matrix Backplane (Focal),

Soichi Mariya, Tsutomu Miyamoto, Takehisa Saeki, Hideyuki Kawai, and Satoshi Nebashi, Seiko Epson Corp. (Japan)

Digital Fabrication Using Electrophotography for Conductive Patterning, Daiki Minegishi,

Yasuo Yamanaka, and Taro Terashi, Ricoh Corp. (Japan)

Precision Deposition of Functional Layers for Microcantilever Sensor Generation,

Nicholas Post and George T.C. Chiu, Purdue University (USA)

Mask-free Fabrication of Color Filter by All Ink-Jet Printing Process, Fu-Kang Chen,

Jih-Ping Lu, Pei-Ju Su, Chao-Fu Sung, Yuh-Zheng Lee, Jyh-Wen Shiu, and Kevin Cheng, Industrial Technology Research Institute; and Hong-Ye Lin, and Li-Chung Chang, AGI Corp. (Taiwan)

Inkjet Patterning of UV Curable Etching Resist for Flexible Conductive Circuits and Electrodes (Interactive),

Chung-Wei Wang, Wen-Chun Cheng, Kevin Cheng; and Yuh-Zheng Lee, DTC/Industrial Technology Research Institute (Taiwan)

High-Viscosity Electronic Materials Printing Using Ultrasonic Inkjet System (Interactive),

Yuko Nomura, Isao Amemiya, Kenichi Mori, Isao Takasu, Keiji Sugi, and Shuichi Uchikoga, Toshiba Corp. (Japan)

Ink-Jet Printed Electrodes for Passive Fluid Based Display, Ming-Huan Yang, Wei-Yuan

Cheng, Jyh-Wen Shiu, Chung-Wei Wang, Kuo-Tong Lin, Chia-Hsun Chen, Yuh-Zheng Lee, Wanda W. W. Chiu, and Kevin Cheng, Industrial Technology Research Institute (Taiwan)

Real-Time Image Compensation and Memory Arbitration, Chih-Hsuan Chiu, Chia-Ming

Chang, Chih-Jian Lin, Wanda W. W. Chiu, Chieh-Yi Huang, and Kevin Cheng, Display Technology Center of Industrial Technology Research Institute (Taiwan)

Electrostatic Printing of Carbon Nano-tube Liquid Toners, etc., Robert H. Deig,

Dietmar C. Eberlein, and Michel Finzi, Electrox Corp. (USA)

Etch and Plating Resist Formation by Hot Melt Ink Jet (Interactive), Nigel Caiger,

Sun Chemical (UK)

6:00-7:00 PM

INTELLECTUAL PROPERTY PANEL

See sidebar, page 22.

Science and Technology of Dyes and Pigments for Imaging Applications—Various Colors Arising from Polymorphs in Organic Pigments, Jin Mizuguchi, Yokohama National University (Japan)

NIP TRACK 1

9:40 AM-3:00 PM

FUSING CURING AND DRYING

Session Chairs: Lutz Engisch, Technische Universität Chemnitz, Shunji Nakamura, Canon Inc., and Donald Bott, Xerox Corporation

Design and Operational Characteristics of a High-Speed Contactless Fuser (Focal),

Wolfgang Schullerus, Océ Printing Systems GmbH (Germany)

Challenges in Fuser System Materials Design (Focal), Santokh S. Badesha, Xerox Corp. (USA)

The Effect of Fusing Parameters on Gloss and the Study of Maximum Toner Temperature as a Universal Fusing Parameter, Brandon Chaffin, Boise State University; and Anthony Paris and Anthony Holden, Hewlett-Packard Company (USA)

Effect of Coating Micro-Structure on Toner/Paper Interfacial Temperature

Variation During Xerographic Fusing (Focal), Pooya Azadi, Ramin Farnood, and Ning Yan, University of Toronto (Canada)

Viscoelasticity in Toner Fusing Process, Suresh Ahuja, retired (USA)

Energy-saving Technology for Fusing Systems Using EDLC Power Assistance, Kazuhiro Kishi, Naoki Satoh, Yasuhisa Katoh, and Masami Okamoto, Ricoh Co., Ltd. (Japan)

Edgeline Inkjet Drying Technology (Focal), Vance Stephens, Hewlett-Packard Company (USA)

Drying of Paper: Theory and Practice (Focal), Tim Patterson, Georgia Tech Institute of Paper Science (USA)

3:10-5:40 PM

PRODUCTION DIGITAL PRINTING

Session Chairs: Eric Hanson, Hewlett-Packard Company, Marcel Slot, Océ, and Masahiko Itaya, Samsung

Expectations and Challenges of Consumer Package Customisation, Elina Rusko and Jali Heilmann, VTT Technical Research Centre of Finland (Finland)

Advances in NexPress Digital Printing

Technology (Focal), Yee S. Ng, Hwai Tai, Chung-hui Kuo, and Dmitri Gusev, Eastman Kodak Company (USA)

HP Indigo Industrial Web Presses: Technology and Applications, Yoram Hart, HP Indigo (Israel)

The HP Indigo White Ink for Industrial Applications, Gal Victor, Galia Golodetz, Edna Mannheim, and Udi Chatow, Hewlett-Packard (Israel)

Inkjet Printing Technology Solutions for the 21st Century (Focal), James M. Chwalek, Eastman Kodak Company (USA)

NIP TRACK 2

9:40 AM-2:30 PM

TEXTILE & INDUSTRIAL PRINTING

Session Chairs: Hitoshi Ujiiie, Philadelphia University, Rafi Bronstein, Hewlett-Packard Company, and Yasuji Fukase, Fuji Xerox Company, Ltd.

