Digital Fabrication 2010

NIP26

26th International Conference on Digital Printing Technologies

PRELIMINARY PROGRAM

September 19-23, 2010

Austin, Texas

General Chair:
Reinhard Baumann
Fraunhofer Einrichtung for Electronic Nano Systems ENAS

Publications Chair:
Shinri Sakai
Seiko Epson Corporation

General Chair:
Gerhard Bartscher
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Publications Chair:
Xavier Bruch
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*as of June 30, 2010

If you work in the fields of digital printing, digital fabrication, or any related technology you must attend NIP26 and Digital Fabrication 2010!

Join us in AUSTIN, TEXAS, where two great conferences come together under one roof for one great price!

This year marks the sixth that NIP and Digital Fabrication have collocated to offer participants the advantage of attending two great conferences by mixing and matching technical sessions of interest under a single registration fee.

Publications Chairs Xavier Bruch (NIP26) and Shinri Sakai (Digital Fabrication 2010) have developed an outstanding program to bring you presentations that both challenge and enlighten. Collocation lends great synergy and optimal networking opportunities for all attendees.

You will find stimulating and engaging content-packed days that include:

- 3 days of short courses
- a 2-day exhibit, complete with Tuesday evening happy hour
- 4 full days of multi-track technical sessions
- six outstanding and timely keynotes talks
- a Panel Discussion on Open Innovation and "Speed Dating" event
- an engaging Interactive Paper Session, with lunch provided
- plenty of opportunities to network, including a farewell reception after the final keynote

See details of the whole week beginning on page 19.

When you register for either conference, you gain admission to the other. We are also offering special rates on short courses that save attendees 20% when they take at least 8 hours of classes. See details on page 3.

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

—Gerhard Bartscher, General Chair NIP26, and Reinhard Baumann, General Chair DF2010

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Short Course Program

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

Special Offer:
Sign up for 8 or more hours of short courses and receive 20% off the member or non-member fee.

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

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

Sunday, September 19, 2010

SC01-S1: Introduction to Electrophotography

8:00 am – 12:00 pm (4 hours)
Instructor: Marc Cousoulis, Lexmark International, Inc.

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

Benefits

This course enables an attendee to:

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

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

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

SC02-S1: Top Ten Myths of Color Management

8:00 am – 12:00 pm (4 hours)
Instructor: Thomas E. Madden, Eastman Kodak Company

Myths often evolve to explain what seems otherwise inexplicable and to support ideas people wish to believe. Color itself can seem quite inexplicable at times, and people strongly want to believe color images can be interchanged freely among systems. So it is not surprising that numerous myths have arisen regarding digital color management. While a few of these myths are relatively harmless, many have been detrimental to making real progress within the color imaging industry. Persistent myths have led to compromised systems and undesirable results that could have been avoided, and disagreements on relevant conceptual and technical issues have frequently derailed discussions on standards for color interchange.

This course examines and challenges a number of the more persistent and persuasive-sounding color-management myths. The intent is to set forth sound principles that can help avoid pitfalls and unnecessary complexity in color-imaging systems.

Benefits

This course enables an attendee to:

- Explain the difference between colorimetry and color appearance.
- Describe the colorimetric relationships between original-scenes and reproduced color images.
- List and describe the physical, psychological, and psychophysical effects that must be accounted for in color-managed systems.
- Compare visual adaptation transformations with standard colorimetric calculations.
- Relate the distinctions between perfect whites, whiter-than-whites, adaptive whites, and media whites in color-managed systems.
- List and describe the factors that must be considered when selecting an appropriate color-encoding specification.
- Understand the capabilities and limitations of device-independent and device-dependent color encodings.

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

Tom Madden is a senior principal scientist in the Image Science Platform Center at Eastman Kodak Company. The holder of numerous color imaging patents, he is co-author of Digital Color Management: Encoding Solutions*, now in its second edition, and a contributing author to several other textbooks in the field. Madden is an award-winning instructor in color and image science at Kodak, and has been an adjunct instructor at RIT. He is a contributor to numerous publications, and a frequent lecturer at technical symposia, universities, and industries in the US, Canada, and Europe.*

SC03-S1: Advanced Digital Halftoning

8:00 am – 12:00 pm (4 hours)
Instructor: Jan P. Allebach, Purdue University

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

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

Benefits

This course enables an attendee to:

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

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

Jan P. Allebach is Hewlett-Packard Distinguished Professor of Electrical and Computer Engineering at Purdue University in West Lafayette, Indiana. His work on digital halftoning and image rendering algorithms has been licensed by major ven-

dors in the printing industry and is used in products, some of which have sold 100s of millions of units world-wide. Allebach is a Fellow of the IEEE, IS&T, and SPIE. He has been Distinguished/Visiting Lecturer for the IEEE Signal Processing Society and IS&T, and has received five teaching awards while at Purdue. He received the Bowman Award from IS&T in 1998, and was named 2004 Electronic Imaging Scientist of the Year by IS&T and SPIE. In 2007, he was named Honorary Member of IS&T—the Society's highest honor. In 2008, he received the Purdue College of Engineering Mentoring Excellence Award and the Purdue Sigma Xi Faculty Research Award.

SC04-S1: Introduction to Toner Technology

8:00 am – 12:00 pm (4 hours)
Instructor: George Marshall, Lexmark International, Inc.

This course includes an introduction to electronic printing technologies and defines the place of electrophotography in its various embodiments. One common element— toner—is discussed in terms of architecture, formulation, and implementation in each of these embodiments. Also discussed are various toner design criteria and performance requirements. Analytical and measurement techniques are surveyed including size, shape, charge, and rheological attributes. Recent product introductions and future trends in toner technology are reviewed and presented. A glossary and bibliography for future reference are provided.

Benefits

This course enables an attendee to:

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

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

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

SC05-S1: Fusing Technologies and Toner Materials Relationships

8:00 am – 12:00 pm (4 hours)
Instructors: David Thompson, Xerox Corp., and Dinesh Tyagi, Eastman Kodak Company

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

Benefits

This course enables an attendee to:

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

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

David Thompson is currently the manager of the Print Process Integration and Fusing Systems group within the Xerox Research Center Webster. He joined Xerox in 1981 and has worked in all areas of toner based printing systems. He managed the development of the fusing systems on the 9700, 4850, 4890, 6180, and iGen3 product families. Thompson received an MS in product development from RIT and has degrees in mechanical engineering from the University of Rochester and the University of Cincinnati.

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

SC06-S2: An Introduction to Digital Fabrication: Methods, Materials, and Applications

10:00 am – 12:00 pm (2 hours)

Instructor: James W. Stasiak, Hewlett-Packard Company

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

Benefits

This course enables an attendee to:

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

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

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

SC07-S3: Liquid Toner Printing: Technology and Applications

1:30 – 3:30 pm (2 hours)

Instructor: George Gibson, Xerox Corporation

Liquid toner technologies have long been held as versatile methods for imaging in a variety of applications. Known for high image quality, especially high-quality color, liquid toners are undergoing a renaissance. Applications of current import include not only document printing, but a number of industrial printing, display, and fabrication applications. In spite of these demonstrated strengths, liquid toners are employed in a minority of printing systems today. We explore how the fundamental strengths of these technologies have led to this current state and project where liquid toner will continue to be a vibrant force.

This course covers the variety of liquid toner processes that are and have been used—including the strengths and limitations of each—and the major application areas in which these techniques are employed. The course includes an analysis of improvements of liquid toner systems found in recent technical literature and patents.

Benefits

This course enables an attendee to:

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

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

George A. Gibson is the program manager for New PIJ Platforms in the Xerox Research Center Webster of the Xerox Innovation Group. He has led research, development, and manufacturing organizations involved in non-impact printing for more than 20 years. Originally trained as a chemist, he did his undergraduate and graduate work at Binghamton University. He also holds an MBA from the University of Rochester's Simon Graduate School of Business. Gibson has 52 US patents and has written more than 20 published papers in imaging and colloid science and the management of research and development. He is a frequent lecturer in imaging technology, R&D productivity, portfolio management, and technology valuation. Recent invited lectures include "Good, Fast Cheap in New Product Development: Don't Settle for Just Two," and "Creative Destruction: Portfolio Renewal Rate and Returns Optimization." He is the author of a forthcoming book, Finding the Golden Eggs: an R&D Professional's Guide to Managing New Product Development Through Valuation.

SC08-S3: Standard Workflows in Printing and Proofing

1:30 – 3:30 pm (2 hours)
Instructor: Andreas Kraushaar,
Fogra Graphic Technology Research Association

ISO standards provide international agreed upon aims such as ISO 12647-2 for offset lithography, part 7 of Contract Proofing or part 8 for Validation Prints. This course provides an introduction to the concepts and the interplay of important ISO standards for the graphic arts industry. It also provides an insight into how to create characterization data and how to establish workflows that meet those standards.

Benefits

This course enables an attendee to:

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

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

Andreas Kraushaar is head of the prepress division at Fogra Graphic Technology Research Association in Munich, Germany. He joined Fogra in 2001. Within the prepress department he is responsible for research in the fields of colour management for digital cameras, preflighting production data, and contract color proofing (remote and softproofing). Furthermore he is in charge of several seminars offered by Fogra such as color management or softproofing. He is the convener of working group 3 (process control) within ISO TC 130 (graphic technology) and editor of ISO 12647-2. He received a master degree in media technology from the Technical University Ilmenau, Germany, and is currently a candidate for a doctoral degree from Aachen University.

SC09-S3: Desktop Inkjet Products Performance Study

1:30 – 3:30 pm (2 hours)
Instructor: Rob Beeson,
Hewlett Packard Company

This course examines products from HP, Canon, Epson, Lexmark, Brother, Kodak, and Ricoh. Print head performance parameters and ink/ media interactions are discussed with appropriate reverse engineering data from the HP labs. A few examples of how ink jet compares with competing technologies, such as dye diffusion thermal transfer, laser, and ZINK are discussed. The latest Memjet public information is included.

Benefits

This course enables an attendee to:

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

Intended Audience: for those somewhat familiar with ink jet printing technology who want a better understanding on the differences in 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 Company. He has held several management and engineering positions in thermal ink jet technology since 1985, and is currently the R&D Competitive Intelligence Team Leader. He holds 12 ink jet patents. He has a BS/MS in mechanical engineering from Colorado State University and has worked with several divisions in HP since 1966.

SC10-S3: 3D Ink-Jet Printing

1:30 – 3:30 pm (2 hours)
Instructors: Branka Lozo and Maja Stanic, University of Zagreb

3D printing is a rapid prototyping technique based on standard ink-jet printing process, with basic materials in form of powder and liquid binders, clear and colored. The virtual CAD model is either created in 3D modeling software or is obtained from the 3D scan of an existing real object. The scan can later be modified. The object is being built from consecutive layers of powder, with binder selectively applied by ink-jet printing, in cross-cuts of the 3D model, and solidified. The printed object is usually post-processed by the selected infiltrant. The method is used in various application areas, from native RP, CAD, and concept modeling to architecture, GIS and spatial planning, retail and entertainment, fine arts and preservation of cultural heritage, just to mention some. This overview includes an introduction to the basics of 3D ink-jet printing of both white and colored models, describing all phases in creation of the printed object, with the emphasis on the characterization of materials and prints, specific material effects on the final structure properties, prints mechanical stability, permanence, and color stability. The course also uses the case studies, addressing specific issues of utilization of 3D printing in various areas of application.

Benefits

This course enables an attendee to:

- Understand the basics of 3D ink-jet printing technique: the printing process, phases of creation of the object, basic build materials, and finishing agents.
- Comprehend and evaluate the materials and process preferences effects on the printed objects properties.
- List and compare the different application areas of 3D printing and identify related specific technological issues.
- Recognize the emerging areas of use and future topics of interest for researchers and users of 3D technology.

Intended Audience: technical professionals, scientists, students and other who are interested in introduction to 3D ink-jet printing, basics of process principle and materials, current and emerging applications.

Branka Lozo is an assistant professor in the Department of Materials in printing technology at the Faculty of Graphic Arts, University of Zagreb, Croatia. She received her MSc and PhD (2005) in graphical engineering from the same institution. During her academic and professional career she carried out several study visits to institutions such as Helsinki University of Technology, Finland; PFI, Trondheim, Norway; and CTP, Grenoble, France. In 2006/07 she was a visiting scientist at the University of Ljubljana where she currently teaches a course in graphical engineering. She is a coordinator of national research project in innovative printing materials, partner in a bilateral project in new graphic applications, and has participated in several EU funded projects. Lozo is an author or co-author of a number of peer-reviewed journal and conference papers, many of them published in IS&T journals and conference proceedings in Europe, USA, and China.

Maja Stanić is currently a PhD student studying graphic engineering, at Faculty of Graphic Arts, University of Zagreb. She received a degree in graphic technology from the same university. Her disertation concerns the inner and surface structure properties, colour issues, and permanence of 3D ink-jet prints. Other research interests include novel printing techniques, developments in digital printing, print quality assessment, and image analysis techniques in papermaking and printing technology.

