

17th International Conference on Digital Printing Technologies 2001

(NIP 17)

**Fort Lauderdale, Florida, USA
30 September - 5 October 2001**

ISBN: 978-1-62276-618-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2001) by the Society for Imaging Science & Technology
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact the Society for Imaging Science & Technology
at the address below.

Society for Imaging Science & Technology
7003 Kilworth Lane
Springfield, Virginia 22151

Phone: 703-642-9090
Fax: 703-642-9094

info@imaging.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Thank You Sponsors	iv
The Committee	vi
Introduction	vii
Special Events	v
Tutorial Program	vi

The Technical Papers Program

	Program	Papers
The Keynote Papers	x	1
Track I		
Printing Systems Engineering/Optimization	x	28
Digital Printing/Quality Control Instrumentation	xi	83
Media for Digital Printing	xii	107
Focused Session on Image Permanence	xiii	159
Image Permanence	xiv	167
Production Digital Printing	xvi	263
Track II		
Ink Jet Processes	xvii	278
Ink Jet: Commercial and Industrial	xviii	323
Toner Based Printing Materials	xix	341
Ink Jet Materials	xx	379
Textile and Fabric Printing	xxi	418
Color Science and Image Processing	xxii	442
Thermal Printing	xxiii	491
Track III		
Focused Session on Electronic Paper and Paper-like Display	xxiv	515
Optoelectronic Imaging Materials and Devices	xxiv	530
Specialty and Security Printing	xxvi	576
Toner Based Printing Processes	xxvii	594
Advanced and Novel Imaging Systems	xxviii	657
Print and Image Quality	xxx	705
Interactive Sessions		
Tuesday		
Advanced and Novel Imaging Systems	xxx	739
Optoelectronic Imaging Materials and Devices	xxxi	760
Color Science and Image Process	xxxii	780
Print and Image Quality	xxxii	808
Digital Printing/Quality Control Instrumentation	xxxiii	830

Thursday		
Toner Based Printing Material	xxxiii	834
Toner Based Printing Process	xxxiii	848
Media for Digital Printing	xxxiv	869
Ink Jet Materials	xxxiv	878
Ink Jet: Commercial and Industrial	xxxiv	881
Ink Jet Process	xxxiv	885
Specialty and Security Printing	xxxiv	895
Authors Index		899
Exhibitors		903
IS&T Officers		908
Corporate Members		909
Hotel Floor Plans		910

Thank You Sponsors

The Society gratefully acknowledges the following companies who have made contributions to the sponsorship of this conference.

Conference Sponsors

Adobe Corporation
 Agfa Gevaert Group
 Applied Science Fiction, Inc.
 Degussa Hüls Corporation
 Eastman Kodak Company
 Fuji Photo Film Co., Ltd.
 Hewlett Packard
 ImageXpert, Inc.
 Kodak Polychrome Graphics
 Konica Corporation
 Lexmark International Inc.
 Polaroid Corporation
 Torrey Pines Research
 Xeikon N.V.
 Xerox Corporation

Session Sponsors

Fuji Xerox Co. Ltd.
 Heidelberg Digital L.L.C.
 Ilford AG
 Minolta Co., Ltd.
 NexPress Solutions LLC
 Ricoh Co., Ltd.
 TREK Inc./ TREK Japan KK
 Xaar plc

Contributors

QEA, Inc.
 Mitsubishi Chemical Co.

The Papers Program

The Keynote Papers

8:00 am to 9:00 am

Monday	Evolution of Non-Impact Printing Technologies, Joseph Gaynor, Innovative Technology Associates (<i>USA</i>)	1
Tuesday	The Power of Print: Evolution of Print Media Production through Digitalization, Innovations, Electronic Media and Market Demand, Helmut Kipphan, Heidelberger Druckmaschinen AG (<i>Germany</i>)	2
Wednesday	The Future of Paper, M. Bruce Lyne, International Paper (<i>USA</i>)	22
Thursday	Decolorable Ink, Kenji Sano, Toshiba Corporation (<i>Japan</i>)	24

Track 1

Monday, October 1, 2001

Printing Systems Engineering/Optimization

*Session Chair(s): Peter Mason, Torrey Pines Research;
Edward Caruthers, Xerox Corporation; Peter Bracke, Barco Graphics*

Monday, October 1— 9:20 to 11:40 am

9:20 am	Focal Paper: High Throughput Industrial Digital Printing Peter Bracke, Barco Graphic, nv (<i>Belgium</i>)	28
9:50 am	UV Curing of Ink Jet Printing R. W. Stowe, Fusion UV Systems, Inc. (<i>USA</i>)	33
10:10 am	Design and Implementation of a DSP Based Inkjet Printer Motion Control System for Dynamic Print Mode Control A. V. Deshpande, M. Kamasak, G. T. -C. Chiu, K. L. Thoon, C. A. Bouman, J. P. Allebach, Purdue University (<i>USA</i>) S. Fedigan, D. Schafer and C. Cole, Texas Instruments (<i>USA</i>)	34
10:30 am	Coffee Break	
11:00 am	The Ink Cartridge as a Major Component of an Inkjet System Joachim Kretschmer, Pelikan Hardcopy Production AG (<i>Switzerland</i>)	43

- 11:20 am **Designing and Optimizing an Ink Cartridge for Use with Higher Viscous Inks**, Henning Frunder, Uli Haeutle, Hermann Kilb, and Gerhard Lohrmann, Tally Computerdrucker GmbH (*Germany*) 49

Lunch Break (on your own)

Printing Systems Engineering/Optimization (Continued)

Session Chair(s): Peter Mason, Torrey Pines Research; Edward Caruthers, Xerox Corporation; Peter Bracke, Barco Graphics

Monday, October 1—1:10 to 3:20 pm

- 1:10 pm **Focal Paper: Using Maintenance Strategy to Improve the Availability of Complex Systems**, John P. King and John R. Thompson, Heidelberg Digital, L.L.C. (*USA*) 56

- 1:40 pm **Banding Artifact Reduction in Electrophotographic Processes Using OPC Drum Velocity Control**, Cheng-Lun Chen, George T.-C. Chiu, and Jan P. Allebach, Purdue University (*USA*) 60

- 2:00 pm **Optimizing Paper Picking Capability; Light Weight & High Speed** Peter J. Wood, Steve Zalaznik and Jay Peterson, Check Technology Corporation (*USA*) 67

- 2:20 pm **The Expanding Roll of Semi-Conductive Polyurethane in Electro-Photographic Systems**, Charles J. Matteliano, Winfield Industries, Inc. (*USA*) 71

- 2:40 pm **Dynamic Print Modes Control for Inkjet Printers** Mustafa Kamasak, Anand V. Deshpande, Kok Leong Thoon, Charles A. Bouman, George T.-C. Chiu, and Jan P. Allebach, Purdue University (*USA*) 78

- 3:00 pm **Integrated Architecture for Ink-Jet Printer** Denis Genon-Catalot and Cyril Schlemer, Plateforme Technologique de Valence, Université Pierre Mendès (*France*) *

