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/
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NIP23 / Digital Fabrication 2007
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
- Welcome and Conference Receptions,
  the latter held at the Anchorage Muse-
  um of Art and History
- high-quality exhibits
  a Print and Digital Art Gallery
- five timely keynotes
  a joint Thursday afternoon Interactive
  Paper Session
- a new NIP interactive panel:
  “Future and Limitations of Ink Jet and
  Electrophotographic Printing”
  a special single-track session on Envi-
  ronmental Issues held Friday morning;
- a special panel on Intellectual Property
  the session begins with a Breakfast Ple-
  nary and ends with a panel discussion
- new NIP sessions on “Fusing, Curing,
  and Drying” and “Advanced Materials
  and Nanoparticles”

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 tech-
ology, 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
Esrix 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

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*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

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.

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T1: Introduction to Electrophotography
Sunday, September 16, 2007
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 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.
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/MAS 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
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-dimen- sional 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 labora- tory bench to the manufacturing floor. This tutorial is intended to provide an in- troduction to this emerging science. It cov- ers established and new digital fabrication methods, new materials and processes that enable fabrication, and manufacture a broad range of devices, systems and struc- tures. 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 process- es 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 active- ly involved in developing new digital fabrication meth- ods 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 ef- fort is being conducted in the modification or “tuning” of existing dyes, or dye classes in terms of shade, solubility and/or reactivi- ty. This tutorial assists in the understanding such tuning processes. Using color (in pre- sentations 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/prop- erty (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 chro- mophores 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 renowned 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).

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:

- 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 special emphasis on "aging" mechanisms and additive effects. From 1998 until the end of 2000, Nash served an expatriate assignment at Fuji Xerox, Take-matsu, 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.

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 CIELab 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 hours)
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 systems. 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. He 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 (WOFE), 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&G 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.

**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 at 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.

**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. 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 frequent lecturer at technical symposia, universities, and industries in the US, Canada, and Europe.

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 systems.

“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 PreparedToners
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.”
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

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**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.

**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
- Identify the relationship between chemical make up and the function of the various layers in an organic photoreceptor
- 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 (1989). 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.
**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.

- Akihiro Yamamura, Oki Data Corp. (Japan)  
  New Technologies for High Durable/Reliable Photoconductor Unit in Color MFP, Tadashi Kasai, Tokuya Ohjimi, Shinichi Kawhara, Takatsugu Fujisiro, and Jun Shiori, Ricoh Company, Ltd. (Japan)

- Analysis of Image Defects at Solid Edges in Single Component Development Systems, J. Yoo, Jeanman Sur, Ki-Jae 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 Electrographic System by Large-scale Discrete Element Method, Hiroshi Mio, Keihanna Interaction Plaza Inc.; and Yoshishiro 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, 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 Kueiying 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 Ferrari, 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, Dor Kella and Amirn Lazav, 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,
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, Toyouo Morokita, and Yoshishiko Azuma, Tokyo Polytechnic University (Japan)

Fundamental Considerations Related to Chromatic Adaptation (Focal), Nobuhiro Matsuhiro, 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 Heur-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), HyungSeo 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 Rijavec, 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 Autoimage in Multi-Level Supercell Halftone Screen Designs, Kenneth R. Crouse, Monotype Imaging Inc. (USA)

Image Synthesis Method for Integral Photography Using Hexagonal Fly’s Eye Lens, Kazuhisa Yanaka, Hirotoshi Nii, and Hidea Kasuga, Kangawa Institute of Technology (Japan)

5:20-6:20 pm
INTERACTIVE PANEL
“Future and Limitations of Ink Jet Printing and Electrophotography”

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

Extending Toner Shape Analysis to 3D, Kevin Loftus, Eastman Kodak Company (USA)

Particle Size Dependence on Toner Charge in Two-Coponent Developer, Yosui 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,
Anchorage, Alaska / September 16–21, 2007

and Toshikiko 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, Norihito Fukui, 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. Ivata, K. Tan, and A. Watada, Ricoh Co Ltd. (Japan); H. Ikeura-Seikiguchi, RIIF, 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, Chenjen 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 Chenjen 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 “Round-ing” Surface Treated Toner (RST-toner) vs. Chemically Prepared Toner (CP-toner) (Interactive), Shyi-Shyang (Robert) Li, Evenlight 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, Hainuo 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 Kaneda, Paul Brandi, 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)