SC11-S3: Electrostatics and Particle Adhesion in Electrophotography

1:30 – 5:30 pm (4 hours)
Instructor: Dan A. Hays, consultant

Electrophotography is widely used in digital copiers and printers to produce high-quality documents for office and production markets. Over the years, continual advances in the technology have enabled high-speed printing and excellent image quality for both mono and

full-color printing. This short course provides a foundation for understanding various electrostatics phenomena that are exploited in the electrophotographic process. The course serves as an introduction to electrostatics topics covered in other related courses on electrophotography.

Benefits

This course enables an attendee to:

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

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

Dan A. Hays is presently a Torrey Pines Research Fellow, having retired from Xerox Corporation in 2006 as a Senior Fellow in the Wilson Center for Research & Technology in Webster, NY. His research and technology contributions in the field of electrophotography have spanned the areas of triboelectricity, charged particle adhesion, and xerographic development systems. He has published 57 scientific papers and holds 73 US patents. Prior to joining Xerox in 1968, he received a BS from Iowa State University and a PhD in physics from Rutgers University.

SC12-S3: Papermaking, Coating Fundamentals, and Media for Digital Printing

1:30 – 5:30 pm (4 hours)
Instructor: Sen Yang, Avon Products

This course includes an introduction to papermaking and coating technologies, and a discussion on media requirements for digital printing with an emphasis on electrophotographic and ink jet printing applications. Paper attributes that are important for color electrophotographic and ink jet printing are discussed. A review of recent developments of ColorLok™ Technology and "better paper for better printing" is included.

Benefits

This course enables an attendee to:

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

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

Sen Yang is currently a senior manager for Product Innovation with Avon Products. He spent 17 years with International Paper, Champion International, and Oce-Arkwright managing digital printing media R&D and new product development projects. He received his PhD in polymer science from Brown University (1990). Yang has led and contributed to a number of new-to-the-industry and commercially successful digital printing media launches for both private label and OEM brands. He has more than 10 patents in the area of coated ink jet, EP papers, and specialty media.

SC13-S4: Image Quality Assessment: Not So SSIMple

3:45 – 5:45 pm (2 hours)
Instructor: Al Bovik, The University of Texas

Being able to assess image quality is important in many ways. For example, image processing algorithms that seek to improve image quality can only be demonstrated to do so if there is a benchmark index of quality to gauge the results. Systems that deliver image media over networks, to displays, and printing devices can maintain better quality of service if there is a method for continuously monitoring the image quality.

The ultimate benchmark, of course, is human subjective opinion of the image quality, but this is costly and impractical to implement in most scenarios. Therefore, algorithms that seek to objectively predict the quality of distorted images in a manner that agrees with subjective opinion are very desirable. Of course, Image Quality Assessment (IQA) algorithms have been around for a long time, most notably the vener-

able Mean-Squared Error (MSE) and Peak Signal-to-Noise-Ratio (PSNR). The problem is that these venerable devices do not correlate well with subjective opinion, as has been demonstrated in large human studies. Indeed, for many years, the problem was thought of as too difficult to solve, perhaps because it required a deeper understanding of visual perception that was available.

More recently, there have been developed a variety of IQA algorithms that do achieve a high correlation with subjective quality. The best known of these is the Structural Similarity index, or SSIM index. The SSIM index is a conceptually and computationally simple algorithm for quality assessment that nevertheless embodies a number of powerful perceptual concepts. It has been deeply analyzed and a number of interesting variants of the SSIM index exist.

This course describes the basic principles of image quality assessment and the philosophy underlying the SSIM index. We talk about such basic principles as perceptual masking, natural scene modelling, and multi-scale analysis. The SSIM index in detail, as well as successful variants, such as Multi-scale SSIM (MS-SSIM) and P-SSIM is addressed. The relationship of SSIM to other IQA algorithms such as the MSE and the Visual Information Fidelity (VIF) index is presented. A description of the available IQA databases and subjective studies that have been conducted is discussed along with a large-scale application of the SSIM index to print quality assessment.

Benefits

This course enables an attendee to:

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

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

Al Bovik is the Curry/Cullen Trust Endowed Chair at The University of Texas at Austin, where he is a professor in the Department of Electrical and Computer Engineering, the Department of Biomedical Engineering, and the Institute for Neuroscience. He is the director of the Laboratory for Image and Video Engineering (LIVE). Bovik has published more than 500 technical articles in the areas of image processing and perception, and holds two US patents. He is also the author of The Handbook of Image and Video Processing, Second Edition *(Elsevier Academic Press, 2005),* Modern Image Quality Assessment *(Morgan & Claypool, 2006),* The Essential Guide to Image Processing, *and* The Essential Guide to Video Processing *(both from Elsevier Academic Press, 2009). Bovik has received a number of major awards from the IEEE Signal Processing Society, including: the Best Paper Award (2010); the Education Award (2008); the Technical Achievement Award (2005); the Distinguished Lecturer Award (2000); and the Meritorious Service Award (1998). He is also a recipient of the Hocott Award for Distinguished Engineering Research from the Cockrell School of Engineering at The University of Texas at Austin (2008), the Distinguished Alumni Award from the University of Illinois at Champaign-Urbana (2008), the IEEE Third Millennium Medal (2000) and several journal paper awards. He is a Fellow of IEEE, OSA, and SPIE.*

SC14-S4: Role of Inkjet in Commercial and Industrial Printing Applications

3:45 – 5:45 pm (2 hours)

Instructor: Ronald Askeland, Hewlett-Packard Company

This short course examines products from HP, Canon, Epson, FujiFilm, Xaar, Kyocera, and Kodak. Inkjet will be compared to electrophotographic, offset, flexo, screen, and rotogravure printing for markets beyond the consumer and office. Thermal, piezo, and continuous inkjet print head performance parameters and ink/media interactions are examined for applications in large format, publishing, direct mail, photographic and package printing. Future trends in commercial/ industrial printing are discussed.

Benefits

This short course enables an attendee to:

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

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

Ronald Askeland is a system architect in the Printing Technology Platforms division of Hewlett-Packard Company. He has 25 years of experience in thermal inkjet technology and has been awarded over 50 US patents on inkjet inks and printing systems. Askeland received his PhD in analytical chemistry from Colorado State University and has worked for Hewlett-Packard in San Diego, CA since 1984.

SC15-S4: An Introduction to Photo-Voltaic Systems and Manufacturing Technologies

3:45 – 5:45 pm (2 hours)
Instructor: Robert Detig, Electrox Corporation

The course begins with an introduction to solar energy technology; including solar thermal (sunlight to produce heat), photo-voltaics (solar energy to produce electric energy) and mixed systems (a combination of the two). Fundamental energy concepts, such as Carnot efficiency of heat engines are discussed and the state of the art in existing electrical power generation, with a focus on efficiency of power delivered to the home as a fraction of the heat taken from the thermal source is reviewed.

The fundamental physics of photo voltaic cells—band gap energies and their relation to absorption spectra, energy diagrams and advanced concepts such as tandem cells are introduced and different types of photo voltaic systems; some of which are mature technologies and others just starting commercial introduction, are reviewed including polycrystalline cast silicon panels or ribbon; thin film silicon system; thin film amorphous and polycrystalline silicon; other thin film inorganic technologies; Cadmium Telluride; CIGS (or CIS); organic/ hybrid technologies; futuristic technologies (including multiple exciton PV systems, intermediate band gap semiconducting materials, and nano-architecture systems); dye-sensitized solar cells (DSSC); organic solar cells; and hybrid organic/inorganic cells.

A review of some future needs to reduce manufacturing costs that will enable greater penetration of solar PV into the energy space is included.

Benefits

This short course enables the attendee to:

- Attendees will gain an understanding of the current manufacturing technologies used in the industry.
- Understand chamber type processes, sputtering, CVD, PE-CVD.
- Learn about slot-die coating, for organics, hybrids, and DSSC.
- Understand screen printing of silver inks for current collectors and other surfaces.
- Learn about inkjet systems for broad area layers and interconnects.
- Become familiar with solution deposition processes.
- Investigate other graphic arts processes: Flexo, gravure, etc.
- Appreciate toner printing opportunities, thin or thick layers of nano-materials and fibers.
- Discover the areas where costs reduction will bring significant impact to the industry.

Intended Audience: any scientist or engineer interested in solar energy and PV technology. More keenly interested people would include scientists and engineers working with inkjet printing systems, traditional graphic arts systems, in the screen, flexo, and gravure segments of the industry, electro-graphics engineers/scientists, toner and ink chemists, and coating technologists.

Robert H. Detig founded the Electrox Corporation in 1992 to apply electrographic imaging technology as a manufacturing tool for various industries. He holds some of the fundamental patents on the photo-polymer electrostatic printing plate and functional liquid toners, a concept which he pioneered as a tool for manufacturing inexpensive electronic products. This is now called the field of "plastic electronics." He has worked in the field of electro-graphics since the mid 1960s when he joined Xerox Corporation. Later assignments include Olivetti, Litton Honeywell, and Olin-Hunt Chemicals Inc. In the 1970s thru mid-1980s, Detig worked in the field of ultrasonic imaging of humans organs, mostly the human heart. He has approximately 20 patents. Detig was awarded a BS and PhD in electrical engineering by Carnegie-Mellon University, where he taught briefly after serving in the US Army Signal Corp.

Monday, September 20, 2010

SC16-M2: Fabrication Materials and Processes of Inkjet Printheads

10:30 am – 12:30 pm (2 hours)
Instructor: Hue Le, Picojet, Inc.

In recent years, enormous progress has been made in the design, fabrication, and commercialization of ink jet printing systems. This course describes the materials and processes that have been used to produce various ink jet printheads, which are the core component of the printing systems. Methods of forming ink jet nozzle, anti-wetting coated nozzle surface, ink channel and chamber, and various bonding methods are then reviewed. Materials of thin

film resistor (for thermal ink jet) and piezoelectric ceramic (for piezoelectric ink jet) are also discussed. The course concludes with a review of the current status of MEMS technology in the ink jet printheads from various manufacturers.

Benefits

This course enables an attendee 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: scientists, engineers, product managers, and others 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, Oregon), which designs and fabricates fluid jetting devices for industrial printing applications. He has more than 29 years of experience in developing and commercializing ink jet printing systems. Le holds 20 US patents in the field of ink jet printing technology. Prior to forming PicoJet, Inc. in 1997, Le held the position of director of technology development for Tektronix, Inc.'s Printing and Imaging Division. He received his BS in chemistry from the University of Iowa (1979) and MS in chemistry from New Mexico State University (1981).

SC17-M2: Improving Your New Product Success Rate

10:30 am – 12:30 pm (2 hours)
Instructor: George Gibson, Xerox Corporation

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

Whether you are in a large or small company, the question of which products or services to develop and bring to market is critical to success. This course explores what is known about the causals for this dismal track record and suggests a path that can lead to improved results. The course includes techniques, procedures, and guidelines that allow one to select the new offerings for development that are most likely to be successful, as well as offers techniques for ensuring that new products or services under development stay on track. We discuss the application of these fundamental principles with reference to some of the successful and lackluster product introductions that we have seen this year. Each participant will receive a copy of Gibson's forthcoming book *Finding the Golden Eggs: An R&D Professional's Guide to Valuation.*

Benefits

This course enables an attendee to:

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

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

See bio under SC07-S3

SC18-M3: Industrial Inkjet Technology for Printing and Fabrication

1:30 – 5:30 pm (4 hours)
Instructor: Alan Hodgson,
3M Security Printing & Systems Limited

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

considers the commercial and technical drivers and their contribution to the future direction of application development. It compares and contrasts the developments in printing and fabrication areas but shows the interdependence between them.

Benefits

This course enables an attendee to:

- List and explain the commercial and technical drivers for industrial inkjet in both Printing and Digital Fabrication application areas.
- Gain awareness of how printers, heads, fluids and substrates interact to make an inkjet printing system.
- Gain an overview of current and future applications of industrial inkjet technology.
- Summarise the technology of inkjet printing and how this can be leveraged to best effect in the future.
- Be aware how new technology is affecting both fabrication and "traditional" printing applications.
- Identify the shows and conferences to attend to gain further awareness.

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

Alan Hodgson has 28 years experience in printed hard copy and a background in radio frequency electronics and image science. With a combined marketing and technical background he can give technical issues a commercial perspective. Hodgson previously managed R&D and Technical Services groups active in industrial inkjet application development. For four years he worked on inkjet consultancy projects in both traditional printing and fabrication applications. In November 2008 he joined the Technology & Innovations group of 3M Security Printing & Systems Limited and continues to be a regular conference speaker and tutor. He has a BSc in colorant chemistry and a PhD in instrumentation, both from the Department of Chemistry at the University of Manchester. He is a Fellow of the Royal Photographic Society as an Accredited Senior Imaging Scientist. In addition to IS&T, Hodgson is active in the Royal Photographic Society and Institute of Physics as a speaker and session chair. He is currently IS&T Conference VP.