- 3:20 pm Coffee Break

Digital Printing/Quality Control Instrumentation

Session Chair(s): Allen Rushing, LogLight Designs; Alan Hudd, Xennia; Yasushi Hoshino, Nippon Institute of Technology

Monday, October 1 —3:40 to 5:30 pm

- 3:40 pm **Focal Paper: Better Products Faster - Demonstration of a Novel Technique for Characterization and Quantification of Inkjet Performance** James Fox, Xennia Technology Ltd. (*United Kingdom*) 83

* Paper not available at time of publication

4:10 pm	Use of Analytical Techniques to Characterize the Stability of Difficult Ink Jet Pigmented Systems , Kristian Sime and Phil Bentley, Xennia Technology Ltd. (<i>United Kingdom</i>)	87
4:30 pm	Characterization of Semi-Insulating Devices for Electrophotography with Corona Charging Current Measurements , Inan Chen and Ming-Kai Tse, Quality Engineering Associates (QEA), Inc. (<i>USA</i>)	92
4:50 pm	Electrical Characterization of the Transfer Belt Tsuneo Mizuno and Jun-ichi Hanna, Tokyo Institute of Technology (<i>Japan</i>)	96
5:10 pm	Evaluation of an LED Printer and Printhead Using Print Quality Analysis Luo Cheng, David Forrest, and Ming-Kai Tse, Quality Engineering Associates (QEA) Inc. (<i>USA</i>)	101

Tuesday, October 2, 2001

Media for Digital Printing

Session Chair(s): Vera Bares, Weyerhaeuser; Axel Niemoeller, Sihl; Takao Abe, Konica Corp.

Tuesday, October 2 — 9:20 to 11:40 am

9:20 am	Focal Paper: Comparison of Print Characteristics of Wide Format Photograde Ink Jet Papers , M. Graindourze, H. Kanora, S. Lingier, and G. Desie, Agfa-Gevaert N.V. (<i>Belgium</i>)	107
9:50 am	Gloss of Ink Jet Media at High Ink Loads Tom Graczyk and Shailesh Mody, Arkwright, Inc. (<i>USA</i>)	112
10:10 am	The Influence of Silica Gel Pigment Levels in Coated Ink Jet Papers David C. Darwin and R. Trevor Taylor, Grace Davison (<i>USA</i>) and Philip J. Press, Philip Press Statistical Consulting, Inc. (<i>USA</i>)	116
10:30 am	Coffee Break	
11:00 am	Inkjet Printing: Effect of Paper Properties on Print Quality Gérard Baudin and Eliane Rousset, Ecole Française de Papeterie et des Industries Graphiques (<i>France</i>)	120
11:20 am	Comparison of Ink Jet Media for Drop-on-Demand Piezo Ink Jet Contract Proofing , M. Graindourze and E. Dutoit, Agfa-Gevaert N.V. (<i>Belgium</i>)	125

Lunch Break (on your own)

Media for Digital Printing (Continued)

*Session Chair(s): Vera Bares, Weyerhaeuser; Axel Niemoeller, Sihl;
Takao Abe, Konica Corp.*

Tuesday, October 2 — 1:00 to 3:50 pm

1:00 pm	Focal Paper: Wettability Characterization of Printing Substrates: Facts and Interpretations , Abraham Marmur, Chemical Engineering Dept., Technion - Israel Institute of Technology (<i>Israel</i>)	129
1:30 pm	The Future Potential of the Cast Coating Process Gerd Papier, Andre Becker, and Olaf Friederichs, Zanders Feinpapiere AG (<i>Germany</i>)	133
1:50 pm	Silica Filler for Ink Jet Paper , Kenji Fukunaga, Kenichi Ishizu and Hiroya Yamashita, Tokuyama Corporation (<i>Japan</i>)	137
2:10 pm	Effect of Paper Properties on Print Quality of Inkjet Printer Swati Bandyopadhyay, Jadavpur University (<i>India</i>)	141
2:30 pm	Coffee Break	
2:50 pm	Toner Layer Structure and Toner Adhesion on Coated Paper Katja M. Sipi, Helsinki University of Technology (<i>Finland</i>)	145
3:10 pm	Photofinishing Paper for Digital Presses Dieter Reichel, CELFA/FOLEX (<i>Switzerland</i>)	151
3:30 pm	Image Quality Improvement by Embedding Toner into a Special Resin-Coated Layer of Digital Electrophotography Tomofumi Tokiyoshi, Takashi Okazaki, Yasuhiro Oba, Shuichi Maeda, Akira Nakamura, and Masaru Kato, Oji Paper Company (<i>Japan</i>) Fyosuke Nakanishi, Kiyoshi Hosoi, Tsukasa Matsuda and Hiroyoshi Hosomura, Fuji Xerox Co., Ltd. (<i>Japan</i>)	154

Wednesday, October 3, 2001

Focussed Session on Image Permanence—Changing Requirements with the Transition to Digital Imaging

Session Chair(s): Douglas Bugner, Eastman Kodak Company

Wednesday, October 3 — 9:20 to 11:40 am

9:20 am	Imaging Permanence: Professional Photography Rita Hofmann, Ilford Imaging Switzerland GmbH (<i>Switzerland</i>)	159
---------	---	-----

10:00 am	Image Permanence: Commercial Signage/Fleet Graphic Ronald R. Adkins, Commercial Graphics Division, 3M (USA)	162
10:40 am	Unique Image Permanence Issues Faced in the Medical Imaging Field as it Transitions from Analog to Digital Output Paula Calloway, Eastman Kodak Company (USA)	166
11:20 am	Consumer Photography Franziska Frey, Rochester Institute of Technology (USA)	*

Lunch Break (on your own)

Image Permanence

*Session Chair(s): Henry Wilhelm, Wilhelm Imaging Research;
Rita Hofmann, Ilford Imaging Switzerland GmbH;
Tetsuo Murayama, Mitsubishi Chemical Corporation*

Wednesday, October 3—1:10 to 5:50 pm

1:10 pm	Focal Paper: Arrhenius Testing under Controlled Atmospheres: Measurement of Dark Keeping Properties of Inkjet Photographic Prints, Michelle Oakland, Douglas E. Bugner, Rick Levesque, and Peter Artz, Eastman Kodak Company (USA)	167
1:40 pm	Effect of Ozone Exposure on Inkjet Prints Deepthi Sid, RIT Research Corporation (USA)	171
2:00 pm	Ozone Concentration Effects on the Dark Fade of Inkjet Photographic Prints Michelle Oakland, Douglas Bugner, Rick Levesque, and Richard Vanhanehem, Eastman Kodak Company (USA)	175
2:20 pm	The Influence of Relative Humidity on Short-Term Color Drift in InkJet Prints, Mark McCormick-Goodhart and Henry Wilhelm, Wilhelm Imaging Research, Inc. (USA)	179
2:40 pm	Estimating Light-fastness of InkJet Images: Accounting for Reciprocity Failures, Shilin Guo and Nils Miller, Hewlett Packard Company (USA)	186
3:00 pm	Coffee Break	
3:40 pm	Focal Paper: Image Permanence of Ink Jet Photographic Prints Hiroyuki Onishi, Masahiro Hanmura, Hidemasa Kanada, and Teruaki Kaieda, Seiko Epson Corporation TP R&D Division (Japan)	192
4:10 pm	Reciprocity Behavior in the Light Stability Testing of Inkjet Photographs Henry Wilhelm and Mark McCormick-Goodhart, Wilhelm Imaging Research, Inc. (USA)	197

