



**Digital
Fabrication
2011**



NIP27
27th International Conference on
Digital Printing Technologies

**PRELIMINARY
PROGRAM**

www.imaging.org/conferences/nip

October 2-6, 2011

Minneapolis, Minnesota

Digital Fabrication

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Shinri Sakai

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Publications Chair:

Paul Benning

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NIP

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Contact Donna Smith at info@imaging.org for details.

*If you work in the field of digital printing,
digital fabrication, or
any related technology,
and are looking for the best training,
exposure to cutting edge technology advances, and/or
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join us in Minneapolis, Minnesota for the 27th International Conference on **Digital Printing Technologies (NIP27)** and the **2011 Digital Fabrication Conference!**

As digital printing continues to grow and expand into areas we never imagined 27 years ago, these collocated conferences offer participants the chance to learn about the latest technologies in the worlds of digital printing and fabrication. No other venue offers you the chance to attend vibrant sessions that present cutting-edge research findings under a single registration fee.

Publications Chairs Scott Silence and Paul Benning have developed an exceptional program to bring you presentations that both challenge and enlighten. Four content-packed days include:

- Three days on which to pick from an in-depth array of 23 informative short courses
- Four full days of multi-track technical sessions
- Exhibitors who represent the companies who provide you with the services and products you need to succeed
- Joint Interactive Paper and Demonstration Session and Print Gallery; this year the session will be held in the Exhibit Hall and will include a Happy Hour
- Six keynote talks from world-reknown experts
- Special Monday panel discussion on Improving the Velocity of Innovation
- Wednesday afternoon roundtables on Technology and Application
- Welcome and Conference Receptions
- A Farewell Reception for one last round of networking opportunities

See details of the whole week beginning on page 16.

Please mark your calendars to join us in Minneapolis, Minnesota! We look forward to seeing you there.

—Xavier Bruch, General Chair NIP27, and
Shinri Sakai, General Chair Digital Fabrication 2011

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The Venue: Minneapolis, Minnesota

NIP27/Digital Fabrication 2011 will take place at the Hilton Minneapolis, conveniently located in the center of the city. The hotel is connected to eight miles of covered skyways, leading to the pedestrian-friendly Nicollet Mall area, home to restaurants offering diverse cuisines.

The Mississippi River runs through Minneapolis—in fact Lock #1 is found here. With 22 lakes within the city limits and dozens of parks, there are river and lake tours to take and walking trails to discover.

Boasting the world famous Mall of America (520

stores, 50 restaurants, and the nation’s largest theme park), Minneapolis is also home to the Walker Art Center, one of the best contemporary art museums in the US. More than 400 artists live in the Northeast Minneapolis Art District and there is a very lively music scene—maybe you’ll run into hometown rock icon Prince!

Early October weather can range from a high of 71°F/22°C to a low of 39°F/4°C, thus layers and rainware are suggested.

For more information on the city, visit www.minneapolis.org/.

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Short Course Program

This year's NIP/DF Short Course Program offers a wide range of introductory and advanced topics in the fields of nonimpact printing and digital fabrication given by internationally recognized experts dedicated to promoting the understanding and advancement of imaging science and technology. Attendees receive copies of the instructors' notes/slides with course registration. We encourage you to sign up for short courses by the early registration deadline to ensure that a course runs.

Special Offer:

Sign up for 2 or more short courses and receive 10% off the member or non-member fee.

Students may take any short course for \$50. Additional discount does not apply.

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

Sunday October 2, 2011

SC01-S1: An Introduction to Digital Fabrication: Methods, Materials, and Applications

8:00 – 10:00 AM (2 hours)

Instructor: James W. Stasiak, Hewlett-Packard Company

During the past decade, there has been a remarkable convergence of two disparate technologies: digital printing of text and images and the fabrication of physical objects. This convergence, a blending of traditional printing methods with recent advances in materials science and with established manufacturing methods, has brought about the foundation of a new technology: digital fabrication. Already, digital fabrication approaches are enabling new discoveries at the laboratory bench and are beginning to provide new efficiencies and unprecedented product customization on the manufacturing floor. In the near future, digital fabrication methods—along with the development of “functional inks”—will make it possible to print complete electronic circuits, optical devices, mechanical structures, and even new biological materials. The objective of this short course is to provide an introduction to the rapidly emerging science and technology of digital fabrication. The course includes an up-to-date overview of the methods, materials, and processes that are reshaping manufacturing and enabling new commercial applications in electronics, MEMS, and the life sciences. Finally, the class examines factors that are moving digital fabrication from a niche technology toward a new manufacturing paradigm.

Benefits

This course enables an attendee to:

- Develop an understanding of different digital fabrication methods and materials.

- List and compare different applications that range from printed electronics to the life sciences.
- Evaluate the technological issues and challenges of digital fabrication.
- Develop an understanding of the technology landscape, key players, and practitioners.
- Recognize the market opportunities addressed by this emerging technology.

Intended Audience: this is a survey course for engineers, scientists, and technical marketing professionals who are working or are interested in digital fabrication and printed electronics.

James Stasiak is currently a principal scientist in Hewlett-Packard's Technology Development Laboratory in Corvallis, Oregon. He is actively involved in developing new digital fabrication methods and applications. In a career spanning more than 30 years, he has made contributions in the fields of device physics, molecular electronics, non-impact printing technologies, and, more recently, the emerging fields of flexible electronics and digital fabrication. In 2005 and 2006, he served as the General Chair for the Digital Fabrication Conference and now serves on the Digital Fabrication Conference Advisory Committee. He holds more than 14 issued US patents and is the author or editor of numerous technical articles and proceedings.

SC02-S1: Introduction to Electrophotography

8:00 AM – 12:00 PM (4 hours)

Instructor: Marc Cousoulis, Lexmark International, Inc.

Electrophotography is the underlying print engine technology that drives the multimillion dollar laser printer and toner industries. This course provides a review of the foundational

science required to understand the functional and architectural decisions that define the design of modern toner-based imaging systems. Electrophotography is examined from both a historical perspective and with an emphasis on current technological trends. The business of electrophotography transcends multiple industries and disciplines: from chemical manufacturers to managed print service providers, and from physicists to IT specialists. Any individual who works directly or indirectly with the toner-based imaging industry will benefit from this course.

Benefits

This course enables an attendee to:

- Appreciate the history and evolution of electrophotography.
- Identify and explain the six fundamental steps of electrophotography.
- Comprehend the basic physics of toner charging, development, transfer, and fixation.
- Understand how industry standards are used and misused when categorizing marking systems.
- Compare the current technology choices utilized commercially.

Intended Audience: imaging professionals in all disciplines who are seeking an overview of the science and application of electrophotography.

Marc Cousoulis has more than 15 years of electrophotographic experience across three market segments, holding the positions of senior scientist at Moore Business Forms developing ultra high speed toner-based imaging systems, senior electrophotographic engineer at Aetas Technology developing low end color laser printer technologies, and currently electrophotographic technology team lead for high-end color laser printers for Lexmark International. He holds separate degrees in physics and imaging science from the Rochester Institute of Technology.

SC03-S1: Introduction to Toner Technology

8:00 AM – 12:00 PM (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. Also discussed are 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 are provided.

Benefits

This course enables an 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: Customer for Life Award.

SC04-S1: Advanced Digital Halftoning

8:00 AM – 12:00 PM (4 hours)

Instructor: Jan P. Allebach, Purdue University

Digital halftoning, which creates the impression of continuous-tone using marking processes that have finite spatial and amplitude resolution, is a fundamental step for virtually all printing technologies, ranging from small inkjet photo-printers through office laser electrophotographic printers; to high-speed, digital dry- and liquid-toner presses and large-format, industrial inkjet systems. The design of an effective halftoning algorithm is strongly impacted by the performance requirements, the available computational resources, the specific characteristics of the marking process, and the characteristics of the human visual system.

This short course describes the basic principles of digital halftoning and the three major classes of halftoning methods: screening, error diffusion, and search-based. It discusses the impact of the human visual system on the design of digital halftoning algorithms, how models for the marking process may be incorporated within this design, and the extension of halftoning algorithm design to color. The course shows how training-based strategies can leverage the quality of computationally intensive search-based methods into the design of much simpler algorithms that yield nearly the same level of image quality as the more computationally intensive methods from which they are derived. The latter part of the course focuses on stochastic, dispersed-dot masks and error diffusion algorithms that are widely used in inkjet products; periodic, clustered-dot, supercell halftones that are widely used in laser electrophotographic products, and stochastic, clustered-dot masks that have potential applications in a range of printing technologies.

Benefits

This course enables an attendee to:

- Understand the basic concepts of digital halftoning.
- Appreciate factors that influence the design of digital halftoning algorithms.
- Be able to characterize marking processes in order to parameterize models that can be used in the algorithm design.
- Learn how to design dispersed-dot and clustered-dot stochastic masks; modern error diffusion algorithms that are free from the artifacts commonly seen in error diffusion generated halftone textures; and clustered dot, periodic supercell halftone screens using rotated screens or non-orthogonal lattices to suppress moiré in color printing.

Intended Audience: for individuals who want to learn the fundamentals of digital halftoning, and to become familiar with the current state of digital halftoning algorithm design. Attendees are presumed to have a basic knowledge of image processing and linear systems.

Jan P. Allebach is Hewlett-Packard Distinguished Professor of Electrical and Computer Engineering at Purdue University in West Lafayette, Indiana. His work on digital halftoning and image rendering algorithms has been licensed by major vendors in the printing industry and is used in products, some of which have sold 100s of millions of units world-wide. Allebach is a Fellow of the IEEE, IS&T, and SPIE. He has been Distinguished/Visiting Lecturer for the IEEE Signal Processing Society and IS&T, and has received five teaching awards while at Purdue. He received the Bowman Award from IS&T in 1998,

and was named 2004 Electronic Imaging Scientist of the Year by IS&T and SPIE. In 2007, he was named Honorary Member of IS&T – the Society's highest honor.

SC05-S1: Business in Japan and China

8:00 AM – 12:00 PM (4 hours)

Instructors: Robert J. Nash, Hafren Associates and Graham Galliford, Galliford Consulting & Marketing

The Far East is an important center for the digital printing industry. Many major OEM manufacturers of printers and supplies are based in Japan, with manufacturing plants being increasingly relocated to Special Economic Zones in China. These areas of China are also home to many third-party producers of print cartridges, printer components, etc. As a result, many digital printing technologists and businessmen must travel frequently to Japan and China. For Westerners these visits can create significant cross-cultural challenges. Accordingly, this course has been designed to facilitate East/West interactions, based on personal experiences.

The first two hours of the course discuss the underlying factors of business life in Japan from a cultural and linguistic perspective. For the frequent traveler to Japan, an understanding of the underlying social rules can greatly improve business relationships. The discussion of doing business in Japanese focuses on the verbal and non-verbal clues that are important for effective interpersonal relationships in the country. To demystify Japanese writing, key features of hiragana, katakana and kanji are briefly reviewed. Natural-sounding, Japanese speech patterns and intonation are presented.

The second two hours focus on the logistics of business in China. Opportunities for business and different options of how to enter into business in China will be discussed with reference to the objectives of doing so. There will be a detailed discussion of doing business as a visitor, joint ventures, wholly owned foreign enterprises, personnel considerations, cultural differences, and dealing with the local and national government. Cultural aspects of conducting business in China will also be addressed, including interpersonal dynamics, the importance of personal contact, conducting meetings in China, travel considerations, and etiquette in business entertaining.

Benefits

This course enables an attendee to:

- Learn about Japanese life through the experiences of a resident foreigner living and working daily in the local environment.
- Learn to understand the unwritten set of rules that governs life in Japan, such as non-

verbal interactions, indirect queries, social hierarchies, the maintenance of harmonious relations, etc.

- Avoid being viewed as a boorish, blunt, questioning, impatient, ill-tempered, impolite, etc. Western visitor.
- Recognize key Japanese verbal expressions.
- Develop interpersonal traits compatible with the Japanese lifestyle.
- 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: travelers to Japan who still feel confused and uncomfortable even after repeated visits. Japanese nationals seeking an insight into the “problems” that foreigners experience in Japan. Non-Chinese managers and specialists without experience working in foreign business environments destined to work in China either as visitors or on an expatriate basis.

Robert Nash served an expatriate assignment at Fuji Xerox, in Japan, as the senior manager, resident for the Xerox Supplies Development, Manufacturing and Supply Chain Operations organization from 1998 until the end of 2000. There, he and his wife lived in a close-knit Japanese neighborhood where they experienced many aspects of everyday life in Japan. Nash 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.

Graham Galliford founded Galliford Consulting & Marketing, a techno-commercial consulting business concerning toner-based digital printing in May 1994. GCM operates from a unique facility for research and development into digital printing materials and has created new printing materials and assisted in design, testing, and qualification of raw materials for printing. Apart from his R&D initiatives, Galliford is a regular speaker at conferences worldwide on the toner business from technology to marketing to manufacturing and has recently focused upon development of chemically prepared toners (CPT) as well as the global shifts in business from Western Markets to Asia and in particular the shift to the Peoples Republic of China.

SC06-S1: Standard Workflows in Printing and Proofing

8:00 AM – 12:00 PM (4 hours)

Instructor: Peter Karp, Fogra

ISO standards provide international agreed upon aims such as ISO 12647-2 for offset lithography, part 7 of Contract Proofing or part 8 for Validation Prints, ISO 12646 and ISO 14861 for softproofing and the upcoming ISO

15311 for digital printing. This course provides an introduction to the concepts and interplay of important ISO standards for the graphic arts industry. It also provides insight into how to create characterization data and how to establish workflows that meet those standards.

Benefits

This course enables an attendee to:

- Understand the history and evolution of ISO 12647-family.
- Identify and explain of how digital prints are currently covered with ISO.
- Provides means of how to achieve a compliance check with respect to a standard print, a contract proof, and a validation print.
- Comprehend the basic differences of process calibration concepts often termed as “G7” versus “TVI”.
- Describe guidelines of how to create a standard workflow.
- Compare softproof and hardproof quality.
- Give an outlook on ISO 15311 — the digital printing production standard.

Intended Audience: imaging professionals in all disciplines seeking an overview and scope of important ISO standards for the graphic arts industry.

Peter Karp works in the prepress division at Fogra, Munich, Germany. He joined Fogra in 2008. Within the prepress department he does research in the fields of color management, color appearance, contract color proofing (hard and softproofing), and print. He received a master degree in photographic engineering from the University of Applied Sciences in Cologne, Germany and worked as a product manager for a monitor manufacturer before joining Fogra.

SC07-S2: Liquid Toner Printing: Technology and Applications

10:15 AM – 12:15 PM (2 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. In spite of these demonstrated strengths, liquid toners are employed in a minority of printing systems today. The course explores how the fundamental strengths of these technologies have led to this current state and project where liquid toner will continue to be a vibrant force.

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.

Benefits

This course enables an 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.
- Have a vision of where liquid toner technologies are fundamentally advantaged.
- Learn about recent innovations in liquid toner technology.