SC19-M3: Electrostatic Toner Transfer

1:30 – 5:30 pm (4 hours)
Instructor: Mark Zaretsky, Eastman Kodak Company

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

Benefits

This course enables an attendee to:

- Understand basic electrostatic concepts related to transfer.

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

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

Mark C. Zaretsky, senior electrophotographic engineer at Eastman Kodak Company, received his BS (1980), MS (1982), and PhD (1988) in electrical engineering from MIT. He has worked in the area of electrostatic technology at Kodak since 1982. At present his work focuses on electrophotography, including toner transfer and corona charger technology. He also has considerable experience in the design and manufacture of photographic and non-photographic products from an electrostatic perspective, involving material composition, coating and conveyance technology, and customer usage. He holds 20 US patents and has authored 10 peer-reviewed papers. He received the IS&T Charles Ives Award in 1995 as a co-author. He has been the newsletter editor for the Electrostatics Society of America since 2003.

SC20-M3: Charging Systems and Dependent Processes in Electrophotography

1:30 – 5:30 pm (4 hours)
Instructor: Kenneth Pietrowski, Xerox Corporation

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 in the xerographic process. The system type, functional requirements, and operational modes can be quite different in delivering performance for each process step. This course addresses the applied principles of operation necessary to meet the process requirements including the associated critical parameters. Devices employed since the invention of xerography are reviewed and include biased charging and transfer rolls as well as interesting novel charging system concepts that have yet to be implemented in products. The application dependent requirements and supporting analysis in the form of examples will be discussed with a stronger focus on photoreceptor charging and the practical aspects of dealing with toner transfer challenges.

Benefits

This course enables an attendee 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 used in various electrophotographic process steps.
- Relate current-voltage behavior to equivalent electrical circuits.
- Define the critical parameters and failure modes governing performance in black and white and color xerographic engines.
- 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.
- Understand the issues and compensation measures employed in the toner transfer process that are dependent on toner characteristics, and transfer media electrical and dimensional properties.

Intended Audience: scientists and engineers involved in the development of electrophotographic marking subsystems and systems employing corona devices and their variants. The attendee should have a basic understanding of electrophotographic processes used in xerography.

Kenneth Pietrowski was a principal technology manager/specialist in the Wilson Center for Research and Technology at Xerox Corp. He joined Xerox in 1963 and worked in both R&D and product engineering environments addressing electro-optic image devices, thin film technology, and xerographic processes. He spent much of his last 29 years as a principal contributor in the development of charging and toner transfer systems appearing in many of today's xerographic marking engines. Pietrowski holds several patents in these disciplines. Before retiring in 2006, he managed a team of technologists and engineers focused on processes for future xerographic products and became a certified Green Belt in Design for Lean Six Sigma (DFLSS) practices. He was a member of IS&T, past member of the NIP Technical Council, and served as a session and publications chair at prior NIP conferences. Short courses on this topic and electrophotography were also presented at previous NIPs. He received a BS in electrical engineering from RIT.

Tuesday, September 21, 2010

SC21-T3: Digital Biofabrication

1:30 – 5:30 pm (4 hours)
Instructor: Thomas Boland, University of Texas El Paso

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

Benefits

This course enables an attendee to:

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

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

Thomas Boland is an associate professor in the Department of Bioengineering at Clemson University. He received his BS in chemical engineering from the Ecole Nationale Supérieure d'Ingénieurs de Genie Chimique in Toulouse (1990), and his PhD in chemical engineering from the University of Washington (1995). Following his PhD, Boland was a Postdoctoral Fellow at Pennsylvania State University and then at the Naval Research Laboratory. In 1999, he joined Clemson University as assistant professor, where he received tenure in 2005. Boland is an adjunct associate professor at the Medical University of South Carolina's College of Graduate Studies and is the director of a NSF/NIH-funded Bioengineering and Bioinformatics Summer Institute. His research interests are applying engineering principles to automate, predict, and build three-dimensional structures that show biological function. He is the author of more than 45 publications; a member of AVS, MRS, IS&T, and the Tissue Engineering and Regenerative Medicine International Society.

SC22-T3: Organic Photoreceptors in Electrophotography

1:30 – 5:30 pm (4 hours)
Instructor: David Weiss, University of Rochester

Organic photoreceptors are at the heart of today's electrophotographic printers and this technology is also the foundation upon which the current research and development of organic electronic devices (light emitting diodes, photovoltaic solar cells, and field-effect transistors) is based. What are organic photoreceptors, what is their development history, what are they made of and how are they made, how do they work in electrophotographic printers, how are they studied and characterized, how long do they last and what are their failure modes, how has this technology been adapted for other organic electronic devices? All these questions and more will be answered in this short course. The course provides the attendee with a comprehensive understanding of organic photoreceptors in this important technology. Topics include the history of OPC development and the electrophotographic process, OPC functions in copying and digital printing, device architecture and materials, characterization and testing, chemistry and physics, manufacturing, failure modes, current trends and outlook.

Benefits

This course will enable the attendee to:

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

Intended Audience: those interested in understanding the essential role of organic photoreceptors in modern digital electrophotographic printers will benefit from this course. It is

continued on page 18

NIP26/Digital Fabrication 2010 Week A

8 9 10 11 12 1

SUN

SC01-S1 / SC02-S1 / SC03-S1 / SC04-S1 / SC05-S1

SC06-S2

MONDAY

PLENARY

Kodak's Stream Inkjet Technology and the Future of Digital Printing,

James M. Chwalek, Eastman Kodak Co.

SC16-M2 /SC17-M2

ADV. & NOVEL IMAG. SYS.

INK JET PI

TONER-BASED PRINTING: MATERIA

DESIGN FOR ENVIRONMENTAL SUST

PROCESS MATERIALS AND SUBSTRATES

PRINT GALLERY OPENS AT COFFEE BRE

TUESDAY

PLENARY

Printing Application for Large Area Electronics,

Seong Jin Kim, Samsung Electromechanics

INKJET PRINTIN

TONER-BASED PRINTING: F

PRINT AND IMAGE QUAL

DIGITAL FABRIC

EXHIBIT OPEN

WEDNESDAY

PLENARY

Appearance Analysis Research of Archives Texture of Inkjet Printing,

Kohei Iwamoto, Seiko Epson Corp.

HIGH SPEED INK JET CON'T.

IMAGE PERMANENCE

FUSING, CURING, AND DRYING

2- AND 3-D FUNCTIONAL PRINTING

EXHIBIT OPEN

THURS.

AUTHEN. AND FORENSICS

SEC. & FORENSIC PRINTING

PRINT. SYS. ENGIN./OPTIMIZ.

DIGI. PACK.

TEXTILE AND FABRIC PRINTING

PRINTED ELECTRONICS: DEVICES

SPECIAL

Interactive P

and L

LE

NIP Track 1

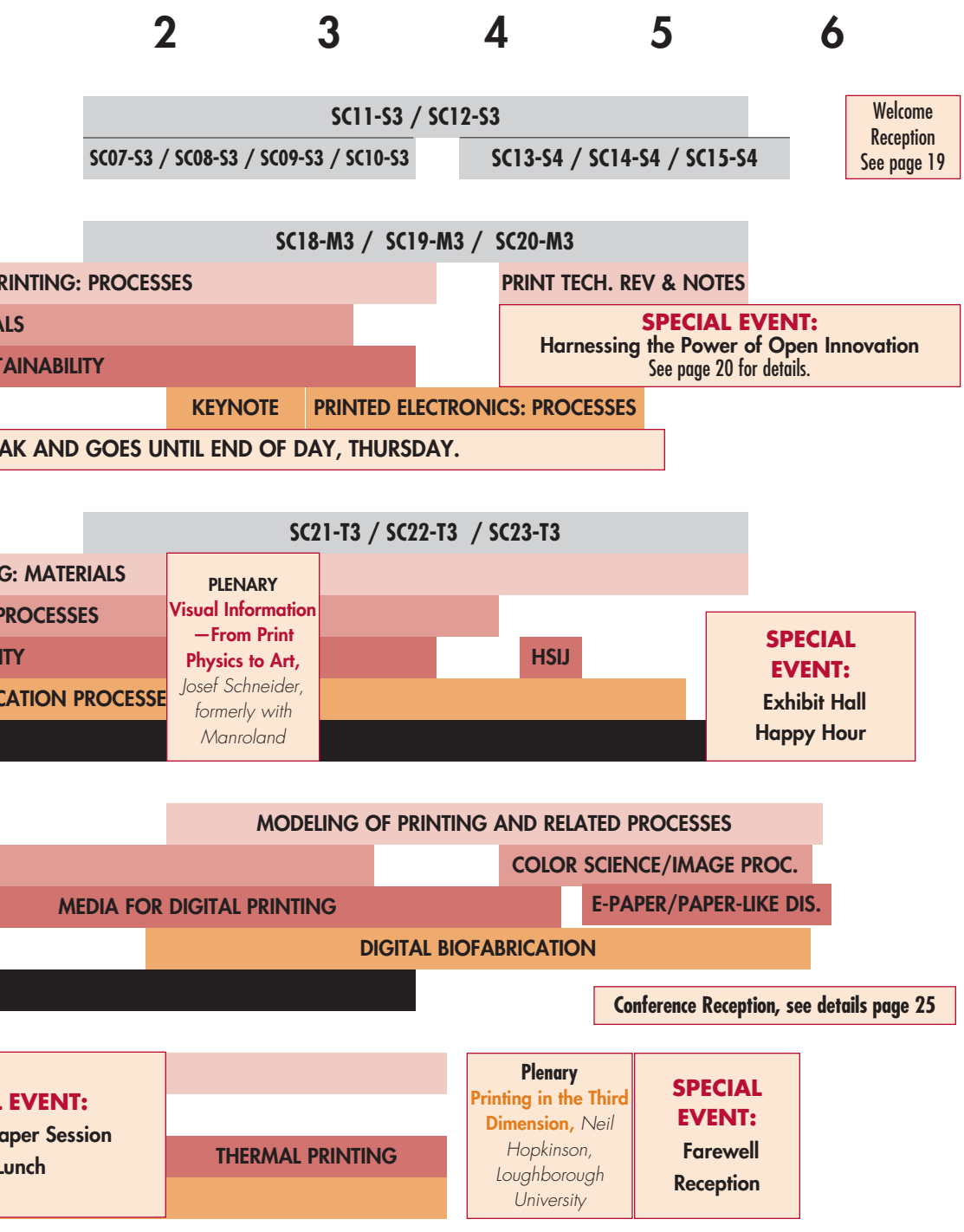
NIP Track 2

NIP Track 3

Digital Fabricaton

Please note: Lunch and coffee breaks that occur in the middle of sessions are not

t-a-Glance



GEND

Special Joint Events

Exhibit

Short Course

t shown. Schedule is subject to change.

anticipated that attendees will have a variety of backgrounds and experience: students, managers, sales and marketing personnel, technicians, engineers, and scientists. A general background in chemistry, physics, and the electrophotographic process will be helpful but not essential.

David S. Weiss is a senior scientist in the Department of Chemical Engineering at the University of Rochester and an independent consultant on organic photoreceptors and organic electronic materials and devices. He received his PhD in chemistry from Columbia University (1969) and in 2009 retired from the Eastman Kodak Company as a Scientist Fellow. His research has focused on electrophotographic technologies with emphasis on organic photoreceptors and other organic-based devices. He is an inventor on 19 US patents and is an author on more than 98 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 was an associate editor of the* Journal of Imaging Science and Technology *from 1988-2008 and has served as General Chair of NIP17 and in many other NIP committee assignments. He is the Sponsorship Chair of NIP26/DF2010. In 1999 he received the Chester F. Carlson Award, in 2004 he was named an IS&T Senior Member, and in 2008 he was awarded IS&T Fellowship. Weiss was elected to the IS&T Board as a vice-president (2006) and treasurer (2008 and 2010).*

SC23-T3 Light-Paper Interaction in Print Color Reproduction: Model and Experiment

Tuesday 1:30 – 5:30 pm (4 hours)
Instructor: Li Yang, Innventia

The course gives an overview of research on light-paper interaction in print color reproduction. It begins with fundamentals on light absorption, scattering, and fluorescence and follows with the state of art status of research activities. Physical descriptions (modeling) and experimental measurements of optical dot gain, physical dot gain, and fluorescence are discussed in detail. A newly developed model: the revised Kubelka-Munk theory, describing light propagation in turbid media, is also discussed. The course covers the most recent developments since it was last time given at NIP22 in 2006.

Benefits

This course will enable the attendee to:

- Gain an overview of research on light-paper interaction: absorption, scattering, surface reflection, and fluorescence.
- Learn about physical models dealing with physical- and optical-dot-gain, surface reflection, and fluorescence.
- Get an insight into the fundamentals of the physical models and experimental methods.
- Understand the background (physical considerations and assumptions) of the original (K-M) theory.
- Appreciate how the theoretical models are applied to determine the optical properties of materials.
- To predict the optical presentation of an optical system.