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 DeMelio, 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, Hiroshi Eguchi, and Yoshivisia Ohita, Ricoh Company, Ltd. (Japan)
Novel Micro Piezo Technology for Inkjet Printhead (Focal), Tomoaki Takahashi and Motonori Okumura, Seiko Epson Corp. (Japan)
Using Solid Mechanics to Evaluate the Capillary and Viscous Behavior of Polyester-based Chemically Prepared Toner for High-speed Digital Production Printing (Focal), Dinesh Tyagi, Eastman Kodak Company (USA)
Performance Analysis of Pulvized “Round-ing” Surface Treated Toner (RST-toner) vs. Chemically Prepared Toner (CP-toner) (Interactive), Shyi-Shyang (Robert) Li, Evenlight USA Inc., and Jian-Sheng Hung, Tren Tone Imaging Inc. (USA)
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Process Design and Optimization of External Additive Blending on to Toner Surface, Samir Kumar, Xerox Corp. (USA)
Noncircular Tube Shapes, Robert W. Cornell, Lexmark International, Inc. (USA)
Performance Comparison of Square and Split Heaters (Interactive), Min Soo Kim, Bang Wlon 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 Castejon-Pita, and Ian Hutchings, University of Cambridge (UK)
Splashing of Droplets on Structured Surfaces, Jonathan Stinger and Brian Derby, University of Manchester (UK)
Studies on Inkjet Ink with Confocal Raman Microscopy (Interactive), L. Engisch, J. Örtegren, and W. Goedl, 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. Soucemarianadin, 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 Lu, 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 Lu, 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 Jürgens, photograph conservator (Germany)
TBA (Focal)

NIP TRACK 3
9:40 AM-4:35 PM
PRINT AND IMAGE QUALITY
Session Chairs: Chunghui 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 Ane, Rochester Institute of Technology, and Chunghui 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 Hashino, Nippon Institute of Technology (Japan)
Indigo Light Inks: Raising the Bar for Image Quality

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 Crenan, Xerox Corporation, Webster, NY
Joseph E. Root, Haynes, Belfield & Wolfleld, Half Moon Bay, CA

Tuesday, September 18
6:00–7:00 pm

NIP 23 / Digital Fabrication 2007
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Tuesday, September 18
6:00–7:00 pm
Quality (Interactive), KokWei Koh and Ethud Chatow, Hewlett-Packard Labs (USA)

Absolute Calibration of Gloss Measurements (Focal), J.S. Arney and Dave Nolosek, 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, Chunghui 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, OV Kaukonenemi, 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)

Converting Nanoparticles by Surface Modification and Chemomechanical Processing (Focal), Steffen Pilotek, Bühler Inc. (USA); and Samuel Schar, Klaus Steingröver, and Frank Tabellion, Bühler 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 Paulina 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, Mark 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. Marshfield, 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)

4:50-5:50 PM

ADVANCED MATERIALS AND NANOPARTICLES IN IMAGING

Session Chair: Robert Boydo, Sensient Imaging Technologies

Silica Sol-/Gel based Nano Structured Hardcoats (Focal), Hans Joseph Humpert, AEG Elektrooptik und Mikromechanik GmbH; and Michael Dohle, Christoph Roth, Bernd Knackfur; and Wolfgang Witt, Sensient Imaging Technologies GmbH (Germany)
Wednesday September 19, 2007

8:30-9:30 AM
PLENARY SESSION
Session Chair: Ramon Borrell, Hewlett-Packard España SL

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)


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)

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 Dispensions 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 Buchinal, Georgia Institute of Technology, and Jeffrey F. Moris, City College of New York (USA)

Preparation and Properties of Cationic Pigment Dispensions 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)