Cationic Pretreatment for Improving Image Quality of Inkjet Printing on Polyester

Fabrics, Chaoxia Wang, Kuanjun Fang, Anli Tian, Xia Zhang, Shaohai Fu, and Xue Jiang, Southern Yangtze University (China)

Effect of Interfacial Energy of Fabrics on Image Quality, Hyunyoung Ok, University of Texas at Austin (USA)

Effect of Texture on Visual Perception of Color in Inkjet Printed Woven Textiles

JiHyun Bae and Traci May Lamar, North Carolina State University (USA)

Preparation of Waterborne Nanoscale Pigment Dispersions for Formulations of Inkjet Inks, Shaohai Fu, Kuanjun Fang, Xia Zhang, Xue Jiang, Anli Tian, and Chaoxia Wang, Southern Yangtze University (China)

UV Curable Pretreatment of Polyester Fabrics for Inkjet Printing (Focal)

Hongxia Xue, Qinguo Fan, and Yong K. Kim, University of Massachusetts Dartmouth (USA)

Dynamics of Impaction and Post-impaction Behavior of Drop-on-Demand (DOD) Inkjet Drops on Textiles

Xi Wang, Wallace W. Carr, and David Bucknall, Georgia Institute of Technology; and Jeffrey F. Morris, City College of New York (USA)

Preparation and Properties of Cationic Pigment Dispersions with SMD Random Copolymers (Interactive)

Xue Jiang, Kuanjun Fang, Xia Zhang, Shao Hai Fu, Chaoxia Wang, Anli Tian, and Hongmin Zhu, Southern Yangtze University (China)

Color Properties of Disperse Dye Inks and Pigment Inks on Polyester Fabrics (Interactive)

Anli Tian, Kuanjun Fang, Xia Zhang, Shaohai Fu, Chaoxia Wang and Xue Jiang, Southern Yangtze University (China)

SPECIAL EVENT

This year's conference reception will take place at the Anchorage Museum of Art and History. Arrangements have been made to have the galleries open so you can learn about the history of this special place while networking with colleagues.

NIP23/ Digital Fabrication 2007 Conference Reception

**Wednesday, September 19
7:00–10:00 pm**

Influence of Different Components on the Properties of Pigment Inks for Textiles (Interactive), Xia Zhang, Kuanjun Fang, Shaohai Fu, Xue Jiang, Anli Tian, and Chaoxia Wang, Southern Yangtze University (China)

Effect of Surface Treatment of Silk Fabrics with Plasma on Inkjet Printing (Focal), Kuanjun Fang, Chaoxia Wang, Anli Tian, Xia Zhang, Shaohai Fu, Xue Jiang, and Shaohua Wang, Southern Yangtze University (China)

2:40-6:10 PM

SECURITY AND FORENSIC PRINTING

Session Chairs: Steven Simske, Hewlett-Packard Company, Tony Harris, Software Imaging, and Shuichi Maeda, Oji Paper Co., Ltd.

Security Printing Deterrents: A Comparison of TIJ, DEP, and LEP Printing (Focal)

Steven Simske, Jason Aronoff, Margaret Sturgill, and Galia Golodetz, Hewlett-Packard Company (USA)

Printer Mechanism-Level Information Embedding and Extraction for Halftone Documents: New Results

S. Suh, J. P. Allebach, G.-T. Chiu, and E. J. Delp, Purdue University (USA)

Digital Watermarking Using Clear Toner (Interactive)

Detlef Schulze-Hagenest, Kodak Digital Printing Solutions NexPress GmbH (Germany); and Arun Chowdry and Dinesh Tyagi, Eastman Kodak Company (USA)

Application of Thermal Printing Technology for Security Printing (Focal)

Fariza B. Hasan, Zink Imaging, LLC (USA)

Development of an Electrophotographic Laser Intensity Modulation Model for Extrinsic Signature Embedding

Peiju Chiang, Aravind K. Mikkilineni, Sunjoo Suh, George T.-C. Chiu, Edward J. Delp, and Jan P. Allebach, Purdue University (USA)

Channel Coding and Pulse Shaping for Data Hiding in Text, Aravind K. Mikkilineni,

Pei-Ju Chiang, George T.-C Chiu, Jan P. Allebach, and Edward J. Delp, Purdue University (USA)

Analysis of Optical Print Growth for Black and Black Fluorescent Ink with Applications in Graphic Security, Robert Cordery,

Claude Zeller, Judith Auslander, and Bertrand Haas, Pitney Bowes (USA)

The Application of Silver Nanoparticles for Security Printing Applications,

Greg Jablonski, Mike Mastropietro, and Chris Wargo, PChem Associates, Inc; and Steve Simske, Hewlett-Packard Company (USA)

Digital Print Technology: An Opportunity and a Threat to Banknote Production,

Astrid Mitchell, Currency News (UK)

NIP TRACK 3

9:40 AM-3:00 PM

MEDIA FOR DIGITAL PRINTING

Session Chairs: Abbie Parker, Hewlett-Packard Company, Wolfgang Schmidt, Felix Schöller, and Toshiharu Enomae, University of Tokyo

Micro-sizing Degree as a Property of Ink-jet Media Printability, Toshiharu Enomae,

Yohta Mori, and Akira Isogai, University of Tokyo (Japan)

Efficient and Accurate MTF Measurement for Spatially Non-uniform Paper,

Masayuki Ukishima, Norimichi Tsumura, Toshiya Nakaguchi, and Yoichi Miyake, Chiba University (Japan); and Markku Hauta-Kasari and Jussi Parkkinen, University of Joensuu (Finland)

Improving the Performance of Inkjet and Laser Printing Through Paper Modification,

John Stoffel, Hewlett-Packard Company (USA)

Application of CLSM Observation Technique to Multicolored Ink-jet Dots (Interactive),

Mikiko Naito, Yasushi Ozaki, and Hisato Nagashima, National Printing Bureau; and Toshiharu Enomae and Akira Isogai, University of Tokyo (Japan)

Approach for Detecting Localization of Inkjet Ink Components using Dynamic-SIMS Analysis (Interactive),

Masaya Shibatani and Tsutomu Asakawa, Seiko Epson; and Toshiharu Enomae, and Akira Isogai, University of Tokyo (Japan)

Observation of Ink-jet Ink Distribution Using a Confocal Laser Scanning Microscope (Interactive),

Mikiko Naito, Yasushi Ozaki, and Hisato Nagashima, National Printing Bureau; and Toshiharu Enomae and Akira Isogai, University of Tokyo (Japan)

Preparation and Properties of Thermo-sensitive Latex Films (Interactive),

Zhongxiao Li, Yujuan Zhang, and Jialing Pu, Beijing Institute of Graphic Communication (China)

The Study of Coating Properties of Substrate to Print Quality on HP Indigo (Interactive),

Xiaoying Rong, California Polytechnic State University (USA)

Inkjet Printing Dynamics: Influence on Ink Distribution in Paper and Print Quality (Focal),

Jonas Örtengren, Johan Eklund, and Jakob Norstedt-Moberg, Mid-Sweden University; Elisabeth Alfthan, M-real Corp./Technology Centre Örnsköldsвик; Jan-Erik Häggglund, MoRe Research (Sweden); Lutz Engisch, Technical University Chemnitz (Germany); and Arne Erikson, Norwegian University of Science and Technology (Norway)

Silica Properties for Matte-Coated Media for Pigment Based Inks, Stephanie Rose, INEOS

Silicas Americas; and Gemma Morea-Swift, INEOS Silicas Ltd. (USA)

Improving Inkjet Print Performance with

YOU DO THE MATH!