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

George A. Gibson is the program manager for New PII Platforms in the Xerox Research Center Webster of the Xerox Innovation Group. He has led research, development, and manufacturing organizations involved in non-impact printing for more than 20 years. Originally trained as a chemist, he did his undergraduate and graduate work at Binghamton University; he holds an MBA from the University of Rochester's Simon Graduate School of Business. Gibson has 52 US patents; has written more than 20 published papers in imaging and colloid science, and the management of R&D; is a frequent lecturer in imaging technology, R&D productivity, portfolio management, and technology valuation. He is the author of a forthcoming book Finding the Golden Eggs: An R&D Professional's Guide to Managing New Product Development Through Valuation.

SC08-S3: Role of Inkjet in Commercial and Industrial Printing Applications

1:30 – 3:30 PM (2 hours)

Instructor: Ronald Askeland, Hewlett-Packard Corp.

This short course examines products from Canon, Epson, FujiFilm, HP, Kodak, Kyocera, and Xaar. Inkjet is compared to electrophotographic, offset, flexo, screen, and rotogravure printing for markets beyond the consumer and office. Thermal, piezo, and continuous inkjet printhead performance parameters and ink/media interactions are examined for applica-

tions in large format, publishing, direct mail, photographic, and package printing. Future trends in commercial/industrial printing are also discussed.

Benefits

This course enables an attendee to:

- Compare the pros and cons of electrophotographic, inkjet, and analog printing technologies in commercial/industrial applications.
- Describe key differences in piezo, continuous and thermal inkjet printhead performance characteristics.
- Understand future directions in digital printing beyond the home and office.

Intended Audience: intended for those somewhat familiar with inkjet printing technology who want a better understanding of inkjet's role in the analog to digital conversion process.

Ronald Askeland is a system architect in the Printing Technology Platforms division of Hewlett-Packard. He has 26 years of experience in thermal inkjet technology and has been awarded more than 50 US patents on inkjet inks and printing systems. Askeland received his PhD in analytical chemistry from Colorado State University and has worked for HP in San Diego, CA since 1984.

SC09-S3: Introduction to 3D Printing

1:30 – 3:30 PM (2 hours)

Instructor: Ramon Vega, Hewlett-Packard Corp.

3D printing or additive manufacturing technologies in general, is an expected future growth area, with a wide variety of different technologies available. Some of the fundamental technologies have been around for a while but the latest enhancements in equipments, performance and materials are now making them a compelling alternative for a diverse range of applications, some of them unique. Also the emergence of low cost 3D printers is contributing to the popularity of the subject. This course provides an overview of the existing 3D printing technologies, materials, their fundamentals, current performance, relative strengths and weaknesses. An overview of the 3D printing overall ecosystem, market, players, applications, software, trends, and news is included.

Benefits

This course enables an attendee to:

- Get up to speed on the fundamentals of 3D printing (additive manufacturing) in a short time.
- Have a clear view of different existing

approaches to create 3D parts by means of additive manufacturing.

- Understand the fundamentals of the underlying technologies and the materials used to work with each of those.
- Learn the pros and cons of each technology and the challenges ahead. Also, an overview of some public research projects being conducted in 3D around the world.
- Appreciate a broad view of the key players in the market, the verticals being addressed, a rough idea of the market potential, and thoughts on how the industry may evolve and the barriers to mass adoption.

Intended Audience: anyone interested in getting up to date in regards to 3D printing, with none or little previous exposure to it (this is where the gain/time is maximized).

Ramon Vega is a senior technologist and marketer at Hewlett Packard's Large Format Printer (LFP) division in Barcelona, Spain. He's been involved in the development of LFPs since 1997, taking a wide spectrum of technical roles/skills. Having a MS in mechanical engineering (UPC ETSEIT) combined with an EMBA (Esade Business School), and a curious mind, he's been lucky to be involved in many technology/business scouting activities and startup programs in the past. His latest work has been around 3D printing competitive intelligence. His involvement for 3D printing goes back to his university days where he was instructing 3D CAD SW and developed SW for an FDM like printer.

S10-S3: Electrostatics and Particle Adhesion in Electrophotography

1:30 – 5:30 PM (4 hours)

Instructor: Dan Hays, Consultant

Electrophotography is widely used in digital copiers and printers to produce high-quality documents for office and production markets. Over the years, continual advances in the technology have enabled high-speed printing and excellent image quality for both mono and full-color printing. This short course provides a foundation for understanding various electrostatics phenomena that are exploited in the electrophotographic process. The course serves as an introduction to electrostatics topics covered in other related courses on electrophotography.

Benefits

This course enables an attendee to:

- Understand basic concepts regarding electrostatic forces, electric fields, electrostatic potential, and energy.
- Comprehend the role of electrostatics in the electrophotographic process.

- Describe different methods for charging or neutralizing an insulative layer.
- Identify different methods for charging powder (toner).
- Describe techniques for measuring the charge on an insulative layer and powder.
- Appreciate how the maximum electric field for air breakdown depends on the air gap and particle size.
- Describe the importance of charged particle adhesion in electrophotography.
- Explain model descriptions of charged particle adhesion due to Van der Waals and electrostatic forces for both uniformly and nonuniformly charged particles.
- Understand adhesion and electric field detachment measurement methods and results for triboelectric and ion charged particles.

Intended Audience: technicians, engineers, scientists and managers involved in electrophotographic research and engineering. Familiarity with college-level physics is a recommended prerequisite.

Dan A. Hays retired from Xerox Corporation in 2006 as a Senior Research Fellow in the Wilson Center for Research & Technology, Webster, NY. His research and technology contributions in the field of electrophotography have spanned the areas of triboelectricity, charged particle adhesion, and xerographic development systems. During a 38 year career, he published 57 scientific papers and holds 75 US patents. Prior to joining Xerox in 1968, he received a BS from Iowa State University and a PhD in physics from Rutgers University.

SC11-S3: Fusing Technologies and Toner Materials Relationships

1:30 – 5:30 PM (4 hours)

Instructor: Dinesh Tyagi, Eastman Kodak Company

Most conventional electrophotographic printing systems require a fusing sub-system that 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 that is 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 each technology's 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 is explained. In the last part of the

course, the two to three most-common fusing technologies are discussed, covering the critical parameters and failure modes that govern each technology's operation, and the scientific and engineering challenges faced during both the technology and product-development cycles of a fuser.

Benefits

This course enables an 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 in 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 will be assumed; familiarity with the basics of heat transfer, and mechanics will be beneficial, but is not required.

Dinesh Tyagi received his PhD from Virginia Tech (1985) from the Department of Chemical Engineering with a thesis titled "Structure-Property Relationships in Segmented Polymers." After a one-year post-doctoral position there, he joined Eastman Kodak Company as a research scientist where he has continued to work in the area of toner formulations and electrophotography. He was inducted into Kodak's Distinguished Inventors Gallery in 1994. In 1999, he joined NexPress Solutions, which was later absorbed back into Kodak. Tyagi has more than 80 patents worldwide. In the past, he has taught this course with David Thompson, Xerox Research Center Webster.

SC12-S3: Digital Packaging

1:30 – 5:30 PM (4 hours)

Instructor: George Gibson, Xerox Corporation

Increasingly the benefits of digital printing are being applied to the production of packaging. Conventional package printing techniques certainly produce the high quality demanded by brand owners but frequently this comes with significant inventory and waste. Additionally increasingly sophisticated approaches to market segmentation have shown that there is significant value to be had in tailoring offerings to an increasingly number of smaller niches. Key to

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unlocking this potential is the ability to produce packaging of appropriate quality and cost in a way that meets the scale and value chain requirements of the host industry.

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.

Benefits

This course enables an attendee to:

- Understand the forces driving adoption of digital print in the various package printing segments and the opportunities for market growth.
- Understand the applications and requirements for package printing in label, folding carton, corrugated packaging and flexible packaging.
- Map the technology characteristic onto the market requirements identifying the relative strengths, weaknesses, opportunities and threats of each technology in the context of packaging markets.
- Understand the current market offerings and their position to the market's "ideal points".

Intended Audience: technical professionals who want to become more knowledgeable about how digital printing is likely to fit into the package printing markets.

See bio under SC07-S2

SC13-S3: Digital Biofabrication

1:30 – 5:30 PM (4 hours)

Instructor: Thomas Boland, University of Texas El Paso

Digital and non-impact printing has found new applications in non traditional disciplines, such as MEMS and bioengineering. By exploiting non-impact printing approaches and new materials, it has become possible to pattern two- and three-dimensional structures that are biologically active. This course provides an introduction to the emerging science of biofabrication. It covers established and new digital fabrication methods, new materials, and processes that enable fabrication and manufacture a broad range of biologically active devices, systems, and structures.

Benefit

This course enables an attendee to:

- Identify different digital fabrication methods and biomaterials.
- List and compare different digital fabrication methods with application in the life sciences.
- Evaluate the technological issues and challenges of digital fabrication processes and materials.
- Understand the technology landscape, key players, and practitioners.

Intended Audience: engineers and scientists working in or interested in entering the interface of printing and life sciences.

Thomas Boland a professor at University of Texas at El Paso, is also director of UTEP's Biomedical Engineering Program and an adjunct professor at Texas Tech University. He received his BS from the Ecole Nationale Supérieure d'Ingénieurs de Genie Chimique (1990) and his PhD from the University of Washington (1995), both in chemical engineering. In 1999, he joined Clemson University receiving tenure in 2005. Prior to heading up the UTEP BME program, Boland was the Director of a NSF/NIH-funded Bioengineering and Bioinformatics Summer Institute. His research interests are applying engineering principles to automate, predict, and build 3D structures that show biological function. He has received numerous awards; authored more than 45 publications; delivered more than 25 invited presentations; and been featured on CNN and Discovery Channel for his ground breaking innovations using inkjet printers to assemble cells and biomaterials. He is a member of the AVS, MRS, I&E-T, and the Tissue Engineering and Regenerative Medicine International Society.

SC14-S4: Meeting Global Indoor Air Quality Requirements for Imaging Devices

3:45 – 5:45 PM (2 hours)

Instructors: Marilyn Black, Air Quality Sciences (AQS) and GREENGUARD Environmental Institute, and Scott Steady, AQS

Designing products to meet global regulatory and sustainability standards requires products to be evaluated for chemical exposure and indoor air quality (IAQ) performance. Poor IAQ leads to health complaints like eye, nose, and throat irritation, and headaches among those exposed to the air surrounding operating equipment. Indoor pollutants originating from imaging devices can include volatile organic compounds (VOCs) like styrene and formaldehyde; semi volatile organic compounds like phthalates and siloxanes; particulate matter, and ozone. Public concern has also been raised about the release of ultra fine particles (UFPs) that have increased human health consequences. This course addresses common IAQ pollutants associated with different types of imaging devices. Participants learn how testing and health assessment procedures can help manufacturers meet global regulatory requirements needs and achieve market acceptability.

Benefits

This course enables an attendee to:

- Identify and review global IAQ programs and requirements for imaging devices.
- Review common pollutant emissions from imaging devices and human health impact.
- Review airborne levels of key pollutants emitting from imaging devices and how they compare with established international occupational and consumer IAQ standards and guidelines.
- Understand basic environmental chamber and analytical measurement methodologies for studying chemical emissions and odor perception and predicting indoor exposure concentrations.
- Review ultrafine particle release from operating devices- measurement technologies, levels, and test methods.
- Learn basic risk assessment procedures with a review of key government toxicology programs.

Intended Audience: product development engineers, product stewards, environmental regulatory managers, sales engineers, field application engineers, and imaging scientists.

Marilyn Black is Chief Scientist of Air Quality Sciences (AQS) and Founder of the GREENGUARD Environmental Institute,

member companies of Underwriters Laboratories. She received a PhD in chemistry from Georgia Institute of Technology, and is an expert on characterizing indoor air pollution and its impact on human health. With 25 years of experience, she has directed research studies on chemical and particle emissions from electronic equipment and authored more than 200 scientific publications.

Scott Steady is the Technical Sales Director at AQS. Steady received his BS in chemical engineering from Louisiana State University and has worked as an air quality consultant and product emissions expert for more than 10 years. He has extensive experience working with manufacturers to measure product emissions and determine compliance with global regulatory and sustainability programs. He has worked with several manufacturers in the building product, electronics, and printing industries to develop standardized protocols for measuring product emissions.

SC15-S4: Free-Volume Effects in Imaging Systems

3:45 – 5:45 PM (2 hours)

Instructor: Michel (Mike) Frantz Molaire,
Formulation, Coating, and Process Consultant

The majority of imaging systems consist of dispersed and/or dissolved image-active molecules in polymeric matrixes. The glass temperature T_g of the polymeric matrix, the characteristic of the imaging mixture (compatibility, miscibility, thermal history), and the operating temperature critically influence the imaging process. The free-volume theory provides a framework to analyze and describe the impact of various manufacturing processes on the imaging process.

This course reviews the free-volume theory emphasizing the key and important concepts. Examples of free-volume imaging effects in photopolymerizable dry-film systems, photoreceptors, photoreceptor drums, sol gel overcoats and photochromic systems are presented. It further proposes general imaging mechanisms that are susceptible to free-volume influence and techniques to overcome and minimize those effects.

Benefits

This course enables an attendee to:

- Learn about the free-volume theory.
- Appreciate the importance of the glass transition temperature T_g in amorphous coating systems.
- Understand physical aging of glasses.
- Learn about several free-volume effects in various imaging systems, including photoreceptors, photopolymerizable compositions, and sol-gel overcoats.
- Discover how to differentiate “free-volume trapping” from “intrinsic trapping.”

- Analyze the critical conditions for potential free-volume effects.
- Review techniques to minimize or eliminate negative free-volume effects.

Intended Audience: imaging professionals; formulation, coating and process scientists; manufacturing engineers who want to become aware of a potential problem that only reveals itself to those looking for it. A basic knowledge of polymer science will be beneficial but is not required.

Michel (Mike) Frantz Molaire received his BS in chemistry, MS in chemical engineering/polymer science, and MBA from the University of Rochester. As a senior research associate with Eastman Kodak, Molaire gained much experience with polymer synthesis, photopolymerization, molecular glasses, optical recording materials, photoelectrographic masters, photoreceptor formulations, pigment dispersions, conductive coatings, castable polyurethane, image transfer materials, drum coating technology, and robust testing of digital printers. He holds 55 US and more than 110 international patents. Molaire is the recipient of the Kodak's C.E.K. Mees Award for excellence in scientific research and reporting, an inductee of Kodak's Distinguished Inventor's Gallery, and the African Scientific Institute Fellowship. A member of IS&T, he is the president and the vice president of programs for its Rochester chapter.

Monday October 3, 2011

SC16-M2: Overview and Segmentation of Digital Production Printing

10:30 AM – 12:30 PM (2 hours)

Instructor: Detlef Schulze-Hagenest,
Kodak Graphics Communications GmbH

Toner technologies, specifically electrophotography, have to date led digital printing technologies in most segments of the marketplace. Inkjet technologies have been available for this application as well for a long time, but specifically since DRUPA 2008, inkjet-based production printing has become the primary focus of the digital print community. This course provides a segmentation and overview—from the technical viewpoint—of the toner- and ink-based products now available on the market for digital production printing.