Intended Audience: Engineers and scientists who work in the areas concerning print color reproduction, the optical properties or color of materials and composites will benefit from this class.

Li Yang is a senior project manager of research at Innventia, (the Institute of Forestry Technology), formerly known as STFI-Packforsk. Formerly, he was a project manager at Holmen Paper Development Center and an associate professor, Department of Graphic Technology, at Karlstad University, Sweden. His research activities cover broad research areas, such as paper optics, prepress, ink-paper interaction, and light-paper interaction. He is the initiator and the main contributor to the work on revising the Kubelka-Munk theory. He has more than 40 journal publications and many conference reports.

Technical and Social Program

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

SPECIAL EVENT

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

NIP/DF Welcome Reception
Sunday, September 19th
6:00 – 7:30 pm

Monday September 20, 2010

ALL TRACKS
WELCOMING REMARKS AND PLENARY SESSION

8:30 – 9:30 AM

Kodak's Stream Inkjet Technology and the Future of Digital Printing, *James M. Chwalek, Eastman Kodak Co. (USA)*

NIP TRACK 1
ADVANCED AND NOVEL IMAGING SYSTEMS

Session Chairs: Ashish Pattekar, PARC (Palo Alto Research Center); Detlef Schulze-Hagenest, Kodak Graphic Communications GmbH; and Yasushi Hoshino, Nippon Institute of Technology

9:40 – 11:00 AM

News Applications for Laser Femtosecond (Focal), *Benjamin Dusser[1,2], Eric Audouard[2], Sebastien Landon[2], and Adrien Floch[1]; [1]ATT and [2]Laboratoire Hubert Curien (France)*

Pulse Control Characteristics of Jumping Conductive Toner by a Pair of Aperture Electrode (Interactive), *Kai Li and Yasushi Hoshino, Nippon Institute of Technology (Japan)*

A New Plate Making Technology (Interactive), *Haihua Zhou and Yanlin Song, Chinese Academy of Sciences (China)*

Color Reading of Nanostructured Steel Samples Marked by Ultrashort Laser Pulses with a Flatbed Scanner, *Benjamin Dusser[1,2], Zbigniew Sagan[2], Hervé Soder[3], Nicolas Faure[1], Jean Philippe Colombier[1], Michel Jourlin[1], and Eric Audouard[1]; [1]Université de Saint-Etienne, [2]ATT (Advanced Track & Trace), and [3]Impulsion, Pôle Optique Vision (France)*

Paper Re-Use: Toner-Print Removal by Laser Ablation, *David R. Leal-Ayala and Julian Allwood, University of Cambridge (UK)*

INK JET PRINTING: PROCESSES

Session Chairs: Kathleen Vaeth, Eastman Kodak Co.; Ramon Borrell, Xaar plc; and Mineo Kaneko, Canon Inc.

11:30 AM – 3:40 PM

Effects of Fluid Viscosity on DoD Inkjet Break-Off (Focal), *Stephen D. Hoath, Graham D. Martin, and Ian M. Hutchings, University of Cambridge (UK)*

Experimental Analysis of Defects on Drop on Demand Nozzles, *J.R. Castrejón-Pita, G.D. Martin, and I.M. Hutchings, University of Cambridge (UK)*

In-Situ Measurement of Instantaneous Jetting Speed Curve, *Kye-Si Kwon, Soonchunhyang University (South Korea)*

Continuous Ink-Jet Diameters and the Velocity Profile Across the Nozzle Exit (Focal), *Stephen D. Hoath[1], Lisong Yang[2], Neil F. Morrison[3], Wen-Kai Hsaio[1], Jose R. Castrejon-Pita[1], Daniel M. Colgate[1], Ian M. Hutchings[1]; [1]University of Cambridge, [2]University of Durham, and [3]University of Leeds (UK)*

The Path from Drop Formation to the Final Print, *Xi Wang and William Letendre, FUJIFILM Dimatix, Inc. (USA)*

Tonejet: A Multitude of Digital Printing Solutions, *Daniel Mace, Tonejet Ltd. (UK)*

Matching PIJ Inkjet Print Head Performance Characteristics with Industrial Application Requirements, *Vincent Cahill and Patrice Giraud, VCE Solutions (USA)*

PRINTING TECHNOLOGIES: TECHNICAL REVIEWS AND NOTES

Session Chairs: Eric Stelter, Eastman Kodak Co.; Justin Picard, Advanced Track and Trace; and Hiroyuki Kawamoto, Waseda University

4:00 – 5:30 PM

Toner Based Digital Presses at IPEX (Focal), *Detlef Schulze-Hagenest, Kodak Graphic Communications GmbH (Germany)*

Future Color Technologies for Digital Commercial and Industrial Print (Focal), *Gary Dispoto, Hewlett-Packard Co. (USA)*

Ink Jet Technology in Textile Finishing (Focal), *Kasper J. Nossent and Gerrit Koele, TenCate (the Netherlands)*

NIP TRACK 2
TONER-BASED PRINTING: MATERIALS

Session Chairs: Dinesh Tyagi, Eastman Kodak Co.; Christoph Batz-Sohn, Evonik Degussa GmbH; and Yoshihiro Hattori, Konica Minolta Business Technologies, Inc.
9:40 AM – 3:10 PM

Crystalline Polyester for Low Energy Fusing with High Charging Ability, *Takeshi Ashizawa, Akihiro Eida, Youko Hanada, and Jun Shimizu, Kao Corp. (Japan)*

Development of High Abrasion Resistance OPC Utilizing Cross-Linked Over-Coat Layer, *Yoshiaki Kawasaki, Ryohichi Kitajima, Tetsuro Suzuki, and Kazukiyo Naga, Ricoh Co., Ltd. (Japan)*

Hole and Electron Transport in a Triphenylamine Based Compound, *Richard A. Klenkler, Xerox Research Centre of Canada (Canada)*

Modified Pigments for Chemically Prepared Toner (CPT), *Joseph B. Carroll, Curtis Luke, Danny Pierre, Casey Whicher, and Scott Sawrey, Cabot Corp. (USA)*

Comparison of Fumed and Colloidal Silica Based External Additives for Toner (Focal), *Angelos Kyrlidis, Dmitry Fomitchev, Alyson Christopher, and Holly White, Cabot Corp. (USA)*

SPECIAL EVENT

Harnessing the Power of Open Innovation:
Panel Discussion and "Speed Dating" Event

Monday, September 20th
4:00–5:30 PM (panel) / 7:00–9:00 PM ("speed dating")

Open Innovation (OI) is one of the most powerful techniques available for companies to use today to extend their capability. Examples across many companies—indeed across many industries—have shown its power, but how do you get started? How do you recognize a project that's likely to succeed? Just as importantly, how do you recognize a failure before it starts? This event is designed to help you answer these vital questions and then put theory into practice.

The event is comprised of two parts, a panel discussion about using OI and an interactive session where participants can learn about the capabilities of others.

The session starts with an afternoon panel discussion among a distinguished group of industry executives with real experience working in an open innovation context. Each will make a brief presentation then answer questions from the moderator and audience. The goal of this session is to increase your knowledge of how OI works, what types of relationships generate greater chances of success, and pitfalls to avoid.

After a break for dinner on your own, participants will reconvene for a "speed dating" event designed to allow you to network with the greatest number of other participants in a meaningful way. The mechanics of "speed dating" are simple. Participants are divided into two groups. The members of Group A each sit at a table. The members of Group B sit at one of the tables facing the Group A member for a prescribed amount of time, typically 10 minutes. At the end of 10 minutes, a bell rings and each Group B member moves one seat over to the next table. In 100 minutes, you get to have 10 non-confidential discussions where you can explore the potential for some mutual interest. If areas of possible collaboration surface, participants can follow up with one another in a more confidential manner.

Those wishing to participate in the event need to indicate their interest on the conference registration form. Shortly before the conference, you will be asked to fill out a more in-depth form about your interest in attending so that we may divide participants into mutually beneficial groupings.

Moderator: George Gibson, Xerox Corporation

Confirmed Panelists:
Ramon Borrell, director R&D, Xaar, plc
Paul France, director of open innovation, MeadWestvaco
Jack Gormley, manager, Business Development, Performance Pigments Division, Sun Chemical Corp.

Preparation of Colored Core-Shell Particles by Coacervation Process in Organic Solvent, *Takashi Iimura and Osami Abe, Ibaraki University; Atsushi Suka and Toshihiko Oguchi, Morimura Chemicals Ltd. (Japan)*

Study on the Physical Properties of the Branched Binder Resins, Using Aromatic and Alkyl Type Branching Agents (Interactive), *Ui Gab Joung, Hyung Jin Roh, Yun Ju Chang, Sung Hwan Cho, and Doe Kim, Samyang Corp. (South Korea)*

The Influence of the Toner Reverse-Charge Element in the Mono-Component Development System (Interactive), *Wei-Ting Chen and Jian-sheng Huang, Trend Tone Imaging, Inc. (Taiwan)*

Eco-Friendly Prepared Chemical Toner with Mixed Polyester Resin (Focal), *Eui-Hyun Ryu, Dong Won Kim, Il-Hyuk Kim, Sung Yul Kim, and Kyung-Yol Yon, Samsung Fine Chemicals, Co. Ltd. (South Korea)*

Polyester-Based Chemical Toner with Low Level of Total Volatile Organic Compounds, *Bo Young Kim, Dong Won Kim, Sung Yul Kim, Jun Hee Lee, and Kyung-Yol Yon, Samsung Fine Chemicals Co., Ltd. (South Korea)*

Toner Charge Control by the Externally Additive CCA Particles, *Koichi Tsunemi, Atsushi Suka, Takashi Iimura, and Toshihiko Oguchi, Morimura Chemicals Ltd. (Japan)*

NIP TRACK 3
DESIGN FOR ENVIRONMENTAL SUSTAINABILITY

Session Chairs: Marcos Esterman, Rochester Institute of Technology; Axel Fischer, INGEDE; and Yusuke Takeda, Ricoh Co., Ltd.
9:40 AM – 3:30 PM

The Gap Between Environmental Considerations and Durability of Nonimpact Printer Products on Different Substrates, *Werner Sobotka, VFG- GLV (Austria)*

Pilot Scale Recycling of HP-Indigo Printed Media and Mixed Office Waste, *Hou T. Ng, Manoj Bhattacharyya, Laurie Mittelstadt, and Eric G. Hanson, Hewlett-Packard Co. (USA)*

Evaluating Environmental Sustainability of Digital Printing (Focal), *Merja Kariniemi, Minna Nors, Tiina Pajula, Hanna Pihkola, and Marjukka Kujanpää, VTT Technical Research Centre of Finland (Finland)*

Environmental Life Cycle Assessment of Commercial Analog and Digital Printing (Focal), *Tim Strecker, Hewlett-Packard Co. (USA) and Pascal Lesage, Research Centre for the Life Cycle of Products, Processes and Services (Canada)*

A Green Scorecard for Printer Equipment, *Fritz Ebner, Shu Chang, and John Knapp, Xerox Corp. (USA)*

Developing a Tool for Routine Carbon Footprint Assessment of Printing Systems, *Jason Ord, Scott Canonico, and Timothy Strecker, Hewlett-Packard Co. (USA)*

Attempts to Improve the Deinkability of Ink Jet Inks (Focal), *Hiromichi Takahashi, Nobushige Tanaka, and Masafumi Ueda, Kao Corp. (Japan)*

Advances in Deinking and Deinkability of Inkjet Inks, *Axel Fischer, INGEDE (Germany)*

Effect of Surfactant Chemistry on Deinkability, *Manoj K. Bhattacharyya, Hou T. Ng, Laurie Mittelstadt, and Eric G. Hanson, Hewlett-Packard Co. (USA)*

High Quality Deinked Pulps via Alkaline-Based HPMA Deinking Chemistry, *Laurie S. Mittelstadt, Hou T. Ng, Manoj Bhattacharyya, and Eric G. Hanson, Hewlett-Packard Co. (USA)*

Interpreting the Schedule

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

Plenary: 50 minutes
Focal: 30 minutes
Oral: 20 minutes
Interactive (preview): 5 minutes

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

NIP Session/Focus

Digital Fabrication Session/Focus

SHOW US YOUR PRINTS! PARTICIPATE IN THE PRINT SAMPLE GALLERY

The Gallery will available for viewing Monday morning until Thursday afternoon.

Interested?
To contact a Print Gallery Chair
fill out the appropriate line on the registration form or e-mail
nip26–df2010@imaging.org

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

DIGITAL FABRICATION

PROCESS MATERIALS AND SUBSTRATES

Session Chairs: Greg Herman, Oregon State University; Patrick Smith, University of Sheffield; and Masaaki Oda, ULVAC, Inc.