\$715 = Non-member Conference Registration

OR

\$600 Member registration fee
+\$95* IS&T membership

\$695 = Conference Registration
IS&T Membership
JIST or JEI subscription
Reduced Tutorial Fees
Access to ALL online papers
Access to member directory
Six issues of *The Reporter*
other IS&T Conference discounts

Become a member when you register for NIP23 or Digital Fabrication 2007 and use the member rates to calculate your fees!

Join today and become a member of the Society dedicated to promoting your profession!

* based on one-year, US address membership rate; non-US address rate is \$105 for a total of \$705.

Fumed Silica at the Size Press, *Leo M. Nelli, Degussa Corp. (USA)*

Printability of Ink-jet Printing on Surface-treated Nonwoven Fabrics (Focal),

Hitomi Hamada, Yasushi Ozaki, and Mikiko Naito, National Printing Bureau (Japan)

Photo-Quality Print Media, *Mridula Nair, Narasimharao Dontula, and Joseph Sedita, Eastman Kodak Company (USA)*

Development of High Quality Inkjet Printing Paper, *Ryoichi Nakano and Hiroshi Yamamoto, FUJIFILM Company (Japan)*

**4:00-5:30 PM
ELECTRONIC PAPER AND
PAPER-LIKE DISPLAYS**

Session Chairs: *Beng Ong, Xerox Corp., Hideyuki Kawai, Seiko Epson, Co., Ltd.*

Novel Type of Bistable Reflective Display (QR-LPD)TM and Material Design of Electronic Powder (Focal), *Koji Takagi, Norihiko Kaga, and Itsuo Tanuma, Bridgestone Co. (Japan)*

Reason Why We Prefer Reading on Paper than Displays: An Approach to the Ideal Design of Readable Electronic Paper, *Junko Imai and Makoto Omodani, Tokai University (Japan)*

Control of Particle Movement for Color Toner Display, *Takashi Kitamura, Sakiko Nakamura, and Nobukazu Kiyagawa, Chiba University (Japan)*

Achieving Color Uniformity from Multi-Element Display and Printhead Devices, *Behnam Bastani and David Donovan, Hewlett-Packard Company (USA)*

DIGITAL FABRICATION

**9:40-11:00 AM
INDUSTRIAL AND COMMERCIAL
APPLICATIONS**

Session Chair: *James Stasiak, Hewlett-Packard Company.*

Substrate Alignment for Single and Multilayer Ink Jet Materials Deposition in Digital Fabrication Systems, *Ross N. Mills and Thomas W. Miller, imaging Technology international (iTi) Corp. (USA)*

Inkjet Method for Forming Openings to Buried Semiconductor Layers of Silicon Solar Cells, *Alison Lennon, Roland Utama, and Stuart Wenham, University of NSW (Australia)*
Inkjet Printed Indicators, *Jali Heilmann, VTT Technical Research Center of Finland (Finland)*

Modeling and Dynamic Analysis of Ink-Jet Fabrication in Reel-to-Reel System, *Wanda W. W. Chiu, Wei-Hsun Huang, Chih-Jian Lin, Cheng-Yi Wang, Chih-Hsuan Chiu, Chen-Chu Tsai, Chien-Kai Chang, and*

Kevin Cheng, DTC / Industrial Technology Research Institute (Taiwan)

**11:30 AM-12:25 PM
PRINTED ARCHITECTURAL
COMPONENTS**

Session Chair: *James Stasiak, Hewlett-Packard Company*

In Search of the Impossible Ceramic Object, *David Huson, University of the West of England (UK)*

Development of Femto Liter Piezo Ink-jet Head and Its Applications (Interactive), *Kin'ya Ozawa, Takahiro Usui, Katsuya Ide, Hayato Takahashi, and Shinri Sakai, Seiko Epson Corp. (Japan)*

3D Printing as a Function of 2D Printing (Interactive), *Branka Lozo, Maja Staniač, and Sonja Jamnicki, University of Zagreb (Croatia); and Tadeja Muck, University of Ljubljana (Slovenia)*

Phase Change Rapid Prototyping with Aqueous Inks, *Dario Mager, Patrick J. Smith, and Jan G. Korvink, IMTEK-University of Freiburg (Germany)*

Epitaxial-film-bonding Technology for Integrating Disimilar Device Materials (Interactive), *Tomoki Igari, Takahito Suzuki, Hironori Furuta, Tomohiko Sagimori, Yusuke Nakai, Hiroyuki Fujiwara, and Mitsuhiro Ogihara, Oki Digital Imaging Corp. (Japan)*

**2:00-3:30 PM
MATERIALS AND SUBSTRATES**

Session Chair: *Maikel van Hest, National Renewable Energy Laboratory*

Overview of Liquid Coal and Its Applications, *Khe C. Nguyen, Sinh T. Do, and Thong V. Le, Saigon Hi Tech Park Research Laboratories (Vietnam)*

Customizing Paper-Based Substrates for Digital Fabrication Printing (Interactive), *Wolfgang A. Schmidt, Felix Schoeller Jr. (Germany)*

Inkjet Printing as a Fabrication Method for Hydrophobic Surfaces (Interactive), *Liisa Hakola, Kim Eiroma, Jali Heilmann, and Hannu Linna, VTT Technical Research Centre of Finland (Finland)*

Polymeric Materials for Printed Electronics and Their Interactions, *Erika Hrehorova, Alexandra Pekarovicova, Valery N. Bliznyuk, and Paul D. Fleming, Western Michigan University (USA)*

Inkjet Printed Active Element on Paper Based on Conductive and Thermochromic Materials, *Kim Eiroma, Liisa Hakola, Jali Heilmann, Kaisa Lehtinen, Tapio Mäkelä, and*

Marja Vilkmán, VTT Technical Research Centre of Finland (Finland)

Thursday September 20, 2007

**8:30-9:40 AM
PLENARY SESSION**

Session Chair: Ross N. Mills,
imaging Technology international. Corp.