Benefits

This course enables an attendee to:

- Identify the basic concepts of production digital printing.
- Understand the toner- and ink-based print technologies used in this market segment and their related strengths.
- Gain an overview of the current application

- spectrum of digital production printing.
- Identify the current products on the market and their main applications.
- Learn how the different technical approaches lead to the product properties as requested in the marketplace.
- Be aware of components and materials relevant to the success of the products.

Intended Audience: anyone working in the field of digital production printing and is seeking a mainly technical-driven introduction to the field. Engineers, scientists, technical product managers, and suppliers working in the field of digital production printing or seeking to develop an in-depth understanding of it, are the intended audience.

Detlef Schulze-Hagen studied physics and intellectual property law in Hamburg and Berlin and received his PhD in physics from Kaiserslautern-University. Since 1980, he has worked in the field of platforms, processes, and materials for digital printing, with a special focus on electrophotography and inkjet. He is currently the Senior Engineer of Technology Development at Kodak Graphic Communications GmbH in Kiel, Germany. He is the author of approximately 50 patent families; is a member of IS&T; and was General Chair of NIP24. He practices classical music, sailing, and gardening, and is co-editor of a German magazine for railway enthusiasts.

SC17-M2: Image Quality Assessment: Not So SSIMple

10:30 AM – 12:30 PM (2 hours)

Instructor: Al Bovik, The University of Texas

The course describes the basic principles of image quality assessment and the philosophy underlying the SSIM index. We discuss such basic principles as perceptual masking, natural scene modeling, and multi-scale analysis. The SSIM index is discussed in detail, as well as successful variants, such as Multi-scale SSIM (MS-SSIM) and P-SSIM, and the available IQA databases and subjective studies that have been conducted. A description of an application of SSIM to print quality assessment is included. Lastly, the course surveys the new breed of emerging blind image quality assessment algorithms that are able to predict subjective image quality without the need for a reference, with an accuracy approaching or even exceeding SSIM.

Benefits

This course enables an attendee to:

- Understand the basic concepts of image quality assessment (IQA).
- Appreciate perceptual factors that underlie the design of IQA algorithms.

- Become familiar with the philosophy behind the Structural Similarity index and how the algorithm is designed and implemented.
- Learn about more advanced versions of the SSIM index, such as Multiscale SSIM (MS-SSIM) and P-SSIM.
- Learn about the subjective prediction power of the SSIM index and its variants.
- See examples of the SSIM index in action, including a large-scale application to print quality assessment.
- Discuss the future of image quality assessment, including Blind (or No-Reference) IQA.

Intended Audience: for individuals who want to learn the fundamentals of image quality assessment, and to become familiar with the current state of image quality assessment algorithm design. Attendees are presumed to have a basic knowledge of image processing.

Al Bovik is the Curry/Cullen Trust Endowed Chair Professor of Engineering at The University of Texas at Austin and Director of the Laboratory for Image and Video Engineering (LIVE). He has published about 600 technical articles in image processing and perception. He authored several books, most recently The Essential Guides to Image and Video Processing (Elsevier Academic Press, 2009). He was named 2011 Imaging Scientist of the Year by IS&T and SPIE.

SC18-M2: Improving Your New Product Success Rate

10:30 AM – 12:30 PM (2 hours)

Instructor: George Gibson, Xerox Corporation

This past year has been a case study in success and failure of new product development in our industry. This is consistent with the multitude of studies of new technology ventures and new product success rates show alarmingly poor performance whether they come from new companies or established industry leaders. If the criteria of success includes a new offering that lives up to or exceeds its revenue projections or is judged by the continuing existence of a new technology venture three or five years from inception, success rates are as low as 10%. Whether you are in a large or small company, the question of which products or services to develop and bring to market is critical to success.

This course explores what is known about the causals for this dismal track record and suggests a path that can lead to improved results. The course includes techniques, procedures, and guidelines that allow one to select the new offerings for development that are most likely to be successful, as well as offers techniques for ensuring that new products or services under

development stay on track. We discuss the application of these fundamental principles with reference to some of the successful and lackluster product introductions that we have seen this year. Each participant will receive a copy of Gibson's forthcoming book *Finding the Golden Eggs: An R&D Professional's Guide to Valuation*.

Benefits

This course enables an attendee to:

- Recognize the critical warning signals of impending new product development failure and success.
- Structure an analytical and operational process, which allows improved targeting of continuing oversight of your new product development projects, to make sure they are headed for success.
- Choose among the bewildering array of market investigation techniques to help understand, which is most appropriate for your new product development project.
- Go beyond just talking about the customer's current wants and needs to understanding those latent, unarticulated needs that are so often the source of real blockbusters.
- Understand how to use the metrics of finance to communicate the value of your new product development efforts and to use that insight to help shape your work.

Intended Audience: technical professionals and managers who want to improve the success rate of their new product development efforts.

See bio under SC07-S2

SC19-M3: Innovation Processes, an Oxymoron?

1:30 – 3:30 PM (2 hours)

Instructor: Marcos Esterman, RIT

As engineers and scientists, we are trained in convergent methodological approaches; we typically arrive at “an” answer. However, innovation, and the creative problem solving processes at the heart of innovation, is dominated by divergent thinking and processes. This short course explores creativity and innovation through the lens of a systems engineer. Several concept generation approaches and methodologies are discussed and explored that can help you think about the innovation process in a different light. Furthermore, a concept selection approach is presented that not only promotes convergence, but divergence, and as a result, leads to more robust solutions.

Benefits

This course enables an attendee to:

- Gain an appreciation for the benefits of structured processes to aid in the systematic generation of innovative solution alternatives.
- Understand a variety of approaches to generate innovative solution alternatives.
- Learn a structured approach for selecting and refining superior solution alternatives.

Intended Audience: product and technology developers or people who directly interact with these functions. However, the techniques are general enough to be applied to all problem solving situations.

Marcos Esterman is an associate professor in the Industrial and Systems Engineering Department at the Rochester Institute of Technology (RIT). He directs the Print Research and Image Systems Modeling and co-directs the Sustainable Print Systems Laboratories. Prior to joining the RIT faculty, he worked for Hewlett Packard's Imaging and Printing Division in Boise, ID, and for General Electric Medical Systems in Milwaukee, WI. Marcos earned his PhD in mechanical engineering from Stanford University; and MSME and BSME from MIT.

SC20-M3: Colorant Chemistry

1:30 – 5:30 PM (4 hours)

Instructor: Jeffery Banning, Xerox Corp.

Very little research is being conducted in the traditional (textile) dye industry. Instead, most dye research effort is being conducted in the modification or “tuning” of existing dyes—often referred to as “functional dyes”. Dyes for digital/non-impact printing represent nice examples of “functional dyes.” Utilizing color (through PowerPoint and handouts), the course starts with the concept of a light interacting with a prism, and guides the student through additive and subtractive coloration, further explaining the cause of coloration of a dye or pigment, and continuing on to the area of structure/property (color) relationships. An understanding of how one develops strategies for tuning/tailoring the shade and other physical and chemical properties of a dye emerges throughout the short course.

Benefits

This course enables an attendee to:

- Understand the concept of additive and subtractive coloration.
- Understand the common terms employed by color chemists and their literature.
- Understand the four classes dyes are divided into based on the electronic origin of the color.

- Understand the concept of structure/color relationship, in the major classes of colorants.
- Be able to predict shifts in shades (bathochromic/hypsochromic) based on structural changes/modifications within the chromophore.
- Understand the major classes of chromophores employed in making dyes of various hues.
- Be able to 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 chemistry and organic chemistry is recommended.

Jeff Banning is a Xerox Fellow in the Global Product Delivery Group in Wilsonville, Oregon. He has worked in the areas of dye, polymer, organic synthesis, coatings and inks with Milliken Chemicals, BIC Corp., Tektronix, and Xerox Corp. He holds more than 100 US patents in these areas and has scaled-up many dye intermediates and dyes, leading to many commercial products and product lines. He has a PhD in organic chemistry from the University of North Dakota.

SC21-M3: Electrostatic Toner Transfer

1:30 – 5:30 PM (4 hours)

Instructor: Mark Zaretsky, Eastman Kodak Co.

The transfer of toner from photoconductor to receiver is a potentially quality-limiting step in all electrophotographic machines. Achieving high quality electrostatic toner transfer requires an understanding of toner design (optimally charged toner with minimal surface adhesion) and electrostatic field generation (maximize electrostatic forces and minimize unwanted ionization). A significant degree of complexity is inherent in toner transfer resulting from the many interactions that exist with essentially every other subsystem in the electrophotographic process. In this course, explanations and models of the key mechanisms affecting dry-toner transfer provide a foundation for understanding transfer subsystem design and performance, its interactions with other subsystems, and the importance of various noise factors. Throughout the course, examples are drawn from many practical transfer subsystems.

Benefits

This course enables an attendee to:

- Understand basic electrostatic concepts related to transfer.
- Comprehend the operation of various electrostatic transfer technologies.
- Explain the important mechanisms governing electrostatic toner transfer.
- Identify noise factors and material properties that affect electrostatic toner transfer.
- Describe and explain causes of transfer related image quality degradation.
- List and explain the interactions between the transfer subsystem and other subsystems.

Intended Audience: engineers, scientists, and managers involved or interested in electrophotographic research, development, or commercialization. Familiarity with the electrophotographic process and college-level physics are recommended.

Mark C. Zaretsky, senior electrophotographic engineer at Eastman Kodak Company, holds a BS, MS, and PhD in electrical engineering from MIT. His expertise is in the area of electrophotography (focusing on toner transfer and corona charger technology) and electrostatic charge management (design and manufacture of web coated products). Zaretsky holds 22 US patents, has authored 10 peer-reviewed papers, received the IS&T Charles Ives Award (1995), and has been newsletter editor for the Electrostatics Society of America since 2003.

Tuesday October 4, 2011

SC22-T3: Industrial Inkjet Technology for Printing and Fabrication

8:00 AM – 12:00 PM (4 hours)

Instructor: Alan Hodgson,
3M Security Printing & Systems Limited

This course is intended to bridge the NIP and Digital Fabrication conferences. It therefore covers inkjet technology for both traditional printing and emerging fabrication applications. It achieves this by summarizing how the key elements of industrial inkjet technology (printers, heads, inks and media) have developed, showing how this knowledge can be used in 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.

Benefits

This course enables an attendee to:

- List and explain the commercial and techni-

cal drivers for industrial inkjet in both printing and digital fabrication application areas.

- Gain awareness of how printers, heads, fluids, and substrates interact to make an inkjet printing system.
- Gain an overview of current and future applications of industrial inkjet technology.
- Summarize the technology of inkjet printing and how this can be leveraged to best effect in the future.
- Be aware how new technology is affecting both fabrication and “traditional” printing applications.
- Identify the shows and conferences to attend to gain further awareness.

Intended Audience: course is a broad overview aimed at engineers, scientists, and students. It is suitable for those working in organizations considering accessing new opportunities in industrial inkjet either as a supplier or a user. It is particularly appropriate for participants who are considering the further potential of inkjet and would like an overview of the relevant inkjet technologies in both traditional printing and fabrication applications. As such it aims to be equally accessible to the target audiences of the NIP and Digital Fabrication conferences.

Alan Hodgson has 29 years experience in printed hard copy and a background in radio frequency electronics and image science. With a combined marketing and technical background he can give technical issues a commercial perspective. He previously managed R&D and technical services groups active in industrial inkjet application development. For four years he worked on inkjet consultancy projects in both traditional printing and fabrication applications. In November 2008 he joined the Technology & Innovations group of 3M Security Printing & Systems Limited and continues to be a regular conference speaker and tutor. He has a BSc in colorant chemistry and a PhD in instrumentation, both from the University of Manchester and is a Fellow of the Royal Photographic Society (RPS) as an Accredited Senior Imaging Scientist. In addition to IS&T, he is active in the RPS and Institute of Physics. He is currently IS&T Executive VP.

SC23-T3: Organic Photoreceptors in Electrography

1:30 – 5:30 PM (4 hours)

Instructor: David Weiss, University of Rochester

Organic photoreceptors (OPCs) are at the heart of today’s electrophotographic printers and this technology is also the foundation upon which the current research and development of organic electronic devices (light emitting diodes, photovoltaic solar cells, and field-effect transistors) is based. This course provides the attendee

with a comprehensive understanding of OPCs.

What are OPCs, what is their development history, what are they made of and how are they made? How do OPCs function in electrophotographic printers? How are OPCs studied and characterized? What are OPC failure modes and what are the approaches to longer lived OPCs?

Benefits

This course enables an attendee to:

- Understand the design and function of organic photoreceptors in an electrophotographic printer.
- Appreciate the interplay between photoreceptor physics and electrophotographic function.
- Understand the relationship between chemical composition and the functions of the various layers in an organic photoreceptor.
- Describe the technologies involved in the manufacturing and certification of organic photoreceptors.
- Describe how organic photoreceptors are studied and characterized.
- Be aware of the currently accepted mechanisms of charge generation and transport in organic photoreceptors.
- Identify photoreceptor failure modes and diagnose problems.
- Appreciate how organic photoreceptor technology has been adapted to other organic electronic devices.

Intended Audience: those interested in understanding the essential role of organic photoreceptors in modern digital electrophotographic printers will benefit from this course. It is anticipated that attendees will have a variety of backgrounds and experience: students, managers, sales and marketing personnel, technicians, engineers, and scientists. A general background in chemistry, physics, and the electrophotographic process will be helpful but not essential.

David S. Weiss, senior scientist (University of Rochester, Department of Chemical Engineering), is a consultant in the area of organic photoreceptors and organic electronic materials and devices. He received his PhD in chemistry from Columbia University (1969) and retired from Eastman Kodak Company as a Scientist Fellow in 2009. Weiss is the inventor on 22 US patents, author on 98 publications, and co-author of Organic Photoreceptors for Imaging Systems (1993), Organic Photoreceptors for Xerography (1998), and co-editor of the Handbook of Imaging Materials, Second Edition (2002). He received the Chester F. Carlson Award (1999) and is an IS&T Senior Member and Fellow, a past vice-president, and current treasurer.

NIP27/Digital Fabrication 2011 Week A

8 9 10 11 12 1

SUN

SC02 / SC03 / SC04 / SC05 / SC06

SC01

SC07

MONDAY

KEYNOTE
Managed Print Services and Data-Driven Environmental Impact,
Fritz Ebner, Xerox Corp..

