

NIP20 Conference
Preliminary Program

NIP20

International Conference on
Digital Printing Technologies



Oct. 31 to
Nov. 5, 2004

Little America Hotel and Towers
Salt Lake City, Utah

Sponsored by:



The Society for Imaging
Science and Technology

<http://www.imaging.org>

and

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Introduction

Join us in Salt Lake City to celebrate NIP20, the twentieth anniversary of NIP: International Conference on Digital Printing Technologies. Over the years, the NIP conferences have emerged as the preeminent forum for discussions of advances and directions in non-impact and digital printing technologies. A comprehensive program of over 250 contributed papers from leading scientists and engineers is planned along with keynote addresses, sessions of invited papers on special topics, an extensive program of tutorials, discussion panels, a print gallery and an exhibition of digital printing components, products, materials and equipment.

- The **Tutorial Program**, from Sunday through Thursday, offers 27 tutorials on a wide variety of subjects. Detailed descriptions of the tutorials can be found in this program.
- Monday through Thursday will begin with **Keynote Addresses** by industry leaders from Konica Minolta, Hewlett Packard, Oji Paper Company, and Scitex Vision.
- The three-track **Technical Program** will feature over 250 papers in twenty sessions, including four Special Topic sessions.
- Four **Special Topics Sessions** will offer invited presentations by experts in these areas, “*Printed Electronic Components*”; “*Security and Forensic Printing Applications*”; “*Electronic Paper and Displays*”; and “*Control Systems*”.
- The **Industrial & Textile Printing Gallery**, held on Thursday afternoon, will provide a chance to learn about the state-of-the-art textile and fabric printing technologies and to take a close-up look at digitally printed textiles, at printed electronic components and other applications of printing technologies.
- The **Print Gallery** will begin on Monday afternoon and the gallery will be on display until the end of the day on Wednesday.
- The **IS&T Awards Ceremony** will be held on Tuesday Morning after the keynote address.
- **Interactive Sessions**, from Monday through Thursday, the 5-minute oral previews portion of the interactive papers will be presented during the regular oral technical sessions of similar subjects. On Tuesday and Thursday afternoons, the poster display portion (all tracks) of the interactive papers will be presented. These sessions present an opportunity for one-on-one interactions with the authors. Light refreshments will be available during the poster presentations.
- The **Exhibition**, on Tuesday and Wednesday, will showcase a wide range of products, applications, and services related to printing and imaging.
- On Wednesday afternoon, there will be a **Panel Discussion on “Intellectual Property”**.
- *The Social Program, an “Ice-Breaker” on Sunday evening and the “Conference Banquet” on Wednesday evening, offer great networking opportunities. Check our website www.imaging.org for updates on tours and special activities for you and your guest in Salt Lake City. If you work in the field of digital printing or related technologies, the NIP20 is the conference to attend!*

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NIP20 Exhibitors

The Exhibit Hall will be open on Tuesday, November 2 from 9:30 am to 5:00 pm and Wednesday, November 3, 2004 from 9:00 am to 4:00 pm. Please join us.

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Special Events

NIP 20th Anniversary Dinner

The IS&T Board of Directors, NIP20 Committee and Past NIP Chairs cordially invite all attendees to celebrate twenty years of NIP at a gala anniversary dinner party on Wednesday, November 3. We hope everyone will come and enjoy good music, good company, and a trip down memory lane.

Panel Discussion on Strategic Management of Intellectual Property in the Global Marketplace

Chair: Dr. Jan M.K. Jaferian, President, Lucent Technologies, Intellectual Property Business

This panel will follow the special session on this topic and will discuss intellectual property issues. Interested parties should contact one of the organizers,

Dr. George Gibson - george.gibson@crt.xerox.com

Dr. Ramon Borell - ramon.borrell@hp.com.

Print Gallery

• The Print Gallery enables an up-close, detailed look at the performance capabilities and relative advantages of various printing technologies on paper and traditional media.

Interested parties should contact the organizer, Dr. Huoy-Jen Yuh:

huoy-jen.yuh@usa.xerox.com or 585-422-4684.

Industrial & Textile Printing Gallery

• Now scheduled is a panel and forum on "Textile and Fabric Printing" that will occur in conjunction with the papers session on the same topic. Interested in being a panelist or displaying your digitally printed industrial prints or textiles and fabrics? The Industrial Printing Gallery familiarizes the attendees with the magnificently broad scope of commercial and manufacturing applications for printing: from textiles to corrugated cardboard to wide-format printing and from printed electronic components to displays to biological devices. Please contact Mr. Vince Cahill at:

vince@vcesolutions.com or 717-762-9683.

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Monday November 1, 8:00 am to 9:00 am

HIGH SPEED COLOR LASER PRINTING

Shoei Yamana, Konica Minolta Business Technologies, Inc.

The market expectation for high-speed color laser beam printer technology is growing every year, and the boundary between large volume printing within offices and industrial printing is finally about to disappear. Big factors for such changes are:

1. rapid development of network environment
2. improvement of on-demand printing performances, realized by evolution of polymerization toner, related technologies and other technologies such as image-processing
3. improvement of color image quality
4. practical prices and so on.

From now on, more and more information will be electronic, and when customers insist on output on paper, key points of customer requests will be that they can print on any type of paper, at high speed, with high quality and with high reliability, completed with a nice suite of finishing procedures. Therefore, it will be important to further scale down toner particles, lower adhesion, and enable low-temperature fixing. In the high-speed color laser beam printer domain, therefore, technologies with polymerization toner as a core technology will surely gain more importance.

Shoei Yamana is Executive Director of MFP Sales and Marketing HQ in Konica Minolta Business Technologies. He received a bachelors' degree in commerce from Waseda Univ. and joined Minolta in 1977. In 1996 he was promoted to General Manager of the Corporate Strategy Division. In 2001 he was appointed CEO of Minolta QMS. In 2002 he was promoted to Executive Officer in Minolta. Since August 2003 he has been Senior Executive Officer in Konica Minolta Holdings. He is a member of the Policy Planning Committee of Japan Business Machine and Information System Industries Association (JBMIA).

Tuesday November 2, 8:00 am to 9:00 am

TWENTY YEARS OF INK JET DOMESTICATION

John D. Meyer, Hewlett-Packard Laboratories

The introduction by Hewlett Packard of the ThinkJet printer in 1984 marked a turning point in ink jet printing. A technology which had been

primarily implemented in industrial applications embarked upon a developmental course that ushered in consumer digital photography via unheard of low prices for a desktop printer capable of photographic image quality. In this sense the complexity of ink jet printing was domesticated, bringing it onto the desktop and into the home with simplicity of operation, maintenance and user interface. Complementing the extension into consumer applications, professional photographers and commercial printers have found ever expanding applications for the large and ultra-large format ink jet implementations. Today, the installed base of ink jet printers is in the hundreds of millions. These numbers have not arisen simply from a predictable improvement in the performance parameters such as resolution, drop volume and operating frequency. Parallel innovations in ink, colorants (both dyes and pigments), specialty substrates, digital halftone algorithms and colorimetrically based color reproduction methods have acted as technology "forces" to guide the evolution of ink jet printing. The ever increasing computational power of PCs coupled with plunging memory costs has added "fuel to the fire" as it were, energizing a digital imaging revolution that has centered, to a great deal, on ink jet printing.

Given this remarkable history some obvious questions occur, many centering around the future of ink jet. Some of these relate to the ability of ink jet to compete with other printing technologies such as laser electrophotography, dye sublimation, even offset lithography. This approach leads to a performance specification analysis: resolution, dry time, drop volume, grayscale capability, waterfastness, operating frequency, lightfastness, color gamut etc., and the list is yet quite incomplete. Another approach is to examine the future directions for the printing applications, such as digital photography, where ink jet printers are very popular, and seek to ascertain how ink jet can supply the changing demands of those markets. The author will seek to blend both of these approaches as a way of looking to the future.

Finally, the insights and lessons derived from taking a nascent idea and following its development from a very modest 96 dpi printer all the way into the photographic imaging technology of today's ink jets are of value to all who seek to invent. A selection of observations, lessons and some humorous stories will be offered for potential inventors.

John Meyer is Director of the Hardcopy Technologies Lab. (HTL) at HP Labs. Dr. Meyer holds a PhD in experimental low-temperature physics from the Univ. of Southern California. He is a past president of the Society for Imaging Science and Technology. Dr. Meyer is also a member of the Faculty Advisory Board for the Center for Imaging Science, Rochester Institute of Technology.

Wednesday November 3, 8:00 am to 9:00 am

CURRENT TRENDS IN ELECTRONIC PAPER

Shuichi Maeda, Oji Paper Company, Japan

We have access to much more information than before through electronic media. These electronic media sometimes do away with the need for paper, but at other times they create more demand for it. Paper supports some kinds of human activities better than the electronic alternatives do. For example, paper tends to present a much more comfortable and barrier-free interface to its users than liquid crystal displays. In fact, people prefer to print documents out on paper when they want to read them.

Recently, there has been increasing interest in electronic paper that combines the advantages of electronic media with the human-friendly characteristics of paper. Electronic paper represents both a threat to traditional paper as well as a significant opportunity for new product development because it has properties which are close to those of paper, such as readability and stability.

In this talk, after discussing what electronic paper is, the present candidates will be introduced including reflective liquid crystal systems, electrical twisting ball displays, electrophoretic image displays and other new technologies. Then the discussion will focus on the future of both paper and electronic paper, with particular emphasis on their performance and applications.

Shuichi Maeda is a senior research scientist at Oji Paper Company. He received his MSc. in polymer chemistry from Keio Univ. and joined the research Lab. at Oji in 1989. He worked on polymer colloids at the Univ. of Sussex beginning in 1992. After receiving his PhD from the Univ. in 1994, he returned to Oji's research laboratories.

His current interests are polymer colloids, media for printing and electronic paper. Dr. Maeda received the "Polymer Lab Award" of the Royal Society of Chemistry in 1994 and the "Japan Tapii Award" of Japan Tapii in 2002.

Thursday November 4, 8:00 am to 9:00 am

INDUSTRIAL INKJET PRINTING: FROM THE NICHE TO THE MAINSTREAM

Itai Halevy, Scitex Vision

The last several years has seen inkjet printing penetrate and dominate high value added, niche printing applications. As industrial inkjet has proven itself in terms of reliability, quality and productivity, it is now ready to move from the "Niche" to "The Mainstream" of industrial printing applications.

Scitex Corporation and more specifically Scitex Vision is and has been for several years in the forefront of this trend. We would like to share our experience in penetrating industrial markets. Specifically we will relate to the challenges presented by the various markets we address and how we go about addressing them from a product/technology point of view as well as from a marketing/business development perspective. We will attempt to address the economic trade offs as viewed by the customers and even project the rate of industrial inkjet penetration solutions we expect in various market segments.

Itai Halevy, Executive Vice President and Chief Marketing Officer joined Scitex Vision in January 2003. Previously, Mr. Halevy served as Vice President of Business Development at Clal Industries and Investments Ltd., one of the main shareholders of Scitex Vision. Prior to that, he held several product, marketing and business development positions at Scitex Corporation Ltd. which he joined in 1991. His last position within Scitex was as Corporate Vice President, Business Development and Strategic Planning. Mr. Halevy holds a bachelors degree in industrial engineering from Tel Aviv Univ. and an MBA degree from INSEAD, Fontainebleau, France.

Tutorial Program

NOTE: We reserve the right to cancel tutorial classes in the event of insufficient advance registration. Indicate your interest early. Prerequisites are noted in the description for advanced courses.

T-1 - 4 hour tutorial Sunday, October 31
8:00 am to 12:00 noon

DIGITAL PRODUCTION PRINTING (TECHNOLOGIES, METHODS & SYSTEMS)

*Instructor: Helmut Kipphan,
Heidelberger Druckmaschinen AG*

Newly revised for 2004 this course will reflect and explain the newest improvements, developments, and trends in technologies, industries and markets — as shown during the world's biggest and most important international exhibition — DRUPA2004.

This course offers an overview of high quality digital production printing. Digital production printing demands equipment that produces high quality prints, exhibits high productivity, and is highly reliable; such systems are in use in commercial printing establishments, at in-house print shops, at data centers as well as offices and print shops of large organizations. The course describes several versions of systems for digital printing - all based on the fully digital defined print products, including conventional techniques, non-impact-printing technologies as well as hybrid printing technologies for sheetfed and web printing systems. We will discuss computer-to-plate, computer-to-press/direct imaging and computer-to-print. We will pay special attention to system architecture including single pass and multipass design. The course will cover print quality specification, pressroom networking, and digital workflow. Print production strategies like centralized and distributed printing, versioning, customization, personalization, print on demand and book on demand will be sections of this course. The course will offer descriptions and comparisons of the state-of-the-art equipment of many manufacturers worldwide. We will also discuss electronic media and future requirements, demand, and technological trends.

Benefits: This course will enable you to:

- Understand the several printing technologies for print media production
- Differentiate/understand the various workflow steps premedia, prepress, print, postpress/finishing, distribution for producing print media based on digital described print products
- Understand the basic principles of conventional, NIP-based and hybrid printing production systems

- Select production tools/solutions for your special application and customers demands
- Identify and discuss technologies of digital printing solutions to use within the different areas for print media production
- Analyze and evaluate available equipment and production systems with their architecture and system design
- Rank the various systems and technologies from the perspective of market demand and customer/user requirements
- Recognize and differentiate the principles in system architecture, design, imaging and printing methods
- Demonstrate enhanced basic knowledge about networking, workflow and color management
- Compare different print production strategies and possibilities
- Categorize technologies and production systems according to the print quality that can be achieved and productivity measurements
- Understand and summarize state-of-the-art technologies and systems for digital printing including imaging systems and all "Computer to..." technologies
- Recognize trends, opportunities, challenges and demand within the graphic arts industry
- Position and compare print media with electronic media

Intended Audience: Engineers, researchers and scientists working in the area of product/system research and development, technical marketing people, managers in print shops and publishing houses, trainers and lecturers for graphic arts and print media production will benefit from this class, as well as anyone who is interested in state-of-the-art and future trends in the imaging, printing and publication, media and communication industry. Participants only need a basic technical understanding; the concept of the course is to lead to deep knowledge step-by-step using detailed handouts and course materials.

***Helmut Kipphan** is Senior Vice President Advanced and Future Technologies and Chief Scientist/Technology Advisor at Heidelberger Druckmaschinen AG. He studied mechanical engineering at the Univ. of Applied Sciences in Mannheim and at the Univ. of Karlsruhe. In 1971, he served as a scientific assistant at the Institute for Measurement and Automation Control Engineering at the Univ. of Karlsruhe. Fol-*

Tutorial Program

lowing his doctoral thesis (Dr.-Ing., 1975) and post-doctoral thesis (Dr.-Ing. habil., 1979), he assumed a professorship (Prof., 1985) in Measurement Technology and Systems and has been teaching as a lecturer at the Univ. of Karlsruhe. In 1978 he joined Heidelberg as a research engineer. Helmut Kipphan has held several management and executive positions in R&D and technology/product development in the fields of sheet-fed and web-fed offset printing, technology transfer, patenting and education. Since 1992 he has been a senior vice president for technology and innovation research, dealing especially with advanced and future technologies for digital printing with conventional and NIP technologies. He holds leading positions in international committees within the graphic arts industry and associations for industrial joint research. He is a member of TAGA and IS&T; served on several IS&T and IS&T/SPIE conferences and as a member of the TAGA board of directors. He is the inventor of over 40 patents, a speaker at various international technical conferences, author of numerous publications as well as the main author and editor of "Handbook of Print Media-Technologies and Production Methods" (German/2000, English/2001, Russian/2003 edition). In 2001 he received the TAGA Honors Award "for his research activities, contributions for technology and product developments and his contribution and support to improve worldwide education and technologies within the graphic arts and communication industry". Since 2002 he has been a full member of the "Heidelberg Academy of Sciences and Humanities". In April 2003, Dr. Kipphan was honored by receiving the laureateship of an honorary doctorate, the academic title "Dr.h.c." (Doctor honoris causa) from the Moscow State Univ. of Printing Arts. In September 2003 he was elected as a member of the board of IARIGAI (International Association of Research Organisations for Printing, Information and Communication Industries). In October 2003 he was awarded an honorary professor (Prof. h.c.) from the Republic of Uzbekistan, the Tashkent Institute of Textile and Light Industry (the complete academic title is now: Prof. Dr.-Ing. habil. Dr. h.c. Prof. h.c.). Since March 2003, Dr. Kipphan has been an advisor for printing technologies of the German Federal Ministry of Finance, which is responsible for design and production of postal stamps and banknotes. Since October 2003 he has been a member of acadtech, the Council for Engineering Sciences at

the Union of the German Academies of Sciences and Humanities, the German Universities and Industries. In 2004 Helmut Kipphan was awarded with the Fellowship of IS&T "for his significant contribution to digital printing technologies".