4:30 pm	Accelerated Laboratory Testing: Developing Meaningful Test Methods for Evaluating Light Stability of Ink Jet Images , Eric T. Everett, Q-Panel Lab Products (<i>USA</i>)	203
4:50 pm	Densitometry versus Colorimetry for Permanence Investigations Rita Hofmann, Eduard Baumann, and Remon Hagen, Ilford Imaging (Switzerland)	209
5:10 pm	Interpretation of Life-of-Display Prediction Calculated from Accelerated Light Fading Tests , G. Van Ackere, H. Kanora, M. Graindourze, H. Friedel, and S. Lingier, Agfa-Gevaert N.V. (<i>Belgium</i>)	213
5:30 pm	Issues in Evaluation and Standardization of Light Fading Tests of Ink Jet Materials , Barbara Vogt and Franziska Frey, Image Permanence Institute, Rochester Institute of Technology Rochester (<i>USA</i>)	218

Thursday, October 4, 2001

Image Permanence (continued)

*Session Chair(s): Henry Wilhelm, Wilhelm Imaging Research;
Rita Hofmann, Ilford Imaging Switzerland GmbH;
Tetsuo Murayama, Mitsubishi Chemical Corporation*

Thursday, October 4 —9:20 to 11:40 am

9:20 am	Focal Paper: Light Stability and Gas Fading on Nanoporous Ink-Jet Materials , Rolf Steiger, Pierre-Alain Brugger and Martin Staiger, Ilford Imaging GmbH (<i>Switzerland</i>)	222
9:50 am	The Durability of Digital Images on Photomedia Aidan Lavery and Steve Spittles, Felix Schoeller Digital Imaging (<i>England</i>)	226
10:10 am	Influence of Enclosure and Mounting Materials on the Stability of Inkjet Images , Mark B. Mizen and Christopher M. Mayhew, Creative Memories (<i>USA</i>)	231
10:30 am	Coffee Break	
11:00 am	Aging Properties of Non-Impact Prints: Influence of the Paper Properties Anne Blayo, Bernard Pineaux, and Franck Medlege, EFPG (<i>France</i>)	235
11:20 am	Physical Colors by Nanoparticle Resonant Color Pigments for High-Quality Printing Processes , Manfred R. Kuehnle and Herman Statz, XMX Corporation (<i>USA</i>)	239
	Lunch Break (on your own)	

Image Permanence (Continued)

*Session Chair(s): Henry Wilhelm, Wilhelm Imaging Research;
Rita Hofmann, Ilford Imaging Switzerland GmbH;
Tetsuo Murayama, Mitsubishi Chemical Corporation*

Thursday, October 4—1:10 to 3:30 pm

- | | | |
|---------|---|-----|
| 1:10 pm | Focal Paper: The Long-Term Preservation and Digital Access of the Corbis Photography Collections , Els Rijper and William Hannigan, Corbis Corporation (<i>USA</i>) | 243 |
| 1:40 pm | Spectroscopic Determination of Very Low Quantum Yield of Singlet Oxygen Formation Photosensitized by Dyes and Pigments
Shoichi Yamaguchi and Yutaka Sasaki, Center for Analytical Chemistry and Science, Inc. (<i>Japan</i>)
Kimiya Takeshita, Yukichi Murata, and Tetsuo Murayama, Mitsubishi Chemical Corporation (<i>Japan</i>) | 244 |
| 2:00 pm | Durability of Ink Jet Transfer Prints based on Fusible Coatings
Axel Niemöller and Manfred Schäfer, Sihl Research and Development/Digital Imaging (<i>Germany</i>) | 250 |
| 2:20 pm | Coffee Break | |
| 2:50 pm | Development of Image Longevity Enhancing UV Blocking PET Overlamination Films , Yijun Ye and Steve J. Sargeant, Toray Plastics America, Inc. Lumirror Operations (<i>USA</i>) | 254 |
| 3:10 pm | Natural Outdoor Testing: An Important Component of a Light Stability Testing Program , Eric T. Everett, Q-Panel Lab Products (<i>USA</i>) | 258 |

Friday, October 5, 2001

Production Digital Printing

Session Chair(s): Eric Stelter, Heidelberg Digital LLC; Gregor Enke, MAN Roland

Friday, October 5—8:00 to 10:00 am

- | | | |
|---------|---|-----|
| 8:00 am | Focal Paper: Reimageable Offset Master - A Close Look to the DICO Process Parameters , Michael Schönert, Alfons Schuster, and Josef Schneider, MAN Roland Druckmaschinen AG (<i>Germany</i>) | 263 |
| 8:30 am | Focal Paper: Digital Color Printing and the NexPress Approach
Arun Chowdry, NexPress Solutions LLC (<i>USA</i>) | 267 |

9:00 am	Remote Contract Proofing , William J. Hulsman and A. Stephen Novick, E. I. DuPont de Nemours and Co., Inc. (USA)	269
9:20 am	The Opportunity of Digital Color Printing , Christopher J. Payne, NexPress Solutions LLC (USA)	272
9:40 am	Developing a Common Print Application Architecture Leonard Christopher, NexPress Solutions LLC (USA)	275

Track 2

Monday, October 1, 2001

Ink Jet Processes

*Session Chair(s): Laurie Mittelstadt, Hewlett Packard Company;
Arthur Soucemarianadin, University Joseph Fourier; Shinri Sakai, Seiko Epson*
Monday, October 1—9:20 to 11:40 am

9:20 am	Focal Paper: A MEMS Ejector for Printing Applications A. Gooray, Eastman Kodak Co.; G. Roller, Xerox Corp., P. Galambos, K. Zavadil, R. Givler, and F. Peter, Sandia National Labs, J. Crowley, Electrostatic Applications	278
9:50 am	Continuous Improvement: Performance and Reliability in Shear Mode Piezo Ink Jet Printing , Marlene McDonald, Spectra, Inc. (USA)	287
10:10 am	Novel Silicon-Based Continuous Inkjet Printhead Employing Asymmetric Heating Deflection Means , James M. Chwalek, David Trauernicht, Christopher P. Delametter, David N. Jeanmaire, and Constantine Anagnostopoulos, Eastman Kodak Company (USA)	291
10:30 am	Coffee Break	
11:00 am	Performance of Fluids in a Silicon-Based Continuous Inkjet Printhead Using Asymmetric Heating , David P. Trauernicht, Christopher N. Delametter, James M. Chwalek, David L. Jeanmaire, and Constantine Anagnostopoulos, Electronic Imaging Products, R&D, Hardcopy and Display Technology Division, Eastman Kodak Company (USA)	295
11:20 am	Stimulation of a Conductive Liquid Jet Directly Heated by an Electric Current , B. Barbet, IMAJE (France); and P. Atten, L.E.M.D - CNRS & Université. Joseph Fourier (France)	299
	Lunch Break (on your own)	