SC16 / SC17 / SC18

E-PAPER COLOR/IMAGE PROC.
 INK JET PRINTING: PROCESSES
 TONER-BASED PRINTING: PROCESSES
 SERV. & SOLU. (MATHEMATICAL) MODELING

TUESDAY

KEYNOTE
Evaluation of the Effectiveness of Digital Fabrication Technologies,
Vince Cahill and Patrice Giraud, VCE Solutions Group

SC22

IMAGE PERMANENCE
 IJ PRINTING: PROC DAY 2
 TONER-BASED PRINT: MATERIALS
 PRINTED ELECTRONICS

ALL NIP TRACKS
 INTERACTIVE PAPER
 PREVIEWS

EXHIBIT OPEN

WEDNESDAY

KEYNOTE
Digital Printing and Workflow Evolution. . . ,
Will Allen, Hewlett-Packard Corp.

COMMERCIAL PRINT. & DIGITAL PACKAGING

PHOTOELEC. IJ: MATERIALS
 PRINT. SYS. ENGIN./OPTIMIZ.
 NOVEL APPS. ENERGY & PHOTOVOLTAICS

EXHIBIT OPEN

THURS.

THERMAL PRINT. SEC. & FORENSIC PRINTING
 DESIGN FOR ENVIRONMENTAL SUSTAINABILITY
 FUSING, CURING, AND DRYING PRINT & IMAGE QUAL.
 SMART PACKAGING 3D PRINTING & PROTOTYPING

<p>NIP Track 1</p> <p>NIP Track 2</p>	<p>NIP Track 3</p> <p>Digital Fabricaton</p>
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Please note: Lunch and coffee breaks that occur in the middle of sessions are not

At-a-Glance

2

3

4

5

6

SC10 / SC11 / SC12 / SC13

SC08 / SC09

SC14 / SC15

Welcome Reception
See page 18

SC20 / SC21

SC19

COLOR/IMAGE PROC.

ADV. & NOVEL

INK JET PRINTING: PROCESSES

METHODS, TOOLING, AND PROCESSES

(MATHEMATICAL) MODELING

SPECIAL EVENT
Innovation Panel
See page 19 for details.

SC23

IMAGE PERMANENCE

IJ PRINTING: PROC DAY 2

TB PRINT: MATERIALS

PRINTED MATERIALS

SPECIAL EVENT
INTERACTIVE PAPER, DEMONSTRATION,
AND PRINT SAMPLE SESSION
AND HAPPY HOUR
IN THE EXHIBIT HALL

EXHIBIT OPEN

KEYNOTE
Is Paper a Nuisance . . .
Hirohito Shibata, Fuji Xerox Co., Ltd.

COMM. PRINT. & DIGITAL PACK.

IJ: MATERIALS

PRINT. SYS. ENGIN./OPTIMIZ.

ENERGY & PHOTOVOLTAICS

SPECIAL EVENT
Tech. & Apps. Roundtables
See page 27 for details.

EXHIBIT OPEN

Conference Reception, see details page 28.

SEC. & FORENSIC
ENVIRONMENTAL
PRINT & IMAGE QUAL.

KEYNOTE
Printed Smart Objects . . .

Reinhard Baumann, Chemnitz University & ENAS

SPECIAL EVENT
Farewell Reception

KEYNOTE
IJ Print . . . High Efficiency Silicon Solar Cells, *Juergen Sollner, SCHMID Tech*

AGEND

Short Course

NIP Track 4

Special Joint Events

Exhibit

not shown. Schedule is subject to change.

Technical and Social Program

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

SPECIAL EVENT

Kick off the conference by meeting friends and colleagues Sunday evening.

NIP/DF Welcome Reception
Sunday, October 2nd
5:45 – 7:00 PM

Monday October 3, 2011

ALL TRACKS

WELCOMING REMARKS AND KEYNOTE

Session Chair: Steve Simske, Hewlett-Packard Laboratories
 8:30 – 9:30 AM

Managed Print Services and Data-Driven Environmental Impact, Fritz Ebner, Xerox Corp. (USA)

NIP TRACK 1

ELECTRONIC PAPER AND PAPER-LIKE DISPLAYS

Session Chairs: Jeff Mabeck, Hewlett-Packard Co.; Arie Hooimeijer, KCPK; and Makoto Omodani, Tokai University
 9:40 – 11:00 AM

Photonic Crystal Display Materials,

Andre C. Arsenault, Hai Wang, Fergal Kerins, Ulrich Kamp, Opalux Incorporated, and Geoffrey A. Ozin, University of Toronto (Canada)

New Developments in Full Color Flexible Reflective Cholesteric Liquid Crystal Display Technologies, Oleg Pishnyak, Andrew DeMiglio, Clinton Braganza, Mathew Bowser, John Krinock, Duane Marhefka, Kevin Dysert, Erica Montbach, Asad Khan, and J. William Doane, Kent Displays, Inc. (USA)

SHOW US YOUR PRINTS! PARTICIPATE IN THE PRINT SAMPLE GALLERY

The Gallery will be available for viewing during exhibit hours.

Interested?

To contact a Print Gallery Chair fill out the appropriate line on the registration form or e-mail nip_df@imaging.org

Space is limited to one 2- x 4-foot or one 4- x 4-foot space

Bringing Digital Pen and Paper Interactivity to New Surfaces, Petter Ericson, Anoto AB (Sweden)
Full Color Reflective Electronic Media (Focal), Qin Liu¹, Zhang-Lin Zhou¹, Brad Benson¹, Gregg Combs¹, Jong-Souk Yeo², Jeff Mabeck¹, Tim Koch¹, and Dick Henze¹; ¹Hewlett-Packard Co. (USA) and ²Yonsei University (Korea)

COLOR SCIENCE/IMAGE PROCESSING

Session Chairs: Behnam Bastani, Memjet; Rita Hofman, ILFORD Imaging Switzerland GmbH; and Hiroyuki Kawamoto, Waseda University
 11:30 AM – 2:50 PM

Proposed ICC Profile Extension for Device MTF Characterization (Focal), Carl Staelin, Lior Shapira, and Ron Banner, Hewlett-Packard Laboratories (Israel)

Robust Spectral Implementation of High-Fidelity Printer Characterization for Cross-Media High-Dynamic-Range Imaging Applications, Mei-Chun Lo, Jin-Ling Lin, and Xin-Kai Ma, Shih Hsin University (Taiwan)

HANS Unlocking New Print Control Alternatives by Bringing Color Separation and Halftoning Closer Together (Focal), Jan Morovic, Hewlett-Packard Co. (UK), and Peter Morovic and Juan Manuel Garcia, Hewlett-Packard Co. (Spain)

Color Reproduction Capability on 100% Cotton Fabrics Using Dye-Sublimation Heat Transfer Printing, Yu-Ju Wu and Rendong Bai, Eastern Illinois University (USA)

The Effect of Paper Texture on Printed Colors, Saeideh Gorji Kandi, Institute for Color Science & Technology (Iran)

ADVANCED AND NOVEL IMAGING SYSTEMS

Session Chairs: Marie Vans, Hewlett-Packard Co.; Katri Vikman, Sappi Fine Paper Europe; and Yasushi Hoshino, Nippon Institute of Technology
 2:50 – 3:40 PM

Direct Electrostatic Toner Marking with Novel Electric Field Induced Hole Injection Between PE-DOT:PSS and Molecularly Doped Polymer Layers of Aryl Ami, Mandakini Kanungo, Kock-Yee Law, and Yuanjia Zhang, Xerox Corp. (USA)

Small Dot Ion Print-Head (Focal), Napoleon J. Leoni, Henryk Birecki, Omer Gila, Michael H. Lee, and Eric G. Hanson, Hewlett-Packard Laboratories (USA)

SPECIAL PANEL DISCUSSION

4:00 – 5:30 PM
see below for details

NIP TRACK 2 INK JET PRINTING: PROCESSES

Session Chairs: Kathleen Vaeth, Eastman Kodak Co.;
Paul Drury, Xaar Technology Ltd.; and Mineo Kaneko and
Yutaka Kurabayashi, Canon Inc.

9:40 AM – 3:40 PM

From Ink Bottle to Ink Drop: The Flow Environment in an Inkjet Printhead, Mario Massucci, Peter Boltryk, Tri Tuladhar, and Paul Drury, Xaar plc (UK)
Nozzle Plate Observations During Printing: Pooling and Its Impact on Reliability, Mario Massucci, Nick Jackson, Tri Tuladhar, and Paul Drury, Xaar plc (UK)
Dependence of Drop Speed on Nozzle Diameter

and Drive Amplitude in Drop-on-Demand Ink-Jet Printing, Stephen D. Hoath, Wen-Kai Hsiao, Sungjune Jung, Graham D. Martin, and Ian M. Hutchings, University of Cambridge (UK)

Jetting, In-Nozzle Meniscus Motion, and Nozzle-Plate Flooding in an Industrial Drop-on-Demand Print Head, Wen-Kai Hsiao, Stephen D. Hoath, Graham D. Martin, and Ian M. Hutchings, University of Cambridge (UK)

Influence of Printhead Geometry, Print Conditions and Fluid Dynamic Properties on the Jetting Behaviour (Focal), Tri Tuladhar, John Tatum, and Paul Drury, Xaar plc (UK)

Performance Improvement of a Drop-on-Demand Inkjet Printhead: A Robust Feedforward Control based Approach, Amol A. Khalate, Xavier Bombois, and Robert Babuska, Delft University of Technology, and Herman Wijshoff, Sjirk Koekebakker, and Rene Waarsing, Océ Technologies B.V. (the Netherlands)

SPECIAL EVENT

IMPROVING THE VELOCITY OF INNOVATION PANEL DISCUSSION

Monday, October 3, 2011

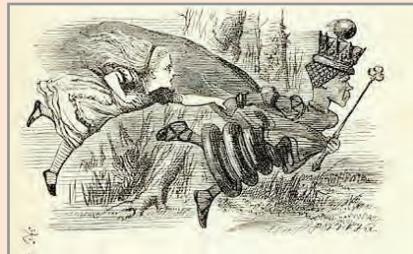
4:00–5:30 PM

Moderator: George Gibson, Xerox Corporation

Our industry has always been a hotbed of innovation. Innovation is a never-ending race however and the better you are at it, the better you have to be at it to distinguish yourself.

How to increase the pace and value of innovation in our companies is a challenge we all face. New techniques and “best practices” are developed at an astounding rate. How should we separate out those that are just fads from those that actually can make a difference in the lives of our customers—hence a difference in our company’s fortunes and in our own?

During this panel discussion we will hear a number of our industry’s most distinguished innovators tell you what they’ve seen that really works. We will also count on the audience to become “panel members lite” and share their stories of success and failure. Our intent is that every participant comes away from our event with one or more techniques or strategies that they can implement when they get home to improve their innovation game and that of their company.



“Well, in our country,” said Alice, still panting a little, “you’d generally get to somewhere else—if you run very fast for a long time, as we’ve been doing.”

“A slow sort of country!” said the Queen. “Now, here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!”

Confirmed Panelists:

Ramon Borrell, director R&D, Xaar, plc

Eric Hanson, director, Commercial Print Engine Lab, Hewlett-Packard Company

Jack Gormley, manager, Business Development, Performance Pigments Division, Sun Chemical Corp.

Model to Predict the Suitability of Fibre-based Substrates for Hybrid Printing, Viviane Alecrim and Mattias Andersson, Mid Sweden University (Sweden)

Towards an Optimization of DOD Printing of Complex Fluids (Focal), Moussa Tembely¹, Damien C. Vadillo², Malcolm R. Mackley², and Arthur Soucemarianadin¹; ¹University of Grenoble (France) and ²University of Cambridge (UK)

Ultra-High Speed Particle Image Velocimetry on Drop-on-Demand Jetting, J.R. Castrejón-Pita, S.D. Hoath, A.A. Castrejón-Pita, W.K. Hsiao, N.F. Morrison, and I.M. Hutchings, University of Cambridge (UK)

Evaluation of Crosstalk Effects in Inkjet Printing with Xaar1001, Wolfgang Voit¹, Katrin Preckel², Sohail Iqbal¹, Ingo Reinhold¹, Nick Jackson³, and Werner Zapka¹; ¹Xaarjet AB (Sweden), ²KHS GmbH (Germany), and ³Xaar plc (UK)

Development of Inkjet Monitoring System via Piezo Self-Sensing (Focal), Kye-Si Kwon, Soonchunhyang University (South Korea)

SPECIAL PANEL DISCUSSION

4:00 – 5:30 PM

see page 19 for details

NIP TRACK 3

TONER-BASED PRINTING: PROCESSES

Session Chairs: Marc Cousoulis, Lexmark Int'l., Inc.; Volkhard Maess, Océ Printing Systems GmbH; and Nobuyuki Nakayama, Fuji Xerox Co., Ltd.

9:40 AM – 12:50 PM

Effect of Transfer Roller Surface Roughness on Discharge Mark, Ryosuke Hamamoto, Yasuo Yoda, Hiroyuki Seki, Toyoshige Sasaki, Takuma Onishi, and Asako Sugiyama, Canon Inc. (Japan)

A Study of Deletion Mechanism in High Humidity from the Point of View of Image Forming System, Koji Otsuka, Mamoru Kido, Toru Ogawa, and Nobuhide Inaba, Fuji Xerox Co., Ltd. (Japan)

Pale Defect of Halftone Following Solid Image in Two-Component Magnetic Brush Development System in Electrophotography, Hiroyuki Kawamoto, Satoshi Iesaka, Takuya Muraga, and So Watanabe, Waseda University (Japan)

Analysis of Toner Developing Behavior in Two-Component Electrophotographic System by Discrete Element Method, Soon Cheol Kweon, Ki Hwan Kwon, and Tatsuhiro Otsuka, Samsung Electronics Co., Ltd., and Sang Hwan Lee and In Soo Seo, Hanyang University (Korea)

Non-Spherical Toner Behavior Simulation by Polyhedral Particle (Focal), Toyoshige Sasaki, Shingo Nagai, Masanori Shida, and Yasuo Yoda, Canon Inc. (Japan)

Numerical Simulation on Dynamics of Toner and

Carrier Particles in Two-Component Magnetic Brush Development System in Electrophotography, Hiroyuki Kawamoto and Satoshi Iesaka, Waseda University (Japan)

Toner Adhesion State Control in Electrophotography (Focal), Christopher A. DiRubio, Palghat Ramesh, Aaron M. Bury, and Antonio DeCrescentis, Xerox Corp. (USA)

SPECIAL PANEL DISCUSSION

4:00 – 5:30 PM

see page 19 for details

NIP TRACK 4

PRINTING SERVICES AND SOLUTIONS

Session Chairs: C.K. Kuo, Eastman Kodak Co.; Branka Lozo, University of Zagreb; and Yasushi Hoshino, Nippon Institute of Technology

9:40 – 10:40 AM

Optimization as a Service (OaaS) for Print Service Providers (Focal), Fabio Giannetti, Hewlett-Packard Laboratories (USA)

Toward a SLA-based Marketplace for Commercial Print Providers (Focal), Sunil Kothari, Hjong Lin, and Jun Zeng, Hewlett-Packard Laboratories (USA)

(MATHEMATICAL) MODELING OF PRINTING AND RELATED PROCESSES

Session Chairs: Margaret Sturgill and Marc Aronhime, Hewlett-Packard Co.; and Tomoyuki Ito, Fuji Xerox Co., Ltd.