T01 - \$200/\$245

T02 - 4 hour tutorial Sunday, October 31
8:00 am to 12:00 noon

INTRODUCTION TO ELECTROPHOTOGRAPHY

Instructor: Lawrence B. Schein, Consultant

Electrophotography is the primary technology used in copiers and laser printers. In this introduction the fundamentals of the technology will be discussed, from the basic six steps to the underlying physics of the process. Discussions will include the physics of development and transfer, our current understanding of toner charging, and the challenges of color electrophotography. The architecture of some commercial applications of color electrophotography will be examined.

Benefits: This course will enable you to:

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

Intended Audience: This course should be of interest to anyone working in the field of digital printing technologies.

Lawrence B. Schein received his Ph.D. in solid state experimental physics from the Univ. of Illinois in 1970. He worked at the Xerox Corp. from 1970 to 1983 and at the IBM Corp. from 1983 to 1994. He is now an independent consultant. He has helped implement development systems in IBM laser printers, has proposed theories of most of the known electrophotographic development systems, and has contributed to our understanding of toner charging and charge transport mechanisms in photoreceptors. He is the author of "Electrophotography and Development Physics," a Fellow of the IS&T, recipient of IS&T's Carlson Memorial Award in 1993, a

Tutorial Program

Senior Member of the IEEE, and a member of the American Physical Society and the Electrostatics Society of America.

T02 - \$200/\$245

T03 - 4 hour tutorial Sunday, October 31
8:00 am to 12:00 noon

AN OVERVIEW OF INK JET PRINTING FROM AN INK PERSPECTIVE

Instructor: Alan Hudd, Xennia Technology

This class provides a detailed description of the complexities of developing new chemistries for the major ink jet printing technologies and an overview of the different printhead technologies from an ink chemist's perspective. The course will concentrate on describing the key design criteria for successful ink development and highlight the importance of good scientific understanding to ensure reliability, critical for any ink jet product. State-of-the-art characterization measurements will be presented to gain a better insight into the factors influencing reliability for different applications. A review of ink technology patents will be presented based on Pivotal Resources patents service, "Directions". Examples will be used to illustrate recent major technical breakthrough advances in new chemistry for ink jet. The status of a range of new industrial applications will be highlighted.

Benefits: This course will enable you to:

- Understand the key elements and design criteria for successful ink development
- Describe the processes influencing the development of new chemistries for ink jet printing
- Compare the ink properties required for the range of printhead technologies
- Predict reliability of ink jet products using state-of-the-art characterization measurements
- Summarize the status of the ink jet ink patent literature
- Identify recent technical breakthroughs in new chemistries

Intended Audience: This class assumes basic scientific knowledge. The class provides a useful background to anyone entering the ink jet industry and those seeking an efficient update in developments of ink jet technologies.

Alan L. Hudd founded Xennia Technology in April 1996, an independent contract ink jet technology house dedicated to developing new ink jet inks for both the industrial and office ink jet industries. In 1987, he joined Domino Printing

Sciences and spent eight years as the Fluids Technology Manager, developing a wide range of ink jet inks for diverse applications. He is credited with a number of patents and significant innovations. He spent almost eight years with the Ministry of Defense and Royal Ordnance in the U.K., developing new solid polymer rockets for air to air missiles. He graduated with a B.Sc. Honours degree in Chemistry and Physics, M.Sc. and Ph.D. research degrees in Polymer Chemistry from Manchester Univ.

T03 - \$200/\$245

T04 - 4 hour tutorial Sunday, October 31
8:00 am to 12:00 noon

COLOR QUALITY FACTORS IN DESKTOP PRINTING

Instructor: Gabriel Marcu, Apple Computer

This tutorial discusses and illustrates the most important quality factors of color reproduction for desktop printing. Elements such as reproduction technology, colorant/media interaction, geometric resolution, halftoning, color separation (including UCR/GCR), TRC corrections, and gamut mapping will be examined for their influence on print quality. The importance of color management (including characterization and calibration) for high quality color reproduction is discussed. The influence of chromatic adaptation and the viewing conditions on evaluation of the print quality is highlighted. The role of measurement and interpretation of data (including gamut comparison) for color quality evaluation will be demonstrated. The importance of test and reference images is illustrated with examples.

Benefits: This course will enable you to:

- Identify the key elements in achieving a high color quality in printing
- Understand the technology limitations in achieving the high quality color reproduction
- Understand the concept of resolution, MTF, CTF and their contribution in deriving quality metrics
- Compare the color gamut on different media and understand the role of ink/media interaction
- Understand the role of tone reproduction, halftoning, color separation, gamut mapping on color quality
- Understand the difference between Gray Component Replacement and Under Color Removal techniques and their contributions in high quality color reproduction
- Understand the influence of halftoning in achieving a high quality color reproduction and the practical limitations due to dot gain

Tutorial Program

- Identify the advantages and limitations of CMM in achieving high quality color reproduction in desktop printing
- Recognize the role of characterization and calibration for accurate color reproduction
- Understand the role of adaptation in judgement of color quality
- Understand the importance of the viewing conditions for color quality evaluation
- Select the test and reference images and use them effectively to evaluate the quality of color reproduction

Intended Audience: The tutorial is intended for engineers, scientists and managers confronting color quality issues in color reproduction. Participants should have familiarity with color imaging and computer systems.

Gabriel Marcu is Senior Scientist in ColorSync group, at Apple Computer. His achievements are in color reproduction (device characterization and calibration, halftoning, gamut mapping, ICC profiling). Dr. Marcu has taught seminars and short courses on color topics for Shizuoka Univ., Japan ('92, '93), UC at Berkeley (April, '97), IS&T/SPIE's Electronic Imaging Symposium '98-99, IS&T/SID's CIC '98-2000, IS&T's PICS '99-2000. Since 1998 he was Co-Chair of the IS&T/SPIE EI Conference on Color Hard Copy and Applications, San Jose, CA and in 2003 he was the General Co-Chair of the IS&T/SID Color Imaging Conference, Scottsdale, AZ.

T04 - \$200/\$245

T05 - 4 hour tutorial Sunday, October 31
8:00 am to 12:00 noon

PAPERMAKING, COATING FUNDAMENTALS AND MEDIA FOR DIGITAL PRINTING

Instructor: Sen Yang, International Paper

This tutorial includes an introduction to papermaking and paper coating technologies and a discussion on media requirements for digital printing with an emphasis on electrophotographic (EP) and inkjet printing applications. Paper attributes that are important for color EP and inkjet printing will be reviewed and discussed.

Benefits: This course will enable you to:

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

Intended Audience: This class is directed toward anyone seeking an introduction to papermaking and paper coating fundamentals and for a better understanding the relationship of media properties and performance for EP and inkjet printing. No working knowledge of papermaking and coating techniques will be presumed or required.

Sen Yang is manager of Surface Science and Digital Printing in the corporate research center of International Paper Company. He received his Ph.D. degree in polymer science from Brown Univ. Since 1990, he has worked in the field of specialty paper and film coatings for digital imaging applications. Prior to joining International Paper, he worked for Océ-Arkwright and Champion International Corp. where he led and contributed to a number of successful specialty paper and coated film products both for private label and OEM businesses. He has several patents in the area of coated inkjet paper and specialty films.

T05 - \$200/\$245

T06 - 4 hour tutorial Sunday, October 31
1:00 pm to 5:00 pm

OPPORTUNITIES IN PHOTOGRAPHIC QUALITY DIGITAL IMAGING

*Instructor: James C. Owens,
Torrey Pines Research*

The technologies available to photography, printing, and display have developed dramatically in the last few years, leading to startling workflow efficiency improvements in some existing businesses but also opening many opportunities for new businesses and applications. Our challenge in optics, electronics, and software is to build devices and systems that match or exceed the visual quality and system robustness of traditional photography while improving on its flexibility and range of application. In this course, we discuss the new opportunities for high-quality imaging, choosing the most appropriate technical approach, and selecting the best printing method.

Benefits: This course will enable you to:

- Identify the major commercial and scientific applications of photographic quality color printing
- Describe the most important attributes of image quality and customer preference
- Select appropriate image capture devices
- Choose file formats and color management devices and software

Tutorial Program

- Explain and compare the principles, advantages, and disadvantages of the major color printing technologies
- Recognize the appearance and causes of the most common image artifacts produced by digital systems and develop designs that avoid them
- Explain and give examples of workflow simplification
- Select and apply the most appropriate imaging technology for a given application

Intended Audience: Engineers, scientists, product planners, and end users needing a broad understanding of digital imaging technology along with judgment and perspective in order to choose and adapt the appropriate process for any given application will benefit from this course.

James C. Owens is a physicist with 30 years' experience in the development of many types of imaging systems at the Research Laboratories of Eastman Kodak Company, where he received the C. E. K. Mees Award for his work on hardware and media for infrared laser scan printing. Dr. Owens is currently the Senior Fellow of Torrey Pines Research. He is a Fellow, a past President, a past Visiting Lecturer, and currently the Web Tutorial Editor of the IS&T; the Chair-Elect of the New York State Section of the APS; the past President and currently a Councilor of the Rochester Section of OSA; and a member of IEEE.

T06 - \$200/\$245

T07 - 4 hour tutorial Sunday, October 31
1:00 pm to 5:00 pm

ELECTROSTATICS AND PARTICLE ADHESION IN ELECTROPHOTOGRAPHY

*Instructor: Dan Hays,
Xerox Corp.*

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 tutorial provides a foundation for understanding various electrostatics phenomena that are exploited in the electrophotographic process. The tutorial serves as an introduction to electrostatics topics covered in other related tutorials on electrophotography including "Introduction to Electrophotography", "Introduction to Toner Technology", "Electrostatic Toner Transfer", "Physics of Electrophotographic Development", Charging Systems and Dependent Processes in

Electrophotography" and "External Additives for Xerographic Toners".

Benefits: This course will enable you 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: This tutorial is intended for technicians, engineers, scientists and managers involved in electrophotographic research and engineering. Familiarity with college-level physics is a recommended prerequisite.

Dan A. Hays is a Senior Fellow at Xerox Corp. in the Wilson Center for Research and Technology. Dr. Hays' research and technology contributions in the field of electrophotography have spanned the areas of triboelectricity, charged particle adhesion, and xerographic development systems. He received the Xerox President's Award in 1980 and 1997, and IS&T's Chester Carlson Award in 1991. He was appointed to Fellowship in IS&T in 1996 and received the American Institute of Physics 1997-98 Prize for Industrial Applications of Physics. In 1999, he became a Fellow of the American Physical Society and received the Gutenberg Prize from the Society for Information Display. He has been a leader in IS&T's Digital Printing Technologies Conferences and the NIP Technical Council. Dr. Hays has published 55 scientific papers and holds 58 U.S. Patents. Prior to joining Xerox in 1968, Dr. Hays received a B.S. degree from Iowa State Univ. and a Ph.D. in physics from Rutgers Univ.

T07 - \$200/\$245

Tutorial Program

T08 - 4 hour tutorial Sunday, October 31
1:00 pm to 5:00 pm

EVALUATING INK JET TECHNOLOGY

*Instructor: Ross N. Mills,
imaging Technology international (iTi) Corp.*

This course will cover the methods for evaluating and selecting the correct type of ink jet technology for printing scientific and manufacturing applications. In addition to an advanced introduction to the different types of ink jet, the fundamental advantages and disadvantages of each type will be discussed. Topics such as the influence of throughput parameters, ink and substrate physical properties, maintenance, and reliability on print head selection for these applications will be presented. Business issues such as make or buy, do-it-yourself or hire-it-done, availability and cost of print heads, and time-cost tradeoffs to complete the application will be covered.

Benefits: This course will enable you to:

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

Intended Audience: This course is intended for people who have a basic understanding of ink jet technology and who wish to expand their knowledge base in the area of ink jet applications.

Ross N. Mills is currently President and CTO of imaging Technology international (iTi) Corp.. He received his Ph.D. and Masters Degrees in Engineering Science from the Univ. of California Berkeley and his B.S. Degree in Aerospace Engineering from the Univ. of Texas at Austin. Since 1978 he has worked as a research, development, and manufacturing engineer in both staff and management capacities in the areas of piezoelectric and thermal ink jet printers and electrophotographic printers for IBM, Lexmark International, and Topaz Technologies as well as iTi. In 1992, he founded iTi Corp. in Boulder, Colorado as an ink jet consulting firm and as a development and integration facility for advanced non-impact printing and imaging technology. Dr. Mills has twelve patents in this field and he

is the inventor of iTi's proprietary ESIJET™ technology.

T08 - \$200/\$245

T09 - 4 hour tutorial Sunday, October 31
1:00 pm to 5:00 pm

IMAGE QUALITY: PERCEPTION AND QUANTIFICATION

*Instructor: Eric K. Zeise,
NexPress Solutions, Inc.*

A meaningful description of image quality requires an accurate linkage between the measurement of an attribute and its perceived quality. Measurement without a linkage to perception can lead to meaningless specsmanship. Perception without objective measurement can degenerate to opinion. In this course, we examine the characteristics and limitations of human visual perception and the models of perception used to describe the appearance of objects. From this perspective, we identify important attributes of image quality and investigate measurement techniques used to quantify these attributes. We examine the scope, utility and limitations of standards that permit comparison of non-impact printing device image quality. We will work through short examples of psychometric scaling methods that create the required relationship between instrumental measurement and perceived quality, allowing a meaningful, quantitative measurement of perceived image quality.

Benefits: This course will enable you to:

- Utilize psychometric scaling methods to provide meaningful, quantitative measurement of perceived image quality
- Understand the limitations of perception to avoid over-specification
- Understand the applicability of important image quality measurement techniques
- Understand the utility of standards for comparison of device image quality

Intended Audience: This course is directed towards anyone seeking to understand the quantitative measurement of perceived image quality. No prior experience is necessary.

Eric K. Zeise is a research associate and group leader for image quality evaluation at NexPress Solutions Inc., a Kodak company. He has been involved in many aspects of color systems modeling, printing system architecture and perceptual image quality evaluation since joining the research laboratories of Eastman Kodak Co. in 1981. Dr. Zeise is chair of the ANSI/ISO SC28

Tutorial Program

and INCITS W1.1 standards project (ISO 19751) for perceptually linked determination of image quality for printing systems. He was an initial staff member of NexPress LLC when it was formed in 1998 as a joint venture between Eastman Kodak Co. and Heidelberger Druckmaschinen AG. He received a Ph.D. in low-temperature physics from Cornell Univ. in 1981.

T09 - \$200/\$245

T10 - 4 hour tutorial Sunday, October 31
1:00 pm to 5:00 pm

INTRODUCTION TO TONER TECHNOLOGY

*Instructor: George P. Marshall,
Lexmark International, Inc.*

This course will include an introduction to electronic printing technologies and define the place of electrophotography in its various embodiments. One common element - toner - will be discussed in terms of architecture, formulation and implementation in each of these embodiments. Various toner design criteria and performance requirements will be discussed. Analytical and measurement techniques will be surveyed, including size, charge and rheological attributes. Recent product introductions will be reviewed and present and future trends in toner technology will be discussed. A glossary and bibliography for future reference will also be provided.

Benefits: This course will enable you 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 EP 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: This class is directed toward anyone seeking an introduction to electrophotography, electrophotographic printing, supplies technology or related development activities. An interest in toners or carriers is helpful. No working knowledge of electrophotography will be presumed nor is required.