10:00 AM – 12:25 PM

Inkjet Printing of Functional Ionogels for Flexible and Transparent Conductive Electrode Materials, *Jolke Perelaer, Joseph T. Delaney, Albert R. Liberski, and Ulrich S. Schubert, Friedrich-Schiller-Universität Jena (Germany)*

Direct Print of Metal Nanoparticle Inks for Si Solar, *James P. Novak, Yunjun Li, Jennifer Li, and Valerie Ginsberg, Applied Nanotech, Inc. (USA)*

Preparation of Silver Nanoparticles for Electro-Conductive Inkjet Inks, *Jun Natsuki and Takao Abe, Shinshu University (Japan)*

Printing Nanoparticle Copper Ink to Form Functional Electronic Devices (Focal), *Peter B. Laxton, Applied Nanotech, Inc. (USA)*

Mark-less Patterning Technology for the Printed Electronics Market, *P. Blom, A. Stevens, Avan Schijndel, and T. Huiskamp, Innophysics BV (the Netherlands)*

Study on the Materials of High Contrast Ratio Color Filter for Ink Jet Process (Interactive), *Jung-Yul Lee, Ji-Hye Kim, Bu-Geun Ryu, Sung-Chul Park, and Doe Kim, Samyang Corp. (South Korea)*

DF KEYNOTE TALK

Session Chair: Reinhard Baumann, Fraunhofer Einrichtung for Electronic Nano Systems ENAS

2:00 – 3:00 PM

Printed Electronics: The Next High Growth Market for the Printing Industry, *Andrew W. Hannah, Plextronics (USA)*

PRINTED ELECTRONICS: PROCESSES

Session Chairs: James Stasiak, Hewlett-Packard Co.; Jolke Perelaer, Friedrich-Schiller-Universität Jena; and Kye-Si Kwon, Soonchunhyang University

2:50 – 4:50 PM

Laser Scribing of ITO and Organic Solar Cells, *Jens Hänel, M. Clair, and C. Scholz, 3D-Micromac AG (Germany)*

Laser Printing of Conductive Silver Lines, *Dustin Büttner[1], Beat Zobrist[2], Andreas Schönberger[2], Dieter Jung[2], and Klaus Krüger[1]; [1]Helmut Schmidt University and [2]CTG-PrintTEC GmbH (Germany)*

Self-Patterned Metal Electrodes by the Fusion Control of Silver Nanoclusters for Inkjet Printing Process (Focal), *Dong-Youn Shin, Korea Institute of Machinery and Materials (South Korea)*

Inkjet Printing and Argon Plasma Sintering of an Electrode Pattern on Polymer Substrates Using Silver Nanoparticle Ink, *Oliver Pabst[1,2], Jolke Perelaer[1], Erik Beckert[2], Ramona Eberhardt[2], Andreas Tünnermann[1,2], and Ulrich S. Schubert[1]; [1]Friedrich-Schiller-Universität Jena and [2]Fraunhofer Institute for Applied Optics and Precision Engineering (Germany)*

Tuesday September 21, 2010

ALL TRACKS

PLENARY TALKS

8:30 – 9:30 AM

Printing Application for Large Area Electronics, *Seong Jin Kim, Samsung Electromechanics (South Korea)*

2:00 – 3:00 PM

Visual Information—From Print Physics to Art, *Josef Schneider, formerly with Manroland (Germany)*

NIP TRACK 1

INKJET PRINTING: MATERIALS

Session Chairs: Jim Mrvos, Lexmark International, Inc.; Rita Hofmann, ILFORD Imaging Switzerland GmbH; and Hiroyuki Onishi, Seiko Epson Corp.

9:40 AM – 5:30 PM

Pigment Yellow 1—A Viable Inkjet Alternative to Pigment Yellow 74, *Alexander Shakhnovich, Cabot Corp. (USA)*

X-ray Photoelectron Spectroscopy of Carbon in Commercial Copper Phthalocyanine Pigments, *K. Nauka and Hou T. Ng, Hewlett-Packard Co. (USA)*

Azo or Hydrazone Structure in Azo Pigments, *Yuya Kamei, Hiroki Shibata, and Jin Mizuguchi, Yokohama National University (Japan)*

Four Crystal-Structures Derived from a Yellow Pyrazolyl Azo Pigment, *Jin Mizuguchi and Hiroki Shibata, Yokohama National University (Japan)*

Directional Self-Cleaning Surface Design for Ink Jetting Devices (Focal), *Hong Zhao and Kock-Yee Law, Xerox Corp. (USA)*

Development of Ultra Clean Permanent Photoresists for MEMs Device Applications, *George J. Cernigliaro[1], Melanie A. Mathis[2], Timothy Adams[1], and Kevin McNair[2]; [1]MicroChem Corp. and [2]Lexmark International, Inc. (USA)*

Improving the Performance Properties of Aqueous Based Inkjet Inks, *Deverakonda Sarma, Ian Maxwell, and Andrew Grantham, Lubrizol Advanced Materials Inc. (USA)*

The Formulation of Thermoforming UV Inkjet Inks (Focal), *Steve Hall, SunChemical Ltd. (UK)*

Characterization of Yellow Pyrazolyl Azo Pigments with or without Na Integrated as the Central Metal (Interactive), *Hiroki Shibata and Jin Mizuguchi, Yokohama National University (Japan)*

TUESDAY AFTERNOON

Please note that Tuesday afternoon begins with a plenary for all tracks at 2:00 pm.

Preparation of Nanoscale Waterborne Disperse Dye Dispersion by Phase Separation Technique for Inkjet Printing Ink (Interactive), *Shaohai Fu, Lei Ding, Anli Tian, Xia Zhang, and Chaoxia Wang, Jiangnan University (China)*

Improved Dispersibility of Surface Oxidized Carbon Black Pigments for Inkjet Inks (Focal), *Gerd Tauber, Christoph Batz-Sohn, and Klaus Bergemann, Evonik Degussa GmbH (Germany)*

Ink-Jet Printing for Ceramic Functional Coating, *Marta Vilardell, Susagna Ricart, and Xavier Granados, Institut de Ciència de Materials de Barcelona (Spain)*

Sensients S.M.A.R.T. 4000 Technology for Self-Dispersed, Polymer-Attached Nano Particle Dispersions for Inkjet Inks, *Mihaela Madaras and P. K. Sujeeth, Sensient Technical Colors (USA)*

Preparation and Properties of Encapsulated Phthalocyanine for Inkjet Printing Inks (Interactive), *Shaohai Fu and Mingjun Zhang, Jiangnan University (China)*

High Light Fastness Disazo Dyes for Inkjet Printing (Interactive), *Hsiao-San Chen and Jen-Fan Lin, Everlight Chemical Industrial Corp. (Taiwan)*

NIP TRACK 2
TONER-BASED PRINTING: PROCESSES

Session Chairs: Chui-Heng Liu, Xerox Corp.; Volkhard Maess, Océ Printing Systems GmbH; and Hitoshi Nakai, Brother Industries, Ltd.

9:40 AM – 4:00 PM

Investigations in the Influence of Rounded Toner Particles on the Image Quality Parameters, *Ralf Habermann, Hosokawa Alpine AG (Germany), and Beat Zobrist, Zobrist Engineering & Consulting (Switzerland)*

Doctor Process of Toner Layer in Non-Magnetic Single-Component Development System in Electrophotography, *Hiroyuki Kawamoto, Tomohiko Sugiyama, and Wataru Furuichi, Waseda University (Japan)*

Discrete Element Method Simulation of Developer Flow Behavior and Toner Developing in Two-Component System, *Soon Cheol Kweon, Ki Hwan Kwon, and Tatsuhiro Otsuka, Samsung Electronics Co., Ltd., and Sang Hwan Lee and Cheol O. Ahn, Hanyang University (South Korea)*

Visualization Study of Developer Powder Flow in a Screw Feeder Unit with X-ray Penetraion, *Keisuke Uchida, Ricoh Co., Ltd. (Japan)*

Triboelectrification of Toner and Film in Contact with Surface Treated Carriers (Interactive), *Disna Jayampathi Karunanayake and Yasushi Hoshino, Nippon Institute of Technology (Japan)*

Advances in Xerographic Marking Systems to Meet the Future of Digital Printing (Focal), *Dale Mashtare, John Knapp, William Nowak, and John Shaw, Xerox Corp. (USA)*

Dielectric Constant of Ink Layer on HP-Indigo Developer Roller, *Michael H. Lee, Quang Lam, and Paul F. Matheson, Hewlett-Packard Co. (USA)*

Analysis of a Blade Cleaning System for Reduction in Wear Rate Variation of the Photoreceptor, *Nobuyuki Nakayama, Kazuhiko Arai, Masashi Ogasawara, Yasuhiro Oda, and Toru Teshigawara, Fuji Xerox Co. Ltd. (Japan)*

Toner Adhesion Measurement (Focal), *Julie Whitney and Brandon Kemp, Lexmark International, Inc. (USA)*

The Horizontal Banding Image Related to the Surface Heating Fuser System, *Jun Asami, Yasutaka Yagi, Kenichi Karino, and Ken Oi, Canon, Inc. (Japan)*

SPECIAL EVENT

Conference Exhibit
opens Tuesday at 10:00 AM

Please visit our exhibitors!

Tuesday (10:00 AM – 6:30 PM)
and
Wednesday (9:00 AM –4:00 PM)

There will be an Exhibit Hall Happy Hour Tuesday evening from 5:15 – 6:30 PM

NIP TRACK 3
PRINT AND IMAGE QUALITY

Session Chairs: Susan Farnand, Rochester Institute of Technology; Anna Lundberg, Mid Sweden University; and Shigeru Kitakubo, Nippon Institute of Technology

9:40 AM – 3:40 PM

Registration Error Measurement and Compensation Method for Modular Printing Systems, *Mu Qiao, Robert P. Loce, Shen-ge Wang, Daniel Costanza, and Rakesh Kulkarni, Xerox Corp. (USA)*

Optimization of Cartridge Life Using JND Sampling Without Compromising the Quality of Printed Color Images, *Kishor M. Bhurchandi, Rajesh B. Raut, and Vipul S. Lande, Shri Ramdeobaba Kamla Nehru Engineering College (India)*

Improved Print Quality by Surface Fixation of Pigments, *Anna Lundberg and Jonas Örtegren, Mid Sweden University, and Ole Norberg, VOXVIL AB (Sweden)*

Print Quality Comparison Between Kodak Prosper and Offset Lithography, *Xiaoying Rong, California Polytechnic State University (USA)*
Print Noise Diagnoses through Correlation Analyses (Focal), *Palghat Ramesh, Peter Paul, and Eric Gross, Xerox Corp. (USA)*
System Image Diagnosis Framework and Its Application to Image Noise, *Chu-heng Liu, Xerox Corp. (USA)*
Experimental Study on the Optical Phenomena on the Surface of Inkjet Photo Papers, *Takanori Otsuhata, Ryo Marukado, and Takeshi Iimori, Nippon Paper Industries Co., Ltd. (Japan)*
Understanding Subjective Print Quality Evaluation for Universial Printer Benchmark (Focal), *Seunga Kang Ha and Youn Jin Kim, Samsung Electronics Co. (South Korea)*
A Document Scanner Equalization Technique (Interactive), *Ahmed Eid, Mohamed Ahmed, and Michael Phelps, Lexmark International, Inc. (USA)*
Effect of Gloss and Colorant Mass on Color (Interactive), *Suxia Yang and Rick Veregin, Xerox Research Centre of Canada, (Canada)*

HIGH SPEED INK JET

Session Chairs: Marie Vans, Hewlett-Packard Co.; Marc Graindourze, Agfa-Gevaert N.V.; and Norio Ohkuma, Canon, Inc.
4:10 – 4:30 PM

Effect of Print Resolution in Single-Pass Inkjet Printer Design, *J. Corrall, Industrial Inkjet Ltd. (UK)*

DIGITAL FABRICATION

DIGITAL FABRICATION PROCESSES

Session Chairs: Ross Mills, Vexajet LLC; Wolfgang Voit, Xaar plc; Werner Zapka, XaarJet AB; Koei Suzuki, Ricoh Co. Ltd.; and Masahiko Fujii, Fuji Xerox Ltd.
9:40 AM – 5:10 PM

Flow-Induced Chain Scission of High Molar Mass Functional Polymers During Ink-Jet Printing, *Stephen Yeates and Khalid A. Alamry, University of Manchester (UK)*
Drop on Demand Inkjet Drop Formation of Poly Ethylene Oxide (PEO) Aqueous Solutions, *Xuejia Yan, Hongming Dong, and Wallace W. Carr, Georgia Institute of Technology (USA)*
Methodology for Inkjet Printing Partially Wetting Films, *Dan Soltman, Ben Smith, Hongki Kang, Stephen Morris, and Vivek Subramanian, University of California, Berkeley (USA)*
Micro-Film Formation by Multi-Nozzle Electrostatic Jets, *Kazuyuki Tada, Kiyohito Maruo, Norie Endo, Nozomi Yoshida, and Hiroyuki Kawamoto, Waseda University (Japan)*
The Effect of Corona Treatment on Inkjet Drop Impact and Spreading (Focal), *E.S. Betton, G.D. Martin, and I. M. Hutchings, University of Cambridge (UK)*
Reactive Inkjet Printing of Copper and Nickel Conductors, *Paul Calvert and Dapeng Li, University of Massachusetts Dartmouth (USA)*
The Importance of Surface Characteristics for Structure Definition of Silver Nanoparticle Ink Patterns on Paper Surfaces, *Thomas Öhlund[1], Jonas Örtegren[1], Henrik Andersson[1,2], and Hans-Erik Nilsson[2]; [1]Digital Printing Center and [2]Mid Sweden University (Sweden)*
Aerosol Jet® Material Deposition for High Resolution Printed Electronic Applications, *Mike O'Reilly and Mike Renn, Optomec, Inc., (USA)*
Inkjet Printing of Hot Melt Materials with Xaar1001 Printheads, *Ingo Reinhold, Frank Steinhäusser, Wolfgang Voit, Moritz Stürmer, Andreas Madjarov, and Werner Zapka, XaarJet AB (Sweden)*
Advances in Design and Simulation of Piezoelectric Inkjet Printheads, *Ross N. Mills, Vexajet LLC and Philip Branning, CubicVue (USA)*
Inert Piezoelectric Inkjet Print Head Technology for Advanced Fabrication of Solar Cells, *Ty Chen, Trident-an ITW Co. (USA)*
Production Digital Fabrication System Using the Dimatix Q-Class Printhead, *William Buskirk, ImTech, Inc. (USA)*

Wednesday September 22, 2010

ALL TRACKS

PLENARY TALK

8:30 – 9:30 AM
Appearance Analysis Research of Archives Texture of Inkjet Printing, *Kohei Iwamoto, Seiko Epson Corp. (Japan)*

NIP TRACK 1

HIGH SPEED INK JET CON'T.