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, Perju Chiang, Aravind K. Mikkilineni, Sunjoo Suh, George T.-C. Chiu, Edward J. Delp, and Jan P. Allebach, Purdue University (USA)
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道路上的交通顺畅。车辆在道路上快速行驶，没有明显的拥堵现象。街道两旁的建筑物排列整齐，楼体颜色各异，有红色、白色、蓝色等。人行道上，行人穿梭其中，有的匆忙赶路，有的悠闲漫步。在公园里，孩子们在草地上玩耍，家长在一旁看护。公园的周围种满了树木和花草，为城市增添了一抹绿色。周围的建筑以现代化为主，简洁而时尚。
Marja Vilkman, 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 elo, and Norio Nagayama Osaka University

Development of OPC for High Speed Digital Monochromatic MFP (Focal), Naohiro Toda, Ryohichi Kitajima, Niimi Tatsuya, Naozuru Tamoto, Ichirch Shimeki, Takeshi Orito, Masako Koeda, and Yassyuki 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 Yong-Jin Ahn, Samsung Electronics (Korea); and Valentas Gaidelis, Jonas Sidaravicius, Robertas Maldzius, and Tadeusz Lozivski, Vilnius University (Lithuania)

A Novel Ring-Structured Diphenoquione 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)

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

Dipenoquinone 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-diketopyrpyrrolopyrrole, Hiroo Takashiki 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, Takeshi Mine, Takumi Ohtuka, and Jin Mizuguchi, Yokohama National University (Japan)

Preparation of TiO$_2$ on Ti-wires or Fixation of Powdered TiO$_2$ onto Wires of Heating Element for Decomposition of Organic Wastes by Thermally-generated Holes (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 TiO$_2$ 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 Pyridylimidazophenanthrene (Interactive), Yuichiro Tsukada, Keita Hirao, and Jin Mizuguchi, Yokohama National University (Japan)

Anomalous Phenomenon in Hydrogen Gas Sensors Based Upon Pyridylimidazopyrene, 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)

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

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. Treindle, Eastman Kodak Company (USA)

Dipenoquinone 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)

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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)

Photovoltaic Effect of a Thiophene Substituted Diarylethene Polymer Film (Interactive),
Taechang Kwon, Jaekwon Do, Jaeheon Baek, and Eunkyung 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, Eunkyung Kim, Krishnamurthy Ramsheshbabu, 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, IFORD Imaging Switzerland GmbH, and Takao Abe, Shinshu University

Spectroscopic Investigation of LJ Paper Yellowing, Juerg Reber, Rita Hofmann, Marc Pauchard, and Urs Fuenholz, IFORD 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 Erdmann, 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 Carrera 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, Nils Boek, and Katie Burns, Hewlett-Packard Company (USA)
Lighfastness Properties of Different Digital Printers and Papers (Focal), Steven Rice and Paul D. Fleming III, Western Michigan University (USA)
Effects of Paper Manufacturing Factors on Inkjet Print Quality and Lightfastness, Lokendra Pal, Sachin Agate, and Paul D. Fleming, Western Michigan University (USA)

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 España, and Teruaki Misuyu, 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 Valera, 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 Shinich 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 Takura, 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 Inkjet Printing, Brian Derby, Rachel Saunders, and Julie Gough, University of Manchester (UK)
Piezoelectric Inkjet Printing of Horseradish Peroxidase on Fibrous Substrates, Sabrina 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, SI, Kazuhiro Murata, AIST; Kazuo Shimizu, SJ Technology, Inc.; and Yorihide Matsuda, Hanima 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 Oht, Roman Kyan, 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 Ernsch, 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 Myasaka (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 of this part of the world. 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 and Jan Morovic, Hewlett-Packard Company (Spain)

9:40 AM-12:30 PM
ENVIRONMENTAL ISSUES

Environmental Issues and Non-Impact 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? (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 Ficker, University of the Arts London (UK)

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

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

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

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 www.imaging.org/conferences nip23 as additional information becomes available.

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, 1 pm, 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

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)

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
• 1.5-hour guided flightseeing tour
• Tours are weather dependent

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
rope, 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

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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

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**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

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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 a 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.
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/ancashh_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.

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

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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
___ NIP/DF Hardcopy book ___ NIP/DF abstract book with CD
$100/each       $ _____

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**
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)

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

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Membership

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Other

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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.
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