George P. Marshall is a Senior Technical Staff Scientist in the Imaging Solutions Division of Lexmark International, Inc. He has been

involved in multiple aspects of copier and printer development. He has developed toner formulations for IBM and Lexmark printers and is a recognized figure in the area of electrophotography and related supplies disciplines. His interests include toner charge control, rheology/fusing, print quality evaluation and toner processing. He received his Ph.D. in Organic Chemistry from the Univ. of Arizona in 1978 and worked for IBM Corp. Office Products Division from 1978 until 1991, at which time a divisional sale created Lexmark International, Inc. He has worked in the Toner Development Group since 1978. He served on the Board of Directors of IS&T, edited IS&T's Recent Progress in Toner Technology (December, 1997), and is a member of the Editorial Review Board for "Particulate Science and Technology: An International Journal." He received Lexmark's highest employee honor ('Customer for Life Award') in 1996.

T10 - \$200/\$245

T11 - 6 hour tutorial Monday, November 1
9:15 am to 4:15 pm

SURFACE TENSION, WETTING, AND CAPILLARITY

*Instructor: Abraham Marmur,
Israel Institute of Technology*

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

Benefits: This course will enable you to:

- Understand the concepts of surface tension and interfacial tension and compare techniques for their measurements
- Define contact angles and learn to correctly measure them
- Distinguish between various modes of wetting
- Understand the mechanism of liquid penetration into a porous medium
- Compare methods for characterization of porous media
- Realize the effect of drop size on penetration into a porous medium

Intended Audience: Engineers and scientists working in the areas of ink formulations, sub-

strates for printing (paper, plastic, metal, glass), design and development of ink-jet heads, etc. will benefit from this class.

Abraham Marmur holds the *Albert and Anne Mansfield Chair in Water Science and Technology*, and has been working in the field of interfacial phenomena and wetting for over twenty-five years. He has published many papers on the theory and practice of wetting processes, and is also a consultant for major companies involved in the design and utilization of inkjet printing systems. He was also an editor of *Reviews in Chemical Engineering*, on the advisory committee of “*J. of Colloid and Interface Science*,” and is on the advisory committee of “*J. of Adhesion Science and Technology*.” Prof. Marmur is a recipient of Technion’s Muriel and David Jacknow Award for Excellence in teaching, and the Henry Taub Prize for excellence in research.

T11 - \$300/\$350

T12 - 2 hour tutorial Monday, November 1
9:15 am to 11:15 am

ORGANIC PHOTORECEPTORS FOR DIGITAL ELECTROPHOTOGRAPHIC PRINTERS

Instructor: David Weiss, NexPress Digital

This course will provide a detailed description of the architecture, chemistry, manufacturing, testing, and functional requirements of the organic photoreceptors used in today’s electrophotographic printers. Discussions will include current trends in organic photoreceptor technology and the unique requirements of digital printing which must be satisfied.

Benefits: This course will enable you to:

- Understand how organic photoreceptors function in an electrophotographic printer
- Discuss the interplay between architecture and electrophotographic function
- Explain the relationships between chemical make up and the electronic functions of the various layers in an organic photoreceptor
- Point out the technologies involved in the manufacturing of organic photoreceptors
- Assess how organic photoreceptors are studied and characterized

Intended Audience: This tutorial is intended for an audience with an interest in understanding organic photoreceptors and how they function in modern digital electrophotographic printers. A general background in chemistry and physics will be helpful but is not essential.

David S. Weiss is a Scientist Fellow at NexPress Digital LLC. He received his Ph.D. in chemistry from Columbia Univ. (New York) in 1969. His work focuses on electrophotographic technologies with emphasis on organic photoreceptors. He holds 15 U.S. patents and is author on over 70 publications. He is co-author of *Organic Photoreceptors for Imaging Systems* (Marcel Dekker, Inc., 1993), *Organic Photoreceptors for Xerography* (Marcel Dekker, Inc., 1998) and he is co-editor of the *Handbook of Imaging Materials, Second Edition* (Marcel Dekker, Inc., 2002). He has been is an Associate Editor of the “*Journal of Imaging Science and Technology*” since 1988; has served as General Chair of NIP 17; and in many other NIP committee assignments. In 1999 he received the Carlson Memorial Award and in 2004 he was named a Senior Member of the IS&T.

T12 - \$150/\$195

T13 - 4 hour tutorial Monday, November 1
1:00 pm to 5:00 pm

COLOR MANAGEMENT BASICS AND USE FOR COLOR PRINTERS WITH 4&5 COLORANTS

Instructor: Eggert Jung, NexPress GmbH

Fundamentals of color science (visual perception, physical definition, color measurements, standards) will be described for understanding digital color management principles. The advantages of color management systems in imaging applications in order to maintain best color reproduction will be explained for typical color-workflows: from an original scene by image capturing (via photographic/electronic imaging and scanners), then digital processing including creation of pages and finally output on color monitors and digital printers. In particular the generation, structure and use of ICC profiles for output with 4 resp. 5 colorants – and related parameters like color rendering intents will be demonstrated on sample prints as well as by monitor simulations.

Benefits: This course will enable you to:

- Understand the basics of color and color management systems
- Explain color and tone reproduction principles
- Understand additive and subtractive color mixing including screening necessities for multi-color print processes
- Discuss definition and generation of ICC profiles and corresponding parameters
- Use ICC profiles, rendering intents within custom color workflows

Tutorial Program

- Optimize color-quality of your CMYK-printer including proof-simulation for other print conditions
- Evaluate color accuracy of printers or print processes
- Judge the color gamut expansion by use of an additional 5th colorant and interpret the color volume calculations and the used definition

Intended Audience: This is an introductory level tutorial for all people interested in better understanding and practical optimization of color imaging output quality, especially for CMYK (=4C) print applications incl. evt. added fifth colorants for improved simulation of saturated spotcolors. A basic knowledge of widely used applications like Photoshop, Acrobat, would be beneficial.

Eggert J. Jung studied Physics at the Univ. of Kiel, where he earned his Master and Ph.D. in Engineering Physics. In 1974 he joined the company, Dr.-Ing. Rudolf Hell GmbH, working on new and improved pre-press products for the graphic arts industry. The main focus of his work has been on colorimetry and color management; image scanning, processing and reproduction with high fidelity including screening for optimized output quality of multi-color-images. Within "Linotype-Hell" (after merging with Linotype) he was responsible for digital color correction and later for proofer integration including technology assessment and improvement of existing ink-jet solutions in respect to workflow and color quality by using ICC profiles for simulation of color prints. After the integration of Linotype-Hell into "Heidelberger Druckmaschinen" he joined the team for developing a new digital color printer based on electrophotographic technology. With the founding of the NexPress JV by Eastman Kodak and Heidelberg in 1999 he became a Senior Scientist responsible for Image Quality and Color Workflow at NexPress GmbH (since May 2004 a Kodak company). He holds several patents and has given papers at graphic arts conferences in Europe and the U.S. He is member of TAGA, IS&T, and the technical advisory group of FOGRA in Munich. Dr. Jung also supports some national standardization groups related to color, printing and image quality.

T13 - \$200/\$245

T14 - 2 hour tutorial Monday, November 1
1:00 pm to 3:00 pm

FABRICATION MATERIALS AND PROCESSES OF INK JET PRINTHEADS

Instructor: Hue Le, PicoJet, Inc.

This tutorial describes the materials and processes that have been used to fabricate various ink jet printheads with the emphasis on the thermal and piezoelectric ink jet devices. Methods of forming ink jet nozzle, anti-wetting coated nozzle surface, ink channel and chamber, and various bonding methods are then reviewed. Materials of thin film resistor (for thermal ink jet) and piezoelectric ceramic (for piezoelectric ink jet) are also reviewed. The tutorial will conclude with observations concerning manufacturing, performance, and cost issues in the existing and emerging ink jet printhead manufacturers.

Benefits: This course will enable you to:

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

Intended Audience: Scientist, engineers, product managers, and other charged with development or manufacture of ink jet printing systems will benefit from this class.

Hue Le is the CEO/President of PicoJet, Inc., Hillsboro, OR which designs, manufactures and markets fluid jetting devices for industrial printing applications, as well as for biotechnology equipment and drug delivery applications. Hue Le has over 23 years of experience in developing and commercializing ink jet printing systems that include ink jet printhead, ink and printing process. Mr. Le holds 18 U.S. patents in the field of ink jet printing technology. Prior to forming PicoJet, Inc. in 1997, he held the position of Director of Technology Development for Tektronix, Inc.'s Printing and Imaging Division. He received his BS degree in Chemistry from the Univ. of Iowa (1979) and MS degree in Chemistry from New Mexico State Univ. (1981).

T14 - \$150/\$195

Tutorial Program

T15 - 2 hour tutorial Tuesday, November 2
10:00 am to 12:00 noon

THE VALUATION OF R&D PROJECTS

*Instructor: George Gibson,
Xerox Corp.*

One of the hardest challenges the technical community faces is communicating the value of new projects and technologies to the business and investment community that must fund our work. Proper metrics for expressing the value of the projects we are considering is essential to making sound decisions. This course will familiarize the participants with the main methods of valuing new projects and technologies and the strengths and weaknesses of each.

Benefits: This course will enable you to:

- Conduct discounted cash flow analysis and derive the sensitivities of the analysis
- Utilize the sensitivities of the main variables including discount and opportunity cost
- Understand the differences among net present value, payback and internal rate of return including the strengths and weaknesses of each
- Use the decision theory formalism to value projects
- Know how to use the real options formalism to value projects
- Understand how the projects can be analyzed as a portfolio of real options
- Describe the effects of a total risk management approach on the management of multiple projects
- Develop a business case for your project including explicit consideration of both technical and commercialization risk

Intended Audience: This course is intended for technical professionals who work with the business community (including managers, consultants and potential entrepreneurs) to select among projects or technologies for investment.

George Gibson is Manager, Research and Development Portfolio in the Xerox Innovation Group. Previously he has held research and manufacturing management positions for Savin and AM Graphics. Mr. Gibson holds over 35 patents in non-impact printing and has published ~20 papers. He holds a Masters in Chemistry from Binghamton Univ. and an MBA from the Univ. of Rochester's Simon Graduate School of Business.

T15 - \$150/\$195

T16 - 4 hour tutorial Tuesday, November 2
1:00 pm to 5:00 pm

INTRODUCTION TO ORGANIC ELECTRONIC MATERIALS AND DEVICES

Instructor: Zoran D. Popovic and Tim Bender, Xerox Research Center of Canada

The research, development and technological applications of organic electronic materials development is an area of intense current interest, which entails applications in many fields including displays, sensors, transistors, emissive devices and electronic circuitry. This tutorial will begin with a survey of these current areas of application, showing where organic materials may offer advantages over traditional inorganic materials. The key classes of organic materials involved: photoconductors, semiconductors, transport molecules (hole and electron), and conductors will then be discussed from the standpoint of molecular design, synthesis, purification and characterization. Finally an overview of the characterization methods of important electronic material parameters and evaluation methods of currently used devices will be given together with some device design principles. The main emphasis will be placed on small molecule systems although, where relevant, polymeric systems will also be discussed.

Benefits: This course will enable you to:

- Understand technological applications where organic electronic materials are, or may become, important
- Develop criteria for the design, synthesis, purification and broad-scale characterization of organic electronic materials
- Describe some of the specialized techniques used to characterize these materials both as pure molecules and in devices
- Explain basic device design concepts

Intended Audience: Although based primarily on chemistry and physics, this course will be of interest to a wide audience of scientists, engineers, project managers and others interested in the design, synthesis and applications of organic electronic materials. Being an introductory course, the subject matter will not be dealt with in great detail. Rather the audience will be introduced to the key areas of scientific expertise required to become knowledgeable in this area. References to more detailed information will be provided.

Zoran D. Popovic has a Bachelors Degree in Electrical Engineering from the Univ. of Belgrade and a Ph.D. in Materials Science from McMaster Univ. (Hamilton, Canada). Dr. Popovic has worked at the Xerox Research Centre of Canada for over 30 years. His major interest has been in organic photoreceptors and, more recently, in organic electroluminescence. Dr. Popovic is internationally renowned in both fields and he is a frequently invited speaker at major conferences. He has published over 100 papers and holds 30 U.S. Patents.

Tim Bender received his B.Sc. with High Honors and Ph.D. degrees in Chemistry from Carleton Univ. in Ottawa, Ontario, Canada. As a graduate student he studied new methodologies of polyimide synthesis under Prof. Wayne Wang. Both Dr. Bender's undergraduate and graduate thesis were recognized by the MSE Division of the Chemical Institute of Canada as the most outstanding undergraduate thesis in 1996 and graduate thesis in 1999 for Canada. Upon graduation he joined Xerox Research Centre of Canada (XRCC) as an NSERC Industrial Post-Doctoral Fellow and after a short period of time joined XRCC as a permanent member of the research staff in the Advanced Organic Materials Area (now the Imaging Materials Design and Synthesis Area), a position he currently holds. His current research interests are in the area of organic electronics specifically in the areas of new materials design for photogeneration of electrostatic charge, hole and electron transport and hole transport through organic-inorganic hybrid materials and in studies of chemical reaction engineering. He has published over 15 papers on a variety of topics and has filed 20 U.S. patents, 5 have been allowed and/or issued to date. Recently he has been named as the chair of the Univ. Partnerships Committee after serving 3 years as a general member. The committee's mandate is to facilitate and foster collaborations between members of XRCC's technical staff and Univ. researchers worldwide.

T16 - \$200/\$245

T17 - 4 hour tutorial Tuesday, November 2
1:00 pm to 5:00 pm

COLOR QUALITY FACTORS IN ELECTRONIC DISPLAY

Instructor: Gabriel Marcu, Apple Computer

This tutorial discusses and illustrates the most important quality factors of color reproduction

for electronic displays. CRT and TFTLCD technologies are discussed and compared. Factors such as display technology, resolution, color gamut, viewing angle, gain function, luminance level, glare, color model accuracy are discussed. The importance of color management (including characterization and calibration) for accurate color reproduction is discussed. The influence of viewing conditions and adaptation on evaluation of displayed color is highlighted. The role of measurement and interpretation of data (including gamut visualization) for color quality evaluation will be demonstrated.

Benefits: This course will enable you to:

- Identify the key elements in achieving a high color quality in electronic displays
- Understand the limitations of the display technology in achieving the high quality color reproduction
- Understand and compare the CRT and TFTLCD technologies in terms of color reproduction and color performance
- Compare CRT technologies (aperture grille and shadow mask) for color quality
- Compare LCD technologies (In Plane Switching and Twist Nematic) for color quality
- Understand the effect of chromaticities, tone correction ("gamma"), white point in color reproduction on electronic displays
- Understand the concept of resolution, MTF and CTF and their contribution in deriving quality metrics
- Identify the role of the CMM and its advantages/limitations in achieving high quality color reproduction
- Recognize the role of characterization and calibration for accurate color reproduction
- Understand the role of gamut mapping on color quality on displays
- Understand the role of adaptation in judgement of color quality on displays
- Understand the importance of the viewing conditions for color quality on displays

Intended Audience: The tutorial is intended for engineers, scientists and managers confronting color quality issues on electronic displays. Participants should have familiarity with color imaging and computer systems.