Session Chairs: Marie Vans, Hewlett-Packard Co.; Marc Graindourze, Agfa-Gevaert N.V.; and Norio Ohkuma, Canon, Inc.
10:00 AM – 12:40 PM

Approaches to High Speed Inkjet Printing (Focal), *Alison Morris, Ingo Reinhold, Mario Massucci, Paul Drury, Tri Tuladhar, Wolfgang Voit, and Werner Zapka, Xaar plc (UK)*
The Scalable Pipeline Architecture behind HPs T300 Color Inkjet Web Press (Focal), *Lluis Abello, Hewlett-Packard Co. (USA)*
Xerox Inkjet Production Printing System (Focal), *Howard Mizes, Enrique Viturro, and Jeff Folkins, Xerox Corp. (USA)*
Imaging Considerations for Single Pass Print System Design, *Saurabh K. Halwawala, FUJIFILM*

Dimatix, Inc. (USA)
Improvement of Image Quality in Single Pass UV Ink Jet Printing, *Shin Ishikura, Daisuke Takahashi, and Kentaro Mori, Kyocera Corp. (Japan)*

MODELING OF PRINTING AND RELATED PROCESSES

Session Chairs: Margaret Sturgill, Hewlett-Packard Co.; Li Yang, Holmen Paper; and Nobuyuki Nakayama, Fuji Xerox Co., Ltd.
2:00 – 5:35 PM

Realistic Models for DoD Droplet Formation (Focal), *Stephen D. Hoath, Graham D. Martin, and Ian M. Hutchings, University of Cambridge (UK)*
Parameter Analysis of Impact and Spreading Processes of Fluid Droplets onto Textile Surfaces for Modeling of Droplet-Substrate Interaction of Textiles, *Kees Heil, Xennia Holland BV (the Netherlands), and Armen Jaworski, CIM-MES Projekt (Poland)*
Computer Simulation Research on Batik Crack Patterns (Interactive), *K.J. Fang[1,2], Y. Tang[2], and S.H. Fu[2]; [1]Qingdao University and [2]Jiangnan University (China)*
Factors in Security Printing & Imaging Based Anti-Counterfeiting Ecosystem (Focal), *Steven Simske, Margaret Sturgill, Jason Aronoff, and Marie Vans, Hewlett-Packard Co. (USA)*
Simulation of Mixing of Toners in Micro and Macro Scales, *Akin Ecer, Technalysis Inc. (USA)*
Lean Print Manufacturing: Operations Simulation and Analysis of a Digital Printer, *Jun Zeng, Eric Hoarau, I-Jong Lin, and Gary Dispoto, Hewlett-Packard Co. (USA)*
Content-Driven Neural Network Design of a PSP, *I-Jong Lin, Jun Zeng, and Eric Hoarau, Hewlett-Packard Co. (USA)*
Model Based Printer Linearization, *Dror Kella, Lior Katz, and Ayelet Pnueli, Hewlett-Packard Co. (USA)*
Multi-Level Simulation of Digital PSPs (Interactive), *I-Jong Lin and Jun Zeng, Hewlett-Packard Co. (USA)*

NIP TRACK 2

IMAGE PERMANENCE

Session Chairs: Franziska Frey, Rochester Institute of Technology; Alexander Lincoln, University of Leeds; and M. Itaya, Samsung Electronics
10:00 AM – 3:15 PM

High Humidity Color Bleed in Modern Digitally Printed Materials, *Eugene Salesin and Daniel Burge, Rochester Institute of Technology (USA)*
Hydrophobically Modified Copolymers as Dispersants for Pigment Inkjet Inks, *Alexander Lincoln, University of Leeds (UK)*
The Effects of Lamination on Image Quality and

SPECIAL EVENT

NIP26/Digital Fabrication 2010 Conference Reception

Wednesday, September 22
7:00 – 9:30 pm

Light Stability of Display Media, *Yu Ju Wu, Gabriel Grant, and Rendong Bai, Eastern Illinois University (USA)*
A Comparison of Image Permanence and Print Durability Attributes for Commercial Digital Print Materials with Traditional Offset (Focal), *Brian L. Lindstrom and Douglas E. Bugner, Eastman Kodak Co. (USA)*
Light Fastness Comparison of Xerography and Ink Jet Presswork (Interactive), *Cui Xiaomeng , Chen Guangxue, Xia Zheng, and Yan Jin, South China University of Technology (China)*
Influence of Dry Time on Ozone Reciprocity Failure (Interactive), *Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)*
Influence of Temperature in Xenon Testing (Interactive), *Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)*
Impact of Light Exposure on Measurements of Print Images (Interactive), *Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)*
Fade Stability of Color Photographic Images in the Presence of Ozone Gas—Part II, *David A. Miller, Eastman Kodak Co. (USA)*
A Novel Sensor to Visually Track Fading of Printed Material (Focal), *Eric Hoarau and Ingeborg Tastl, Hewlett-Packard Co. (USA)*
Improved Dark Storage Test Method, Part 2, *Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)*
Validity of Dark Storage Test Method, *Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)*
Image Permanence Test Chamber Uniformity (Interactive), *Matthew Comstock and Ann McCarthy, Lexmark International, Inc. (USA)*

COLOR SCIENCE/IMAGE PROCESSING

Session Chairs: Chung-Hui Kuo, Eastman Kodak Co.; Daniel Nyström, Linköping University; and Shinjiro Umezu, The Institute of Physical and Chemical Research
4:00 – 5:50 PM

The Effects of Perceptual Based Image Gloss and Color on the Evaluation of Image Preference (Focal), *Seunga Kang Ha, Youn Jin Kim, Yousun Bang, and Heui-Keun Choh, Samsung Electronics Co. (South Korea)*
Research on the Halftoning Method to Achieve

High-Fidelity Printing (Interactive), *Chen Guang-Xue, Chen Qi-Feng, Tang Bao-Ling, and Tai Jing-Lei, South China University of Technology (China)*
Methods and Mechanisms of Expanding Destination Color Gamut in HF Color Printing (Interactive), *Li Xiaozhou and Chen Guangxue, South China University of Technology (China)*
A New Hypothesis and Its Verification Explaining Exaggeration of Horizon Moon (Interactive), *Shinya Uematsu and Makoto Omodani, Tokai University (Japan)*
A Distributed Low-Cost RIP for Digital Presses (Interactive), *John Recker, Eric Hoarau, Wei Koh, and I-Jong Lin, Hewlett-Packard Co. (USA)*
Optimal Noise Management Method for a Robust Separation Based Calibration of Color Printing System, *Mu Qiao, Michael Sanchez, Yongda Chen, Isaac Case, and GouYau Lin, Xerox Corp. (USA)*
Microscopic Color Measurements of Halftone Prints, *Daniel Nyström, Linköping University (Sweden)*
Global Optimized Multiscale Tobacco Leaves Inspection Through Graph Cut, *Yinhui Zhang, Yunsheng Zhang, and Zifen He, Kunming University of Science and Technology (China)*

NIP TRACK 3

FUSING, CURING, AND DRYING

Session Chairs: David Thompson, Xerox Corp, and D.W. Kim, Samsung Electronics
10:00 AM – 12:20 PM

Smoothed-Particle Hydrodynamic Simulations of Viscous Fluid Flow, *John G. Shaw, Mike Thompson, Dale Mashtare, and Rachael McGrath, Xerox Corp. (USA)*
Carbon Nanotube Filled Composite Material Analysis Utilizing Nano and Conventional Testing Techniques, *Wade Eichhorn, Boris Avrushchenko, and David Winters, Z-SIGMA, Inc. (USA)*
Imbibition and Evaporation of Water Droplets on Paper and Solid Substrates, *Asaf Oko[1], Agne Swerin[1], Per M. Claesson[1,2]; [1]YKI, Ytkemiska Institutet AB/Institute for Surface Chemistry and [2]Royal Institute of Technology (Sweden)*
The Mechanics of Geometric Stripping (Focal), *Augusto E. Barton, Xerox Corp. (USA)*
Thermal Performance of Copy Papers During Fusing, *S. Lavrykov and B. V. Ramarao, SUNY College of Environmental Science & Forestry; R. Solimeno, Immersitech LLC; and K. M. Singh, International Paper Co. (USA)*

MEDIA FOR DIGITAL PRINTING

Session Chairs: Eric Burch, Hewlett-Packard Co; Wolfgang Schmidt, Felix Schoeller Service GmbH & Co. KG; and Toshiharu Enomae, University of Tokyo
12:30 – 4:30 PM

Study on the Process of Infiltration for Ink Droplets in the Inkjet Printing Substrate (Interactive), *Chen Qifeng, Chen Guangxue, Tang Baoling, and Tai Jinglei, South China University of Technology (China)*
Allessan® APT-Versatile Additive for Paper Treatment (Interactive), *Tanja Schaffer, Allessa-Chemie GmbH (Germany)*
New Media to Improve Print Performance, Reliability, and Longevity of DEP Printers (Focal), *John Stoffel, Gracy Wingkono, and Charlie Zhou, Hewlett-Packard Co. (USA)*
Adhesion in LEP and its Correlation to Paper Surface Chemical Makeup, *Manoj K. Bhattacharyya, Sivapackia Ganapathiappan, Hou T. Ng, Marc Aronhime, Bruce Jackson, and Stanley Morse, Hewlett-Packard Co. (USA).*
Drying Rate Impacts on the Porous Coating Structure and Image Quality, *Haigang Chen, Bor-Jiunn Niu, Lokendra Pal, and Bangaru Sandeep, Hewlett-Packard Co. (USA)*
Speed of Ink Absorption on Modified Paper Surfaces, *Christoph Batz-Sohn[1], Andreas Lembach[2], Leo Nelli[3], Astrid Müller[1], Ilia Roisman[2], and Cam Tropea[2]; [1]Evonik Degussa GmbH, [2]Technische Universität Darmstadt (Germany), and [3]Evonik Degussa Corp. (USA)*
Application of Nano Pigments in Inkjet Paper Coating, *Roland Gong, Sinan Sonmez, and Paul D. Fleming, Western Michigan University (USA)*

ELECTRONIC PAPER AND PAPER-LIKE DISPLAYS

Session Chairs: Jeff Mabeck, Hewlett-Packard Co., and Makoto Omodani, Tokai University
4:30 – 6:00 PM

Integral Photography Using Color Electronic Paper, *Kazuhisa Yanaka, Hiromitsu Nishimura, and Hideo Kasuga, Kanagawa Institute of Technology (Japan)*
Influence of Dye Concentration on Display Characteristic in Wax-Base Electrophoretic Rewritable Media (Interactive), *Takeshi Hasegawa[1], Takayuki Sano[2], and Yasushi Hoshino[1]; [1]Nippon Institute of Technology and [2]Tomoegawa Paper Co., Ltd. (Japan)*
Effects of Constitunt of External Additives on Triboelectrical Charge and Display Characteristics of Toner Display (Interactive), *K.K. Chamilli Kumara, Satoshi Suzumi, Sakiko Nakamura, Nobukazu Miyagawa, and Takashi Kitamura, Chiba University (Japan)*

Consideration of Short-Term Memory for Explaining the General Difficulty of Tasks on a Display, *Sonomi Inoue and Makoto Omodani, Tokai University (Japan)*

Dyed Polymeric Microparticle Colloid Dispersions for Full Colour Electrophoretic Displays, *Mark James, Louise Farrand, Ashley Smith, Nils Greinert, Henry Wilson, Claire Topping, Roger Kemp, Emily Markham, Mark Goulding, and Johannes Canisius, Merck Chemicals Ltd. (UK), and Richard Vidal, Merck Chimie (France)*

Nanopatterned Polythiophenes Films for Electrochormic Imaging (Interactive), *Yuna Kim, Sehwan Kim, Xu Yang, and Eunkyoung Kim, Yonsei University (South Korea)*

Usability Evaluation of Paper/PC/e-Paper Proceeding Books (Interactive), *Yuta Nakayama and Makoto Omodani, Tokai University (Japan)*

DIGITAL FABRICATION

2- AND 3-D FUNCTIONAL PRINTING

Session Chairs: Jeff Nielsen, Hewlett-Packard Co.; Jali Heilmann, VTT; and Akira Suzuki, Ricoh Co., Ltd.