Ink Jet Processes (Continued)

*Session Chair(s): Laurie Mittelstadt, Hewlett Packard Company;
Arthur Soucemarianadin, University Joseph Fourier; Shinri Sakai, Seiko Epson*

Monday, October 1, 2001—1:10 to 3:00 pm

- | | | |
|---------|---|-----|
| 1:10 pm | Focal Paper: Droplet Formation from Particulate Suspensions | 304 |
| | Roy J. Furbank and Jeffrey F. Morris, Georgia Institute of Technology (USA) | |
| 1:40 pm | Dynamics of Jetted Liquid Filaments | 308 |
| | Pascal Pierron, Sandrine Allaman, and Arthur Soucemarianadin,
University Joseph Fourier (France) | |
| 2:00 pm | Droplet Formation and Physical Characterization of Powder Suspensions | 313 |
| | Sarojini Deevi, Philip Morris, (USA) | |
| 2:20 pm | Air Bubble Management on a New Thermal Ink Jet Head | 314 |
| | Kazuyuki Oda, Koji Ikegami, Yoshihisa Ueda, and Masaki Kataoka,
Fuji Xerox Co., Ltd. (Japan) | |
| 2:40 pm | The Numerical Study on Size Effects of the Inkjet Print Head | 319 |
| | Ching-Long Chiu, Jinn-Cherng Yang, Chien-Hung Liu, Je-Ping Hu, and
Charles C. Chang, OES/ITRI (Taiwan) | |
| 3:00 | A Novel Re-circulating Ink Supply for Large Static Array and Scanning""; Carriage Printead Systems | |
| | Mats Ottosson, Xaar, UK | |
| 3:20 pm | Coffee Break | |

Ink Jet: Commercial and Industrial

*Session Chair(s): Hiromichi Noguchi, Canon;
Joseph Ryan, Hitachi Koki Imaging Solutions, Inc.; Mats Ottosson, Xaar*

Monday, October 1—3:40 to 5:10 pm

- | | | |
|---------|--|-----|
| 3:40 pm | Focal Paper: Adaptability of Piezoelectric Inkjet Head | 323 |
| | Tomoaki Takahashi, SEIKO EPSON Corporation (Japan) | |
| 4:10 pm | Performance Improvements for Commercial Piezo Printhead | 328 |
| | Thomas G. Duby, Spectra, Inc. (USA) | |
| 4:30 pm | An Aqueous UV Curable Inkjet Printing for Graphic Output | 332 |
| | Hiromichi Noguchi and Masako Shimomura, Canon Inc. (Japan) | |
| 4:50 pm | Direct Computer to Plate Printing | 336 |
| | Daniel F. Gloster and Michael A. Andreottola, American Ink Jet Corporation (USA) | |

Tuesday, October 2, 2001

Toner Based Printing Materials

Session Chair(s): Thomas Jadwin, Heidelberg Digital LLC; Peter Erk, BASF; Yoichi Yamamoto, Sharp Corp; Manabu Takeuchi, Ibaraki University

Tuesday, October 2—9:20 to 11:20 am

- 9:20 am **Focal Paper: Encapsulated Emulsion Aggregation Toner for High Quality Color Printing**, Yasuo Matsumura and Takashi Fuchiwaki, Fuji Xerox Co., Ltd. (*Japan*); and Patricia Burns, Xerox Research Centre of Canada (*Canada*) 341
- 9:50 am **Preparation of Toner Particles with Micro-serrated Texture by Chemical Milling**, Chul-Hwan Kim, Eui-Jun Choi, Seung-Wook Lim, Suk-Jin Kim, and Hyun-Nam Yoon, R&D Center of DPI Solutions, Inc. (*Korea*) 345
- 10:10 am Coffee Break
- 10:40 am **Particle Size Distribution and Morphology of Suspension Polymerized Mono-component Magnetic Toner**, Jun Yang, New Jersey Center for Engineered Particulates, NJIT (*USA*); Hong He, Tingjie Wang, Fei Wei, and Yong Jin, Department of Chemical Engineering, Tsinghua University (*China*) 350
- 11:00 am **The Toner for Low Energy Fusing by Using Crystallized Polyester** Eiji Shirai, Katsutoshi Aoki and Masayuki Maruta, Kao Corporation Performance Chemicals Research Laboratories (*Japan*) 354

Lunch Break (on your own)

Toner Based Printing Materials (Continued)

Session Chair(s): Thomas Jadwin, Heidelberg Digital LLC; Peter Erk, BASF; Yoichi Yamamoto, Sharp Corp; Manabu Takeuchi, Ibaraki University

Tuesday, October 2—1:10 to 3:50 pm

- 1:10 pm **Focal Paper: CCA Effects on the Triboelectric Charging Properties of a Two-Component Xerographic Developer**, Robert J. Nash, Michael L. Grande, and Richard N. Muller, Xerox Corporation (*USA*) 358
- 1:40 pm **Effect of CCA Particle Configuration on the Charging Behavior of CCA/Binder Matrix Film Surface**, Keiki Suganami, Manabu Takeuchi, Ibaraki University (*Japan*); and Toshihiko Oguchi, Morimura Chemicals Ltd. (*Japan*) 365

- 2:00 pm **Standardization of the Blow-off Charge Measurement Procedure and Standard Developer**, Toshihiko Oguchi, Morimura Chemicals Ltd. (*Japan*); Masatoshi Kimura, Fujitsu Ltd. (*Japan*); Noboru Sawayama, Ricoh Co., Ltd. (*Japan*); Chiaki Suzuki, Fuji Xerox Co., Ltd. (*Japan*); Masusuke Takahashi, Tokai University (*Japan*); Manabu Takeuchi, Ibaraki University (*Japan*); Tatsuya Tada, Canon Inc. (*Japan*); and Katsuyoshi Hoshino, Chiba University (*Japan*) 369
- 2:20 pm Coffee Break
- 2:50 pm **A Nodal Model for Non-Linear Conduction in Toner Particles Modified with Conductive Additives** 374
Vladislav Skorokhod, Xerox Research Centre of Canada (*Canada*)
- 3:10 pm **Study on Magnetic Force Acting on the Magnetic Toner in the High Pixel Density Magnetic Printer with Longitudinal Recording** 375
Norio Kokaji, Naoyuki Fujiya, and Taku Ono, Meisei University (*Japan*)

Wednesday, October 3, 2001

Ink Jet Materials

*Session Chair(s): Aidan Lavery, Felix-Schoeller Imaging;
James Mrvos, Lexmark International; Junichi Hanna, Tokyo Institute of Technology*