Gabriel Marcu - see Tutorial T04

T17 - \$200/\$245

Tutorial Program

T18 - 3 hour tutorial Wednesday, November 3
9:15 am to 12:15 pm

BUSINESS IN JAPAN

*Instructor: Robert Nash, Consultant,
Hafren Associates*

Since Japan continues to be an active center for research, development and marketing for non-impact marking technologies, travel to Japan has become a routine event for many Western engineers, technologists and business professionals involved in such technologies. However, for many Westerners, repeated travel to Japan does not eliminate the strong feeling of being a foreigner in a distinctly non-Western environment. Though survival in such a foreign environment can be eased thanks to written instructions provided by thoughtful Japanese hosts, by willingness for Japanese counterparts to use English as a common language, etc., subtle cross-cultural issues still remain as causes for unease in the Western mind. Unfortunately, such issues tend to increase as a result of repeated visits — gradually, an observant Western visitor will begin to comprehend some of the unwritten rules that govern life in Japan, and in retrospect will appreciate just how many social gaffes can be made during initial, casual visits. While such gaffes may be viewed as minor embarrassments by some Westerners, it is important to realize, from a working relationship viewpoint, that Japanese hosts will evaluate Western visitors on the basis of such gaffes — it is human nature to use internal benchmarks to form opinions, and since the Japanese rules of behavior are significantly non-Western, there are great opportunities for misunderstandings and erroneous judgments. From problems with footwear, with chopsticks, with forms of verbal address, with overall decorum, etc., the possibilities for transgressions seem endless, even if the cures are often trivial. Accordingly, in my tutorial I hope that I can provide an inside Western perspective on some of the more baffling aspects of interactions in a Japanese environment, and offer some pointers for behavior that will delight and impress Japanese hosts and colleagues. The course will focus on general cultural and interpersonal topics. Advanced business-oriented topics such as Western vs. Japanese negotiation strategies, Japanese financial systems, Japanese labor rules, etc., will not be covered.

Benefits: This course will enable you to:

- Learn about Japanese life through the experiences of a resident foreigner living daily in a Japanese environment

- Handle the logistics of everyday life in Japan — travel by trains and taxis, dining in restaurants, etc.
- Use and comprehend key, short Japanese phrases — greetings, questions, expressions of thanks, etc.
- Develop a clear and understandable pronunciation of common Japanese words and phrases
- Develop an understanding of the historical and cultural framework to life in Japan
- Appreciate the importance of introductions, of gift-giving, etc.
- Identify and interpret the “Japanese Unwritten Rules of Behavior” — body language, “code words”, expected responses, etc.
- Recognize the need for harmony, for a quiet self-effacing demeanor, for patience, for apologies, etc.
- Understand the style of business interactions — consensus, teamwork, attention to detail, devotion to Company, etc.

Intended Audience: This course will be of interest to all “foreigners” who travel to Japan on business, especially those who still feel confused and uncomfortable even after repeated short-term visits. Japanese nationals might also appreciate the foreigner’s view of their homeland presented in the tutorial — such a perspective might help explain some of the puzzling behavior typically shown by visiting foreigners.

Robert J. Nash was a xerographic research technologist at the Xerox Corp. from 1970 until 2001. After fifteen years of short technology-interchange visits to Japan, he finally relocated to Japan in 1988 for a long-term expatriate assignment. For almost three years he spent his days as the lone Xerox Resident at Fuji Xerox, Takematsu, while his wife steadily expanded her circle of Japanese friends through activities such as quilting and informal English Conversation classes. They lived in a hybrid Japanese/Western house in a totally Japanese residential area away from Tokyo, and since all of their friends were Japanese they became well-established as the local resident “foreigners”. By driving their own cars and by shopping unaided at the local shops, they were definitely recognized as non-tourists, and consequently were often assumed to be magically fluent in Japanese. Unfortunately, however, the truth is that they were proficient enough to get into trouble, but not enough to extricate themselves! Overall, however, they certainly felt more “at-home” than the average casual visitor does. Dr. Nash hopes that he can

Tutorial Program

transmit some of their hard-won insights during this tutorial.

T18 - \$175/\$220

T19 - 2 hour tutorial Wednesday, November 3
9:15 am to 11:15 am

ELECTROSTATIC TONER TRANSFER

*Instructor: Thomas Tombs,
NexPress Solutions, Inc.*

An important and potentially quality-limiting step in all electrophotographic machines is the transfer of toner from the photoconductor to paper. A significant degree of complexity is inherent in toner transfer resulting from the many interactions that exist with essential every other subsystem in the electrophotographic process. In this course, explanations of the important mechanisms of dry-toner transfer provide a foundation for understanding the many interactions and noise factors. Throughout the course practical working knowledge of transfer technologies is conveyed.

Benefits: This course will enable you to:

- Comprehend the operation of various electrostatic transfer technologies
- Explain the important mechanisms of toner transfer
- Identify noise factors and material properties that affect 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: This course is intended for engineers, scientists, and managers involved or interested in electrophotographic research, development, or commercialization. Familiarity with the electrophotographic process and college-level physics are recommended prerequisites.

Thomas N. Tombs is a Chief Engineer directing the research and development of electrophotographic technologies at NexPress Solutions, Inc. He received a Ph.D. degree in electrical engineering from the Univ. of Rochester specializing in the fields of electrostatics and particle electromechanics. His involvement with electrophotography began at Eastman Kodak Company in 1992. When NexPress was formed in 1998 he joined to implement the transfer technology he developed in the research labs of Kodak and continued research and development on a range of electrophotographic subsystems and materials. Dr. Tombs has over 40 U.S. patents

and has published articles on particle electrostatics and electrostatic toner transfer.

T19 - \$150/\$195

T20 - 4 hour tutorial Wednesday, November 3
1:00 pm to 5:00 pm

CHARGING SYSTEMS AND DEPENDENT PROCESSES IN ELECTROPHOTOGRAPHY

*Instructor: Kenneth Pietrowski,
Xerox Corp.*

Charging systems are employed in electrophotography to enable a variety of electrostatic functions, the most common including photoreceptor charging, toner transfer, paper handling and toner charge conditioning for both transfer and cleaning. The device requirements and their operational modes can be quite different for each function. This course will address the applied principles of operation in meeting those requirements including critical parameters and known failure modes. The application dependent requirements and supporting analysis in the form of examples will be discussed with a stronger focus on photoreceptor charging and toner transfer processes. Novel charging system concepts will also be reviewed.

Benefits: This course will enable you to:

- Differentiate between charging devices and describe their fundamental differences in terms of geometry, operating modes, current voltage behavior and polarity
- Describe the variety of applications and related principles of operation of devices utilized in various electrophotographic process steps
- Define the critical parameters governing electrical performance and impacting failure modes
- Relate current-voltage behavior to equivalent electrical circuits
- Derive and utilize a simplified model incorporating hardware and process parameters to estimate charging performance in various process steps such as photoreceptor charging and toner transfer
- Comprehend the impacts of photoreceptor electrical behavior on charging subsystem performance
- Define some of the issues associated with toner transfer

Intended Audience: This course should be of interest to scientists and engineers involved in the development of electrophotographic marking subsystems and systems employing corona

IS&T's NIP20 — V

Time	Sunday, Oct. 31	Monday, Nov. 1	Tuesday, Nov. 2
8:00 am	Tutorial Registration T1 <i>Digital Production Printing (Technologies, Methods & Systems)</i> T2 <i>Introduction to Electrophotography</i> T3 <i>An Overview of Ink Jet Printing from an Ink Perspective</i> T4 <i>Color Quality Factors in Desktop Printing</i> T5 <i>Papemaking, Coating Fundamentals and Media for Digital Printing</i>	Registration (7:30 am - 5:00 pm) Introduction Keynote: High Speed Color Laser Printing. <i>Shoei Yamana</i>	Registration (7:30 am - 5:00 pm) Keynote: Twenty Years of Ink Jet Domestic <i>John D. Meyer</i>
		9:00 am T11 <i>Surface Tension, Wetting, and Capillarity</i> T12 <i>Organic Photoreceptors for Digital Electrophotographic Printers</i>	Awards Ceremony Exhibit (9:30 am - 5:00 pm)
10:00 am		Toner Based Printing: Processes Production Digital Printing Image Permanence	Toner Based Printing Materials - Quality Upgrade & Evaluation (continued) Print and Image Quality Ink Jet Printing Materials
11:00 am			The Valuation of R&D
12:00 pm	<i>Lunch Break</i>	<i>Lunch Break</i>	<i>Lunch Break</i>
1:00 pm	T6 <i>Opportunities in Photographic Quality Digital Imaging</i> T7 <i>Electrostatics and Particle Adhesion in Electrophotography</i> T8 <i>Evaluating Ink Jet Technology</i> T9 <i>Image Quality: Perception & Quantification</i> T10 <i>Introduction to Toner Technology</i>	T11 <i>Surface Tension, Wetting, and Capillarity (continued)</i> T13 <i>Color Management Basics and Use for Color Printers with 4&5 Colorants</i> T14 <i>Fabrication Materials and Processes of Ink Jet Printheads</i>	T16 <i>Introduction to Organic Electronic Materials and Devices</i>
1:30 pm			
3:00 pm			
4:00 pm			
5:00 pm			
7:00 pm	5:30 to 7:30 <i>Ice Breaker</i>	Print Gallery	Interactive Poster Sessions 5:00 - 6:30

Note: Check course descriptions for exact times for each class. Coffee breaks

Week at a Glance

		Wednesday, Nov. 3				Thursday, Nov. 4				Friday, Nov. 5							
Registration (8:00 am - 5:00 pm)		Keynote: Current Trends in Electronic Paper <i>Shuichi Maeda</i>				Registration (8:00 am - 5:00 pm) Keynote: Industrial Inkjet Printing: From the Niche to the Mainstream <i>Itai Halevy</i>				Registration (8:00 am - noon)							
Exhibit (9:30 am - 4:00 pm)																	
Projects	15	Printing Systems Engineering and Optimization	Photo-electronic Materials and Devices	Ink Jet Printing Processes	T18	Business in Japan	T19	Electrostatic Toner Transfer	Industrial Printing	Control Systems	Media for Digital Printing	T22	Physics of Electrophotographic Development	T23	Fusing Technologies for Toner-Based Marking Systems		
Lunch Break		Lunch Break				Lunch Break											
Color Quality Factors in Electronic Display	17	Printing Systems Engineering and Optimization (continued)	Photo-electronic Materials and Devices (continued)	Ink Jet Printing Processes (cont'd)	T20	Charging Systems and Dependent Processes in Electrophotography	T21	Chemical Toners	Printed Electronic Components	Textile & Fabric Printing	Adv. & Novel Thermal Printing	T24	Liquid Toner Printing: Technology and Applications	T25	External Additives for Xerographic Toners	T26	Desktop Inkjet Products Performance Study
Panel Discussion: Intellectual Property		4:15 to 5:15				Interactive Poster/Industrial & Textile Printing Gallery				5:00 - 6:30							
NIP 20th Anniversary Dinner		6:30 to 9:30				Panel:				5:00 - 6:00							

will be held at approximately 10:30 am and 3:30 pm each day.

devices and their variants. The attendee should have a basic understanding of electrophotographic processes such as xerography.

Kenneth Pietrowski is a Principal Technology Manager/Specialist in the Wilson Center for Research and Technology at Xerox Corp. He joined Xerox in 1963 and has worked in both R&D and product engineering environments addressing electro-optic image devices, thin film technology and xerographic processes. He spent much of the last 25 years as a principal contributor in the development of charging and toner transfer systems appearing in many of today's xerographic marking engines. He holds several patents in these disciplines. He currently manages a team of technologists and engineers focused on processes for future electrophotographic products. He is a member of IS&T, past member of the NIP Technical Council and served as a Session and Publications Chair at prior NIP conferences. His tutorials on this topic and electrophotography were also presented at previous NIP Congresses. He received his B.S. in Electrical Engineering from RIT.

T20 - \$175/\$220

T21 - 4 hour tutorial Wednesday, November 3
1:00 pm to 5:00 pm

CHEMICAL TONERS

Instructor: *Grazyna Kmiecik-Lawrynowicz, Xerox Corp.*

This course on chemical toners will enable participants to understand the nature of chemical toner technology in comparison with conventional grinding processes for making xerographic toners. It will cover different chemical processes and raw materials used for preparation of chemical toners, as well as the history of chemical toner development. It will also discuss current products on the market with chemically prepared toners. It will point out the advantages and disadvantages of chemical toner compare with pulverized toners in their performance and interaction with the xerographic systems.

Benefits: This course will enable you to:

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

- Understand the current scenario of chemically prepared toner on the market and its potential for future applications

Intended Audience: This class will offer an introduction to chemically produced toners and is directed toward anyone seeking an understanding of the nature of chemical toner and its potential in xerographic application. Some knowledge of xerography and chemistry will be helpful, but is not essential.

Grazyna Kmiecik-Lawrynowicz is a Principal Scientist in Material and Process Technology in the Supplies Delivery Unit of Xerox, where she leads chemical toner technology and polymer carrier coating design activities. She received her M.S.c. and Eng. Degree in Chemistry and Chemical Engineering from Warsaw Technical Univ., and her Ph.D. in Chemistry from Rutgers, The State Univ. of New Jersey. After postdoctoral work at the Univ. of Toronto, she joined The Xerox Research Center of Canada (XRCC) in 1988. During her years at XRCC she worked on a variety of projects related to chemical toners. In 1992 she pioneered work on Emulsion Aggregation (EA) toner at Xerox for future color xerographic applications. In 1996 she transferred with EA toner technology, to Supplies Development and Manufacturing at Xerox. Dr. Kmiecik-Lawrynowicz has 88 publications and patents, which includes 69 U.S. patents. She is a recipient of three Eagle Awards for the highest number of patents at Xerox in years 1994, 1997 and 1998. She is a fellow of the Society for Imaging Science and Technology and a member of the American Chemical Society, and has been an invited speaker at Digital Color Printing Conference, Gordon Polymer Conference, Research Conference on Emulsion Polymers/Polymer Colloids, NATO Advanced Study Institute on Recent Advances in Polymeric Dispersions and Diamond Research Corporation's Toner and Photoreceptor annual conferences.

T21 - \$200/\$245

T22 - 3 hour tutorial Thursday, November 4
9:15 am to 12:15 pm

PHYSICS OF ELECTROPHOTOGRAPHIC DEVELOPMENT

Instructor: *Lawrence B. Schein, Consultant*

One of the most challenging steps in electrophotography is the development step, in which the latent image is converted into a real toner image. In this tutorial, the physics of the various manifestations of the main types of development

Tutorial Program

systems, will be discussed (1) dual component (insulative, conductive, mechanically agitated, ac biased), (2) monocomponent (magnetic, non-magnetic, contact, non-contact, Moore), (3) 1.5 development, and (4) liquid development (standard theory, theory including excess ions, Indigo configuration).

Benefits: This course will enable you to:

- Describe the historical evolution of electro-photographic development systems
- Identify and compare the characteristics of the various manifestations of each of the main types of known development systems, dual component, monocomponent, 1.5, and liquid
- Understand the physics driving toner development in each of these development systems
- Identify the relevant hardware and material parameters for each the development systems
- Identify the aspects of the development systems which makes them suitable for specific applications

Intended Audience: This course should be of interest to anyone working in the field of nonimpact printing. Educational level of at least a Bachelors degree with some college level physics and mathematics is assumed.

Lawrence B. Schein - see Tutorial T02

T22 - \$175/\$220

T23 - 2 hour tutorial Thursday, November 4
9:15 am to 11:15 am

FUSING TECHNOLOGIES FOR TONER-BASED MARKING SYSTEMS

*Instructor: James Hurst,
NexPress Solutions, Inc.*

This course will include a description of the physics of the fusing process and an introduction to fusing technologies that have found commercial application. The most commonly used technology, roll fusing, will be discussed in detail, paying particular attention to the technical hurdles that will likely be encountered during product development. Typical fusing materials (toners, roll coverings, release agents, etc.) and their influence on the fusing process will be discussed.

Benefits: This course will enable you to:

- Understand the physical changes that toner experiences during the fusing process
- Compare the technologies that are available for delivering fusing energy to the toner
- Select the fusing technology that is most appropriate for a given application

- Anticipate the opportunities and challenges that will arise during development of the chosen fusing technology

Intended Audience: This course is intended to be an introduction for people who are new to the field or for those who wish to expand their familiarity with fusing technologies.

James H. Hurst is a Scientific Associate at NexPress Solutions Inc., where he is responsible for developing new fusing technologies for high-speed digital color printing. Dr. Hurst's prior experience since 1993 at Eastman Kodak and Texas Instruments includes development of fusing hardware for both black and white and color digital printer products. He received his Ph.D. and Masters degrees in Chemical Engineering from the Univ. of Florida and B. S. degrees in Chemical Engineering and Chemistry from the Univ. of Utah.