10:40 AM – 4:30 PM

Toner Charge and Environmental Interactions with Toner Adhesion, Julie G. Whitney, Lexmark Int'l., Inc. (USA)

Analytical Modeling of Electrostatic Toner Adhesion (Focal), Brandon A. Kemp, Arkansas State University, and Julie G. Whitney, Lexmark Int'l., Inc. (USA)

A Consideration of Real-Time Imaging and Printing, Steven J. Simske, Marie Vans, Margaret Sturgill, and Jason S. Aronoff, Hewlett-Packard Laboratories (USA)

Wavelet Analysis and Modeling of Time-Varying TRCs, Teck Ping Sim, E-Ink Corp., and Perry Y. Li, University of Minnesota (USA)

Computational and Experimental Study of Colloidal Stability of CuPc Aqueous Dispersions (Focal), Yan Zhao, Hou T. Ng, and Eric Hanson, Hewlett-Packard Labs, and Jiannan Dong, David S. Corti, and Elias I. Franses, Purdue University (USA)

Experimental and Theoretical Study of Hole Transport Mechanism in an Organic Photoconductor, Nurith Schupper, Rafael Kahatabi, Reut Diamant, and Doron Avramov, Hewlett-Packard Indigo (Israel)

Inkjet Printing of Fuel Cell Electrodes Spreading and Evaporation Particle-Laden Drops, Moussa Tembely¹, Anne-Gaëlle Mercier², Christine Nayoze², and Arthur Soucemarianadin¹;

¹University of Grenoble and ²Atomic Energy and Alternative Energies Commission (France)

Numerical Simulations of Dielectric Barrier Discharges in a High Resolution Ion Print Head (Focal), Jun-Chieh Wang and Mark J. Kushner, University of Michigan, and Napoleon Leoni, Henryk Birecki, and Omer Gila, Hewlett-Packard Laboratories (USA)

Prediction Model of Paper Curl Formed by Transportation Path (Focal), Tomoyuki Ito, Kiyoshi Hosoi, Takashi Ogino, and Ryosuke Takahashi, Fuji Xerox Co., Ltd. (Japan)

SPECIAL PANEL DISCUSSION

4:00 – 5:30 PM

see page 19 for details

DIGITAL FABRICATION METHODS, TOOLING, AND PROCESSES

Session Chairs: Jeff Nielson, Hewlett-Packard Co.; Wolfgang Voit and Werner Zapka, Xaartjet AB; Koei Suzuki, Ricoh Co., Ltd., and Masahiko Fujii, Fuji Xerox Co., Ltd.

2:30 – 5:30 PM

Application of Electrostatic Inkjet Phenomena to Micro-Film Formation by Spraying Viscous Liquid from Multi-Nozzles, Kazuyuki Tada, Nozomi Yoshida, Shunsuke Muraki, Takashi Nishiyama, and Hiroyuki Kawamoto, Waseda University (Japan)

Transfer Methods to Enable Additive Manufacturing by Electrophotography, Jason Jones^{1,2}, Greg Gibbons², and David Wimpenny¹; ¹De Montfort University and ²University of Warwick (UK)

Processing of Inkjet Printed Metal Oxides and Nanoparticles on Polymer Substrates, Nenad Marjanovic¹, Ashok Sridhar¹, and Reinhard R. Baumann^{1,2}; ¹Fraunhofer Institute for Electronic Nano Systems ENAS and ²Chemnitz University of Technology (Germany)

Thermal Inkjet System to Enable Picoliter Dispense of Pharmaceutical Compounds (Focal), Jeff Nielsen, Michael Day, Christie Dudenhofer, Heather Paris, Kevin F. Peters, Debora Thomas, Ken Ward, and Joshua Yu, Hewlett-Packard Co. (USA)

Digital Fabrication of Smart Structures and Mechanism—Creative Applications in Art and Design, Peter Walter and David McGoran, University of the West of England (UK)

Self-Aligned Roll-to-Roll-Compatible Hybrid Manufacturing of Electrochemical Transistors, Thomas Blaudeck^{1,2}, Mats Sandberg³, Peter Andersson³, Sebastian Heinz², Isak Engquist¹, Magnus Berggren¹, and Reinhard R. Baumann^{2,4}; ¹Linköpings University (Sweden), ²Chemnitz University of Technology (Germany), ³Acreo AB (Sweden), and ⁴Fraunhofer Institute for Electronic Nanosystems (Germany)

Combined Sintering Approaches for Fast Sintering of Inkjet Printed Nanoparticles for R2R Applications, Jolke Perelaer¹, Robert Abbel², Michael Grouchko³, Shlomo Magdassi³, and Ulrich S. Schubert¹; ¹Friedrich-Schiller-University Jena (Germany), ²Holst Centre (the Netherlands), and ³The Hebrew University of Jerusalem (Israel)

Tuesday October 4, 2011

ALL TRACKS

TUESDAY KEYNOTE

Session Chair: Shinri Sakai, Seiko Epson Corporation

8:30 – 9:30 AM

Evaluation of the Effectiveness of Digital Fabrication Technologies, Vince Cahill and Patrice Giraud, VCE Solutions Group (USA)

NIP TRACK 1

IMAGE PERMANENCE

Session Chairs: Dan Burge, RIT; Maja Stanic, University of Zagreb; and Hiroshi Yamazaki, Konica Minolta Business Technologies Inc.

9:40 – 11:00 AM

The Scratch Sensitivity of Digital Reflection Prints, Eugene Salesin and Daniel Burge, Rochester Institute of Technology (USA)

Abrasion Resistance of Aqueous Pigmented Inkjet Inks on Coated Paper, Tetsuya Eguchi, Yasufumi Ueda, and Hiromichi Takahashi, Kao Corp. (Japan)

Effects of Nitrogen Dioxide on the Various Digital Print Technologies: Documents and Photographs, Daniel Burge, Nino Gordeladze, Jean-Louis Bigourdan, and Douglas Nishimura, Rochester Institute of Technology (USA)

The Effects of Various Adhesives on Dye-based Inkjet and Dye Sublimation Prints, Nino Gordeladze, Daniel Burge, and Andrea Venosa, Rochester Institute of Technology (USA)

INTERACTIVE PREVIEWS TRACK 1

Session Chairs: See above

11:30 AM – 12:40 PM

Dependence of Rewritable Characteristics on Media Thickness in Wax-based Electrophoretic Media, Takeshi Hasegawa¹, Takayuki Sano², and Yasushi Hoshino¹; ¹Nippon Institute of Technology and ²Tomoegawa Co., Ltd. (Japan)

Performance Comparison of Readings Using a Conventional Book and a Cell-Phone, Junko Inada and Makoto Omodani, Tokai University (Japan)

High Contrast Image Projection Using Electronic Paper Screen—Confirmation of Performance in a

Bright Room, Tsukasa Kinjo and Makoto Omodani, Tokai University (Japan)

Eye Fatigue after Readings with Typical E-Books: Comparison of Electrophoretic Display, LC Display, and Conventional Paper, Satoshi Mori and Makoto Omodani, Tokai University (Japan)

Edge Enhancement for Good Image Quality in Digital Halftoning, HaeKee Lee, Samsung Electronic (Korea)

Customized ICC Output Profile Construction and Concerns, Reem El Asaleh and Paul D. Fleming III, Western Michigan University (USA)

Strategy of Map Rapid Guarantee based on PDF Structure, Ruizhi Shi, Zhengzhou Institute of Surveying and Mapping (China)

A Monitor Gamut Description Model based on BP Neural Network, Lei Zhao^{1,2}, Guangxue Chen¹, Baoling Tang¹, and Ruixin Xu¹; ¹South China University of Technology and ²Hangzhou Dianzi University (China)

Study on Influence of Filter Design Parameter on Printing Image Reproduction Quality in Spatial Color Gamut Mapping, Xiaozhou Li^{1,2}, Guangxue Chen¹, Chunjiang Jia¹, Lei Zhao¹, and Ruixin Xu¹; ¹South China University of Technology and ²Shandong Polytechnic University (China)

Research on the Color Matching of Real Dot Proofing, Qinwen Wang and Gang Chen, South China University of Technology (China)

Reproducibility Between Xenon Test Chambers in Different Laboratories, Matthew Comstock and Ann McCarthy, Lexmark Int'l., Inc. (USA)

Impact of Light Bleaching on Dark Storage Test, Matthew Comstock and Ann McCarthy, Lexmark Int'l., Inc. (USA)

Digital Watermarking Security in the Printing and Scanning Process of Image, Haisheng Chen and Baoling Tang, Zhongshan Torch Polytechnic (China)

IMAGE PERMANENCE CONTINUES

Session Chairs: See above

2:00 – 3:40 PM

An Evaluation of the Humidity Test Method ISO 18946 (Focal), Anna L. Fricker¹, Alan Hodgson², Christopher Woods¹, Joyce H. Townsend³, Mark Sandy¹, and Philip Green¹; ¹University of the Arts London, ²3M Security Printing & Systems, and ³Tate Britain (UK)

Use of a Multispectral Camera System and Very Small, Comprehensive “Micropatch” Test Targets for Full Tonal Scale, Colorimetric Evaluation of the Permanence of Digitally Printed Photographs—Part II, Henry Wilhelm, Kabenla Armah, and Barbara Stahl, Wilhelm Imaging Research, Inc., and Ken Boydston, MegaVision, Inc. (USA)

A Review of Industry Standards and Practices for Weathering Testing of Digitally Fabricated Materials, Sean Fowler and Jeffrey Quill, Q-Lab Corp. (USA)

Communicating Image Stability Test Results (Focal), Peter Mason and Adam Bush, Torrey Pines Research (USA)

INTERACTIVE PAPER, DEMONSTRATION AND PRINT SAMPLE SESSION IN THE EXHIBIT HALL

Session Chairs: Omer Gila, Hewlett-Packard Co.;

Dietmar Zipperer, PolyIC GmbH & Co. KG;

Susan Farnand, RIT; and Jolke Perelaer,

Friedrich-Schiller-Universität Jena

3:50 – 6:30 PM

NIP TRACK 2

INK JET PRINTING: PROCESSES DAY 2

Session Chairs: Kathleen Vaeth, Eastman Kodak Co.;

Paul Drury, Xaar Technology Ltd.; and Mineo Kaneko and

Yutaka Kurabayashi, Canon Inc.

9:40 – 11:00 AM

New Developments of Shear-Mode Piezo Inkjet Heads for Industrial Printing Applications,

Hideo Watanabe, Tetsuo Okuno, Shinichi Kawaguchi, Hikaru Takamatsu, and Masato Ueda, Konica Minolta IJ Technologies, Inc. (Japan)

Nozzle Wetting Dynamics on Inkjet Printhead and Its Impact on Jetting, Jing Zhou, Xerox Research Center Webster (USA)

Experimental Investigation of the Impact, Spreading, and Drying of Picolitre Droplets onto Substrates with a Broad Range of Wettabilities,

Arganthaël Berson, Philip S. Brown, Emma L. Talbot, Jas Pal S. Badyal, and Colin D. Bain, Durham University (UK)

Development of Micromachined Electrohydrodynamic Inkjet Printing Head, Kyoung Il Lee^{1,2},

Byungjik Lim¹, Seong Hyun Kim¹, Jin Woo Cho¹, and Yongtaek Hong²; ¹Korea Electronics Technology Institute and ²Seoul National University (South Korea)

INTERACTIVE PREVIEWS TRACK 2

Session Chairs: See above

11:30 AM – 12:40 PM

A Study on Manufacture of Aluminum Plate in Nano-Print to Plate Technology, Haihua Zhou,

Yunxia Liu, and Yanlin Song, Chinese Academy of Sciences (China)

Research on Ink Droplet Placement on Moving Substrate, Chunjiang Jia, Guangxue Chen,

Xiaozhou Li, and Qifeng Chen, South China University of Technology (China)

Two-Layer Multiple Trapping Model for Charge Transport in Molecularly Doped Polymers,

L.B. Schein, Independent Consultant (USA); D.S. Weiss, University of Rochester (USA); D.H. Dunlap, University of New Mexico (USA); Andrey Tyutnev,

SPECIAL EVENTS

Conference Exhibit

Tuesday: 10:00 AM – 6:30 PM
and
Wednesday: 9:00 AM – 4:00 PM
Please visit our exhibitors!

Interactive Paper, Demonstration, and Print Gallery Session

Tuesday 3:50 – 6:30 PM

*Please note: This year the Interactive Paper
Session will take place in the Exhibit Hall.
Drinks will be served.*

Moscow State Institute of Electronics and Mathematics (Russia); and Paul E. Parris, Missouri University of Science & Technology (USA)

Nano-Indentation of Polycarbonate and Diamine Blends (Charge Transport Layer), Suresh Ahuja, Xerox Corp. (USA)

A Comparison of Detection Methods of Pore Characteristic of Inkjet Paper Coating, Jinglei Tai, Guangxue Chen, Qifeng Chen, and Baoling Tang, South China University of Technology (China)

Research on Environmental and Edible Ink-Jet Ink, Jing-mei Sun, Xian-fu Wei, and Bei-qing Huang, Beijing Institute of Graphic Communication (China)

Study on the Influence of Primary Ink of Water-based Ink Jet, Jia-zhen Sun, Xian-fu Wei, Bei-qing Huang, and Ling Jia, Beijing Institute of Graphic Communication, and Yi-chun Zha, Beijing Dongfangyakeli Chemical Technology Co., Ltd. (China)

Investigation to the Influence of Water-based Ink Adherence, Ling Jia, Xianfu Wei, Beiqing Huang, and Na Feng, Beijing Institute of Graphic Communication (China)

Study on Properties of Green Fluorescent Inkjet Ink, Shaohong Gao, Beijing Institute of Graphic Communication (China)

The Study of the Pigment Surface-Modified Technology of Inkjet Printing Ink, Jifang Yan, Xianfu Wei, and Beiqing Huang, Beijing Institute of Graphic Communication (China)

The Effect of Resin on the Property of Red Fluorescent Inkjet Ink, Wan Zhang, Xian-fu Wei, Bei-qing Huang, and Chun-yan Lu, Beijing Institute of Graphic Communication (China)

Research on Filtering Conditions of UV Ink-Jet Ink, Hailiang Pan, Beiqing Huang, Xianfu Wei, and Peng Wu, Beijing Institute of Graphic Communication (China)

Novel Approach to Thermal Transfer Ribbon Residual Security Problem, Hideo Taniguchi and Shigemasa Sunada, HIT Devices Ltd. (Japan), and Jiro Oi, HIT Devices Ltd. (USA)

Study on the Soluble Properties of Binder Resins, Weimin Zhang and Jialing Pu, Beijing Institute of Graphic Communication (China)

INK JET PRINTING: PROCESSES DAY 2 CONT

Session Chairs: See above
2:00 – 4:00 PM

Lateral Merging Continuous Inkjet (Focal), Carolyn Ellinger and Yonglin Xie, Eastman Kodak Co. (USA)