Engineering Challenges in Biofabrication,
Thomas Boland, R. Groff, T. Burg, and
K.J.L. Burg, Clemson University (USA)

NIP TRACK 1

9:50 AM-3:30 PM

**PHOTO-ELECTRONIC MATERIALS AND
DEVICES**

Session Chairs: Andronique Ioannidis, Xerox Corp.,
Hans-Josef Humpert AEG Efo, and
Norio Nagayama Osaka University

**Development of OPC for High Speed Digital
Monochromatic MFP (Focal),** Naohiro Toda,
Ryohichi Kitajima, Niimi Tatsuya,
Nozomu Tamoto, Ichiroh Shimaki, Takeshi Orito,
Maiko Koeda, and Yasuyuki Yamashita, Ricoh
Company, Ltd (Japan)

**Incremental Charging Method to Elucidate
the Role of (+) Trapped Charges near the
OPC Surface in Electrostatic Image Defect
Formation (Interactive),** Zbig Tokarski and
YongJin Ahn, Samsung Electronics (Korea);
and Valentas Gaidelis, Jonas Sidaravicius,
Robertas Maldzius, and Tadeusz Lozivski,
Vilnius University (Lithuania)

**A Novel Ring-Structured Diphenoquinone
Based on Calix[4]arene as Electron Transport
Material Doped in OPC and Its Performances
(Interactive),** Ti Wu, Wen-Guang Wang,
Wei-Min Zhang, and Jia-Ling Pu, Beijing
Institute of Graphic Communication (China)

**Aqueous Surface-Smoothing Layer
Compositions for High-Quality Photoreceptors,**
Michel F. Molaire, Eastman Kodak Company
(USA)

SPECIAL EVENT

IS&T will present some of its
2007 Honors and Awards at
the conclusion of Thursday's
plenary talk.
Please join us as we pay
tribute to this year's awardees.

**Corona Charging Characterization of
Organic Photoreceptors,** David S. Weiss,
Bruce R. Benwood, and Donald L. Troendle,
Eastman Kodak Company (USA)

**Diphenoquinone Derivatives and Their
Applications as Charge Transport Material in
Single-layered Organic Photoreceptor
(Interactive),** Weimin Zhang, Ti Wu,
Wenguang Wang, and Jialing Pu, Beijing
Institute of Graphic Communication (China)

**Hydrogen Gas Sensor Utilizing a High Proton
Affinity of P-diketodipyridylpyrrolopyrrole,**
Hiroo Takahashi and Jin Mizuguchi,
Yokohama National University (Japan)

**Complete Decomposition of Benzene,
Toluene, and Particulate Matter (PM)
Contained in the Exhaust of Diesel Engines
by Means of Thermally-excited Holes
(Interactive),** Toru Ebara, Takashi Makino,
Keiji Matsumoto, Takashi Mine, Takumi Ohtsuka,
and Jin Mizuguchi, Yokohama National
University (Japan)

**Preparation of TiO₂ on Ti-wires or Fixation
of Powdered TiO₂ onto Wires of Heating
Element for Decomposition of Organic
Wastes by Thermally-generated (Interactive),**
Daigo Yamaguchi, Keita Kimura, Toru Ebara,
Keiji Matsumoto, and Jin Mizuguchi,
Yokohama National University (Japan)

**Partial Decomposition of Methanol by Means
of Thermally-generated Holes in TiO₂ for the
Production of Hydrogen (Interactive),**
Yoshiyuki Sato, Keiji Matsumoto, Toru Ebara,
and Jin Mizuguchi, Yokohama National
University (Japan)

**Abnormal Effect in Hydrogen Gas Sensors
Based upon Pyridylimidazonaphthalene
(Interactive),** Yuichiro Tsukada, Keita Hirao,
and Jin Mizuguchi, Yokohama National
University (Japan)

**Anomalous Phenomenon in Hydrogen Gas
Sensors Based Upon Pyridylimidazopyrrole,
Keita Hirao, Yuichiro Tsukada, and
Jin Mizuguchi, Yokohama National University
(Japan)**

**Crystal Structure of Parallel-stacked
Peryleneimides and Their Application to
Organic FET Devices,** Kazuyuki Sato and
Jin Mizuguchi, Yokohama National University;
and Sinji Aramaki and Yoshimasa Sakai,
Mitsubishi Chemical (Japan)

**Organic FET Devices Based Upon Latent
Pigments of Unsubstituted Diketopyrrolopyrrole
and Quinacridone (Interactive),**
Hiroyuki Yanagisawa, Sony Corp.;

Kazuyuki Sato and Jin Mizuguchi, Yokohama
National University; and Sinji Aramaki and
Yoshimasa Sakai, Mitsubishi Chemical (Japan)

**Photovoltaic Effect of a Thiophene Substituted
Diarylethene Polymer Film (Interactive),**

Taechang Kwon, Jaekwon Do, Jaehoon Baek, and Eunkyong Kim, Yonsei University (Korea)
The Optical-drive Type Organic Field Effect Transistor for Driving the Electronic Paper, Norio Nagayama, Jin Yoshikawa, and Masaaki Yokoyama, Osaka University (Japan)
Highly Fluorescent Anthracene Oligomers for Direct Photo Patterning, Eunkyong Kim, Krishnamurthy Rameshbabu, Taechang Kwon, and Jungmok Yoo, Yonsei University (Korea)

NIP TRACK 2

9:50 AM-3:50 PM

IMAGE PERMANENCE

Session Chairs: Franziska Frey, Rochester Institute of Technology, Juerg Reber, ILFORD Imaging Switzerland GmbH, and Takao Abe, Shinshu University

Spectroscopic Investigation of IJ Paper Yellowing, Juerg Reber, Rita Hofmann, Marc Pauchard, and Urs Fuerholz, ILFORD Imaging Switzerland GmbH (Switzerland)
Effect of Airflow on Rate of Paper Yellowing in Dark Storage Test Conditions, Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)

Stain Resistance as Part of Image Permanence for Consumer Digital Ink-Jet and Thermal Imaging Systems, Kristine Lawrence, Joseph LaBarca, Wendell Brattlie, and David Erdtmann, Eastman Kodak Company (USA)
Test Methods of Humidity Fastness of Inkjet Printing Materials, Hideki Kaimoto and Yoshihiko Shibahara, FUJIFILM Corp. (Japan)
Image Permanence: Comparing the Technologies (Focal), Len Carreira and Peter Mason, Torrey Pines Research (USA)

Rf Method of Reciprocity Performance Testing, Part II: Long Term Performance Verification, Adam R. Bush, Joseph LaBarca, Douglas Bugner, and Jon Kapecki, Eastman Kodak Company (USA)

Simulating Accelerated Commercial In-Window Display: Predicted Print Longevity for Pigment Ink Systems on a Range of Media Types, Kali Campbell, Nils Miller, Lori Books, and Katie Burns, Hewlett-Packard Company (USA)
Lightfastness Properties of Different Digital Printers and Papers (Focal), Steven Rice and Paul D. Fleming III, Western Michigan University (USA)

A Survey of Print Permanence in the 4x6-Inch Consumer Digital Print Market in 2004-2007: Part II, Henry Wilhelm, Wilhelm Imaging Research, Inc. (USA)

Effects of Paper Manufacturing Factors on Inkjet Print Quality and Lightfastness, Lokendra Pal, Sachin Agate, and Paul D. Fleming, Western Michigan University (USA)

SPECIAL EVENT

This year NIP and DF are holding a joint Interactive Paper Session. Papers will be available for viewing beginning with the coffee break on Tuesday.