T23 - \$150/\$195

T24 - 4 hour tutorial Thursday, November 4
1:00 pm to 5:00 pm

LIQUID TONER PRINTING: TECHNOLOGY AND APPLICATIONS

*Instructor: George Gibson,
Xerox Corp.*

Liquid toner technologies have long been held as providing versatile methods for imaging in a variety of applications. Known for high image quality, especially high quality color, liquid toners are never-the-less, used less widely today. This course will cover 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 used. The course will include an analysis of improvements of liquid toner systems found in recent technical literature and patents. Much of this material will be new and has not been included in previous versions of this course.

Benefits: This course will enable you 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
- Know the major market applications where liquid toners are employed today
- Learn about recent innovations in liquid toner technology

Tutorial Program

Intended Audience: The course is intended for technical professionals who want to become more knowledgeable about non-impact printing technology.

George Gibson - see Tutorial T15

T24 - \$200/\$245

T25 - 4 hour tutorial Thursday, November 4
1:00 pm to 5:00 pm

EXTERNAL ADDITIVES FOR XEROGRAPHIC TONERS

*Instructor: Robert J. Nash, Consultant,
Hafren Associates*

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

Benefits: This course will enable you to:

- Understand the impact on toner performance of key additive properties such as size and surface composition
- Compare the various processes used to blend external additives onto toner surfaces
- Identify and quantify the effect of toner external additives on key toner development characteristics such as charge level, polarity, charging rate, etc., and developer properties such as conductivity
- Evaluate the effect of toner external additives on the response of xerographic developers to changes ambient humidity
- Describe the impact of external additives on toner charging in terms of a simple model

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

Robert J. Nash - see Tutorial 18

T25 - \$200/\$245

T26 - 2 hour tutorial Thursday, November 4
1:00 pm to 3:00 pm

INK JET MEDIA

*Instructor: Martin Schreer,
Felix Schoeller Service GmbH & Co. KG*

The course of inkjet media will include an overview of the various media types used for inkjet printing. The different substrates and coatings used for inkjet applications will be reviewed. The selection of different media types for the various applications will be discussed including, proofing, photo printing, large format printing and digital fine art. The media required for the different ink systems i.e. dye - based or pigment - based, aqueous or solvent - based, will also be considered.

Benefits: This course will enable you to:

- Understand the different media available for inkjet applications
- Select the optimum media type for certain applications
- Recognize how to select the most compatible media for the different ink systems

Intended Audience: This course is for anyone who would like to know more about the wide range of media available for inkjet printing. It will also provide some insight into how to select the optimum media type for the various inkjet applications. A prior knowledge of inkjet media is not required.

Martin Schreer studied chemistry at the Univ. of Muenster, Germany and received his Ph.D. in 1988 carrying out studies on transition metal chemistry. After that he worked for seven years, as a R&D Group Leader for Sihl in Dueren, developing different types of coated papers and films for registration purposes. From 1996 to 2001, he was R&D Manager at Hoffmann & Engelmann in Neustadt and was responsible for the development of inkjet media and decalcomania paper for the decoration of porcelain and glass. In 2001 he took up his current position with Felix Schoeller Service as head of R&D. Dr. Schreer has 14 years experience in the areas of Inkjet Media and Printing.

T26 - \$150/\$195

Tutorial Program

T27 - 2 hour tutorial Thursday, November 4
3:15 pm to 5:15 pm

DESKTOP INKJET PRODUCTS PERFORMANCE STUDY

Instructor: Rob Beeson, Hewlett Packard

This tutorial will examine products from HP, Canon, Epson, Lexmark, Ricoh, Fuji-Xerox and Brother. Printhead performance parameters and ink/media interactions will be discussed with appropriate reverse engineering data from the HP labs. A few examples of how inkjet compares with competing technology such as dye diffusion thermal transfer and Polaroid's Opal will also be discussed. There will also be a computer modeling simulation exercise.

Benefits: This course will enable you to:

- Understand printhead firing frequency, drop volume, velocity and drop shape tradeoffs from the principal desktop inkjet printer manufacturers

- Examine key differences in piezo and thermal inkjet printhead performance characteristics
- Predict future directions in desktop inkjet products using patent literature

Intended Audience: This course is intended for those somewhat familiar with inkjet printing technology that want a better understanding of the differences of printhead output parameters from the popular manufacturers.

Rob Beeson is a senior member of the technical staff in the Inkjet Technology Platforms Unit of Hewlett Packard. He has held several management and engineering positions in thermal inkjet technology since 1985, and is currently the R&D Competitive Intelligence Team Leader. He holds 12 inkjet patents. He has a B.S. and M.S. in Mechanical Engineering from Colorado State Univ. and has worked with several divisions in HP since 1966.

T27 - \$150/\$195

Salt Lake City, Utah

Salt Lake City, Utah is a locale of truly unique character, both in terms of culture and natural environment. Go to the Salt Lake City web site for a view of all there is to see and do in the area. It is a fascinating city! Home of the 2002 Winter Olympics, the city is just 17 miles from the Great Salt Lake, a scientific mystery whose jade and azure expanse attracts tourists, artists and water enthusiasts alike. The Antelope Island National Park by the lake supports bison, bighorn sheep and plenty of waterfowl. The Little America Hotel is right in the heart of the city, just minutes from the main cultural and sports centers, such as the 10 acre Temple Square with the imposing Temple for the Church of Jesus Christ of Latter-Day Saints, The Utah Symphony, Ballet West, The Utah Opera Company and the NBAS Utah Jazz. The city known as the Genealogical Capital of the World hosts the Family Search Center and the Family History Library. IS&T is fortunate to have Laura Ashley, with her many years of experience in geneology, volunteering to help those of us who are interested in geneology research.

There are many fine restaurants in the area (they do serve alcohol with meals!) And, there are clubs (one person in a group needs to buy a "membership" for \$4, good for two weeks).

With so much to see and do, bring the entire family.

WWW.VISITSALTLAKE.COM

Visit the IS&T Website - www.imaging.org - for more information on this conference, including abstracts of papers, program updates, transportation information and registration information for NIP20

Technical sessions will be held at:
Grand America Hotel, 555 South Main

Other events will be held at:
Little America Hotels and Towers, 500 South Main Street
www.littleamerica.com

Conference Program

Track I

Monday November 1, 2004

Monday November 1, 9:15 am to 2:55 pm

Toner Based Printing: Processes

Session Chairs: Pramod Sharma, Lexmark International, Koji Hirakura, Ricoh Co., Ltd., and Marcel Slot, Océ Technologies

Characteristics of DC Charging Roller System, Masashi Yamamoto, Hitachi Printing Solutions, Ltd. (Japan)

Single Component Non-Magnetic Developing System for High Speed Desktop Printer, Jong Moon Eun, Samsung Electronics (Korea)

Banding Mechanism Caused by Self-Excited Vibration in Contact Development System, Tadashi Iwamatsu¹, Hiroyuki Hirakawa¹, Hiroaki Nakaya², and Takayuki Yamanaka², ¹Sharp Corp.; ²Digital Document Systems Group (Japan)

Characteristics of Two Component Magnetic Brush Development, Eric Stelter, Joseph Guth, and Vern Lincoln, NexPress Digital LLC (USA)

An Innovative Photo Finishing with Xerographic Technology (Focal), Koichiro Shinohara, Kazunori Numao, and Yoshio Kanesawa, Fuji Xerox Co., Ltd. (Japan)

Electrostatic Transfer of Color Images in Electrophotography, Inan Chen, QEA (USA)

Empirically Based Printer Model of Halftone Dot Structure (Interactive), Howard Mizes, Xerox Corp. (USA)

Studies on the Mechanics of Carrier Bead Chains in Two-Component Development Process (Interactive), Nobuyuki Nakayama^{1,2}, Satoshi Yamada², Hiroyuki Takahashi², Masaya Nakatsuhara², Jun Tomomatsu², Mariko Doi², and Hiroyuki Kawamoto², ¹Fuji Xerox Co., Ltd.; ²Waseda Univ. (Japan)

Toner Transport Characteristics in Long Ovally Dented Electrode (Interactive), Suda Kiatkamjornwong, Chulalongkorn Univ. (Thailand)

A Consideration about Oscillation Mechanism of a Cleaning Blade, Minoru Kasama¹, Yimei Yu¹, Tomoyuki Itoh¹, Masatsugu Yoshizawa², and Akiyoshi Itoh², ¹Fuji Xerox; ²Keio Univ. (Japan)

Advances in Liquid Toner Technology, Alex Ozerov and Owen Crees, Research Labs. of Australia (Australia)

Experimental Study on the Magnetic Force Acting on the Toner Using an Enlarged Model in Magnetography, Norio Kokaji, Meisei Univ. (Japan)

DEM Simulations of Toner Behaviour in the Development Nip of the Océ Direct Imaging Print Process (Focal), IEM. Severens, Océ Technologies B.V. (The Netherlands)

Monday November 1, 3:25 pm to 5:10 pm

Toner Based Printing Materials -Quality Upgrade & Evaluation

Session Chairs: Rick Veregin, Xerox Corp., Suda Kiatkamjornwong, Chulalongkorn Univ., and Ian Neilson, Coates Electrographics

Crystalline Polyester for High Durability, Takashi Kubo, Eiji Shirai, and Katsutoshi Aoki, Kao Corp. (Japan)

Crystalline Hyperbranched Polyesters for Toners, Alan Toman and Chris Provost, Reichhold, Inc. (USA)

Kokuten: High-Visibility Black Xerographic Background, Robert J. Nash, Edward P. Imes, Bruce E. Cray, Marsha A. Butler, and Charles G. Dickerson, Xerox Corp. (USA)

Analysis of Spreading of Individual Toner Particles and Levelling of Toner Layers, Torbjorn Pettersson and Andrew Fogden, Institute for Surface Chemistry (YKI) (Sweden)

Crystal Structure of Solvated Zinc Complexes Based on Salicylic Acid Derivatives (Interactive), Takashi Makino and Jin Mizuguchi, Yokohama National Univ. (Japan)

Analysis of Image Quality Parameters on Laser Printouts as Proposal to Extension Standard ISO13660 (Interactive), Ludwik Buczynski and Adam Bieniewski, Warsaw Univ. of Technology (Poland)

Tuesday November 2, 2004

Tuesday November 2, 9:35 am to 12:15 pm

Toner Based Printing Materials -Quality Upgrade & Evaluation (continued)

Session Chairs: Rick Veregin, Xerox Corp., Suda Kiatkamjornwong, Chulalongkorn Univ., and Ian Neilson, Coates Electrographics

The Advanced Color Toner for the Fine Image Quality, *Akihiro Eida, Shinichiro Omatsu, and Jun Shimizu, Kao Corp. (Japan)*

Surface Characterization of Xerographic Developers by IGC: Influence of Surface Acid and Base Properties on Work Functions and Triboelectric Charging (Focal), *Rick Veregin¹, Maria McDougall¹, Mike Hawkins¹, Cuong Vong¹, Vlad Skorokhod¹, and Henry Schreiber², ¹Xerox Research Centre of Canada; ²Universite de Montréal (Canada)*

Functional Fumed Metallic Oxide Based External Additives for Toner, *Yuki Amano¹, Akira Inoue¹, Paul Brandl¹, and Maria Nargiello², ¹Nippon Aerosil Co., Ltd. (Japan) and ²Degussa Corp. (USA)*

Crystal Structure of Some Charge-Control Agents: 3,5-Di-Tert-Butyl-2-Hydroxybenzoic Acid and Its Zinc-Complex, *Jin Mizuguchi, Yokohama National Univ. (Japan)*

Electrical Conductivity Measurements in Toners with Conductive Surface Additives (Interactive), *Vladislav Skorokhod, Xerox Research Centre of Canada (Canada)*

Fusing Characteristics of COC Based Toner (Interactive), *Klaus Berger, Doug Hammond, and Toru Nakamura, Ticona GmbH (Germany)*

Liquid Toner Characterization Using AC Voltage Fields with Variable Frequencies, *Lutz Engisch, Susann Reuter, and Arved C. Hübler, Institute for Print and Media Technology Chemnitz (Germany)*

Effect of Metal Oxide Surface Additives on Xerographic Toner Powder Flow Cohesion and Cohesion Aging Stability (Interactive), *Maria McDougall and Rick Veregin, Xerox Research Centre of Canada (Canada)*

Electronic Structure of a 1:2 Complex of Triphenyl-Para-Rosaniline and a Gallate Derivative (Interactive), *Yasuo Imura and Jin Mizuguchi, Yokohama National Univ. (Japan)*

Tuesday November 2, 1:45 pm to 4:00 pm
Toner Based Printing Materials - Innovative Process

Session Chairs: Scott Silence, Xerox, Manabu Takeuchi, Ibaraki Univ., and Detlef Schulze-Hagenest, NexPress GmbH

New-Type Xerographic Photo Paper for Xerographic Machine Installed an Innovative

Photofinishing Technology, *Ashita Murai, Kazuhito Miyake, and Hiroshi Ishizuka, Fuji Photo Film Co., Ltd. (Japan)*

Enabling Expanded Color Gamut and In-line Coating Processes (Focal), *Dinesh Tyagi, Peter Alexandrovich, Yee Ng, and Hwai Tai, NexPress Solutions, Inc. (USA)*

Functional Toners, *Detlef Schulze-Hagenest¹ and Dinesh Tyagi², ¹Nexpress GmbH (Germany); ²Nexpress Solutions, Inc. (USA)*

Development of a New Polyester-Based Polymerization Toner, *Toshiki Nanya, Fimihiro Sasaki, Shinichiro Yagi, Naohito Shimota, Hiroto Higuchi, Junichi Awamura, and Masami Tomita, Ricoh Company, Ltd. (Japan)*

Factors Affecting Tribocharging Characteristics of Toners (Interactive), *Kenichi Kutsukake and Manabu Takeuchi, Ibaraki Univ. (Japan)*

The Charging Characteristics of CCA (Interactive), *Duck Hee Lee, Seok Hoon Choi, Sang Deok Kim, Kyung-Yol Yon, and Young No, Samsung Electronics Co., Ltd. (Korea)*

Non-Magnetic Mono-Component Impression Developing Process with Polymerized Toner of Positive Polarity (Interactive), *Shougo Sato and Mitsuru Horinoe, Brother Industries, Ltd. (Japan)*

Theory of Toner Adhesion (Focal), *L. B. Schein¹, W. Stanley Czarniecki², Bruce Christensen³, Taomo Mu³, and Graham Galliford⁴, ¹Consultant, ²Torrey Pines Research, ³Aetas Technology Inc. (USA), ⁴Galliford Consulting*

Wednesday November 3, 2004

Wednesday November 3, 9:05 am to 3:45 pm
Printing Systems Engineering and Optimization

Session Chairs: Eric Stelter, NexPress Digital, Takashi Kitamura, Chiba Univ., and Paul Morgavi, IMPIKA

Performance of a Piezo-based Monolithic Silicon PrintHead (Focal), *Christoph Menzel, Andreas Bibl, and Paul Hoisington, Spectra Inc. (USA)*

Methods to Mitigate Dot Position Error Amplification of Phase Change Inks, *James Padgett and Rodney Hill, Xerox Corp. (USA)*

Printhead Design Strategies for Air Bubble Mitigation, *Rodney Hill, David Platt, and James Padgett, Xerox, Inc. (USA)*

Conferencel Program

Ink Density Control System for Continuous Ink Jet Printers (Interactive), Tomohiro Inoue, Hitachi, Ltd. (Japan)

A System to Ease the Support of Multiple Media Types for Inkjet Printers, Albert Such and Sebastia Castellort, Hewlett-Packard ICD (Spain)

Simulation of the Paper Transport to Design the Paper Path of LBP (Focal), Chunghwan Kim and Douksoon Cha, Samsung Electronics Co., Ltd. (Korea)

New Paper Feed Mechanism Utilizing Electrostatic Force, Shinjiro Umez, Jumpei Shiraiishi, and Hiroyuki Kawamoto, Waseda Univ. (Japan)

Representation and Stabilization of Color Tone Reproduction Curve, Teck P. Sim and Perry Y. Li, Univ. of Minnesota (USA)