10:00 AM – 12:00 PM

Complete Digital Fabrication of Polymeric Microsieves, *Jens Hammerschmidt, Enrico Sowade, Stephan F. Jahn, Susann Ebert, Andreas Morschhauser, Werner A. Goedel, and Reinhard R. Baumann, Chemnitz University of Technology (Germany)*

Permanence and Color Stability in 3D Ink-Jet Printing, *Maja Stanic and Branka Lozo, University of Zagreb (Croatia)*

Additive Manufacturing by Electrophotography: Challenges and Successes (Focal), *Jason Jones[1], Greg Gibbons[2], Chris Sutcliffe[3], David Wimpenny[1], and Beat Zobrist[4]; [1]De Montfort University, [2]University of Warwick, and [3]MTT Technologies Ltd (UK), and [4]Zobrist Engineering and Consulting (Switzerland)*

The Digital Fabrication of Ceramics by 3D Powder Printing, *David Huson, University of the West of England (UK)*

DIGITAL BIOFABRICATION

Session Chairs: Thomas Boland, University at Texas El Paso; Stefan Guettler, Fraunhofer Institute IPA; and Shinjiro Umezu, Tokai University

2:00 – 5:50 PM

Rapid Deposition of Hydrogel Layers by Inkjet Printing (Focal), *Don McCallum[1], Paul Calvert[2], Gordon Wallace[1], and Marc in het Panhuis[1]; [1]University of Wollongong (Australia) and [2]University of Massachusetts (USA)*

Fabrication of Biomedical Components & Systems Using Ink Jet Microdispensing, *Donald Hayes and David Wallace, MicroFab Technologies, Inc. (USA)*

Gelatin Patterning Utilizing Electrostatically-Injected Droplet (ELID) Method, *Shinjiro Umezu and Motoya Kawanishi, Tokai University, and Hitoshi Ohmori, Takashi Kitajima, and Yoshihito Ito, RIKEN (Japan)*

Hydrogel Bioactive Scaffold Fabricated with PAM2 System: Realization of Complex Shaped Scaffold with a Homogeneous Dispersion of HepG2 cells, *Annalisa Tirella[1,3], Federico Vozzi[2], Giovanni Vozzi[3], and Arti Ahluwalia[3]; [1]University of Rome "Tor Vergata", [2]IFC - National Council Research, and [3]University of Pisa (Italy)*

Electrophotography (Laser Printng)— An Efficient Technology for Biofabriction (Focal), *Stefan Güttler, Oliver Refle, and Andrzej Grzesiak, Fraunhofer Institute for Manufacturing Engineering and Automation; Volker Stadler, PEPperPRINT GmbH and German Cancer Research Centre; and Achim Weber, Fraunhofer Institute for Interfacial Engineering and Biotechnology (Germany)*

Site Specific Nano-Tuning of Scaffolds Using Inkjet Printing, *Annalisa Tirella[1,2], Francesca Montemurro[2], Bruna Vinci[2], Federico Vozzi[3], Giovanni Vozzi[2], Duccio Sassano[4], Tazio Sandri[4], Livio Cognolato[4], and Arti Ahluwalia[2]; [1]University of Rome "Tor Vergata", [2]University of Pisa, [3]IFC-CNR, and [4]Olivetti I-Jet SPA (Italy)*

Fabrication of Miniature Drug Screening Platform Using Low Cost Bioprinting Technology, *Jorge I. Rodriguez Devora and Tao Xu, University of Texas at El Paso (USA)*

Inkjet Printing of Self-Assembled Hydrogels for Bionic Devices, *Paul Calvert, University of Massachusetts Dartmouth (USA), and Donald McCallum and Marc in het Panhuis, University of Wollongong (Australia)*

Bi-Additive Process for Cell Printing, *Jessica Snyder, Qudus Hamid, Selcuk Guceri, and Wei Sun, Drexel University (USA)*

PLEASE HELP US keep costs down

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Thursday September 23, 2010

ALL TRACKS
PLENARY TALK
3:50 – 4:50 PM

Printing in the Third Dimension: Industry Status and Future Possibilities, *Neil Hopkinson, Loughborough University (UK)*

NIP TRACK 1
HARDWARE FOR PRINTING INSPECTION AUTHENTICATION AND FORENSICS
Session Chairs: Steve Delepine, BrandWatch Technologies; Long Lin, University of Leeds; and Hirotoshi Terao, Alps Electronic Co., Ltd.
8:30 – 10:10 AM

High-Resolution Imaging for Forensics and Security (Focal), *Guy Adams and Stephen Pollard, Hewlett-Packard Laboratories (UK), and Steve Simske, Hewlett-Packard Co. (USA)*
Technologies for Identity Document Verification (Focal), *Alan Hodgson, 3M Security Printing and Systems Ltd. (UK)*
Methods for Producing Covert Barcodes with Authentication Markers, *Benjamin Eick, BrandWatch Technologies (USA)*
The Impact of Digital Print on the Security Market as Seen from the Substrate Supplier, *Fiona E. Davidson, Tullis Russell Coaters Ltd. (UK)*

SECURITY AND FORENSIC PRINTING
Session Chairs: Jason Aronoff, Hewlett-Packard Co.; Alan Hodgson, 3M Security Printing & Systems Ltd.; and Yusuke Takeda, Ricoh Co., Ltd.
10:40 AM – 3:40 PM

Impact of Scrambling on Barcode Entropy, *Marie Vans, Steven Simske, Margaret Sturgill, and Jason Aronoff, Hewlett-Packard Co. (USA)*
Encoding Information in Clustered-Dot Halftones, *Robert Ulichney, Matthew Gaubatz, and Steven Simske, Hewlett-Packard Co. (USA)*
Employing Botanical DNA to Forensically Tag and Authenticate Objects for Security Purposes, *James Hayward, Applied DNA Sciences (USA)*
Security On-Ramp for Variable Data Printing (Focal), *Steven Simske and Marie Vans, Hewlett-Packard Co. (USA)*
Searching for Discriminating Features in B&W Prints to Individualize Printers in a Forensic Setting (Focal), *Koen Herlaar, Jan A. de Koeijer, Mignonne F. Fakkel-Slothouwer, and Henk T. Madhuizen, Netherlands Forensic Institute (the Netherlands)*
Using Printing Technologies to Authenticate and Fight Against Counterfeits, *Lee Metters and Craig Stobie, Domino Printing Sciences (UK)*
Determining Printer and Scanner Resolution Dependency of Text Classification for Digital Image Forensics, *Jason S. Aronoff and Steven J. Simske, Hewlett-Packard Co. (USA)*

THURSDAY SPECIAL EVENTS

Thursday promises to be an exciting day! Please join us for the following special events:

Interactive Paper Session and Lunch
12:30 – 2:00 PM

Final Plenary
3:50 – 4:50 PM

Farewell Reception
4:50 – 5:30 PM

NIP TRACK 2
PRINTING SYSTEMS ENGINEERING/OPTIMIZATION
Session Chairs: Omer Gila, Hewlett-Packard Co.; Patrick Becq, INOV-proJET; and Teruaki Mitsuya, Ricoh Co., Ltd.
8:30 – 10:50 AM

Linescan System for Automated Inkjet Print Head Sustainability Testing, *Yair Kipman, Prashant Mehta, and Kate Johnson, ImageXpert Inc. (USA)*
Accurate Measurement of Diode to Diode Spacing, *Jon Whitney, Lexmark International, Inc. (USA)*
New Induction Heating Technology and System Optimization for Energy-Saving Fuser, *Hiroshi Seo, Ricoh Co., Ltd. (Japan)*
Optimization of Die for Magnetic Development Roller Using Genetic Algorithm, *Yasuo Miyoshi, Ricoh Co., Ltd. (Japan)*
Print Mask Design for Maximum Throughput Subject to Print Quality Constraints (Focal), *J. William Boley and George T.-C. Chiu, Purdue University (USA)*

DIGITAL PACKAGING
Session Chairs: George Gibson, Xerox Corp.; Changlong Sun, Crown Packaging UK Plc; and Norio Nagayama, Ricoh Co., Ltd.
11:20 AM – 12:20 PM

The Use of Inkjet in Packaging Applications (Focal), *Jali Heilmann and Elina Rusko,VTT Technical Research Centre of Finland (Finland)*
Quality of Digitally Printed Paperboard for Folding Cartons, *Xiaoying Rong, California Polytechnic State University (USA)*
Development of In-Line Printing Press Calendering

Station, *Paul D. Fleming, Dania Al-Said, Marian Rebros, Margaret K. Joyce, Erika Hrehorova, and Matthew Stoops, Western Michigan University (USA)*

NIP TRACK 3
TEXTILE AND FABRIC PRINTING

Session Chairs: Agnes Zimmer, Lexmark International, Inc.; Kasper Nossent, TenCate; and Takao Abe, Shinshu University

8:30 AM – 12:10 PM

Direct Inkjet Single Sided Hydrophobic Finishing of Textiles, *Karim Ali, Xennia Technology (UK); Usha Bhaskara, University of Twente ; Joanke Van der Veen and Kasper Nossent, TenCate (the Netherlands)*

Inkjet Printing of Hydrophobic and Breathable Fluorine-Free Based Coatings on Fibres, *Andromachi Malandraki and Stephen G. Yeates, University of Manchester (UK)*

Digitally Finished Cyclodextrin Based Controlled Release Functionality for Cotton Textiles, *Pramod Agrawal[1], Karim Ali[2], and Marijn Warmoeskerken[1]; [1]University of Twente (the Netherlands), and [2]Xennia Technology Ltd. (UK)*

Digital Inkjet Dyeing and Printing on Textiles with Vat Dyes, *Robert M. Christie, Shah M. Reduwan Billah, and Roger H. Wardman, Heriot-Watt University; and Karim Ali, Xennia Technology (UK)*

Inkjet Printing on Textiles: Software Package for Textile Designers, *Armen Jaworski, CIM-mes Projekt Ltd. (Poland) and Kees Heil, Xennia Holland BV (the Netherlands)*

Color Performance of Cotton Fabrics Pretreated by Cationic Reagent and Inkjet-Printed with Pigment Inks, *Anli Tian, Jiangnan University (China)*

Fabric Coating and Printing Cojoined in a Single IJ Textile Printing Process, *Masayuki Ushiku ,Hisato Kato ,Katsunori Goi , and Shinya Watanabe, Konica Minolta IJ Technologies, Inc., (Japan)*

Effect of Padding Parameters on Shade Depth and Dye Penetration of Digitally Printed Cotton Fabrics, *Grace W. Namwamba, Vamshi K. Naarani, and Devona L. Dixon, Southern University (USA)*

Antibacterial Finishing of Flat Textiles by Ink-Jet Printing (Focal), *Edward Rybicki[1], Edyta Matyjas-Zgondek[1], Anna Bacciarelli[1], Marek Kozicki[1], Kasper Nossent[2], Aleksandra Pawlaczyk[1], and M. Iwona Szynkowska[1]; [1]Technical University of Lodz (Poland) and [2]Ten Cate Advanced Textiles B.V. (the Netherlands)*

THERMAL PRINTING

Session Chair: Hirotoshi Terao, Alps Electric Co., Ltd.