A Study on Drying Process of Ink at the Inkjet Nozzle Using a Laser Doppler Vibrometer, Manabu Seo, Yoshihiro Norikane, and Takeo Tsukamoto, Ricoh Co., Ltd. (Japan)

Membrane Keypad Printing Using Only Inkjet Technology, Chuck Griggs, FUJIFILM Dimatix, Inc. (USA)

Study on Image Quality of Page Width Ink Jet Printing, Oh Hyun Baek and Keon Kuk, Samsung Electronics Co., Ltd. (South Korea)

Inkjet Printing of Non-Newtonian Fluids (Focal), Neil F. Morrison and Oliver G. Harlen, University of Leeds (UK)

INTERACTIVE PAPER, DEMONSTRATION AND PRINT SAMPLE SESSION IN THE EXHIBIT HALL

Session Chairs: Omer Gila, Hewlett-Packard Co.; Dietmar Zipperer, PolyC GmbH & Co. KG; Susan Farnand, RIT; and Jolke Perelaer, Friedrich-Schiller-Universität Jena
3:50 – 6:30 PM

NIP TRACK 3 TONER-BASED PRINTING: MATERIALS

Session Chairs: Dinesh Tyagi, Eastman Kodak Co.; Wolfgang Schmidt, Felix Schoeller jr Foto- und Spezialpapiere GmbH & Co KG; and Yoshihiro Hattori, Konica Minolta Business Technologies Inc.
9:40 – 11:00 AM

The Effect of Additive Blending Conditions on Toner Performance, Nahyoung Kim, ChanHyuk Park, and Kyung-Yul Yon, Samsung Fine Chemicals (Korea)

A Model Analysis of the Triboelectric Charging of Fumed Silicas, Robert J. Nash, Hafren Associates (USA)

Biobased-Chemical Toner Prepared from Palm Oil Derivatives, Jaan Soon Tan, Huck Kee Kay, Joshua Raj. s/o Jaganathan, and Seng Neon Gan, Jadi Imaging Technologies Sdn Bhd (Malaysia)

Effect of Negative Externally-Added CCA Particles on Toner Charge, Koichi Tsunemi, Toshihiko Oguchi, Atsushi Suka, and Takashi Iimura, Morimura Chemicals Ltd., and Norihisa Kobayashi, Chiba University (Japan)

INTERACTIVE PREVIEWS TRACK 3

Session Chairs: See above
11:30 AM – 12:40 PM

Optimizing Developer Roll Design for Increased Component Life, Kelly A. Killeen, Lexmark Int'l., Inc. (USA)

Equivalent Particle Model based Mixing Behavior Simulation in Two-Component System by Discrete Element Method, Ki Hwan Kwon, Soon Cheol Kweon, and Dong Woo Ha, Samsung Electronics Co., Ltd., and Cheol O. Ahn, Metariver Technology Co., Ltd. (Korea)

Model of Toner Impaction and Developer Failure, Suresh Ahuja, Xerox Corp. (USA)

Toner Charging Characteristics Dependence on Different Charging Carrier Properties, Disna Jayampathi Karunanayake¹, Kueiyng Sheu², Victor Huang², and Yasushi Hoshino¹; ¹Nippon Institute of Technology (Japan) and ²Trend Tone Imaging, Inc. (Taiwan)

The Research of Process and Characteristic of Pulverized Rounding Surface Treated Toner, Wei-Chih Wang, Yi-Wei Chen, Ya-Yu Li, and Victor Huang, Trend Tone Imaging, Inc. (Taiwan)

Study on the Influence of Printing Conditions on the Curing of UV Ink, Xiaoxue Jia, Beiqing Huang, Xianfu Wei, and Meng Sun, Beijing Institute of Graphic Communication (China)

The Effect of Initiator on Deep Curing of UV Ink, Ma Xiaoxu, Wei Xianfu, Huang Beiqing, and Qiu Lang, Beijing Institute of Graphic Communication (China)

The Study of the Influence of Photoinitiators on Curing Rate in UV System Under Different Oxygen Atmosphere, Kaiyuan Luo, Xianfu Wei, and Beiqing Huang, Beijing Institute of Graphic Communication (China)

Method for Predicting Finishing Performance of Xerographic Prints, Guiqin Song¹, Thomas P. Debies², Kurt Halfyard¹, Brian McAnaney¹, Gordon Sisler¹, and Ed Zwartz¹; ¹Xerox Research Centre (Canada) and ²Xerox Research Centre of Webster (USA)

Rapid Determination of Cure Rate and Direct Identification of Spatial Variations in Cross Link Density, Khoren Sahagian¹, Kevin Kjoller¹, Louis Germinario², and Roshan Shetty¹; ¹Anasys Instruments Inc., and ²LG Analytical, (USA)

Study on the Influence of Coated Paper's Performance on the Printing Quality of HP Indigo Digital Printer, Beiqing Huang, Lingya Gu, Xiaoxue Jia, Xianfu Wei, Jianghao Liu, and Congyuan Wang, Beijing Institute of Graphic Communication (China)

Improvement of the Quality of Digital Printing Using Conditional Halftoning Function, Huawei Duan and Guangxue Chen, South China University of Technology (China)

Quality Analysis of Color Reproduction With

Larger-Format Xerographic Printer, Xiaomeng Cui and Guangxue Chen, South China University of Technology (China)

Line Quality Analysis in Digital Printing, Ruixin Xu, Guangxue Chen, Jinglei Tai, and Lei Zhao, South China University of Technology (China)

TONER-BASED PRINTING: MATERIALS

Session Chairs: See above
2:00 – 3:30 PM

Biotoners: Technology, Ecology, Markets (Focal), Art Diamond, Diamond Research Corp., and Velliyur Sankaran, Sankaran Consulting (USA)

Preparation of Chemically Prepared Toners (CPT) by Polymerisation for Ceramic Decoration, V. Sanz, Y. Bautista, and C. Ribes, Universidad Jaume I, and J.V. Bono, Integra Synergy Systems, S.L. (Spain)

Layer-by-Layer Modification of Core-Shell Structures in Chemically Prepared Toners by Using Heterogeneous Binder Resin Mixtures, Eui-Hyun Ryu, DongWon Kim, NaHyoun Kim, and Kyung-Yol Yon, Samsung Fine Chemicals, Co., Ltd. (South Korea)

Novel Process for Aqueous-based Polyester Chemically Prepared Toner, Nobumichi Kamiyoshi, Shinichi Sata, and Yoshinobu Ishikawa, Kao Corp. (Japan)

INTERACTIVE PAPER, DEMONSTRATION AND PRINT SAMPLE SESSION IN THE EXHIBIT HALL

Session Chairs: Omer Gila, Hewlett-Packard Co.; Dietmar Zipperer, PolyIC GmbH & Co. KG; Susan Farnand, RIT; and Jolke Perelaer, Friedrich-Schiller-Universität Jena
3:50 – 6:30 PM

DIGITAL FABRICATION PRINTED ELECTRONICS

Session Chairs: Paul Benning, Hewlett-Packard Co.; Mark Crankshaw, Cambridge Display Technology Ltd.; Dietmar Zipperer, PolyIC GmbH & Co. KG; Shinichi Nishi, Konica Minolta IJ Technologies, Inc.; and Takap Someya, University of Tokyo
9:40 AM – 12:40 PM

Direct Printing of Circuit Boards Using Aerosol Jetting[®], Michael Renn, Kurt Christenson, and Jason Paulsen, Optomec, Inc. (USA)

Ink Jet Printing of Conductive Silver Traces from Nanoparticle Inks on Mesoporous Substrates, Anna Schuppert¹, Moritz Thielen², Ingo Reinhold², and Wolfgang A. Schmidt¹; ¹Felix Schoeller jr Foto- und Spezialpapiere GmbH & Co. KG (Germany) and ²Xaar Jet AB (Sweden)

Inkjet Printed Silver Electrodes for Organic

Thin-Film Transistors, Yiliang Wu, Xerox Research Centre (Canada)

Inkjet Printing of Electrical Connections in Electronic Packaging, Ingo Reinhold¹, Wolfgang Voit¹, Moritz Thielen¹, Maik Müller¹, Stan Farnsworth², Ian Rawson², and Werner Zapka¹; ¹Xaatjet AB (Sweden) and ²NovaCentrix (USA)

Printed Electronics for Flexible Applications (Focal), Dietmar Zipperer, PolyIC GmbH & Co. KG (Germany)

Characterization of Inkjet Printed Coplanar Waveguides for Flexible Electronics, Yi Feng¹, Jens Liebeskind¹, Qiang Chen¹, Werner Zapka^{1,2}, and Li-Rong Zheng¹; ¹Royal Institute of Technology KTH and ²Xaatjet AB (Sweden)

PRINTED MATERIALS

Session Chairs: Arun Agarwal, Hewlett-Packard Co.; Patrick Smith, University of Sheffield; and Masaaki Oda, ULVAC Technologies, Inc.

2:00 – 3:30 PM

Development of Conductive Carbon Coated Cu Nanoparticle Inkjet Fluid (Focal), Kim Eiroma, Eva-Lena Hult, Thea Sipiläinen-Malm, Pirjo Koskela, Johanna Forsman, Juha Sarlin, Ari Auvinen, Unto Tapper, and Jorma Jokiniemi, VTT Technical Research Centre (Finland)

Pre-Treatment of Silver Particles as a Basis for a Functional Toner, Dustin Büttner¹, Waldemar Diel¹, Beat Zobrist², and Klaus Krüger¹; ¹Helmut Schmidt University (Germany) and ²Zobrist Engineering and Consulting (Switzerland)

Digital Printing of Phosphorescent Particles, Waldemar Diel¹, Dustin Büttner¹, Beat Zobrist², and Klaus Krüger¹; ¹Helmut Schmidt University (Germany) and ²Zobrist Engineering and Consulting (Switzerland)

Novel Low Temperature Copper Inkjet Inks are a Low Cost Alternative to Silver for Printed Electronics, Richard Dixon and Ian Clark, Intrinsic Materials Ltd. (UK)

Effects of Size on the Optical Properties of Organic Semiconductors Copper (III) Phthalocyanine Nanoparticles, Mohammad Al-Amar and Clement Burns, Western Michigan University (USA)

INTERACTIVE PAPER, DEMONSTRATION AND PRINT SAMPLE SESSION IN THE EXHIBIT HALL

Session Chairs: Omer Gila, Hewlett-Packard Co.; Dietmar Zipperer, PolyIC GmbH & Co. KG; Susan Farnand, RIT; and Jolke Perelaer, Friedrich-Schiller-Universität Jena

3:50 – 6:30 PM

New Digital Pad Printing Technology Using Inkjet Printers, Maki Sato¹, Masaru Ohnishi², and Takao

Abe¹; ¹Shinshu University and ²Mimaki Engineering Co. Ltd. (Japan)

Research on the Flow Testing Instrument of Bingham Ink, Qi-Feng Chen, Guang-Xue Chen, Bao-Ling Tang, and Jing-Lei Tai, South China University of Technology (China)

A Method to Prepare Silver Nanoparticles for Inkjet Inks Capable of Sintering at Low Temperature, Jun Natsuki and Takao Abe, Shinshu University (Japan)

Surface Morphology and Conductivity Study of Inkjet Printed Metal Nanoparticle Inks, Yanping Sun, Lujia Bu, Erik Reddington, Thomas Sutter, and Kathleen O'Connell, The Dow Chemical Co. (USA)

Preparation of Silver Nanoparticles by Liquid Chemical Reduction Method, Baoling Tang, Guangxue Chen, and Qifeng Chen, South China University of Technology (China)

Digital Fabrication of a Novel Bio-Actuator for Bio-Robotic Art and Design, Peter Walters¹, Ioannis Ieropoulos², David McGoran¹, and Jonathan Rossiter³; ¹University of the West of England, ²Bristol Robotics Laboratory, and ³University of Bristol (UK)

Industrial Ink Jet Printing Solutions for Photovoltaic and Printed Electronic Applications, Klaus Schiffer, Peter Diepens, and Don Veri, OTB Solar / Roth & Rau (the Netherlands)

Multi-Material Inkjet for Visual and Mechanical Properties in 3D Printing, J.M.P. Geraedts, Océ Technologies B.V., and E.L. Doubrovski and J.C. Verlinden, Delft University of Technology (the Netherlands)

Manipulation of a Small Conductive Ball by Electrostatic Force Generated by Hemisphere-End Stick Electrode, Bin Xu, Disna Jayampathi Karunanayake, and Yasushi Hoshino, Nippon Institute of Technology (Japan)

Electric Conductive Film Formations by Ink-Jet Using Individually Dispersed Nanoparticles Ink formed by Gas Evaporation Method, Masaaki Oda, Kyuko Tei, Masato Osawa, Shigeo Hayashi, Yoshiaki Hayashi, Natsuki Hashimoto, Masami Yamada, and Susumu Sakio, ULVAC Technologies, Inc. (Japan)

High Resolution Conformal Printing with Aerosol Jet[®], Jason Paulsen, Michael Renn, and Kurt Christenson, Optomec, Inc. (USA)

A Novel Chemically Amplified Positive Photoresist for UV Lithography, Liyuan Wang, Na Xu, and Jinxing Yu, Beijing Normal University (China)

3D RFID Transponder Antennas for Smart Packaging Applications, Ralf Zichner¹ and Reinhard R. Baumann^{1,2}, ¹Fraunhofer Institute for Electronic Nano Systems ENAS and ²Chemnitz University of Technology (Germany)

Low Cost In-Situ Drop Analysis System for Ink Jet and Other Non-Contact Dispensing Technologies, Yair Kipman and Prashant Mehta, ImageXpert Inc. (USA)

Preparation and Optical Spectroscopy of BaFCl/Eu2+: A Photoluminescent X-ray Storage Phosphor, Qinghua Liang, Xinmin Yang, and Zhi Li, Chinese Academy of Sciences (China)

Low Voltage, Printed, Flexible Circuits for Display and Memory, Mingjing Ha¹, Wei Zhang¹, Daniele Braga¹, Michael J. Renn², Chris H. Kim¹, C. Daniel Frisbie¹; ¹University of Minnesota and ²Optomec, Inc. (USA)

Wednesday October 5, 2011

ALL TRACKS

KEYNOTE AND AWARD PRESENTATIONS

Session Chair: Branka Iozo, University of Zagreb
8:30 – 9:45 AM

Digital Printing and Workflow Evolution—Opening New Opportunities, Will Allen, Hewlett-Packard Corp. (USA)

KEYNOTE

Session Chair: Shigeru Kitakubo,
Nippon Institute of Technology
1:45 – 2:35 PM

Is Paper a Nuisance in the Office? A Comparison of Paper and Electronic Media from the Perspectives of CO₂ Emissions and Work Efficiency, Hirohito Shibata, Fuji Xerox Co., Ltd (Japan)

**NIP TRACK 1
COMMERCIAL PRINTING AND
DIGITAL PACKAGING**

Session Chairs: George Gibson, Xerox Corp.;
Ron Askeland, Hewlett-Packard Co.;
Marcel Slot, Océ Technologies B.V.; and Hiroshi
Yamazaki, Konica Minolta Business Technologies Inc.
9:50 AM – 4:45 PM

(Note: This session will break for lunch
and resume after the keynote.)