Color Reproduction Stabilization with Time-Sequential Sampling (Interactive), Teck Ping Sim and Perry Y. Li, Univ. of Minnesota (USA)

Dot Gain Table and Developer Voltage Prediction for the HP Indigo Press, Carl Staelin¹, Ruth Bergman¹, Mani Fischer¹, Darryl Greig², Marie Vans¹, Gregory Braverman³, Shlomo Harush³, and Eyal Shelef³, ¹HP Labs. Israel, ²HP Labs. Bristol, ³HP Indigo (Israel)

Micro Scale Temperature Field Analyses for Robust Fusing System Design in High-Speed Heavy-Duty Laser Printers, Teruaki Mitsuya, Daisuke Hara, Ryoji Yabuki, and Heigo Ueki, Hitachi Printing Solutions, Ltd. (Japan)

E-Coil Roller Fusing System for Energy Saving and Long Life, Durk-Hyun Cho, Samsung Electronics Co., Ltd. (Korea)

Electrophoretic Self Assembly: A Manufacturing Process for Various Industries (Focal), Robert H. Detig, ElectroX Corp. (USA)

A Study of Electrophotography Process for Manufacturing Printed Circuit Board, Hideo Aoki, Naoko Yamaguchi, and Chiaki Takubo, Toshiba Corp. (Japan)

Production of Microelectronic Components by Electrophoretic Deposition, Jonathan Van Tasel and Clive A. Randall, Penn State Univ. (USA)

Method of Patching Element Defects by Ink-Jet Printing for Polymer Light Emitting Diodes (Focal), Chih-Jian Lin, Liang-Jiun Chen, and Kevin Cheng, OES/ITRI, Industrial Technology Research Institute (Taiwan)

Method for Forming Cu Metal Wires by Microdispensing Pattern, Part I: The Ink-Jet Process (interactive), Ming-Huan Yang, Wanda Chiu, Kevin Cheng, and Jane Chang, OES/ITRI, Industrial Technology Research Institute (Taiwan)

Method for Forming Cu Metal Wires by Microdispensing Pattern, Part II: Application and Testing (Interactive), Wanda W. W. Chiu, Ming-Huan Yang, Kevin Cheng, Chieh-Yi Huang, Chia-Hsien Cheng, and Jane Chang, OES/ITRI, Industrial Technology Research Institute (Taiwan)

Simulation and Experiment of Micro-Lens Fabrication Using Droplet Deposition Method (Interactive), Chin-Tai Chen, Ching-Long Chiu, and Sz-Sheng Chen, OES/ITRI, Industrial Technology Research Institute (Taiwan)

A Novel Method for Forming Micron Scale Line Using Inkjet Technology (Interactive), Yung-Hsiang Wu, Je-Ping Hu, Ming-Huan Yang, Chun-Fu Lu, Ching-Yi Mao, and Chun-Jung Chen, OES/ITRI, Industrial Technology Research Institute (Taiwan)

Thursday November 4, 1:35 pm to 5:15 pm
Special Session: Printed Electronic Components
Session Chair: Reinhard Baumann, MAN Roland Druckmaschinen AG

Printing in an Electronic World (Invited), Arved Huebler, Chemnitz Technical Univ. (Germany)

Materials for Printing Electronics (Invited), Jennifer Rigney, Flint Ink (USA)

Photochemical Machining by Ink Jet: A Revolution in the Making? (Invited), Mark R. James, Avicia Ink Jet Printing Materials (UK)

Thursday November 4, 2004

Thursday November 4, 9:05 am to 12:25 pm

Industrial Printing

Session Chairs: David Weiss, NexPress Digital, Makoto Omodani, Tokai Univ., and Hugh Allen, Sunjet-Coates

Inkjet Printing of Well-Adapted PEDOT-PSS Dispersions (Focal), Wolfgang Voit¹, Henrik Sjöblom², Lu Wang³, Andrew Fogden², and Werner Zapka¹, ¹XaarJet AB; ²Institute for Surface Chemistry (YKI); ³Swedish LCD Center AB (Sweden)

Universal Module for Material Jet Application, Philippe Sarra-Bournet and Paul Morgavi, IMPIKA (France)

Conference Program

Application of Printable Electronics for LCD Manufacturing: Printing of TFT Gate Layers and Pillar Spacers (Invited), *D. B. van Dam, M. P. J. Peeters, C. J. Curling, R. Schroeders, and M. A. Verschuuren, Philips Research (The Netherlands)*

Formation of Precise Electrically Conductive Circuit with Metal Colloid Inks (Invited), *Toshihiko Oguchi and Keiki Suganami, Morimura Chemicals Ltd. (Japan)*

Friday November 5, 2004

Friday November 5, 8:00 am to 11:30 am

Special Session: Security and Forensic Printing Applications

Session Chair: Annette Jaffe, Consultant

Extrinsic Signatures Embedding Using Exposure Modulation for Information Hiding and Secure Printing in Electrophotographic Devices (Invited), *Pei-Ju Chiang, Gazi N. Ali, Aravind K. Mikkilineni, George T. Chiu, Jan P. Allebach, and Edward J. Delp, Purdue Univ. (USA)*

Application of Principal Components Analysis and Gaussian Mixture Models to Printer Identification (Invited), *Gazi N. Ali, Aravind K. Mikkilineni, Pei-Ju Chiang, Jan P. Allebach, George T. Chiu, and Edward J. Delp, Purdue Univ. (USA)*

Printer Identification Based on Textural Features, *Aravind K. Mikkilineni and Edward J. Delp, Purdue Univ. (USA)*

Authenticate Your Digital Prints with Glossmark Images, *Chu-heng Liu, Shen-Ge Wang, and Beilei Xu, Xerox Corp. (USA)*

Security Printing, *Thomas Plutchak, NexPress Digital L.L.C. (USA)*

Key Issues in Digital Technology for the Security Market, *Stephen R. Postle, Sun Chemical Security (USA)*

Using Image Analysis Systems in Forensics and Security Printing, *Yair Kipman, ImageXpert, Inc.*

Track II

Monday November 1, 2004

Monday November 1, 9:15 am to 11:55 am

Production Digital Printing

Session Chairs: Huoy-jen Yuh, Xerox Corp., Masahiro Hosoya, Toshiba Corp., and Patrick Van den Bergen, Agfa-Gevaert, NV

Is Image on Image Color Printing a Privileged Printing Architecture for Production Digital Printing Applications? (Focal), *Rick Lux and Huoy-Jen Yuh, Xerox Corp. (USA)*

Higher Print Output at Lower Cost, *Bruce W. Dahlgren, Lexmark (USA)*

Printing on a Post Processor Using UP3i in an AFP Environment, *Jean Aschenbrenner, David E. Stone, and Reinhard Hohensee, IBM (USA)*

Océ VS 9000 - A New Platform for Digital Production Printing (Focal), *Martin Schleusener, Océ Printing Systems (Germany)*

Addressing the Problems of Color Science and Management in Digital Print, *Winson Lan, Kikuze Solutions PTE Ltd. (Singapore)*

A PPML/T Based Variable Data Printing Engine for Real Time Targeted Marketing,

Galo Gimenez and Luca Chiarabini, Hewlett Packard (Spain)

A Dot Placement Approach to Stochastic Screening Using Bitmaps, *Mike Woods, Software Imaging (UK)*

Monday November 1, 1:45 pm to 5:00 pm

Digital Printing/Quality Control Instrumentation

Session Chairs: Yee Ng, NexPress Solutions, Inc., Masahiko Itaya, Samsung, and Guido Desie, Agfa-Gevaert, NV

ICC Profile Verification for Digital Printing (Focal), *Allan N. S. Zhang¹, Kamal Youcef-Toumi², and Andrew Y. C. Nee³, ¹Singapore Inst. of Manufacturing Technology (Singapore), ²Massachusetts Inst. of Technology (USA); ³National Univ. of Singapore (Singapore);*

Efficient Characterization of Printing Systems for the Packaging Industry, *David Hasler, Bruno Zimmermann, and Peter Ehbets, LOGO Kommunikations-und Drucktechnik GmbH (Germany)*

Conferencel Program

The Goniometric Characteristics Depending on the Manufacture Conditions of the Electronic Photograph, *Jongpil Kim¹, Hiroshi Doshoda², Toshiya Nakaguchi¹, Norimichi Tsumura¹, and Yoichi Miyake¹*, ¹Graduate School of Science and Technology, Chiba Univ. and ² Sharp Corp. (Japan)

Print Quality Improvement Through Dot Synthesis and Optimization (Interactive), *Lihu Chiu, Tony Jou, and Grant Chang, Printronix, Inc. (USA)*

Contour Mapping of Readability of Hardcopies on a Plane of Optical Densities for Characters and Background: A Guideline for Designing Electronic Papers (Interactive), *Kazuyoshi Sakuragi and Makoto Omodani, Tokai Univ. (Japan)*

Perceptual Color Granularity Metric via Scanner, *Chunghui Kuo and Yee Ng, Nexpress Solutions, Inc. (USA)*

Automating Jet Quality Analysis Using a Scanner-Based System, *Randy Dumas¹, Dana Aultman¹, and Tal Salomon²*, ¹Eastman Kodak Company; ²ImageXpert Inc. (USA)

Improved Ink Jet In Situ Visualization Strategies, *Sandrine Allaman¹ and Guido Desie²*, ¹Ardeje and ²Agfa-Gevaert N.V. (France)

Measurement of Electric Charges on the Flowing Toner with an Electrostatic Voltmeter (Interactive), *Maciej A. Noras and David M. Zacher, Trek, Inc. (USA)*

A Novel Method for Evaluating Ink-Jet Print Head Directionality, *Meng-Ta Yang, Chih-Hsuan Chiu, Chi-Bin Lo, Chun-Jung Chen, and Wu Kuo-Hua, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Tuesday November 2, 2004

Tuesday November 2, 9:35 am to 4:20 pm

Print and Image Quality

Session Chairs: Norm Burningham, Hewlett-Packard, Shigeru Kitakubo, Nippon Institute of Technology, and Bernard Pineaux, EPPG

An Intelligent Color Quality Control Method for Digital Printing (Focal), *Zhang Nengsheng², Kamal Youcef-Toumi¹, and Andrew Y. C. Nee³*, ¹Massachusetts Institute of Technology (USA); ²Singapore Institute of Manufacturing Technology; ³National Univ. of Singapore (Singapore)

Tone Reproduction on a Fluorescent Substrate, *Li Yang, Univ. of Linköping (Sweden)*

Color Gamut of SOCS and Its Comparison to Pointer's Gamut (Interactive), *Masao Inui¹, Tomotaka Hirokawa¹, Yoshihiko Azuma¹, and Johji Tajima²*, ¹Tokyo Polytechnic Univ.; ²Nagoya City Univ. (Japan)

Image Quality Improvement by Rescaling of Color Saturation (Interactive), *Takashi Watanabe, Yuji Akimoto, and Yasushi Hoshino, Nippon Institute of Technology (Japan)*

Direct Tonal Evaluation for the Digital Photo-Imaging System, *Shin Ohno, Nozomu Funyu, Makoto Ogawa, and Akira Naito, Tokyo Polytechnic Univ. (Japan)*

A New Model of Printer Characterization (Focal), *Swati Bandyopadhyay¹, Tapan Paul², Tapasi Raychowdhuri¹, and Sivaji Bandyopadhyay¹*, ¹Jadavpur Univ.; ²ABP Limited; (India)

Coalescence of Solid Ink Drops and Its Effect on Print Quality, *Shu Chang and Peter Paul, Xerox Wilson Center for Research and Technology (USA)*

Evaluation of Graininess for Digital Halftone Images Based on Human Visual Sensitivity (Interactive), *Shigeru Kitakubo, Yasushi Hoshino, and Shi-Biao Xu, Nippon Institute of Technology (Japan)*

The Effect of Paper Roughness on Printing Quality of Digital Printers, *Renmei Xu and Paul D. Fleming, Western Michigan Univ. (USA)*

Gloss and the Specular Properties of Printed Images, *J. S. Arney, P. G. Anderson, and Lydia Knurek, Rochester Institute of Technology (USA)*

Diagnosis for Differential Gloss in Color Hard Copy Outputs (Interactive), *Mamie Kam-Ng and Patrick M. Reed, Eastman Kodak Co. (USA)*

Overview of Inkjet Media from a Photo-Like Quality Point of View, *Hiroyuki Temmei¹, Yoshihiko Shibahara², Akira Kase¹, and Yuzo Toda¹*, ¹Fuji Photo Film B.V. (The Netherlands); ²Fuji Photo Film Co., Ltd. (Japan)

Printability of Different Epson Ink Jet Ink Sets, *Veronika Chovanцова, Paul D. Fleming III, and Paul Howell, Western Michigan Univ. (USA)*

Characterization and Compensation for Chromatic Banding Artifact in Polychrome Electrophotographic Process Using Multiple OPC Drum Velocity Control, *Mu-Chih Chen¹, George T.C. Chiu¹, Jan P. Allebach¹, and Riyadh Al-Kazily³*, ¹Purdue Univ.; ²Hewlett Packard Company (USA)

Banding Reduction in Electrophotographic Printer (Interactive), *Je-Hwan You, Samsung Electronics Co., Ltd. (South Korea)*

Dependence of Image Quality on Edge Enhancement Condition (Interactive), *Pranchalee Rattanasakornchai, Lihong Shi, and Yasushi Hoshino, Nippon Institute of Technology (Japan)*

Image Processing System for Image Enhancement and Halftone Processing (Interactive), *Hsiao-Yu Han, Jessen Chen, Yu-Chu Huang, Shyh-Hsing Wang, Yao-Wen Huang, and Jane Chang, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

A Table-Based Ink-Reducing Approach with Estimating Ink Limitation of Media and Gray Component Replacement for Printing Devices (Interactive), *Tung-Lin Wu, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Wednesday November 3, 2004

Wednesday November 3, 9:05 am to 3:55 pm

Photo-electronic Materials and Devices

Session Chairs: Garry Hinch, Hewlett-Packard, Jin Mizuguchi, Yokohama National Univ., and Reinhard Baumann, MAN Roland Druckmaschinen AG

Co-Crystalline Mixtures of Titanyl Fluorophthalocyanine and Unsubstituted Titanyl Phthalocyanine: The Mechanical Amorphization Process, and Its Characterization, *Michel Frantz Molaire and Theodore Zubil, NexPress Solutions, Inc. (USA)*

Light Emitting Devices from Transition Metal Complexes (Focal), *Jason Slinker, Dan Bernards, Samuel Flores-Torres, Héctor D. Abruña, and George G. Malliaras, Cornell Univ. (USA)*

Direct Observation of Photogenerated Carriers in Layered Organic Photoreceptors by Time-Resolved Spectroscopic Techniques, *Kan Takeshita, Yutaka Sasaki, and Tetsuo Murayama, Mitsubishi Chemical Group Science and Technology Research Center, Inc. (Japan)*

Design for Charge Transport Property of Positive-Charging-Type Single-Layer OPC Photoreceptor (Focal), *Eiichi Miyamoto, Yasufumi Mizuta, and Toru Nakazawa, Kyocera Mita Corp. (Japan)*

High Resolution Imaging Technology Using Positive-Charge-Type Single-Layer OPC

Photoreceptor, *Yasufumi Mizuta, Eiichi Miyamoto, Jun Azuma, and Toru Nakazawa, Kyocera Mita Corp. (Japan)*

Low Temperature Growth of Vertically Aligned Carbon Nanotubes for Field Emission, *Yoshikazu Nakayama, Lujun Pan, and Koichi Takeda, Osaka Prefecture Univ. (Japan)*

Charge Generation Process in the Single Layer OPC, *Saburo Yokota, Hwan-Koo Lee, Beom-Jun Kim, Seung-Ju Kim, Kyung-Yol Yon, and Young No, Samsung Electronics Co., Ltd. (Korea)*

Crystal and Electronic Structure of Metal-Free Porphyrin: A New Material for Organic FET, *Shinji Aramaki and Jin Miizuguchi, Yokohama National Univ. (Japan)*