**Interactive Papers Session
Thursday, September 20
3:50–6:00 pm**

A Review of the Evolution of Ink Jet Print Durability Against Environmental Gases, Stephan Moeller, Wolfgang Schmidt, and Gerd Papier, Felix Schoeller Jr. (Germany)

NIP TRACK 3

9:50 AM-3:30 PM

PRINTING SYSTEM ENGINEERING AND OPTIMIZATION

Session Chairs: George T.-C. Chiu, Purdue University, Xavier Bruch, Hewlett-Packard Española, and Teruaki Mitsuya Ricoh Printing Systems, Ltd.

Industrial Printing Beyond Color, Reinhard R. Baumann, Chemnitz University of Technology (Germany)

Electronics for Industrial Digital Printheads: The Path to a Universal Solution, Clive Ayling, The Technology Partnership plc, (UK)
Optimized Automatic Recovery of Nozzle Health in Inkjet Systems, Jose Luis Valero, Cynthia Jarom, and Esteve Comas, Hewlett-Packard Company (Spain)

Monte-Carlo Optimal Inkjet Nozzle Design (Focal), Jinquan Xu and Christopher Muir, Eastman Kodak Company (USA)

Heat Transfer Issues in Print-heads: Control and Applications (Focal), Pere Canti, Hewlett-Packard Company (Spain)

A Robust Multi-pass Printing Method (Interactive), Cesar Nino and Roger Keane, Dupont Color Communication (USA)

Tone Reproduction Sensitivity Analysis for Color Electrophotography (Interactive), Yan-Fu Kuo and George T.-C. Chiu, Purdue University (USA)

Development of 20 Channel Laser Diode Array of 650 nm Wavelength and Narrow Pitch (Focal), Junshin Sakamoto,

Junichi Matsuno, and Hiroshi Inenaga, Ricoh Printing Systems, Ltd.; and Shinichi Nakatsuka, and Masahiro Aoki, Hitachi, Ltd. (Japan)

Improvement of Color Registration in a Tandem-type Color Laser Printer, Sooyong Kim and Munbo Shim, Samsung Electronics Co., Ltd. (Japan)

A Coupled Analysis of Mechanical Vibration Problem and Transfer Process, Akin Ecer, *Technalysis, Inc. (USA)*

DIGITAL FABRICATION

9:50 AM-12:00 PM PRINTING OF BIOMATERIALS

Session Chair: Jan Sumerel, FUJIFILM Dimatix

Application of Inkjet in Tissue Engineering and Regenerative Medicine,

Makoto Nakamura, Yuichi Nishiyama, Chizuka Henmi, Kumiko Yamaguchi, Shuichi Mochizuki, Koki Takiura, and Hidemoto Nakagawa, Tokyo Medical and Dental University (Japan)

Printed Epoxy-based Hydrogel Sensors and Actuators, *Paul Calvert, Prabir Patra, and Deepak Duggal, University of Massachusetts (USA)*

Damage to Biological Materials During Ink-Jet Printing, *Brian Derby, Rachel Saunders, and Julie Gough, University of Manchester (UK)*

Piezoelectric Inkjet Printing of Horseradish Peroxidase on Fibrous Substrates, *Sabina Di Risio and Ning Yan, University of Toronto (Canada)*

Building Functional Patterned Thin Films One Drop at a Time, *Jan L. Sumerel, FUJIFILM Dimatix; and Leila F. Deravi and David W. Wright, Vanderbilt University (USA)*

12:10 AM-3:50 PM

NEW AND NOVEL DIRECT WRITE METHODS

Session Chair: Thomas Boland, Clemson University

Micron Order Patterning by a Novel Inkjet Technology, *SIJ, Kazuhiro Murata, AIST; Kazuo Shimizu, SIJTechnology, Inc.; and Yorishige Matsuba, Harima Chem., Inc. (Japan)*

Characterization of Photo-reduced Silver Organometallic Salt Deposited by Inkjet Printing, *Jonathan Stringer, Bojun Xu, and Brian Derby, University of Manchester (UK)*

3 Dimensional Microstructuring System for Research and Industrial Applications (Interactive), *Sven Passinger, Christoph Ohrt, Roman Kiyan, Carsten Reinhardt, and Boris Chichkov, Laser Zentrum Hannover E.V. (Germany)*

Electronic Circuit Printing, 3D Printing and Film Formation Utilizing Electrostatic Inkjet Technology, *Hiroyuki Kawamoto, Waseda University (Japan)*

Powder Coating using Electromagnetic Brush Technology, *Juergen Kress and Alex Bruderer, Atotech Germany GmbH (Switzerland)*

Hierarchically Structured Membranes Manufactured by Inkjet Technology, *Stephan Jahn and Lutz Englisch, Institute for Print and Media Technology; and Werner R. A. Goedel and Reinhard R. Baumann, Chemnitz University of Technology (Germany)*

Direct Circuit Formation Technology Using Electrophotography, *Yuichiro Sano, Toru Miyasaka (Japan)*

The Venue: Anchorage, Alaska

Anchorage, Alaska, with its Northern Lights, nearby glaciers, native arts, and frontier culture will host this year's conferences. Join us for what promises to be an exciting technical meeting combine with an incredible travel experience!

A small city by most standards, Anchorage is the perfect location from which to explore the wonders this part of the world has to offer, whether via day or overnight trips. To help accommodate this, IS&T is working with a local tour company to put together some pre- and post-conference trips for you (see page 32). Its proximity to nature allows you to spend the day viewing wildlife or trekking through a glacier valley and be back in the city in time for dinner.

In spite of its size, Anchorage has a wide selection of restaurants—from fine dining establishments to brewpubs—that offer a wide array of taste selections, including Japanese and Russian fare, reindeer sausage, and wonderful fresh fish and seafood. In addition, there is a vibrant art scene and interesting museums and stores to explore.