Wednesday, October 3—9:20 to 12 noon

- 9:20 am **Focal Paper: Polymeric Surface Modification of Pigmented Colorants and Applications to Digital Printing**, Mark Kowalski, Paul Palumbo, Friedrich von Gottberg, Curtis Adams, and Ron Gambale, Cabot Corporation.(*USA*) 379
- 9:50 am **Hyperbranched Polyesteramides For Imaging Applications** 382
Anindya Mukherjee, DSM New Business Development (*USA*); and Peter E. Froehling, DSM Research (*The Netherlands*)
- 10:10 am **Measurement of Modulus Changes of a Phenolic Adhesive Using Nanoindentation for an Inkjet Printhead Nozzle Plate** 385
James M. Mrvos and Girish S. Patil, Lexmark International (*USA*); Elizabeth C. Dickey and Christopher Wonderly, University of Kentucky (*USA*)
- 10:30 am Coffee Break
- 11:00 am **Overview of Next Generation Phase Change Ink** 392
Jule W. Thomas Jr., Xerox Corporation (*USA*)

11:20 am **Solid Ink Formulation Optimization Using Design of Experiment (DOE) Methodologies**, Michael B. Meinhardt, Xerox Corporation (USA) 396

11:40 am **Measurement and Improvement of Automatic Document Feed Performance of Solid Ink Prints**, Wolfgang Wedler, Xerox Corporation (USA) 399

Lunch Break (on your own)

Ink Jet Materials (Continued)

Session Chair(s): Aidan Lavery, Felix-Schoeller Imaging; James Mrvos, Lexmark International; Junichi Hanna, Tokyo Institute of Technology

Wednesday, October 3—1:10 to 2:20 pm

1:10 pm **Focal Paper: Fastness Properties of Ink Jet Prints on Coated Papers** 405
Katri Vikman, Helsinki University of Technology (Finland)

1:40 pm **Nanoporous Photorealistic Materials for InkJet** 411
P.A. Brugger, M. Staiger, R. Steiger, K. Peternell, and O. Cohu, ILFORD Imaging Switzerland GmbH (Switzerland)

2:00 pm **Dye and Pigment Ink Jet Image Stability and Permanence** 414
Ray A. Work, III, Work Associates, Inc. (USA); and
Russell T. Brown, DuPont Imaging Technologies (USA)

Textile and Fabric Printing

Session Chair(s): Ming Xu, Sawgrass System Inc.

Wednesday, October 3—2:30 to 5:30 pm

2:30pm **Focal Paper: The Future of Textile Printing Will be Digital** 418
Brooks G. Tippet, Digital Printing Systems (USA)

3:00 pm Coffee Break

3:40 pm **Focal Paper: Interrelationship Between Textile Design Styles and Production Methods**, Hitoshi Ujiie, Philadelphia University (USA) 423

4:10 pm **Thermodynamics of the Digital Transfer Printing Process** 426
Karl Siemensmeyer, John Provost, Friedrich W. Raulfs, and Jürgen Weiser, BASF Aktiengesellschaft (Germany)

4:30 pm **Pigmented Jet-Inks for Textile Applications** 431
Ally Grant, SunJet (United Kingdom)

- | | | |
|---------|--|-----|
| 4:50 pm | High Performance Piezo Ink Jet Printheads and Production Printing of Textiles , Linda T. Creagh and Howard T. Baldwin, Spectra, Inc. (USA) | 435 |
| 5:10 pm | Interactions of a Single Ink-Jet Droplet with Textile Printing Surfaces
H. Park and W. W. Carr, Georgia Institute of Technology (USA)
J. Zhu, Institute of Paper Science and Technology (USA) | 438 |

Thursday, October 4, 2001

Color Science and Image Processing

*Session Chair(s): Gerhard Thompson, IBM; Jos Notermans, Stork Digital Imaging BV;
Hiroaki Kotera, Chiba University*

Thursday, October 4 —9:20 to 11:20 am

- | | | |
|----------|---|-----|
| 9:20 am | Focal Paper: A System Design for Color Conversions
Jean Aschenbrenner, Reinhard Hohensee, and Yue Qiao, IBM (USA) | 442 |
| 9:50 am | Compact Description of 3D Image Gamut Surface by SVD
Hiroaki Kotera and Ryoichi Saito, Chiba University (Japan) | 446 |
| 10:10 am | Coffee Break | |
| 10:40 am | Comfortable Color Conversion using Image Segmentation
Mitsunori Suzuki and Hiroaki Kotera, Chiba University (Japan) | 450 |
| 11:00 am | 3D Gamut Comparison between Image and Device for Gamut Mapping
Ryoichi Saito and Hiroaki Kotera, Chiba University (Japan) | 454 |

Lunch Break (on your own)

Color Science and Image Processing (Continued)

*Session Chair(s): Gerhard Thompson, IBM; Jos Notermans, Stork Digital Imaging BV;
Hiroaki Kotera, Chiba University*

Thursday, October 4—1:10 to 4:40 pm

- | | | |
|---------|--|-----|
| 1:10 pm | Focal Paper: Printer Simulation Model
P.L.J. Welten and C.J.H. de Zeeuw, Stork Digital Imaging (The Netherlands) | 458 |
| 1:40 pm | The Independent Yellow Channel for Tetrachromatic Imaging
Vitali V. Gavrik (Germany) | 462 |

2:00 pm	Prediction of the Reflection Spectra of Three Ink Colour Prints Patrick Emmel and Roger David Hersch, Ecole Polytechnique Fédérale de Lausanne (EPFL) (<i>Switzerland</i>)	465
2:20 pm	Coffee Break	
2:50 pm	Extending Kubelka-Munk's Theory with Lateral Light Scattering Safer Mourad and Klaus Simon, Eidgenössische Materialprüfungs- und Forschungsanstalt (EMPA) (<i>Switzerland</i>); and Patrick Emmel and Roger David Hersch, Ecole Polytechnique Federale de Lausanne (EPFL) (<i>Switzerland</i>)	469
3:10 pm	Improved Color Error Diffusion Koen Vande Velde and Paul Delabastita, Agfa-Gevaert (<i>Belgium</i>)	474
3:30 pm	Focal Paper: Irrational Halftoning for Electronic Registration Douglas N. Curry, Xerox, Palo Alto Research Center (<i>USA</i>)	477
4:00 pm	Shapes of Printed Dots and Image Quality Shigeru Kitakubo, Yasushi Hoshino, and Shi-Biao Xu, Nippon Institute of Technology (<i>Japan</i>)	483
4:20 pm	Supercell Dither Masks with Constrained Blue Noise Interpolation Chai Wah Wu and Gerhard R. Thompson, IBM T.J. Watson Research Center (<i>USA</i>) Charles P. Tresser, IBM Global Financial Markets Research Center (<i>USA</i>) and Mikel Stanich, IBM Printing Systems Division (<i>USA</i>)	487

Friday, October 5, 2001

Thermal Printing

Session Chair(s): Dan Harrison, IIMAK; Michael Viola, Polaroid; Takao Abe, Konica

Friday, October 5—8:00 to 10:20 am

8:00 am	Focal Paper: Compact and Low Power-consuming Thermal Transfer Printer Unit for Built-in Use in Mobile Devices Shin'ichi Sagawai, ALPS Electric Co., Ltd, (<i>Japan</i>)	491
8:30 am	Photo Printing by Dye Thermal and Inkjet Techniques –Status and Prospects Richard A. Hann and Andrew A. Clifton, ICI Imagedata (<i>United Kingdom</i>)	495
8:50 am	New Thermal Offset Printing Employing Dye Transfer Technology (Tandem TOP-D) , Nobuyoshi Taguchi, Yukikazu Oochi, Kumio Nago, Yukihiro Shimazaki, and Shigeru Yoshida, AVC Company, Matsushita Electric Industrial Co., Ltd. (<i>Japan</i>)	499