Polymorph of Diketodipyridylpyrrolopyrrole (Interactive), *Imoda Tomohiko, Takahashi Hiroo, and Mizuguchi Jin, Yokohama National Univ. (Japan)*

Electronic Interaction and Electric Property in Vacuum Co-deposited Films of Naphthalene Tetracarboxylic Derivatives and Metals (Interactive), *Ken-ichi Nakayama, Yasuro Niguma, Yoshitaka Matsui, Ryoji Miyamoto, and Masaaki Yokoyama, Osaka Univ. (Japan)*

Crystal and Electronic Structure of 2,9-Dichlorodithioketoquinacridone (Interactive), *Tomonori Hoki, Takatoshi Senju, and Jin Mizuguchi, Yokohama National Univ. (Japan)*

Influence of Molecular Orientation on Conductivity in Copper Phthalocyanine Thin Films (Interactive), *Toshikazu Tsuchiya and Manabu Takeuchi, Ibaraki Univ. (Japan)*

Electroanalytical Screening Method for Characterization of Charge Transport Materials, *Dale Russell¹, Ryan Meyer¹, Nathan Davis¹, Nusrallah Jubran², Zbigniew Tokarski², Ron Moudry², and Hwan-Koo Lee³, ¹Boise State Univ., ²Samsung Information System America (USA), ³Samsung (South Korea)*

Pixel Image Formation on a Multi-Layered Organic Film Installed with Pixel-Like Floating Electrodes, *Norio Nagayama, Noriohiro Nakamura, and Masaaki Yokoyama, Osaka Univ. (Japan)*

Novel Hydrazone and Azine Based Hole Transport Materials (Interactive), *Nusrallah Jubran¹, Zbig Tokarski¹, Ron Moudry¹, Vytautas Getautis², Tadas Malinauskas², Vyngintas*

Conferencel Program

Jankauskas³, and Edmundas Montrimas³,
¹Samsung Information Systems America (USA),
²Kaunas Univ. of Technology (Lithuania),
³Vilnius Univ. (Lithuania)

Polymorph of N,N'-bis(2-(4-pyridyl)ethyl) perylene-3,4,9,10-bis(dicarboximide) (Interactive), Kazuyuki Hino and Jin Mizuguchi, *Yokohama National Univ. (Japan)*

The Studies of Hydrazone Compounds as a Plasticizers for 4-Diethylaminobenzaldehyde 1-Benzyl-1-Phenylhydrazone – Polycarbonate Layers (Interactive), Konstantin K. Kochelev, Vladimir N. Bulavka, Vladimir E. Golovin, and Galina A. Kosheleva, *NIFTI (Scientific Research Phototechnical Institute on Slavich Company) (Russia)*

Thickness Influence on the Single Layer Organic Photoreceptor Properties (Interactive), Edmundas Montrimas¹, Jonas Sidaravicius¹, Tadeusz Lozovski¹, Robertas Maldzius¹, Nusrallah Jubran², and Zbig Tokarski², ¹Vilnius Univ. (Lithuania) and ²Samsung Information Systems America (USA)

UV-Curable Pretreatments for Digital Printing Textile Substrates, Qinguo Fan, Yong K. Kim, and Melynda Perucci, *Univ. of Massachusetts Dartmouth (USA)*

Electrophotographic Printing on Textiles and Non-Planar Substrates (Focal), D. S. Rimai¹, D. S. Weiss¹, and D. J. Quesnel², ¹Nexpress Solutions, Inc.; ²Univ. of Rochester (USA)

Pigmented Inkjet Ink Dispersion for Silk Fabric Printing, Suda Kiatkamjornwong, *Chulalongkorn Univ. (Thailand)*

Drying Morphologies of Alginate Thickener Films and Their Impact on Ink Jet Printing Process (Interactive), Ayda Baffoun^{1,2}, Hamidou Haidara², Pierre Viallier¹, ¹LPMT-ENSITM and ²ICSI-CNRS (France)

From DReAM to Dollars (Interactive), Marco Nespeca, *Reggiani Macchine SpA (Italy)*

Impaction of Particle-Laden Drops on Solid Surfaces, Hyunyoung Ok, Heungsup Park, and Wallace W. Carr, *Georgia Inst. of Technology (USA)*

Thursday November 4, 2004

Thursday November 4, 9:05 am to 2:55 pm

Special Session: Control Systems

Session Chair: Howard Mizes, Xerox Corp.

Systems for Image Quality Control in Inkjets Printer (Invited), Ramon Borrell, David Gaston, and Josep Rio, *Hewlett-Packard Company (Spain)*

Sensing and Process Control System for Color MFP (Invited), Yusuke Takeda, *Ricoh Co., Ltd. (Japan)*

Control Advances in Production Printing and Publishing Systems (Invited), Lalit K. Mestha, *Xerox Corp. (USA)*

Control Mechanisms for Print Quality Assurance in HP Indigo Presses (Invited), Gilad Tzori, *HP Indigo (Israel)*

Levels of Process Automation in a Short Run Offset Press (Invited), Peer Dilling, *MAN Roland Druckmaschinen AG (Germany)*

Thursday November 4, 3:25 pm to 5:05 pm

Textile & Fabric Printing

Session Chairs: Hitoshi Ujiie, Philadelphia Univ., Takao Abe, Shinshu Univ., and Martin Smallegange, Stork Digital Imaging

Friday November 5, 2004

Friday November 5, 8:00 am to 12:30 pm

Color Science/Image Processing

Session Chairs: Chai Wu, IBM, Kazuhisa Yanaka, Kanagawa Institute of Technology, and Jordi Corominas, Hewlett-Packard

Image Coding Algorithm Using Luminance-Chrominance Correlation and Spatial Correlation, Toshiaki Fujisawa, Takahiko Horiuchi, and Hiroaki Kotera, *Chiba Univ. (Japan)*

Unsupervised Image Segmentation by Bayesian Discriminator Starting with K-Means Classifier, Hiroaki Kotera and Takahiko Horiuchi, *Chiba Univ. (Japan)*

Clustered AM/FM Halftoning Algorithm (Focal), Zhen He¹ and Charles A. Bouman², ¹Xerox Corp., ²Purdue Univ. (USA)

The Processing of Fine Detail for Digital Halftone Printing, Yuri V. Kuznetsov¹, Andrey A. Schadenko¹, Inna V. Kostiuik¹, Paul V. Wolneikin¹, and David J. Flanagan², ¹St. Petersburg State Univ. of Technology and Design (Russia); ²Cambridge Prepress Services (USA)

The Restoration, Enhancement, and Desk-Top Printing of Historical Photographs, Rodney Shaw, *Hewlett Packard (USA)*

Conference Program

Error Diffusion: Recent Developments in Theory and Applications (Focal), *Chai Wah Wu, IBM T. J. Watson Research Center (USA)*

Single Dimensional Color Maps: Hue Shifts Elimination with Press Gray Balance Table, *Gregory Braverman, Shlomo Harush, Gennady Karvitsky, and Shaul Costis, Hewlett-Packard (Israel)*

A Versatile 3D Gamut Mapping Adapted to Image Color Distribution, *Ryoichi Saito and Hiroaki Kotera, Chiba Univ. (Japan)*

Fundamental Considerations on Chromatic Adaptation from a New Viewpoint, *Nobuhito Matsushiro, Okidata Corp. (Japan)*

Color Profile: Methodology and Influence on the Performance of Ink-Jet Color Reproduction, *Lionel Chagas, Anne Blayo, and Julien Chauveau, EFPG (France)*

Optimization of Scale-Gain Function in Multi-Scale Retinex Model, *Masato Yoda and Hiroaki Kotera, Chiba Univ. (Japan)*

Track III

Monday November 1, 2004

Monday November 1, 9:15 am to 4: 10 pm

Image Permanence

Session Chairs: Larrie Deardurff, Hewlett-Packard, Takao Abe, Shinshu Univ., and Anne Blayo, EFPG

A Review of Accelerated Test Methods for Predicting the Image Life of Digitally-Printed Photographs - Part II (Focal), *Henry Wilhelm, Wilhelm Imaging Research, Inc. (USA)*

Factors to Influence Image Stability of Inkjet Prints, *Akira Kase¹, Taihei Noshita², Meindert Slagt¹, and Yuzo Toda¹, ¹Fuji Photo Film B.V. (The Netherlands); ²Fuji Photo Film Co., Ltd. (Japan)*

Study of Print Life Estimation Using Computer Simulation, *Makoto Machida, Susumu Soejima, Nobuhiko Uchino, and Yoshi Shibahara, Fuji Photo Film Co., Ltd. (Japan)*

On the Development of a "Retained Image Appearance" Metric for the Colorimetric Evaluation of the Image Stability of Photographs, *Mark McCormick-Goodhart and Henry Wilhelm, Wilhelm Imaging Research, Inc. (USA)*

Indoor Light Stability Testing: A Practical Discussion and Overview (Interactive), *Stephen Novak, Eric T. Everett, Greg Fedor, and Bill Solarz, Q-Panel Lab Products (USA)*

The Equivalence of Light Sources in Light Stability Testing (Interactive), *Eduard Baumann and Rita Hofmann, Ilford Imaging Switzerland GmbH (Switzerland)*

Langmuir-Hinshelwood-Hougen-Watson Kinetic Model of Magenta Dye-Based Inkjet Ink Fading on Polymer-Coated Photo Media (Interactive), *John M. Medley, Lexmark International (USA)*

Gamut and Permanence of New-Generation Dye-Based Inks, *Alexey Kabalnov, Charles Dupuy, Jay Gondek, Je-Ho Lee, Ranjit Bhaskar, and David Berfanger, Hewlett Packard (USA)*

The Inkjet Prints Permanence of the Latest Dye Ink Set, *Yasuhiro Oki, Kazuhiko Kitamura, Tetsuya Aoyama, Masahiro Hanamura, and Hiroshi Fukumoto, Seiko Epson (Japan)*

The Durability of Epson's Pigment Ink Sets (Interactive), *Shinichi Kato, Hiroyuki Onishi, Kazuhiko Hara, and Kazuhide Kubota, Epson Research and Development, Inc. (USA)*

Image Permanence of Acidic vs. Acid-Free, Buffered Inkjet Papers—A Photo Album Enthusiast's Perspective (Interactive), *David F. Kopperl and Mark B. Mizen, Creative Memories (USA)*

Evidence for Thermal Dark Fade of Inkjet Photographic Prints (Interactive), *D. E. Bugner, R. Kapusniak, M. M. Oakland, and L. L. Aquino, Eastman Kodak Company (USA)*

Uncertainty in Evaluation of Accelerated Ozone Fading Tests of Inkjet Prints (Focal), *Kazuhiro Miyazawa and Yoshihiko Suda, Konica Minolta Photo Imaging, Inc. (Japan)*

Study of Gas Fastness of Ink Jet Prints, *Yojiro Kojima, Hiroyuki Ogino, and Takao Yamamoto, Canon Inkjet Supply Development Center (Japan)*

Reduction of Ozone Fading of Copper Phthalocyanine Dyes by Non-Conventional Antiozonants Containing Various Substituents, *Fariza B. Hasan and Sheila E. Rodman, Polaroid Corp. (USA)*

The Differences in Characteristics of Dye Based Inkjet Images Subjected to Gas and Light Fading, *Alan Hodgson and Amanda M. Jackson, Ilford Imaging UK Ltd. (UK)*

Conference Program

Comparison of Testing Methods for Estimating the Sensitivity of Inkjet Images to Gas Fading –Part II (Interactive), *Michael Berger and Henry Wilhelm, Wilhelm Imaging Research (USA)*

A Rapid and Simplified Method for Determining Ozone and Other Image Degrading Oxidants in Air (Interactive), *Peter H. Roth, Applied Technology Consultants (USA)*

Indoor Pollutant Gas Concentration and the Effect on Image Stability, *Yukihiko Kanazawa, Yoshio Seoka, and Shinzou Kishimoto, Fuji Photo Film Co., Ltd. (Japan)*

Tuesday November 2, 2004

Tuesday November 2, 9:35 am to 4: 40 pm

Ink Jet Printing Materials

Session Chairs: Rob Beeson, Hewlett-Packard, Mineo Kaneko, Canon Inc., and Katri Vikman, Helsinki Univ. of Technology

Self-Stabilizing Carbon Black: The Technological Advantages in Aqueous Ink Jet Systems (Focal), *Thomas Lütthge, Klaus Bergemann, and Ralph McIntosh, Degussa AG (Germany)*

Automatic Stability Analyses for Ink Jet Inks, *Hélène Buron¹, Laurent Brunel¹, and Patrick Snabre², ¹Formulation, ²Centre de Recherche Paul Pascal (France)*

Organic Pigments for Ink Jet Applications: Special Requirements and Limitations, *Stéphane Biry and Werner Sieber, Ciba Specialty Chemicals (Switzerland)*

Titration of Surface Modified Pigment Particles, *Yuan Yu and Friedrich von Gottberg, Cabot Corp. (USA)*

Reliable Jetting of Difficult Materials, *Philip Bentley, Xenxia Technology (UK)*

Fundamental Mechanisms in Ink Media Interaction for Aqueous, UV-Curing and Solvent Based Inks (Focal), *Guido Desie¹, Geert Deroover², Roland Claes², Frank De Voeght¹, and Arthur Soucemarianadin², ¹Agfa-Gevaert N.V. (Belgium); ²LEGI, UMR (France)*

Approaches to Cross-linking Unique Water Soluble Polymers Used in Inkjet Receptive Coatings, *David K. Hood, Michael A. Tallon, Jim DiBattista, Brett Clark, and Edward J. Johnson, International Specialty Products (USA)*

Print Quality in UV Curing Jet Ink Technology, *Alexander Grant and Hugh Allen, SunJet (UK)*

Dynamic Surface Tension of UV-Curable Inkjet Inks (Interactive), *U. De Rossi, O. Bolender, and B. Domanski, TETENAL Photowerk GmbH & Co. KG (Germany)*

Techniques of Optimizing the UV Ink Jet Curing Process (Interactive), *R. W. Stowe, Fusion UV Systems, Inc. (USA)*

Low Viscosity and Fast Curing UV Curable Inkjet Ink for Flatbed and Wide Format Inkjet Printing (Interactive), *Jie Wang, Graphic Digital (USA)*

The Adhesive Study of Pigment Ink to Uncoated Vinyl (Interactive), *Takuo Mizutani and Nagayuki Takao, Hitachi Maxell Ltd. (Japan)*

Highly Compatible Pigment Preparations for Aqueous Ink Jet Inks (Interactive), *Klaus Saitmacher, Karl-Heinz Schweikart, Catrin Kneisel, and Hans-Tobias Macholdt, Clariant GmbH (Germany)*

Inkjet Printing and Air Quality Regulations, *Steven Noble¹ and Judy Zaczkowski², ¹Photo Marketing Association International, ²Envision Compliance, Ltd. (USA)*

Tailor-Made Silica and Alumina for Inkjet Media Coatings, *Christoph Batz-Sohn and Arnold Storeck, Degussa AG, R&D Center Hanau-Wolfgang (Germany)*

Relation Between Image Quality of Inkjet Printing Media and Power Charge of Microporous Nanoalumina (Interactive), *Tai Sung Kang, and Seung Ho Lee, Research Center of Hanmi Filmtech Co., Ltd., (Korea)*

Polymeric Material Adhesion and Common Failure Mechanisms in the Assembly of Jettable Fluid Devices (Interactive), *Susan Krawiec, Vivian Chan, Robert Frimanson, Chih-Min Cheng, and Robert Palmer, Emerson & Cuming (USA)*

Novel Polyurethane Materials for Use in Digital Imaging Equipment (Interactive), *Joe Lovette, Foamex Technical Products (USA)*

Wednesday November 3, 2004

Wednesday November 3, 9:05 am to 2:45 pm

Ink Jet Printing Processes

Session Chairs: Ross Mills, Imaging Technology Int'l., Shinri Sakai, Seiko Epson Corp., and Werner Zapka, Xaar Jet AB

Multi-Color Printing (Focal), *Guido Desie, Philippe Kerdraon, Damien Vadillo, and Arthur Soucemarianadin, Agfa-Gevaert N.V. (Belgium); LEGI, UMR (France)*