The headquarter hotel for NIP23 is the Hilton Anchorage, which is the site of the tutorials and the Welcome Reception. Technical sessions and the exhibit will take place at the Anchorage Convention Center, located a block from the hotel. To help keep travel budgets down and offset the cost of airfare, we've secured rooms for \$125/night single/double at the Hilton. For more infor-

3:50-6:00 PM

INTERACTIVE PAPER SESSION

Session Chair: Gregory Herman, Hewlett Packard Company, and Hugh Allen, SunJet, a division of Sun Chemical

Friday September 21, 2007

8:00-9:30 AM

PLENARY SESSION

Session Chairs: Ramon Borrell, Hewlett-Packard Española SL

Spectral Printing, *Ján Morovic, Hewlett-Packard Company (Spain)*

9:40 AM-12:30 PM

ENVIRONMENTAL ISSUES

Session Chairs: Eric Stelter, Eastman Kodak Company, Axel Fischer, INGEDE, and Koji Hirakura, Ricoh Company, Ltd.

Environmental Issues and Non-Imact Printing (Focal), *Velliyur R. Sankaran, Sankaran Consulting (USA)*

Environmental Compliance Testing of Fuser and Pressure Roller Products, *Wade Eichhorn and Dave Winters, 7-SIGMA, Inc. (USA)*

Chemical Emissions: Product Stewardship for Printers in the 21st Century, *William Davis, IBM (USA)*

Digitally Printed Newspapers: Unrecyclable Trash or Still a Sustainable Resource?

SPECIAL EVENT

All attendees are invited to join us for the Friday morning plenary, which will feature a buffet breakfast beginning at 8:00 am followed by the plenary address at 8:30.

Breakfast is included in your registration fee, but you must indicate via the conference registration form that you will be at this session to receive the appropriate admission ticket.

**Breakfast Buffet and Plenary
Friday, September 22
8:00–9:30 am**

(Focal), *Axel Fischer, International Association of the Deinking Industry (INGEDE) (Germany)*

The Application of High Intensity Ultrasound to the Deinking of Recycled Papers, *Robert Thompson, Andrew Manning, and Anna Fricker, University of the Arts London (UK)*

Austrian Eco Label for Printed Paper Products, *Werner Sobotka, Druckinnovation; and Christian Kornherr, Verein für Konsumenteninformation (VKI) (Austria)*

Panel Discussion, *lead by Axel Fischer International Association of the Deinking Industry (INGEDE) (Germany)*

mation on housing, see the registration form on page 35.

There are direct flights from many cities in North America to Anchorage, such as Vancouver, Los Angeles, San Francisco, Portland, Seattle, Salt Lake City, Minneapolis, and Chicago. There are direct flights from Frankfurt via Condor (a division of Lufthansa, www.condor.com) on Saturday, Sunday, and Tuesday and on China Airlines (www.china-airlines.com/en/index.htm) from Taipei on Sunday, Tuesday, Thursday, and Friday (return on Monday, Wednesday, Friday, and Saturday).

IS&T continues to research flight options and will post them at [\[ences/nip23\]\(http://www.imaging.org/conferences/nip23\) as additional information becomes available.](http://www.imaging.org/confer-</p></div><div data-bbox=)

Average Anchorage temperatures in September hover around 57°F/14°C, with showers a possibility. Daylight averages 14.25 hours. A special treat is that the Northern Lights should be visible by this time of year.

To learn more about Anchorage and what it has to offer, visit www.anchorage.net. This site is available in English, Spanish, German, Chinese, Japanese, and Korean. Just click on the flag in the lower left corner to change the language.

Tours Program

To help those of you who would like to explore Alaska while you are in Anchorage, IS&T is working with Explore Tours to offer you a variety of tour options. To register for any of these tours, please contact Explore Tours directly.

There are many other tours offered by this company, including those that last multiple days. To view additional options and detailed tour descriptions, and to access the online tour registration go to www.exploretours.com/conferences/sist.html or contact Explore Tours at info@exploretours.com or 800-523-7405.

Tour vouchers and all relevant information will be given to you when you check in to your hotel.

There will be a tour desk set up onsite during selected hours, but we highly recommend that you register for tours before arriving in Anchorage.

TOURS OFFERED DAILY

*You choose the best time and day for you.
All flightseeing tours are weather dependent.
Other tours usually operate rain or shine!
(Alaskans are pretty hardy!)*

Earthquake Park Bike Ride

\$69/person

Departs daily at 9 am, 1pm, and 5 pm; Returns at 11:30 am, 3 pm, and 7 pm, respectively

Take a guided tour along the 10-mile Tony Knowles Coastal trail on a mountain bike to Earthquake Park. Along the way possibly see moose and other local flora and fauna.

Tour Includes:

- Transfer to/from Anchorage
- 1.5-hour guided bike ride
- Kona Suspension Bike
- Snacks and Water Bottle

Discover McKinley Flightseeing Tour

\$295/person

Departure times vary and depend on weather conditions; total duration 3 hours

See Mount McKinley and the surrounding countryside from the cockpit of a small floatplane.

Tour Includes:

- Transfer to/from Anchorage
- Narrated flightseeing tour
- Tours are weather dependent

Explore Knik Glacier/Wildlife Flightseeing Tour

\$205/person

Departure times vary and depend on weather conditions; total duration 1.5 hours

See how the motion of glacier ice shapes the land from cockpit of a small floatplane.

Tour Includes:

- Transfer to/from Anchorage
- Narrated flightseeing tour

Rainforest Hike

\$99/person

Departs daily 8:30 am, and 1:30 and 4:30 pm

Explore a section of the historic Iditarod Trail, which winds through this pristine rainforest located an hour from Anchorage and may include a unique hand tram crossing of Winner Creek Gorge.

Tour Includes:

- Roundtrip transfer to/from Anchorage
- Snack
- Guided 5 mile hike along the Winner Creek Trail (2-3 hour tour)

Glacier Hike

\$179/person

Departs daily 8:30 am and 1:30 pm

Ride the scenic Alyeska Tram 2,300 feet and hike 40 minutes to the edge of a glacier. At the glacier's edge, hikers put on

ropes, harnesses, and crampons before hiking out across the glacier itself, before descending the mountain.

Tour Includes:

- Roundtrip transfer to/from Anchorage, and Tram Ticket
- All Equipment and a snack
- 3-4 hour hike with Int'l Mountain Guide

Learn to Ice Climb

\$229/person

Departs daily 8:30 am; Returns around 3 pm

Learn everything from basic to advanced ice-climbing techniques!

Tour Includes:

- Roundtrip Transfer to/from Anchorage
- 4-5 hours at guided ice climbing location

(tour duration varies based on group and weather conditions)

- All Technical Climbing Equipment

All Terrain Vehicle (ATV) Adventure

\$186/person

Departs daily 9:15 am and 1:15 pm;

Returns 1:45 and 5:45 pm, respectively

See the real Alaska on a guided 4-wheeler tour. Your guide will choose a scenic area with the best conditions for your fun-filled, 3-hour ride in Alaska's backcountry where you'll see the local landscape, all the while looking out for wildlife.