9:10 am	Study of a 1200dpi High-Resolution Thermal Print Head Hirotooshi Terao, Toshifumi Nakatani, Noboru Tsushima, and Ikuo Hibino, ALPS Electric Co., Ltd. (<i>Japan</i>)	504
9:40 am	<i>Focal Paper: New Developments in Thermal Transfer Imaging</i> Daniel J. Harrison and Pam Geddes, IIMAK (<i>USA</i>)	508
10:10 am	Cohesive Ink Failure with Thermal Transfer Printing Tom Rogers, Kevin Conwell and Kathy McCready, Intermec Technologies Corporation (<i>USA</i>)	511

Track 3

Monday, October 1, 2001

Focused Session on Electronic Paper and Paper-like Display

*Session Chair(s): Masaaki Yokoyama, Osaka University,
Andronique Ioannidis, Xerox Corp.*

Monday, October 1—9:20 am to 11:40 am

9:20 am	Evolution and Potential of Thermal Rewritable Marking Yoshihiko Hotta, Thermal Media Company, Ricoh Co., Ltd. (<i>Japan</i>)	515
10:00 am	The Present and Future of Gyricon Electronic Paper Displays Robert Sprague, Xerox Palo Alto Research Center (<i>USA</i>)	519
10:40 am	E Ink Displays , Ian Morrison, E Ink Corporation (<i>USA</i>)	523
11:20 am	Photo-addressable Electronic Paper Using Cholesteric Liquid Crystal H. Arisawa, H. Harada, T. Kakinuma, T. Hikichi, N. Hiji, M. Koshimizu, T. Ishii, S. Yamamoto, H. Kobayashi, and D. Tsuda, Fuji Xerox Co. Ltd. (<i>Japan</i>)	526

Lunch Break (on your own)

Optoelectronic Imaging Materials and Devices

*Session Chair(s): Masaki Yokoyama, Osaka University; Jin Mizuguchi, Yokohama National
University; Frank Nuesch, EPF Lausanne; Jim Duff, Xerox Research Center of Canada*

Monday, October 1—1:10 to 5:00 pm

1:10 pm	<i>Focal Paper: Materials and Patterning Methods for Plastic Electronics</i> Zhenan Bao, Bell Laboratories, Lucent Technologies (<i>USA</i>)	530
---------	--	-----

1:40 pm	ITO Modification for More Efficient Hole Injection in Organic Light Emitting Diodes , Yulong Shen, Ken Diest and George Malliaras, Cornell University (USA)	531
2:00 pm	Space Charge Effects in Single Molecular Devices David H. Dunlap ^{1,2} and George G. Malliaras ¹ , ¹ Cornell University (USA) and ² University of New Mexico (USA)	532
2:20 pm	The Role of Copper Phthalocyanine for Charge Injection into Organic Light Emitting Devices , F. Nuesch, M. Schaer, M. Carrara, D. B. Romero, and L. Zuppiroli, EPFL (Switzerland)	533
2:40 pm	Photocurrent Multiplication in Pigment Dispersion Films and its Application to Opto-electronic Devices , Ken-ichi Nakayama, Yoshihiro Nishikawa and Masaaki Yokoyama, Osaka University (Japan); CREST, Japan Science and Technology Corporation (JST) (Japan)	538
3:00 pm	Coffee Break	
3:30 pm	Focal Paper: Electron Emission Devices Using Carbon Nanocoils Yoshikazu Nakayama, Lujun Pan, and Taichi Hayashida, University of Osaka Prefecture (Japan)	542
4:00 pm	Impurity Effect in Self-Organizing Molecular Semiconductors Takahiro Kamitani, Masahiro Funahashi, and Jun-ichi Hanna, Tokyo Institute of Technology (Japan)	546
4:20 pm	Relationship Between Molecular Properties of Hole Transport Molecules and Field Dependence of Hole Mobility , Takayuki Shoda, Tetsuo Murayama, and Akiteru Fujii, Mitsubishi Chemical Corporation (Japan)	550
4:40 pm	Focal Paper: Charge Transport Modelling in Organic Light-Emitting Diodes M. N. Bussac, E. Tutis, and L. Zuppiroli, Ecole Polytechnique Fédérale (Switzerland)	554

Tuesday, October 2, 2001

Optoelectronic Imaging Materials and Devices (Continued)

*Session Chair(s): Masaki Yokoyama, Osaka University;
Jin Mizuguchi, Yokohama National University; Frank Nuesch, EPF Lausanne;
Jim Duff, Xerox Research Center of Canada*

Tuesday, October 2—9:20 to 11:40 am

9:20 am	The Design of High Performance Organic Photoconductors (<i>Carlson Award Presentation</i>), Tetsuo Murayama, Mitsubishi Chemical Corporation (Japan)	557
---------	--	-----

9:50 am	π-π Interactions of Magnesiumphthalocyanine as Evaluated by Energy Partition Analysis , Jin Mizuguchi, Yokohama National University (<i>Japan</i>)	561
10:10 am	Crystal and Electronic Structures of Perylene Derivatives Kaoru Tojo and Jin Mizuguchi, Yokohama National University (<i>Japan</i>)	564
10:30 am	Coffee Break	
11:00 am	Time-resolved Fluorescence Study on Primary PhotocARRIER Generation Process in Layered Organic Photoreceptors Yutaka Sasaki and Shoichi Yamaguchi, Center for Analytical Chemistry and Science, Inc. (<i>Japan</i>); Takayuki Shoda, Shinji Aramaki and Tetsuo Murayama, Mitsubishi Chemical Corporation (<i>Japan</i>)	568
11:20 am	A Study of 1-Dot Latent Image Potential Kouichi Aizawa, Motohiro Takeshima, and Haruo Kawakami, Fuji Electric Imaging Device Company, Ltd. (<i>Japan</i>)	572

Lunch Break (on your own)

Specialty and Security Printing

Session Chair(s): Yee Ng, NexPress Solutions LLC; Loc Bui, Metromedia Technologies

Tuesday, October 2—1:10 to 3:30 pm

1:10 pm	Focal Paper: Overview of Industrial Digital Printing William R. Dougherty and Ann Reitnauer, Markem Corporation (<i>USA</i>)	576
1:40 pm	Digital Printing Adds New Dynamism to the Decorative Markets Jasmine Geerinckx, Barco Graphics (<i>Belgium</i>)	583
2:00 pm	Interactions of Solvent Based Inks and Vinyl for Ultrawide Format Graphics , Kevin Andrews, Metromedia Technologies, Inc. (<i>USA</i>); Nathaniel R. Schwartz and Michael Fein, Flint Ink Corporation (<i>USA</i>)	589
2:20 pm	Coffee Break	
2:50 pm	Metrology of Small Scale Features in Electrophotographic Non-Image Areas as Forensic Evidence , Tobin Tanaka, Canada Customs & Revenue Agency (<i>Canada</i>)	590
3:10 pm	Use of an Automated Print Quality Assessment System for the Forensic Classification of Inkjet Printers , Marc Gaudreau, American Society of Questioned Document Examiners, American Board of Forensic Document Examiners, Canadian Society of Forensic Science (<i>Canada</i>)	*