Design and Fabrication of the Monolithic Inkjet Print Head, *Chi-Ming Huang, Chia-Tai Chen, Jian-Chiun Liou, Chia-Cheng Chiao, Cheng-Yi Wang, Yu-Hung Chuang, Ching-Yi Mao, and Chun-Jung Chen, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

One Inch Thermal Bubble Jet Printhead with Integrated Nozzle Plate, *Timo Lindemann¹, Heidi Ashauer², Thorsten Götsche², Ying Yu³, Duccio Sassano⁴, Alessandro Bellone⁴, Roland Zengerle¹, and Peter Koltay¹, ¹IMTEK – Univ. of Freiburg (Germany); ²HSG-IMIT (Germany); ³STEAG microParts (Germany); ⁴Olivetti I-Jet (Italy)*

The Performance of High-Frequency and Picoliter-Droplet Inkjet Printhead by a Standard CMOS Processes (Interactive), *Jian-Chiun Liou, Chun-Jung Chen, and Wen-Chien Liu, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Cross-Talk Reduction in Ink Jet Printheads by Optimizing Firing Delays, *Charles A. Willus, Hiroshi Nishimura, and Stuart D. Howkins, Hitachi Printing Solutions America (USA)*

Driving Waveforms to Reduce Voltage Requirement of Inkjets, *Douglas D. Darling, Xerox Corp. (USA)*

Recent Advances in Piezoelectric Inkjet Print Head Technology for Industrial Printing Applications, *Yong Zhou, Trident, An ITW Company (USA)*

Lower Power Supply Thermal Bubble Printhead Chip with MEMS Technology Increasing Thermal Energy Effect (Interactive), *Jian-Chiun Liou, Chun-Jung Chen, and Min-Hon Chuang, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Ink-Jet Instability Behavior Analysis for Polymer Light Emitting Diodes Fabrication (Interactive), *Z. F. Song, F. K. Cheng, H. M. Tsai, J. P. Lu, J. P. Hu, Y. Z. Lee, and Kevin Cheng, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Study of the Thermal Bubble Inkjet Technology on Motorcycle Engine Application, *Yu-Yin Peng, Ching-Yi Mao, Tien-Ho Gau, Chou-Lin Wu, and Jinn-Chereng Yang, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Frequency Dependent Fluidic Inductance and Resistance in Inkjet Passages (Interactive), *Douglas D. Darling, Xerox Corp. (USA)*

Simulation on the Ejection Performance of Thermal Bubble Inkjet Printhead for Top and Back Shooting Design (Interactive), *Jinn-Chereng Yang, Chi-Ming Huang, and Chun-Jung Chen, OES/ITRI Industrial Technology Research Institute Chutung (Taiwan)*

A Novel Etching Method of Silicon Nozzle Plate Manufacture for Monolithic Inkjet Print Head (Interactive), *Chi-Ming Huang, Chia-Tai Chen, Chou-Lin Wu, Lai-Chen Chen, Ching-Yi Mao, and Chun-Jung Chen, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

A Study of Improving PLED Inkjet Printing Quality by Modifying Driving Signal (Interactive), *Po-Fu Chou, Meng-Ta Yang, Chih-Hsuan Chiu, Chi-Bin Lo, Chun-Jung Chen, Fu Kang Chen, De-Guo Zhan, and Ching Chiu Liao, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

An ASIC Design for Managing Thermal Inkjet Heater Array Chip with Integrated Power Drivers and Logic Addressing (Interactive), *Jian-Chiun Liou and Chun-Jung Chen, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Measurement of Smart Driver on Thermal Bubble Inkjet Printhead (Interactive), *Jian-Chiun Liou, Chun-Jung Chen, Wen-Chien Liu, and Min-Hon Chuang, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Lifetime and Failure Mode Study on the Micro-heater of Thermal Bubble Inkjet (Interactive), *Ming-Hong Chuang, Chu-Wen Chen, Jinn-Chereng Yang, and Chun-Jung Chen, OES/ITRI, Industrial Technology Research Institute (Taiwan)*

Addressable Waveform Control System for Ink Jet Printing Technology (Interactive), *Yung-Kuo Ho, Chieh-Yi Huang, Chao-Kai Cheng, and Tung-Lin Wu, OES/ITRI, Industrial Technology Research (Taiwan)*

Wednesday November 3, 3:15 pm to 5:15 pm

Electronic Paper and Displays

Session Chair: Makoto Omodani, Tokai Univ.

Dual Color Leuco Dye Type Thermal Rewritable Marking (Invited), *Ikuo Fujita, Mitsubishi Paper Mills, Ltd. (Japan)*

Conference Program

Rewritable Printing System Using Lueco Dyes (Invited), *Kyoji Tsutsui, Ricoh Co., Ltd. (Japan)*

Photo-addressable E-Paper and Toner Display (Invited), *Hiroshi Arisawa, Fuji Xerox Corp. (Japan)*

Thursday November 4, 2004

Thursday November 4, 9:05 am to 12:25 pm

Media for Digital Printing

Session Chairs: Sanjay Monie, Grace Davison, Toshihiko Oguchi, Morimura Chemicals. Ltd, and Florian Eder, Neusiedler AG

Kinetics of Wetting by Drops: Theory and Implications to Inkjet Printing (Focal), *Abraham Marmur, Technion – Israel Institute of Technology (Israel)*

Influence of Media and Ink Characteristics on the Quality of Color Ink Jet Reproduction of Fine Art Pictures, *Anne Blayo, Lionel Chagas, and Julien Chauveau, EFPG (France)*

Interpretation of Paper Gloss and Associated Printability in Terms of Pigment Particle Size and Composition for Glossy Ink Jet Papers (Interactive), *Hyun Kook Lee, Margaret K. Joyce, and Paul D. Fleming III, Western Michigan Univ. (USA)*

Relationship between Initial Absorption Behavior of Ink-Jet Inks and Three-dimensional Distribution of the Fixed Inks in Paper, *Toshiharu Enomae, Dmitry Ivutin, Akira Isogai, The Univ. of Tokyo (Japan)*

Validation of Numerical Models by Microscopic Analysis of Ink Jet Printed Receivers, *Guido Desie, Chris Van Roost, and Marc Graindourze, Agfa-Gevaert N.V. (Belgium)*

A Comparison of the Physical Properties of Different Gelatine Types for Inkjet Applications (Focal), *Dirk Kisters, Berthold Köhler, and Markus Lechtenfeld, Gelita Photo Europe (Germany)*

Effect of Filler Distribution and Caliper Variations on Toner Transfer in Electrophotographic Printing, *Nikolas Provatas¹, Andrew Cassidy², and Mitsuo Inoue³, ¹Department of Materials Science and Engineering, McMaster Univ.; ²McGill Univ.; ³PAPRICAN (Canada)*

Chitosan for Dye Fixation of Light Fast Gelatine Coatings, *Berthold Köhler, DGF Stoess AG (Germany)*

Fine Art Papers for Ink Jet Printing (Interactive), *Royce L. Bair, Technology Consultant for Inkjet Art Solutions, Inc. (USA)*

Thursday November 4, 1:45 pm to 3:50 pm

Thermal Printing

Session Chairs: Teh-Ming Kung, Eastman Kodak and Hirotooshi Terao, Alps Electric Co., Ltd.

Development of New Direct Laser Printing System, *Kyoko Senga, Yuuichi Fukushige, Hirotaka Matsumoto, and Shintaro Washizu, Fuji Photo Film Co., Ltd. (Japan)*

Matte Finish on Thermal Prints (Focal), *William H. Simpson and Jacob J. Hastreiter, Eastman Kodak Company (USA)*

New Thermal Dye Transfer Media for Digital Photo Usage, *Daisuke Fukui, Dai Nippon Printing Co., Ltd. (Japan)*

Use of Thermal Dye Diffusion Model to Predict the Effects of Increased Thermal Printhead Efficiency, *Edward J. Ozimek, Eastman Kodak Company (USA)*

Development of a Cross-Linked Imaging Layer for Thermal Dye Transfer Receiver, *Teh-Ming Kung, Dave Bailey, George Bodem, and Brian Pope, Eastman Kodak Company (USA)*

Development of True Edge H Series Printhead (Interactive), *Hidekazu Akamatsu, Kyocera (Japan)*

Study of a D2T2 Printing for High-Speed Print (Interactive), *Tatsuhiko Asada, Hiroshi Kobayashi, and Hirotooshi Terao, Alps Electric Co., Ltd. (Japan)*

Analyze of Image Quality Parameters on Thermal Paper as Proposal to Extension Standard ISO13660 (Interactive), *Ludwik Buczynski and Eryk Klucinski, Warsaw Univ. of Technology, Institute of Micromechanics and Photonics (Poland)*

Thursday November 4, 4:20 pm to 4:45 pm

Advanced and Novel Imaging Systems

Session Chairs: Robert Detig, Electrox Corp., Yasushi Hoshino, Nippon Institute of Tech., and Ramon Borrell, Hewlett-Packard

Conferencel Program

Friday November 5, 2004

Magnetic Twisting Ball Display Method Using Resin Ball with Magnetic Coating Layer: A Candidate Method for Electronic Paper (Interactive), Masakatsu Okawa¹, Makoto Omodani², and Kenji Kohno², ¹Tokai Univ.; ²Hitachi Maxell, Ltd. (Japan)

Improvement of Image Contrast in Toner Display (Interactive), Takashi Kitamura, Nobuhiro Mizuno, Sakiko Nakamura, and Katsuyoshi Hoshino, Chiba Univ. (Japan)

Method for Fusing Improvement of Liquid Inks (Interactive), Steve C. Jensen, Truman F. Kellie, Manuel Lozada, Lenard Stulc, Brian P. Teschendorf, and Charles W. Simpson, Samsung Information Systems America (USA)

Estimating of Quality Parameters of Convex Copies for the Blind (Interactive), Ludwik Buczynski and Roman Barczyk, Warsaw Univ. of Technology, Institute of Micromechanics and Photonics (Poland)

Synthesis of Integral Photography Images Using Shade™ (Interactive), Kazuhisa Yanaka¹, Hideo Kasuga¹, Yasushi Hoshino², Koichiro Kuroda³, Takeshi Hakii³, and Hirokazu Sato³, ¹Kanagawa Institute of Technology; ²Nippon Institute of Technology; ³Konica Minolta Photo Imaging, Inc. (Japan)

Friday November 5, 8:00 am to 10:40 pm
Advanced and Novel Imaging Systems (continued)

Session Chairs: Robert Detig, Electrox Corp., Yasushi Hoshino, Nippon Institute of Tech., and Ramon Borrell, Hewlett-Packard

Mechanism on Traveling Wave Transport of Particles, Hiroyuki Kawamoto and Kyogo Seki, Waseda Univ. (Japan)

Analysis of 2,540 DPI Dots Reproduction by Liquid Development, Isao Takasu, Hitoshi Yagi, Yasushi Shinjo, Masaki Takahashi, and Masahiro Hosoya, R&D Center, Toshiba Corp. (Japan)

A Decorative and Protective System for Wares, Hank Sawatsky, Sylvan Point Inc. (Canada)

Glossmark Technology: Digital Printing Beyond Color (Focal), Chu-Heng Liu, Shen-Ge Wang and Beilei Xu, Xerox Corp. (USA)

Advances in Piezoelectric Micropump Precision Deposition Using Silicon Nozzles, Will Letendre and Amy Brady, Spectra, Inc. (USA)

Evaluation of Physical Properties on Ink-jet Printing for Medical Imaging, Jun Yamashita, Toshiya Nakaguchi, Norimichi Tsumura, and Yoichi Miyake, Chiba Univ. (Japan)

Interactive Papers

Oral Previews - See papers flagged (Interactive) within each session and Display of Posters - Tuesday & Thursday 5:00 to 6:30 p.m.

Presentations that benefit from a closer scrutiny of image results, have been assigned to interactive/poster session presentation. This alternative presentation style is always a highlight of the conference and a great opportunity for one-on-one discussion with authors. Five-minute oral previews of each paper are scheduled within the appropriate oral session as noted by the (Interactive) notation after the paper title. This will give you the opportunity to determine which speakers you would like to visit during the display sessions. Presenters will stand by their posters during the poster display sessions schedule on Tuesday afternoon (to include papers previewed throughout the day on Monday and Tuesday) and on Thursday afternoon (to include papers previewed throughout the day on Wednesday and Thursday). Light refreshments will be served.

Hotel Reservation Form

IS&T's NIP20 Digital Printing Technologies

October 31 - November 5, 2004

**Little America Hotel & Towers and Grand America Hotel
Salt Lake City, Utah USA**

(Reservations Deadline - September 30, 2004)

Name _____ No. in party _____

Company _____

Mailing Address _____

Telephone _____ Fax _____ Email _____

Arrival Date _____ Time _____ Departure Date _____

A special block of rooms at a discounted rate is being held at the Little America Hotel & Towers and at the Grand America Hotel for IS&T attendees for the nights of October 30 through November 5. The discounted rate will also be extended for 3 days before and after these dates if space is available. Reservations will be assigned on a priority basis to the IS&T group provided they are received by September 30, 2004. In order to guarantee your room, a deposit equal to one night's housing must accompany your reservation request. Deposits can be made by check or a major credit card number, expiration date and signature.

Payment Method: Check AMEX MC VISA Diner's Discover Check # _____

Card# _____ Exp. Date _____

Signature _____

In the event of cancellation, 24 hours notice of cancellation must be given to the hotel so that you may receive a full refund of your deposit. Be sure to obtain a cancellation number. Check in time is 3:00 p.m. Check out time is 1:00 p.m. There is no charge for children under 18 years when sharing a room with their parents. Please advise us of any change in date or plan.

Little America Hotel (500 South Main Street) Plus 11.2% tax to room rates as quoted below.
Phone: 800-453-9450 or 801-363-6781 ask for reservations; Fax: 801-258-6811 Please reserve my room at the Little American Hotel as indicated:

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| <input type="checkbox"/> Single Tower Room - \$139 | <input type="checkbox"/> Single Garden Room - \$129 |
| <input type="checkbox"/> Double Tower Room - \$139 | <input type="checkbox"/> Double Garden Room - \$129 |
| <input type="checkbox"/> Triple Tower Room - \$149 | <input type="checkbox"/> Triple Garden Room - \$139 |
| <input type="checkbox"/> Quadruple Tower Room - \$159 | <input type="checkbox"/> Quadruple Garden Room - \$149 |
- Special requirements _____

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| <input type="checkbox"/> Single Premier Room - \$164 | <input type="checkbox"/> Double Premier Room - \$164 |
| <input type="checkbox"/> Triple Premier Room - \$174 | <input type="checkbox"/> Quadruple Premier Room - \$184 |
| <input type="checkbox"/> Single Executive Suite - \$184 | <input type="checkbox"/> Double Executive Suite - \$194 |
| <input type="checkbox"/> Triple Executive Suite - \$204 | <input type="checkbox"/> Quadruple Executive Suite - \$214 |
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Mail this form to: Reservations Manager
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Little America Hotel & Towers
500 South Main Street
Salt Lake City, Utah 84101

Conference Registration Form

IS&T's NIP20, 2004—Digital Printing Technologies
October 31 - November 5, 2004
Little America Hotel & Towers, Salt Lake City, Utah

Name _____

Title/Position _____

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Mailing Address _____

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Full registration includes admission to all regular sessions, the final program/proceedings book, and ticketed receptions. Separate registration fees are required for the short courses.

	until 9/30	after 9/30		Member	Non-mbr
Full Conference Registration (CHECK ONE)			Tutorial Registration	(per class)	
<input type="checkbox"/> IS&T Member	\$540.00	\$585.00	<input type="checkbox"/> 6hr. tutorial	\$300.00	\$350.00
<input type="checkbox"/> Non-member	\$650.00	\$695.00	<input type="checkbox"/> 4hr. tutorial	\$200.00	\$245.00
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List tutorials you will attend:

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• Subtotal Conference \$ _____

• Subtotal Other \$ _____

Please help us plan for your comfort:

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