Tour Includes:

- 3-hour guided 4-Wheeler Tour
- Helmets and Rain Gear
- Transfer to/from Anchorage

TOURS OFFERED ON SPECIFIC DAYS

A few of the tours are being offered for attendees on certain days. All are also available on other days with the exception of the Matanuska Valley Tour and the Portage Glacier Tour (it only runs through 9/16).

**Friday, Sept. 21st
Matanuska Valley and
Iditarod Kennel Tour**

\$104/person

Departs at 1:30 pm; Returns 6:15 pm

A great way to end your week. After the special Environmental Session on Friday, join other attendees for an afternoon tour that will allow you to see a wonderful slice of Alaska.

After a 1-hour narrated tour en route to the Matanuska-Susitna Valley, visit Happy Trails Dog Kennel where you will enjoy a multimedia presentation about the Iditarod Sled Dog Race, see a mushing demonstration from an Iditarod musher, and pet the championship sled dogs and puppies.

Tour Includes:

- Narrated Motor coach tour en route
- Admission to Happy Trails Dog Kennel

**Saturday, Sept. 15 and
Sunday, Sept. 16**

Real Alaska Tour

\$241/person

Departs 6:45 am; Returns at 10:15 pm

See all the wonders Alaska has to offer in one full-day tour.

Tour Includes:

- Narrated 3.5-hour train ride (7-hours roundtrip) and all transfers
- 1.5 hour Sled Dog Tour
- Lunch
- Glacier Tour
- Seward City Tour
- Guides at sites

Portage Glacier Cruise

\$69/person

Departs 9 am or 12 pm;

Returns at 4 pm or 7 pm

Portage is an interior lake glacier located within 60 minutes of Anchorage. Stops at the Portage Glacier Visitor Center and explores the Portage Valley.

Tour Includes:

- Narrated Motor coach tour
- 1-hour Portage Glacier Cruise

Saturday, Sept. 15; Sunday, Sept. 16;
Tuesday, Sept. 18, Friday, Sept. 21, and
Saturday, Sept. 22

Kenai Fjord National Park Tour

\$195/person

Departs at 7 am and returns at 9:30 pm

Drive three hours to Seward, before embarking on boat that takes you into Resurrection Bay where you explore the waters of Kenai Fjord National Park. See humpback whales, orcas, otters, sea lions, and colorful sea birds, while a naturalist points out highlights.

Tour Includes:

- 6-hour narrated Wildlife and Glacier Cruise
- Lunch
- Transportation to/from Anchorage

26 Glacier Cruise

\$185.50/person

Departs at 11 am and returns at 7:30 pm

Travel down Turnagain Arm through the tunnel to Whittier, where you board a boat that takes you out into Prince William Sound where you visit multiple glaciers and see lots of wildlife.

Tour Includes:

- 4.5 hour narrated cruise
- Lunch
- Transportation to/from Anchorage

Alaska Native Heritage Center

Daily 9 am – 6 pm only
until Tuesday, September 18th!

A shuttle bus runs to/from the Center from downtown through Tuesday, September 18th.

Tickets are \$23.50/person or
\$21.50 Senior/Military

and can be purchased at the door

The Center celebrates, perpetuates and preserves the unique Alaska Native Cultures, languages, traditions and values through celebration and education. More information can be found at www.alaskanative.net.

PLEASE READ!

**SPECIAL
NOTICE ABOUT
PROCEEDINGS**

You will be asked to choose
either the:

**Joint NIP23/Digital Fabrication 2007
Proceedings (hard copy)**

A stand-alone book containing the technical papers from both NIP23 and Digital Fabrication 2007, as well as information on the program and exhibit.

or the

**Joint NIP23/Digital Fabrication 2007
Proceedings Abstract Book with CD**

A booklet containing the abstract of each paper from both NIP23 and Digital Fabrication 2007, with the full technical papers from both conferences on a CD. The booklet also contains information on the program and exhibit.

when you register.

One of the above is included in your registration fee, **but you must indicate the format you prefer when registering. Those who do not indicate a preference will be given the CD version.**

Additional copies and copies of other formats are available for advance or onsite purchase at a special rate.

We will also offer single CDs at a special price for those who choose the hardcopy book and want a CD as well. See the registration form on page 36 for details.

NIP23/DF 2007 Hotel Registration

A special block of rooms at a discounted rate is being held at the Hilton Anchorage for IS&T attendees for the nights of September 16–21, 2007. The discounted rate is available for 3 days prior to and 3 days after these dates, based on availability. Early reservations are assigned on a priority basis to conference attendees provided they are received by August 25, 2007. To guarantee a room, a credit card number or deposit equal to one night's housing must accompany the reservation request. Please note: A limited number of rooms are available to students and professors at a neighboring hotel at a lower rate. Please contact IS&T for details. We also have a few rooms at the local Marriott at a higher rate. Contact IS&T to learn about these.

Reservations may be made by calling the hotel at 800/245-2527 and telling them you are with the "IS&T NIP23/DF2007 Conference" or by faxing this form to 907/265-7042. For on-line reservations, visit www.hilton.com/en/hi/groups/personalized/ancahhf_ist/index.jhtml. Click on "Book a Room," make sure to select your arrival and departure dates (it automatically populates the fields, which may not be what you want) and your room preference, then click "continue" to fill in your personal information.

Reservations Deadline: August 25, 2007

**Hilton Anchorage
500 West Third Avenue
Anchorage, AK 99501
907/271-7411; 907/265-7042 fax**

First/Given Name _____ Family Name _____

Title/Position _____ Company _____

Mailing Address _____

Telephone _____ Fax _____ Email _____

Arrival Date and Time _____ Departure Date _____

- Single (\$125) Double (\$125) Triple (\$145) Quadruple (\$165)
 King-size bed Two double beds
—Rates are per day plus 12% tax—

Check in is 3:00 pm. Check out is noon.

There is no charge for children under 18 years when sharing a room with a parent with the existing bed configuration.

List any special needs: _____

Deposits can be made by check or a major credit card.

Payment Method: Check (Check # _____) AMEX MC VISA Discover
Card#: _____ Exp. Date: _____

Name as it appears on card: _____

Authorization Signature: _____

Early Departure Fee In the event a guest checks out prior to the guest's reserved checkout date, the hotel will add an early checkout fee of \$50.00 to the guest's account. Guests wishing to avoid this fee should advise the Hilton Anchorage at or before check-in of any change in planned length of stay.