12:10 – 3:40 PM

Development of New Multi-Purpose Heating Head (Interactive), *Hideo Taniguchi, HIT Devices Ltd. (Japan) and Jiro Oi, HIT Devices Ltd. (USA)*

Development of Power Saving Thermal Print Head Part 2 (Focal), *Hirotoshi Terao, Hisashi Hoshino, Taishi Numata, and Toshifumi Nakatani, Alps Electric Co., Ltd. (Japan)*

Development of High Efficiency Thermal Printhead, *Kazuyoshi Sakamoto, Hidekazu Akamatsu, Yoshihiro Niwa, and Koji Ochi, Kyocera (Japan)*

Stability and Tinctorial Strength of Black Leuco-Colorants as Viewed from the Crystal Structure of a Phenolic Developer, *Hideki Shima, Kazuyuki Sato, and Jin Mizuguchi, Yokohama National University (Japan)*

DIGITAL FABRICATION
PRINTED ELECTRONICS: DEVICES

Session Chairs: John Kymissis, Columbia University; James Stasiak, Hewlett-Packard Co.; Mark Crankshaw, CDT; Dietmar Zipperer, PolyIC; Shinichi Nishi, Konica Minolta IJ Technologies, Inc.; and Takao Someya, University of Tokyo

8:30 AM – 3:40 PM

Direct Write Opportunities in Printed Electronics, *Donald Hayes, MicroFab Technologies Inc. (USA)*

Printed Electronics and E-paper, *Reem El Asaleh and Paul D. Fleming III, Western Michigan University (USA)*

Print the Printed Circuit Board—Inkjet Printing of Electronic Devices (Focal), *W. Jillek[1], R. Lesyuk[2], F. Rudolph[1], E. Schmitt[1], and N. M. Yusop[1]; [1]Georg-Simon-Ohm University of Applied Sciences (Germany), and [2]University Lviv (Ukraine)*

Digital Fabrication of—Oxide Electronics (Focal), *Nenad Marjanovic[1], Jens Hammerschmidt[1], Stan Farnsworth[2], Ian Rawson[2], Mahmut Kus[3], Faruk Ozel[3], Serhad Tilki[3], and Reinhard R. Baumann[1,4]; [1]Chemnitz University of Technology (Germany), [2]NovaCentrix (USA), [3]Selçuk University (Turkey), and [4]Fraunhofer Research Institution for Electronic Nano Systems (Germany)*

Inkjet Printing Approach to Fabrication of Non-Sintered Dielectric Films and 3D Structures, *Jongwoo Lim[1,2], Myung-sung Hwang[1], Jihoon Kim[1], Young Joon Yoon[1], Ho Gyu Yoon[2], and Jong-hee Kim[1]; [1]Korea Institute of Ceramic Engineering and Technology and [2]Korea University (South Korea)*

Real-Time Monitoring and Feedback Control on the Production of Inkjet Printed Capacitors, *Dario Mager, Patrick J. Smith, and Jan G. Korvink, University of Freiburg, (Germany)*

Printing of Electronic Nanoinks by Laser Forward Transfer, *Alberto Piqué, Andrew Birnbaum, Heungsoo Kim, Jiwen Wang, Nicholas Charipar, Ray Auyeung, and Scott Mathews, Naval Research Laboratory (USA)*

Inkjet Printing of Single-Walled Carbon Nanotube Strain Gauges, *J. William Boley and George T.-C. Chiu, Purdue University (USA)*

Printable Indium Oxide Thin-Film Transistor (Interactive), *Jong-Keun Lee[1], Ji-Won Kim[1], Young Woong Kim[1], Sung-Kyu Hong[1], Yong-Young Noh[2], and Young Soon Kim[1]; [1]Dongguk University and [2] Hanbat National University (South Korea)*

Inkjet Technology Enables Uniform Light Emission for Large-Area OLED Lighting and OPV Fabrication (Focal), *Maosheng Ren, Harrie Gorter, and Ronn Andriessen, Holst Center/TNO (the Netherlands)*

A TIPS-Pentacene: Polystyrene Thin Film Transistor Produced by Inkjet Printing, *Patrick J. Smith[1], Marie-Beatrice Madec[2], Jan G. Korvink[1,3], and Stephen G. Yeates[2]; [1]University of Freiburg (Germany), [2]University of Manchester (UK), and [3]Freiburg Institute of Advanced Studies (Germany)*

Roll-to-Roll Printed Electronics, *Dietmar Zipperer, PolyIC GmbH & Co. KG (Germany)*

The Venue: Austin, Texas

The host city for NIP26/Digital Fabrication 2010 is not only the capitol of Texas, but also the "Live Music Capitol of the World!" Evenings on the town are sure to be lively with nearly 200 music venues and a plethora of restaurants offering everything from great BBQ to fine dining. We're sure you'll love this city!

The conference itself will be held at the Hilton Austin, and we encourage all attendees to stay there. Your staying at our host hotel keeps registration costs down. The hotel's downtown location puts it within easy walking distance of all the fun and diversity the city has to offer.

In addition to great entertainment and history—the Lyndon Baines Johnson Presidential Library and Museum (www.lbjlibrary.org/) is located at the University of Texas at Austin—there are more than 200 parks, miles of hiking and biking trails, a 30 acre botanical garden, paddle boat cruises on nearby Lake Austin, and nearby vineyards to explore. (Did you know Texas is the fourth largest wine producing state in the US?) Austin also boasts a vibrant art scene, including the Austin Museum of Art; an open air artist market; and quirky shops along South Congress Street – Austin's SoHo. If you're looking for the perfect pair of cowboy boots, you'll find them here. For more information on Austin, please visit www.austintexas.org/visitors.

The average daytime temperature for Austin in September is 90°F/32°C. Evenings average a comfortable 69°F/20°C

Transportation Notes

Austin is served by Austin-Bergstrom International Airport (AUS). Non-stop flights are available from Baltimore (BWI), Chicago (ORD), Houston (IAH), Los Angeles (LAX), Newark (EWR), San Francisco (SFO), and Washington (IAD), as well as other cities. The airport is 7 miles (a 15 minute ride) from downtown. Flight information can be found at www.ci.austin.tx.us/austinairport.

Taxi service is available from the airport. It costs approximately $25/one-way.

SuperShuttle provides roundtrip service from the airport to the hotel for $24 ($13 one-way). To make a reservation, visit www.supershuttle.com or call +1-800-258-3826.

Driving

From Austin-Bergstrom International Airport: Exit airport to Highway 71 W and travel approximately 2.5 miles to ramp for US 183 N. Continue onto Airport Blvd. for approximately 4.5 miles and take exit on the left toward Cesar Chavez/ 5th St. Merge onto E. Cesar Chavez St. for 7.5 miles. Turn right at Red River St. and travel 7.7 miles until making a left on E. 4th Street. Hotel will be on your right at 500 E. 4th Street.

Parking

Parking is available at the hotel for $18/night self-park or $26/night valet. Both include in/out privileges.

PLEASE HELP US

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NIP26/DF 2010 Hotel Registration

A special block of rooms at a discounted rate is being held at the **Hilton Austin** for IS&T attendees for the nights of September 17-24, 2010. The discounted rate is available for 2 days prior to and 1 day after these dates, based on availability. Early reservations are assigned on a priority basis to conference attendees provided they are received by **August 30, 2010**. To guarantee a room, credit card number or deposit equal to one night's housing must accompany the reservation request.

Reservations may be made by calling the hotel at 1-800-236-1592 and telling them you are with the NIP26/Digital Fabrication 2010 or Society for Imaging Science and Technology Group.

For on-line reservations, visit
www.hilton.com/en/hi/groups/personalized/AUSCVHH-IST-20100919/index.jhtml

Reservations Deadline: August 30, 2010
Hilton Austin
500 East 4th Street • Austin, TX 78701
+1-512-482-8000; FAX form to +1-512-682-2769
Please note: There is a $75 Early Departure Fee
Guests wishing to avoid an early checkout fee should advise the hotel at or before check-in of any change in planned length of stay.

First/Given Name_____ Family Name _____
Title/Position _____ Company _____
Mailing Address _____
_____
Telephone _____ Fax _____ Email _____

Arrival Date and Time _____ Departure Date_____

❑ Single/Double ($184) ❑ Triple ($209) ❑ Quad ($219)
I would prefer: ❑ King-size bed ❑ Two Queen-size beds (bed configuration is not guaranteed)
—Rates are per room and include Internet access; the current tax on rooms is 15%—

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

There is no charge for children under 16 years of age
when sharing a room with a parent with the existing bed configuration.
List any special needs: _____

Deposits can be made by a major credit card.

Payment Method: ❑ AMEX ❑ MC ❑ VISA ❑ Discover
Card#: _____ Exp. Date: _____
Name as it appears on card: _____
Authorization Signature: _____

Notice of Cancellation must be given to the hotel 48 hours in advance of arrival date to receive a full refund of deposit.

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NIP26/DF 2010 Technical Registration – page 1

First/Given Name_____

Last/Family Name _____

Title/Position _____

Company _____

Complete Mailing Address _____

_____

Telephone _____ Fax _____

Email _____

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

Guest/spouse registration includes: breakfast on Monday and the three receptions.

To help ensure adequate space in session rooms indicate the days you plan to attend:
___ Mon ___ Tues ___ Wed ___ Thurs

Please circle the session you primarily plan to attend:
NIP Track 1 NIP Track 2 NIP Track 3 Digital Fabrication

Print Sample Gallery Reservation: Are you bringing sample prints to display? If so, please indicate area needed: ____2' x 4' or ____4' x 4'

❒ Please check here if you plan to participate in the Open Innovation Speed Dating Event (see page 20 for details). If you check this box, further information will be sent to you closer to the event.

Conference Registration (CHECK ONE)	**until 8/22**	**after 8/22**	**TOTAL**
Please note: This year IS&T is offering registration packages, as well as the traditional a la carte option. Packages offer considerable savings. **To take advantage of packages, you must fax in the form. This option is not available online.*			
___ Registration Package A (cost savings 4%) includes conference registration and membership through Dec. 31, 2011	$750	$750	$ _____
___ Registration Package B (cost savings 25%) includes conference registration, membership through Dec. 31, 2011, and up to 8 hours of short courses; please indicate courses on page 2.	$935	$935	$ _____
___ Registration Package C (cost savings 33%) includes conference registration, membership through Dec. 31, 2011, and up to 16 hours of short courses; please indicate courses on page 2.	$1,145	$1,145	$ _____
___ IS&T/ISJ Member	$685	$785	$ _____
___ Non-member	$785	$885	$ _____
___ IS&T/ISJ Speaker/Chair Member	$585	$685	$ _____
___ Speaker/Chair Non-member	$685	$785	$ _____
___ IS&T/ISJ Student (ID required) Member	$125	$160	$ _____
___ Student (ID required) Non-member	$150	$185	$ _____
___ One-day	$395	$420	$ _____

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

___ NIP/DF Abstract Book with CD ___ NIP/DF Hardcopy book

❒ Extra hardcopy proceedings ❒ Extra abstract book proceedings @$120/each $ _____

❒ Extra CD (available only as addition to Hardcopy selection/purchase) @$80/each $ _____

Page Subtotal $ _____

continued on next page

NIP26/DF 2010 Technical Registration – page 2

Short Course Registration (course descriptions begin on page 3)

- If you selected one Package B or C, indicate the classes you wish to take below, but a dollar amount of zero.
- Students may take any class for $50. No additional discounts apply.
- If you take up to 8-hours worth of classes, you can deduct 20% off the short course total from the amount due (see below)

	Member	Non-member	
2-hour (add $35/class after 8/22)	$155	$190	$ _____

Check all that apply: ❑ SC06-S2 ❑ SC07-S3 ❑ SC08-S3 ❑ SC09-S3 ❑ SC10-S3 ❑ SC13-S4 ❑ SC14-S4 ❑ SC15-S4 ❑ SC16-M2 ❑ SC17-M2

4-hour (per class; add $35/class after 8/22)	$230	$265	$ _____

Check all that apply: ❑ SC01-S1 ❑ SC02-S1 ❑ SC03-S1 ❑ SC04-S1 ❑ SC05-S1 ❑ SC11-S3 ❑ SC12-S3 ❑ SC18-M3 ❑ SC19-M3 ❑ SC20-M3 ❑ SC21-T3 ❑ SC22-T3 ❑ SC23-T3

OR

Take 8-hours worth of classes or more and receive 20% off the total price

(enter up to 8 hours or more of short course numbers, fill in member or non-member price next to each, add together, and multiply by .80 to get your price; add additional lines if needed)

SC____ $ ____ + SC____ $ ____ + SC____ $ ____ = $_____ x .80 = $ _____

Membership	US address	Non-US Address	
___ 18-month new membership (expires 12/31/11):	$142.50	$157.50	$ _____
___ annual membership renewal (expires 12/31/11):	$95	$105	
___ Student membership (expires Sept. 30, 2011)	$25	$25	$ _____

join now and calculate fees based on member rates

Other

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

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

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

Card#: _____ Exp. Date: _____

Name as it appears on card: _____

Authorization Signature: _____

Return this form with signed credit card authorization or check payable in US dollars to
IS&T, 7003 Kilworth Lane, Springfield, VA 22151
fax to 703/642-9094
or register online at www.imaging.org/ist/Conferences/

Please note: To cover bank charges and processing fees, there is a cancellation fee of $75 until September 15, 2010. After that date, the cancellation fee is 50% of the total plus $75. All requests for a refund must be made in writing. No refunds will be given after October 15, 2010.

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

Digital Fabrication 2010/NIP26

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