Design and Operation of Ink Jet Printheads for High Reliability in Ceramic Applications, William Letendre, FUJIFILM Dimatix, Inc. (USA)

Technical Evolution of Ceramic Tile Digital Decoration, V. Sanz, Y. Bautista, C. Ribes, Y. Reig, and C. Feliu, Instituto de Tecnología Cerámica; and J. V. Bono, Integra Synergy Systems, S.L. (Spain)

New Technologies for Printed Material's Advanced Value in the Production Printing Market, Tomohide Takenaka, Tsuyoshi Asami, Masato Iio, Toshihiro Sugiyama, Akihiko Yamazaki, Akatsu Shinichi, Masayoshi Nakayama, and Bing Shu, Ricoh Co., Ltd. (Japan)

Printed Antennas for Combined RFID and 2D

Barcodes (Focal), Steven J. Simske, Jason S. Aronoff, and Bobby Duncan, Hewlett-Packard Laboratories (USA)

Printing 2D Barcode on Curved Surface, Xiaoying Rong, California Polytechnic State University (USA)

Meeting the Challenges of Digitally Printing Cans, Andrew Clippingdale, Tonejet Limited (UK)

Comparison of Print Durability in Accelerated Weathering, Jali Heilmann and Elna Rusko, VTT Technical Research Centre (Finland)

An Image Processing Method that Enables Efficient Document Management and Reproduction in a Distributed Working Environment, Mu Qiao, Shutterfly Inc. (USA)

A Breakthrough High Speed Wide Format Print Concept for Textiles (Focal), Kasper J. Nossent, Xennia Technology (UK)

Highly Productive Ink Jet Textile Printer for Mass Production (Focal), Shuri Mizoguchi, Konica Minolta IJ Technologies, Inc. (Japan)

SPECIAL ROUNDTABLE SESSION

4:00 – 5:30 PM

see page 27 for details

**NIP TRACK 2
PHOTOELECTRONIC IMAGING MATERIALS
AND DEVICES**

Session Chairs: John Stoffel, Hewlett-Packard Co.; Kasper Nossent, Xennia Technology, Ltd.; and Norio Nagayama, Ricoh Co., Ltd.
9:50 – 10:50 AM

Charge Depletion and Surface Charge Injection in Single-layer, High Gamma Photoreceptors,

Interpreting the Schedule

By knowing the amount of time allotted for each type of presentation, you can estimate when a particular presentation will occur. Order and times are subject to change; exact times will be published in the conference proceedings. On most days, 30-minute coffee breaks occur sometime between 10:00–11:00 AM and 3:30–4:30 PM; lunch breaks are generally from 12:30–2:00 PM. Presentation lengths include time for Q&A.

Keynote: 50 minutes

Focal: 30 minutes

Oral: 20 minutes

Interactive previews: 5 minutes

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



NIP Session/Focus



Digital Fabrication Session/Focus

SPECIAL EVENT

TECHNOLOGY AND APPLICATION ROUNDTABLES

Wednesday, October 5, 2011

4:00–5:30 PM

Session Chairs:

Omer Gila, Hewlett-Packard Company, and George Gibson, Xerox Corporation

This year we are exploring a new type of event: moderated small group discussions. During this session, small groups of conference attendees will meet and explore a relatively narrowly-defined topic in detail. The goal is to integrate newly discovered and published data with the expertise of participants. While the discussion will begin with an exploration of several questions at the leading edge of the discipline, it will move to accommodate the particular interests of the group members. You will have the opportunity to participate in any of the roundtables—and even to help set the agenda by suggesting a topic. A list of proposed topics will be sent out closer to the conference date, then these and any you suggest will be posted in the registration area with sign-up sheets. The first seven topics to reach full seating capacity will be held. Moderators and key research questions for each session will be posted 24 hours before the event. Please join us in exploring this new way of building on our shared expertise.

Kuniki Seino, Shuji Iino, Hideaki Hirahara, Takaaki Konuma, Ichiro Yoshida, and Shozo Kaieda, AFIT Corp., (Japan)

Effect of É-hydroxyl Group of Side Chains on Phase Transition Behavior and Charge Carrier Transport Properties in Terthiophene Liquid Crystals, Toyohiro Fukuda, Takayuki Usui, and Jun-ichi Hanna, Tokyo Institute of Technology (Japan)

A New Field Nullification Method for Electrostatic Force Microscope (EFM) for Unknown High Voltage Measurement, Toshio Uehara¹, Tomoharu Saito², Junpei Higashio¹, Yoshito Ashizawa², Katsuji Nakagawa², and Akiyoshi Itoh²; ¹ TREK JAPAN K. K. and ²Nihon University (Japan)

INK JET PRINTING: MATERIALS

Session Chairs: Agnes Zimmer, Lexmark Int'l., Inc.;

Steve Hoath, University of Cambridge; and

Hiroyuki Onishi, Seiko Epson Corp.

11:20 AM – 4:45 PM

(Note: This session will break for lunch and resume after the keynote.)

The Viscoelasticity of Low Viscosity Ink Jet Suspensions (Focal), Damien Vadillo, University of Cambridge (UK)

Eco-Friendliness of Inkjet Inks and a Novel Solution to Increase It, Anu Ilmonen and Laura Kela, VTT Technical Research Centre (Finland)

Challenges Formulating a Water-based Ink-Jet Inks for Non-Porous Substrates, Devdatt Nagvekar, Elizabeth Flores, and Deverakonda Sarma, Lubrizol Advanced Materials, Inc. (USA); David Cartridge and Ian Maxwell, Lubrizol Advanced Materials, Inc. (UK)

Reactive Heterocyclic Diazonium Treating Agents for InkJet and Other Pigment Applications,

Alex Shakhnovich, Cabot Corp. (USA)

Thermal Inkjet: Can the Ink Formulation Impact Throw Distance, Julie Cross and Stuart Molloy, Domino Printing Sciences (UK)

“Tweaking” the Pigment Color for Advanced Printing Applications, K. Nauka and Hou T. Ng, Hewlett-Packard Co. (USA)

Polymer Stabilized Pigment Dispersions for High Reliability Ink-Jet Printing (Focal), Tom Annable, Owen Lozman, and Paul Ewing, Fujifilm Imaging Colorants Ltd. (UK)

SPECIAL ROUNDTABLE SESSION

4:00 – 5:30 PM

see above for details

NIP TRACK 3

PRINTING SYSTEMS ENGINEERING/ OPTIMIZATION

Session Chairs: Omer Gila, Hewlett-Packard Co.;

Ramon Borell, Xaar Technology Ltd.; and

Teruaki Mitsuya, Ricoh Co., Ltd.

9:50 AM – 4:45 PM

(Note: This session will break for lunch and resume after the keynote.)

Adaptive Digital Press Optimization via Intelligent Calibration System, Chunghui Kuo, Eastman Kodak Co. (USA)

Roller Surface Morphology and Its Effect on Print Quality/Roller Life, Krishna Chaurasia, Fenner Precision (USA)

Assessment of Resistivity Uniformity of HP-Indigo Developer Rollers, Michael H. Lee, Seongsik Chang, Quang Lam, and Omer Gila, Hewlett-Packard Laboratories (USA)

SPECIAL EVENT

**NIP27/Digital Fabrication 2011
Conference Reception**
Wednesday, October 5
7:00 – 9:00 pm

Liquid Cooling Technology in a High-Speed Electrophotographic Process (Focal), Satoshi Okano, Tomoyasu Hirasawa, and Hiromitsu Fujiya, Ricoh Co., Ltd. (Japan)

Calibration Color Patch Reduction for Electrophotography, Yan-Fu Kuo, George Chiu, Yuehwern Yih, and Jan Allebach, Purdue University (USA)

Simulation of Toner Manufacturing Process, Akin Ecer, Vladimir Rubek, and Kemal Arican, Technalysis Inc. (USA)

Paper-Wrinkle Generation Process, Shogo Matsumoto and Yoshihiro Harada, Ricoh Co., Ltd. (Japan)

Direct Binary Search for Print Mask Design, J. William Boley and George T.-C. Chiu, Purdue University (USA)

Holographic Measurement of Drop-on-Demand Drops in Flight, Graham D. Martin, Jose R. Castrejón-Pita, and Ian M. Hutchings, University of Cambridge (UK)

HP's Optical Media Advance Sensor (OMAS) (Focal), Marc Casaldaliga, David Chanclon, Carles Flotats, Sascha de Peña, and Josep M. Rio, Hewlett-Packard Co. (Spain)

SPECIAL ROUNDTABLE SESSION

4:00 – 5:30 PM

see page 27 for details

DIGITAL FABRICATION

NOVEL APPLICATIONS AND TOPICS

Session Chairs: James Stasiak, Hewlett-Packard Co.;

Stefan Guettler, Fraunhofer Institute IPA; and

Shinjiro Umez, Tokai University

9:50 – 10:50 AM

Magnetic Cell Separation by Inkjet Printing for Disease Monitoring, Sylvia L. Natividad¹, Carmelo De Maria³, Julio Rincon¹, Maria Yanez¹, Mingtao Zeng², and Thomas Boland¹; ¹The University of Texas at El Paso (USA), ²Texas Tech University (USA), and ³The University of Pisa (Italy)

Printable Biodegradable Hydrogels with Self-Crosslinking Agents for Wound Dressings, Maria Yanez¹, Carmelo De Maria², Julio Rincon¹, and Thomas Boland¹; ¹University of Texas at El Paso (USA) and ²The University of Pisa (Italy)

Towards Paper Electronics—Printing Transistors on paper in a Roll-to-Roll Process, Roger Bollström, Daniel Tobjörk, Peter Dolietis, Anni Määttänen, Petri Ihalainen, Jouko Peltonen, Ronald Österbacka, and Martti Toivakka, Åbo Akademi University (Finland)

ENERGY AND PHOTOVOLTAICS

Session Chairs: Stan Farnsworth, Novacentrix;

Jolke Perelaer, Friedrich-Schiller-Universität Jena; and

Kye-Si Kwon, Soonchunhyang University

11:20 AM – 5:05 PM

(Note: This session will break for lunch and resume after the keynote.)

Inkjet Printing for OPV and OLED Lighting Production (Focal), Maosheng Ren, Harrie Gorter, Jorgen Sweelssen, and Ronn Andriessen, Holst Center/TNO (the Netherlands)

Front Side Metallization Issues of a Solar Cell with Inkjet Printing, Dong-Youn Shin, Korea Institute of Machinery and Materials; Yong-Kee Cha, Samick THK Co., Ltd.; and Han-Hee Ryu, Millinet Solar Co., Ltd. (South Korea)

R2R-Technologies for the Production of OPV, Jens Haenel, Bernd Keiper, Christian Scholz, Maurice Clair, Rocco Kundt, and Daniel Pickarski, 3D-Micromac AG (Germany)

Printed Fuel Cell Electrodes with Engineered Porosity, Denis Cormier, Rochester Institute of Technology, and Fanglin Chen and Prasun Majumdar, University of South Carolina (USA)

Inkjet Printing of Isolation Layers for Back-Contacted Silicon-Heterojunction Solar Cells, Jan Haschke¹, Ingo Reinhold², Nicola Mingirulli¹, Wolfgang Voit², Bernd Rech¹, and Werner Zapka²; ¹Helmholtz Zentrum Berlin (Germany) and ²XaarJet AB (Sweden)

Discovery of a New Catalyst for Photocatalytic Hydrogen Production: Parallel Ink-Jet Printing Synthesis of Multicomponent Mesoporous Metal Oxides, Xiaonao Liu, Jie Fan, Yi Shen, Liping Xiao, and Sha Li, Zhejiang University (China)

Direct Etching—Targeting Commercial Photovoltaic Applications (Focal), John Rodriguez, Alison Lennon, Yu Yao, Pei Hsuan (Doris) Lu, Catherine Chan, and Stuart Wenham, The University of New South Wales (Australia)

Fundamental Characteristics on Patterning TiO₂ of Dye-Sensitized Solar Cell Utilizing PELID (Patterning with Electrostatically-Injected Droplet) Metho, Shinjiro Umez^{1,2}, Yoshitomo Kunugi¹, and Hitoshi Ohmori²; ¹Tokai University and ²RIKEN (Japan)

Thursday October 6, 2011

**ALL TRACKS INVITED
THURSDAY KEYNOTES FOLLOWED BY
FAREWELL RECEPTION**

Session Chairs: Werner Zapka, XaarJet AB, and
James W. Stasiak, Hewlett-Packard Company
1:20 – 3:45 PM

**Inkjet Printing in Manufacturing of High Efficiency
Silicon Solar Cells**, Juergen Sollner, SCHMID
Technology GmbH (Germany)

**Printed Smart Objects and Their Digital
Fabrication**, Reinhard Baumann, Chemnitz
University of Technology and Fraunhofer Institute for
Electronic Nano Systems ENAS (Germany)

**NIP TRACK 1
THERMAL PRINTING**

Session Chairs: Susan Farnand, RIT; Gerhard Bartscher,
Felix Boettcher GmbH & Co. KG; and Hirotooshi Terao,
Alps Electric Co., Ltd.
8:30 – 9:50 AM

**Study of Performance Improvement for Dye-
Sublimation Printer**, Hirotooshi Terao, Yukiko
Yasuda, and Tomoko Wwauke, Alps Electric Co.,
Ltd., and Isami Niitta and Masaru Iwasaki, Niigata
University (Japan)

**Development of High Quality True Edge Printhead
for Card Printer**, Daisaku Kato, Hidekazu
Akamatsu, Youichi Moto, Naoto Matsukubo,
Akihiro Fukami, and Kohei Nakada, KYOCERA
(Japan)

**Development of Durable and High Efficiency
Thermal Printhead**, Tadatoshi Miwa, Masatoshi
Nakanishi, and Shojiro Daicho, ROHM Co., Ltd.
(Japan), and Tadashi Yamamoto, ROHM
Semiconductor USA, LLC (USA)

**A New D2T2 Photo Printing Material: Its
Advanced Technologies and Excellent Properties**,
Takahisa Terashima, Takuya Arai, and Shigeaki
Ootani, Fujifilm Co., Ltd. (Japan)

SECURITY AND FORENSIC PRINTING

Session Chairs: Jason Aronoff, Hewlett-Packard Co.;
Steve Delepine, Brand Watch Technologies; and
Alan Hodgson, 3M Security Printing & Systems Ltd.
10:40 AM – 2:20 PM

Staggered and Dual-Channel Barcodes (Focal),
Steven J. Simske, Guy Adams, Jason S. Aronoff,
Margaret Sturgill, and Marie Vans, Hewlett-Packard
Laboratories (USA)

Variable Data Void Pantographs,
Steven J. Simske, Jason S. Aronoff, and Margaret
Sturgill, Hewlett-Packard Laboratories (USA)