* Paper not available at time of publication

Wednesday, October 3, 2001

Toner Based Printing Processes

*Session Chair(s): Ian Neilson, Coates Electrographics;
Thomas Tombs, NexPress Solutions LLC; Koji Hirakura, Ricoh Company Ltd.*

Wednesday, October 3—9:20 to 11:40 am

- 9:20 am **Focal Paper: Dynamics of Magnetic Bead Chain in Magnetic Field** 594
Hiroyuki Kawamoto, Nobuyuki Nakayama, Makoto Yamaguchi,
Waseda University (*Japan*)
- 9:50 am **Statics of Magnetic Bead Chain in Magnetic Field** 600
Nobuyuki Nakayama, Hiroyuki Kawamoto, and Makoto Yamaguchi,
Waseda University (*Japan*)
- 10:10 am **Numerical Simulation of Toner Concentration Distribution in
Two-Component Developer by Diffusion-Convection Model** 606
Takeo Tsukamoto, Ricoh Company, Ltd. (*Japan*)
- 10:30 am Coffee Break
- 11:00 am **The Adhesion of Spherical Toner: Electrostatic and van der Waals Interactions** 610
D.S. Rimai, M. Ezenyilimba, W.K. Goebel, and S. Cormier,
NexPress Solutions LLC (*USA*)
and D. J. Quesnel, University of Rochester (*USA*)
- 11:20 am **Modeling Electrophotographic Developer Flow with Viscous Fluid Flow
Model**, Yasuo Takuma, Teruaki Mitsuya, Kaoru Kataoka, Heigo Ueki,
and Tomio Sugaya, Hitachi Koki Co., Ltd. (*Japan*)
Vladimir Rubek, Consultant (*USA*); and Akin Ecer, Purdue University (*USA*)

Lunch Break (on your own)

Toner Based Printing Processes (Continued)

*Session Chair(s): Ian Neilson, Coates Electrographics;
Thomas Tombs, NexPress Solutions LLC; Koji Hirakura, Ricoh Company Ltd.*

Wednesday, October 3—1:10 to 4:50 pm

- 1:10 pm **Focal Paper: The Charging Characteristics of Fine Particle Layers
with Corona-Charge**, Kazuhiko Furukawa, Shigeru Nishio,
Tetsuro Toyoshima, and Tooru Okuda, SHARP Corporation, (*Japan*) 619

1:40 pm	A Numerical Study of Induction Heating Fusers Shogo Yokota, Toshiaki Kagawa, Atsuyuki Katoh, SHARP Corporation (<i>Japan</i>)	624
2:00 pm	Ferroelectric Printing: Electrical Surface Conditions and Print Quality Susann Reuter, Arved C. Hübler, Sigrid Franke, Klaus Wolf, and Michael Schönert, Chemnitz University of Technologies (<i>Germany</i>) and MAN Roland Druckmaschinen (<i>Germany</i>)	629
2:20 pm	Analysis on Stick and Slip Behavior of Cleaning Blades Kuniki Seino and Shizuo Yuge, Minolta Co., Ltd. (<i>Japan</i>); and Masao Uemura, Toyohashi University of Technology (<i>Japan</i>)	633
2:40 pm	Numerical Simulation of Charging Characteristics under the Influence of Photoreceptor Defects , Satoshi Hasebe and Nobuyuki Nakayama, Fuji Xerox Co., Ltd. (<i>Japan</i>)	639
3:00 pm	Coffee Break	
3:40 pm	Photoconductor Charging Modeling for Color Laser Printing System Joong-Gwang Shin, Junhee Cho, Inyong Song, and Kyucheol Shin, Samsung Electronics Co., Ltd. (<i>Korea</i>)	643
4:10 pm	Transfer Current and Efficiency in Toner Transfer to Paper Hussain AL-Rubaiey, and Pirkko Oittinen, Helsinki University of Technology, (<i>Finland</i>)	648
4:30 pm	Focal Paper: Custom Color Printing with Liquid Toners Ed Caruthers, Enrique Viturro, Jim Larson, and George Gibson, Xerox Wilson Center for Research and Technology (<i>USA</i>)	653

Thursday, October 4, 2001

Advanced and Novel Imaging Systems

*Session Chair(s): Yong Zhou, Spectra Inc.;
Norio Kokaji, Meisei University; J. J. Eltgen, Xeikon*

Thursday, October 4—9:20 to 11:40 am

9:20 am	Findings from 15 years of TonerJet® Research (Kosar Award Presentation) Ove Larson, Array AB (<i>Sweden</i>)	657
9:50 am	Focal Paper: Acoustic Ink Printing: Photographic Quality Printing at High Speed , R. Sprague, B. Hadimioglu, C. Brown, S. Buhler, R. Ellson, S. Elrod, R. Kowalski, D. Mantell, R. Matusiak, J. Roy, D. Ruiz, B. Russo, M. Weisberg, D. White, M. Young, and J. Zesch, Xerox Palo Alto Research Center (<i>USA</i>)	660

- 10:20 am **Drop Modulation by Second Harmonic Using Fresnel Lens in Acoustic Inkjet Printing**, Toshinobu Hamazaki and Naoki Morita, Fuji Xerox Co., Ltd. (*Japan*) 664
- 10:40 am Coffee Break
- 11:00 am **Acoustic Ink Printing with Solid Ink** 669
S. Elrod, S. Buhler, R. Ellson, J. Fitch, B. Hadimioglu, R. Kowalski, R. Matusiak, J. Roy, B. Russo, R. Sprague, M. Weisburg, D. White, M. Young, and J. Zesch, Xerox Palo Alto Research Center (*USA*); J. Wang, E. Panides, and J. Domoto, Xerox Wilson Center for Research and Technology (*USA*)
- 11:20 am **Micromachined Piezoelectrically Actuated Flexensional Transducers for High Resolution Printing**, Gökhan Perçin, Adeptient (*USA*); and Butrus T. Khuri-Yakub, Stanford University (*USA*) 673
- Lunch Break (on your own)

Advanced and Novel Imaging Systems (Continued)

Session Chair(s): Yong Zhou, Spectra Inc.; Norio Kokaji, Meisei University; J. J. Eltgen, Xeikon

Thursday, October 4—1:10 to 3:30 pm

- 1:10 pm **Focal Paper: Contact Electrography - A New Electrographic Printing Technology**, Gerhard Bartscher and Domingo Rohde, NexPress GmbH (*Germany*) 677
- 1:40 pm **Dynamics of Pin Electrode in Pin-to-Plate Discharge System** 682
Hiroyuki Kawamoto, Kosuke Takasaki, and Hiromu Yasuda, Waseda University (*Japan*)
- 2:00 pm **Smart Printhead Electronics controls Print Quality in Océ's Direct Imaging Process**, M. Slot and René J. van der Meer, Océ Technologies B.V. (*The Netherlands*) 690
- 2:20 pm Coffee Break
- 2:50 pm **High-Speed High-Resolution 1200 dpi LED Print Head** 696
Masumi Taninaka, Masumi Koizumi, Masaharu Nobori, Hiroshi Tohyama, Mitsuhiro Ogihara, and Yukio Nakamura, Oki Digital Imaging Corporation (*Japan*)
- 3:10 pm **The Newly Developed Extra High Quality Imaging System Can Display Both Merits of Printing and Electric Imaging: Very Dark Expression Space** 701
Makoto Miyahara, JAIST, School of Information Science (*Japan*)

Friday, October 5, 2001

Print and Image Quality

Session Chair(s): Eric Zeise, NexPress Solutions;
Katja Sipi, Helsinki University of Technology; Makoto Matsuki, NTT Quaris Corp.