Notice of Cancellation must be given to the hotel 48 hours prior to arrival date to receive a full refund of deposit. Be sure to obtain a cancellation number.

To/From Anchorage International Airport (ANC)

Information on flights in/out of ANC and ground transportation to/from the airport can be accessed via the airport's very comprehensive Website at www.dot.state.ak.us/anc/index.shtml

Transportation Notes: Taxi service is available at the ANC terminals; the taxi waiting area is located curbside directly outside the main lobby of the airport. The typical minimum charge is \$17.00. For more information visit www.dot.state.ak.us/anc/travelerInfo/taxiSrvcs.shtml. Self and Valet parking are available at the hotel; with a cost of \$8 for self parking and \$14 for valet.

NIP23/DF 2007 Technical Registration

First/Given Name _____

Last/Family Name _____

Title/Position _____

Company _____

Mailing Address _____

Telephone _____ Fax _____

Email _____

Conference registration includes:

admission to all technical sessions for both conferences, a choice of conference Proceedings, entrance to the exhibit, coffee hours, ticketed receptions, and Friday morning breakfast (you must indicate your intention to attend). Separate registration fees are required for tutorials.

Guest/spouse registration includes:

breakfast on Monday featuring a speaker from the CVB who will talk about what there is to do in Anchorage, followed by a specially-designed 1.5-hour city tour, and the Welcome and Conference receptions.

To help ensure adequate space in session rooms indicate the days you plan to attend:

Mon Tues Wed Thurs Fri

(if you plan to attend the Friday morning breakfast, you must check that you plan to attend that day)

Please circle the NIP Track(s)/DF session you plan to attend most:

NIP Track 1 NIP Track 2 NIP Track 3 Digital Fabrication

Conference Registration (CHECK ONE)	until 8/15	after 8/15	TOTAL
<input type="checkbox"/> IS&T/ISJ Member	\$600	\$645	\$ _____
<input type="checkbox"/> Non-member	\$715	\$760	\$ _____
<input type="checkbox"/> IS&T/ISJ Speaker/Session Chair Member	\$485	\$505	\$ _____
<input type="checkbox"/> Speaker/Session Chair Non-member	\$585	\$600	\$ _____
<input type="checkbox"/> IS&T/ISJ Student (ID required) Member	\$140	\$170	\$ _____
<input type="checkbox"/> Student (ID required) Non-member	\$170	\$200	\$ _____

Proceedings Choice (one copy comes with your registration; check the version you'd like)

- NIP/DF Abstract Book with CD (see page 34 for details) NC
- NIP/DF Hardcopy book (see page 34 for details) NC

Extra proceedings; Advance and onsite copies only \$100/each \$ _____

(indicate number of each and multiple by special advance purchase/onsite price)

NIP/DF Hardcopy book NIP/DF abstract book with CD

Extra CD (without abstract book; only available as addition to Hardcopy selection/purchase)

Copy of NIP/DF CD \$75/each \$ _____

Page Subtotal \$ _____

continued on next page

Call for Exhibitor Registration and Information

NIP23/DF 2007 Registration page 2

Tutorial Registration

(multiply number of classes by per course fee; students may register for \$50/class; to get the student rate, you must register via fax and provide a copy of your student ID)

	Member	Non-member	
2-hour (per class; add \$50/class after 8/15)	\$160	\$210	\$ _____
Check all that apply: <input type="checkbox"/> T6 <input type="checkbox"/> T8 <input type="checkbox"/> T12 <input type="checkbox"/> T13 <input type="checkbox"/> T20			

4-hour (per class; add \$50/class after 8/15)	\$240	\$290	\$ _____
Check all that apply: <input type="checkbox"/> T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> T5 <input type="checkbox"/> T7 <input type="checkbox"/> T9 <input type="checkbox"/> T10 <input type="checkbox"/> T11 <input type="checkbox"/> T14 <input type="checkbox"/> T15 <input type="checkbox"/> T16 <input type="checkbox"/> T17 <input type="checkbox"/> T18 <input type="checkbox"/> T19 <input type="checkbox"/> T21 <input type="checkbox"/> T22 <input type="checkbox"/> T23			

Series (per series; add \$100/series after 8/15)

<input type="checkbox"/> General Technology <input type="checkbox"/> Electrophotography			
<input type="checkbox"/> Image Quality	\$540	\$590	\$ _____
<input type="checkbox"/> Business and Tech <input type="checkbox"/> Digital Fabrication	\$480	\$600	\$ _____
<input type="checkbox"/> Ink Jet	\$600	\$720	\$ _____
<input type="checkbox"/> Electrophotographic Materials	\$700	\$820	\$ _____

Mix 'n' Match

(you choose three, fill in member or non-member price next to each, add together, and multiply by .75 to get your price, representing 25% savings)

T_____ \$ _____ + T_____ \$ _____ + T_____ \$ _____ = \$ _____ x .75 = \$ _____

Membership	US address	Non-US Address	
___ IS&T halfyear membership (new members only; expires 12/07)	\$47.50	\$52.50	\$ _____
___ IS&T18-month membership (expires 12/31/08):	\$142.50	\$157.50	\$ _____
___ IS&T membership renewal (expires 12/31/08):	\$95	\$105	
___ Student membership (Oct. 1, 2007–Sept. 30, 2008)	\$25	\$25	\$ _____

join now and calculate fees based on member rates

Other		
___ Guest/spouse registration (Name: _____)	\$100	\$ _____
___ Extra Welcome Reception Ticket	\$35	\$ _____
___ Extra Conference Reception Ticket	\$50	\$ _____

Subtotal from previous page \$ _____

GRAND TOTAL \$ _____

Payment Method: Check (Check # _____) AMEX MC VISA Discover

Card#: _____ Exp. Date: _____

Name as it appears on card: _____

Authorization Signature: _____

Return this form with signed credit card authorization or check payable in US dollars to
IS&T, 7003 Kilworth Lane, Springfield, VA 22151
fax to 703/642-9094

or register online at www.imaging.org/conferences/nip23 or /df2007

Please note: To cover bank charges and processing fees, there is a cancellation fee of \$75 dollars until September 15, 2007. After that date, the cancellation fee is 50% of the total plus \$75. All requests for refund must be made in writing. No refunds will be given without a written request after October 15, 2007.

Digital Fabrication 2007/NIP23

Society for Imaging Science and Technology
7003 Kilworth Lane
Springfield, VA 22151 USA
703/642-9090; 703/642-9094 (fax)



imaging.org

Join us in Annapolis
September 16-21, 2007!

NON-PROFIT ORG.
US POSTAGE PAID
Merrifield, VA
Permit No. 2333