**Automated Optimization of Void Pantograph
Settings**, Steven J. Simske, Jason S. Aronoff, and
Margaret Sturgill, Hewlett-Packard Laboratories
(USA)

Why Isn't Digital Printing Secure? (Focal),
Glenn P. Wood, Reconnaissance Int'l. (UK)

2D Barcode Sub-Coding Density Limits,
Guy Adams, Steve Simske, and Stephen Pollard,
Hewlett-Packard Laboratories (UK)

**Tracing the Source of Documents with Edge-
Refined Stegatones**, Robert Ulichney and Matthew
Gaubatz, Hewlett-Packard Co. (USA)

**Ink Jet Metrology: New Developments at NIST to
Produce Test Materials for Security Applications**,
Michael Verkouteren, Jennifer Verkouteren,
Matthew Staymates, Cynthia Zeissler, Eric Windsor,
and Greg Gillen, National Institute of Standards
and Technology (USA)

AFTERNOON KEYNOTES

1:20 – 3:45 PM
see above for details

**NIP TRACK 2
DESIGN FOR ENVIRONMENTAL
SUSTAINABILITY**

Session Chairs: Marcos Esterman, RIT;
Merja Kariniemi, VTT Technical Research Centre; and
Yusuke Takeda, Ricoh Co., Ltd.
8:30 AM – 2:00 PM

**Life Cycle Analysis in the Printing Industry: A
Review**, Justin Bousquin, Marcos Esterman, and
Sandra Rothenberg, Rochester Institute of Technolo-
gy (USA)

**The Future of Toner: Life-Cycle Inventory, Impacts
and Environmental Technologies**, Anahita
Williamson, Kate Winnebeck, and Brian Hilton,
Rochester Institute of Technology (USA)

**Carbon Footprint Analysis Comparing a Digital
Frame to Printed Photos**, Tom Etheridge, Hewlett-
Packard Labs (USA)

**Making Informed Decisions Toward a
Sustainability Assessment Framework for Printed
Permanent Government Records**, Daniel Burge,
Marcos Esterman, Susan Farnand, Franziska Frey,
Bill Garno, Robert Matesic, and Douglas
Nishimura, Rochester Institute of Technology
(USA)

**The Impact of 20 Years Environmental Certifica-
tion on the Shift from Traditional to Digital Print-
ing**, Werner Sobotka, Printing and Publishing Int'l.
(Australia)

**Fatty Acid-based Alkaline Deinking of Digital and
Non-digital Prints (Focal)**, Manoj K. Bhattacharyya,
Hou T. Ng, and Laurie Mittelstadt, Hewlett-Packard
Co. (USA)

Recent Developments in the Deinking of Inkjet and

Liquid Toner, Axel Fischer, International Association of the Deinking Industry (INGEDE e.V.) (Germany)

Sustainability of the CEWE PHOTOBOOK, Matthias Hausmann, CeWe Color AG & Co. OHG (Germany)

Communicating Environmental Performance of Printed Products (Focal), Merja Kariniemi, Minna Nors, and Maija Federley, VTT Technical Research Centre (Finland)

Exploring Existing Measures of Environmental Impacts of Print: A Survey of Existing Practices, Justin Bousquin, Marcos Esterman, and Sandra Rothenberg, Rochester Institute of Technology (USA)

Surface Treatment to Improve Print Quality on Recycled Paper, Gracy Wingkono, Thomas R. Oswald, and John Stoffel, Hewlett-Packard Co. (USA)

AFTERNOON KEYNOTES

1:20 – 3:45 PM

see page 29 for details

NIP TRACK 3

FUSING, CURING, AND DRYING

Session Chairs: Wade Eichhorn, 7-SIGMA Inc.;

Detlef Schulze-Hagenest, Kodak Graphic Communications GmbH; and Oh Hyun Baek, Samsung Electronics Co., Ltd.

8:30 – 11:10 AM

Nanoscale Testing of Specialized Polymers and Components Esed in Non Impact Printing,

Wade Eichhorn, 7-SIGMA, Inc., and Srikanth Vengasandra, Hysitron, Inc. (USA)

2D Thermal Analysis to Predict a Fuser Performance, Jun O. Kim, Youngdae Ko, Sokwon Paik, and Haeseog Jo, Samsung Electronics Co., Ltd. (South Korea)

Fuser Roller Core and Drive Collar Assembly Design for High Speed Printer, Sunil Chohan, Rich Duda, and Wade Eichhorn, 7-SIGMA, Inc. (USA)

Super Soft, Very Low Compression Set, Material for Pressure Roller Application, Boris Avrushchenko and Wade Eichhorn, 7-SIGMA, Inc. (USA)

A Model for Image Fix for a Belt Fusing System (Focal), David Battat, Lexmark Int'l., Inc. (USA)

Induction Heating Technology for System Optimization (Focal), Dae Whan Kim, Jin-Han Kim, Tatsuhiro Otsuka, Keon Kuk, and Takashi Kidokoro, Samsung Electronics Co., Ltd. (Korea)

PRINT AND IMAGE QUALITY

Session Chairs: Franziska Frey, RIT; Jordi Sender, Hewlett-Packard Co.; and Takao Abe, Shinshu University

11:10 AM – 2:20 PM

Automatic Troubleshooting of Print Quality Defects, Jordi Sender, Joan Jorba, and Sergi Puigardeu, Hewlett-Packard Co. (Spain)

Calibration Technique for Accurate for Diode to Diode Spacing Measurements, Jon B. Whitney and Samuel T. Pepper, Lexmark Int'l., Inc. (USA)

Perception Guided Automatic Press Diagnosis (Focal), Zachi Karni and Hila Nachlieli, Hewlett-Packard Laboratories, and Shaul Raz, Hewlett-Packard Indigo (Israel)

Research on Moiré Fringe in Frequency Conversion Amplitude-Modulated Screening and Its Equation Derivation, Guang-Xue Chen, Qi-Feng Chen, Hua-Wei Duan, Bao-Ling Tang, and Jing-Lei Tai, South China University of Technology (China)

An Analysis of the Factors Influencing Paper Selection for Books of Reproduced Fine Art Printed on Digital Presses, Brian M. Gamm, Franziska Frey, and Susan Farnand, Rochester Institute of Technology (USA)

Perceived Image Quality of Printed Fine Art Reproductions, Susan Farnand and Franziska Frey, Rochester Institute of Technology (USA)

AFTERNOON KEYNOTES

1:20 – 3:45 PM

see page 29 for details

DIGITAL FABRICATION SPECIAL TOPICS: DIGITAL FABRICATION AND SMART PACKAGING

Session Chair: James Stasiak, Hewlett-Packard Co.

8:30 – 10:10 AM

Smart Packaging for Security and Logistics, Steven J. Simske, Hewlett-Packard Laboratories (USA)

Printed Electronics and Media: Lessons from Early Implementations, Alain C. Briancon, NTERA (USA)

Integration of 2D Codes in Paper and Board Packaging - Reproduction and Readability, Maja Stanic, Arie Hooimeijer, and Sanne Tiekstra, Kenniscentrum Papier en Karton (the Netherlands)

Powerful Packaging: Printed Electronics Driving Innovation in Smart Packaging, Andy Hannah, Plextronics, Inc. (USA)

Metal Oxide Transistors with Good Substrate Latitude, Shelby F. Nelson, Lee Tutt, David Levy, and Mitch Burberry, Eastman Kodak Co. (USA)

3D PRINTING AND PROTOTYPING

Session Chairs: Ross Mills, Vexajet Corp. and

Jali Heilmann, VTT Information Technology

10:50 AM – 12:20 PM

Micro-Three-Dimensional Structure Formation by Inkjet Printing of UV Curable Inks,

Jens Hammerschmidt and Reinhard R. Baumann, Chemnitz University of Technology (Germany)

3D Printing of Ceramics for Design Concept

Modelling, David Huson, University of the West of England (UK)

Edible 3D Printing, Deborah Southerland, Peter Walters, and David Huson, University of the West of England (UK)

Digital Decoration of Consumer and Industrial Goods (Focal), Pasi Puukko, Jorma Koskinen,

Timo Salmi, and Ilari Marstio, VTT Technical Research Centre (Finland)

AFTERNOON KEYNOTES

1:20 – 3:45 PM

see page 29 for details

Hotel Registration and Transportation Information

A special block of rooms at a discounted rate is being held at the **Hilton Minneapolis** for conference attendees for the nights of September 30 – October 7, 2010. 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 **September 9, 2011**. To guarantee a room, credit card number or deposit equal to one night's housing must accompany the reservation request.

Reservations may be made by calling the hotel at 1-612-376-1000 or 1-800-445-8667 and telling them you are with the NIP27/Digital Fabrication 2011 or Society for Imaging Science and Technology Group.

The group code is NIP. For on-line reservations, visit http://www.hilton.com/en/hi/groups/personalized/M/MSPMHHH-NIP-20110930/index.jhtml?WT.mc_id=POG

Reservations Deadline: September 9, 2011

Hilton Minneapolis

1001 Marquette Ave. South • Minneapolis, MN 55403-2440

Check in is 3:00 pm. Check out is 12 pm (noon).

Single/Double \$169 + 13.4% tax Junior Suite \$219 + 13.4% tax

Notice of Cancellation must be given to the hotel 24 hours in advance of arrival date to receive a full refund of deposit.

Early Departure Fee: \$75; to avoid this fee, advise the hotel at or before check-in of any change in planned length of stay

Airport Information: Information on flights in/out of Minneapolis/St. Paul International Airport (MSP) can be accessed via the airport's website at <http://www.msppairport.com/>.

Transportation to/from Hotel:

Taxi: From MSP Terminal 1 follow signs to Tram Level (Level T). Signs will direct you to taxi booth one level up. From terminal 2, taxis are available at the Ground Transport Center (ground level, Purple parking ramp) across from the terminal building. The typical charge is \$37-\$47.

SuperShuttle: \$18/one way. To reserve visit www.supershuttle.com or call +1-612-827-7777.

Light Rail: accessible from both MSP terminals. Follow signs to "ground transportation." The Route 55 Light Rail services downtown and runs every 7.5 minutes during rush hour; 10-15 minutes other times. Travel time is approximately 25 minutes and fares vary between \$1.75 – \$2.25.

To reach the hotel, get off at Nicollet Mall Station (5th Street & Nicollet). Take the "Free Nicollet Mall Bus" to the 11th Street stop (11th Street & Nicollet). Walk one block east to 11th and Marquette Avenue. Hotel located on corner of 11th Street and Marquette Avenue.

Parking: Parking is available at the hotel for \$13 per night/self-park with in/out privileges and for \$23/valet with in/out privileges.

NIP27/DF 2011 Technical Registration – page 1

First/Given Name _____

Last/Family Name _____

Title/Position _____

Company _____

Complete Mailing Address _____

Telephone _____ Fax _____

Email _____

Conference registration includes: admission to all technical sessions for both conferences; choice of proceedings (hardcopy or abstract book + CD); entrance to the exhibit hall; coffee breaks; and the Welcome, Conference, and Farewell Receptions. **Separate registration fees are required for short courses unless a package is purchased.**

Guest/spouse registration includes: breakfast on Monday 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

Please circle the session you primarily plan to attend:

NIP Track 1 NIP Track 2 NIP Track 3 NIP Track 4 (Monday only) Digital Fabrication

Print Sample Gallery Reservation: Are you bringing sample prints to display? If so, please indicate area needed: ___2' x 4' or ___4' x 4'

Conference Registration (CHECK ONE)	until 9/5	after 9/5	TOTAL
<input type="checkbox"/> check here if you are a speaker			
___ IS&T/ISJ Member	\$695	\$795	\$ _____
___ Non-member	\$795	\$895	\$ _____
___ IS&T/ISJ Speaker Member	\$595	\$695	\$ _____
___ Speaker Non-member	\$695	\$795	\$ _____
___ IS&T/ISJ Session or Conf. Chair Member	\$595	\$695	\$ _____
___ Session or Conf. Chair Non-member	\$695	\$795	\$ _____
___ IS&T/ISJ Student (ID required) Member	\$135	\$165	\$ _____
___ Student (ID required) Non-member	\$160	\$190	\$ _____
___ One-day	\$415	\$465	\$ _____

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

___ NIP/DF Abstract Book with CD

___ NIP/DF Hardcopy book

Extra hardcopy proceedings Extra abstract book proceedings @\$130/each \$ _____

Extra CD (available only as addition to Hardcopy selection/purchase) @\$75/each \$ _____

Page Subtotal \$ _____

continued on next page

NIP27/DF 2011 Technical Registration – page 2

Short Course Registration (course descriptions begin on page 3)

	Member	Non-member	
2-hour (add \$35/class after 9/5)	\$160*	\$195*	\$ ____
Check all that apply:	<input type="checkbox"/> SC01	<input type="checkbox"/> SC07	<input type="checkbox"/> SC08
	<input type="checkbox"/> SC09	<input type="checkbox"/> SC14	<input type="checkbox"/> SC15
	<input type="checkbox"/> SC16	<input type="checkbox"/> SC17	<input type="checkbox"/> SC18
	<input type="checkbox"/> SC19		

4-hour (per class; add \$35/class after 9/5)	\$235*	\$270*	\$ ____
Check all that apply:	<input type="checkbox"/> SC02	<input type="checkbox"/> SC03	<input type="checkbox"/> SC04
	<input type="checkbox"/> SC05	<input type="checkbox"/> SC06	<input type="checkbox"/> SC10
	<input type="checkbox"/> SC11	<input type="checkbox"/> SC12	<input type="checkbox"/> SC13
	<input type="checkbox"/> SC20	<input type="checkbox"/> SC21	<input type="checkbox"/> SC22
	<input type="checkbox"/> SC23		

*Students may take any class for \$50 (\$85 after 9/5. No additional discounts apply.)

OR

Take two or more classes and receive 10% off the total price

(enter two or more short courses on the line, fill in member or non-member price next to each, add together, and multiply by .90 to get your price; add additional lines if needed)

SC____ \$ ____ + SC____ \$ ____ + SC____ \$ ____ = \$ ____ x .90 = \$ ____

Membership	US address	Non-US Address	
____ 18-month new membership (expires 12/31/12):	\$142.50	\$157.50	\$ ____
____ annual membership renewal (expires 12/31/12):	\$95	\$105	
____ Student membership (expires Sept. 30, 2012)	\$25	\$25	\$ ____

join now and calculate fees based on member rates

Other			
____ Guest/spouse registration (Name: _____)	\$100		\$ ____
____ Extra Welcome Reception Ticket	\$40		\$ ____
____ Extra Conference Reception Ticket	\$55		\$ ____
	Subtotal from previous page		\$ ____
	GRAND TOTAL		\$ ____

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

(to arrange for a bank transfer, contact registration@imaging.org)

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/ist/conferences/

Please note: To cover bank charges and processing fees, there is a cancellation fee of \$75 until September 5, 2011. After that date, the cancellation fee is 50% of the total plus \$75. All requests for a refund must be made in writing. No refunds will be given after October 5, 2011.

Contact Donna Smith (dsmith@imaging.org) for Exhibitor Registration and Information