Friday, October 5—8:00 to 11:20 am

8:00 am	Focal Paper: Image Quality Criteria and the Enhancement of Digital Prints , Rodney Shaw, Hewlett Packard Research Laboratories (USA)	705
8:30 am	Repurposing Device-Dependent Screens for Unintended Printers Stephen Herron, Xerox Corporation (USA)	709
8:50 am	A New Method of Measuring Gloss Mottle and Micro-Gloss Using a Line-Scan CCD-Camera Based Imaging System , Yair Kipman, Prashant Mehta, Kate Johnson, and Dave Wolin, ImageXpert, Inc. (USA)	714
9:10 am	Gloss Uniformity Attributes for Reflection Images Yee S. Ng, Chunghui Kuo, and C. Jeffrey Wang, NexPress Solutions LLC (USA)	718
9:30 am	A Report on a Subjective Print Quality Survey Conducted at NIP16 Gretchen Gast and Ming-Kai Tse, Quality Engineering Associates Inc. (USA)	723
9:50 am	Coffee Break	
10:10 am	Focal Paper: Media Issues In Electrophotographic Digital Printing Velliur Sankaran and James Smith, Oce Printing Systems USA, Inc. (USA)	728
10:40 am	Modeling Ink-penetration for Ink-jet Printing Li Yang, Björn Kruse, Campus Linköping University (Sweden) Nils Pauler, Mreal AB (Sweden)	731
11:00 am	Measuring Dynamic Interactions Between Paper and Microscale Ink Drops Jali Heilmann, VTT Information Technology (Finland)	735

Interactive Group T-A

Tuesday, October 2, 2001

Interactive Session: Advanced and Novel Imaging Systems

4:10 pm	A Novel Application of Ink-Jet Printing Technology on Manufacturing Color Filter for Liquid Crystal Display , Kevin Cheng, Tz-Ya Yang, Victor Wang, Chien-Chang Lai, Kuo-Hua Wu, and Jessen Chen, OES/Industrial Technology Research Institute (Taiwan)	739
---------	--	-----

- 4:15 pm **Role of Charge Transport Layer in Toner Display by Electrical Particle Movement**, Makoto Yasuda, Gug-rae Jo, Katsuyoshi Hoshino, and Takashi Kitamura, Chiba University (*Japan*) 744
- 4:20 pm **A New Type of Display for Electric Paper Using Fine Particles Dispersed in the Nematic Liquid Crystal Cell**
Yasuo Toko, Yasushi Iwakura, Stanley Electric Co., Ltd. (*Japan*)
Yutaka Kohrin, Tetsuya Hayakawa, and Taiju Takahashi, Kokakuin University (*Japan*) 748
- 4:25 pm **Evaluation of Particle Velocity in Mobile Fine Particles Display with Liquid Crystal**, Taiju Takahashi, Yutaka Kohrin, Tetsuya Hayakawa, Kogakuin University (*Japan*), Yasuo Toko, and Yasushi Iwakura, Stanley Electric Co., Ltd. (*Japan*) 752
- 4:30 pm **Operation Efficiency Measurements and Subjective Evaluations for Tasks on Hardcopy and Various Displays**, Hirokazu Yoshikawa, Hidenori Sakai, Makoto Omodani, and Yasusuke Takahashi, Tokai University (*Japan*) 756
- Interactive Session: Optoelectronic Imaging Materials**
- 4:35 pm **J-Aggregate-like Structure and its Influence on the Electronic Spectra in 1,4-diketo-3,6-bis(4-biphenyl)pyrrolo[3,4-c] pyrrole**
Jin Mizuguchi, Yokohama National University (*Japan*) 760
- 4:40 pm **Can the Poole-Frenkel Model Explain the Charge Carrier Transport in Disordered Organic Materials?**
Sergey Novikov, A.N. Frumkin Institute of Electrochemistry (*Russia*) 764
- 4:45 pm **Photoelectrochemical Stability of Triarylamine Doped Polycarbonate Layers** 768
Konstantin K. Kochelev, Vladimir N. Bulavka, Gennady B. Lapa, Alexander E. Gekhman, Vladimir E. Golovin, and Galina A. Kocheleva, Scientific Research Phototechnical Institute (NIFTI) (*Russia*)
- 4:50 pm **Surface Voltage Decay Model of Phthalocyanine Binder Type Photoreceptor (II)**, Yasushi Hoshino, Nippon Institute of Technology (*Japan*) 772
- 4:55 pm **Flow Behavior of Micro Inkjet Drop on The Layer Surface of Micro Color Device**, Chin-Tai Chen and Tz-Ya Yang, Industrial Technology Research Institute (*Taiwan*) 776

Interactive Group T-B

Tuesday, October 2, 2001

Interactive Session: Color Science and Image Processing

4:10 pm	Resolution Distribution in Human Vision Hideaki Takamiya, Makoto Omodani, and Yasusuke Takahashi, Tokai University (<i>Japan</i>)	780
4:15 pm	Digital Halftoning Based on a Repulsive Potential Model Kazuhiya Yanaka and Hideo Kasuga, Kanagawa Institute of Technology (<i>Japan</i>) and Yasushi Hoshino, Nippon Institute of Technology (<i>Japan</i>)	784
4:20 pm	Gamma Transformation (Tone Rescaling) by Sigmoid Function II, Yoshitaka Iwasaki, Takashi Yamaguchi, Takashi Watanabe, and Yasushi Hoshino, Nippon Institute of Technology (<i>Japan</i>)	789
4:25 pm	Document Resizing Using a Multi-layer Neural Network Mohamed N. Ahmed, Brian E. Cooper, and Shaun Love, Lexmark International (<i>USA</i>)	792
4:30 pm	Gamut Mapping in a Composite Color Space Huanzhao Zeng, Hewlett-Packard Company (<i>USA</i>)	797
4:35 pm	Color Gamut Mapping along Electrostatic Field Lines Maarten van Gestel and Henk Draaisma, Océ-Technologies B.V. (<i>The Netherlands</i>)	801
4:40 pm	3-Dimensional Color Gamut Quantification and Comparison Paul Doll, American Ink Jet Corporation (<i>USA</i>)	804

Interactive Session: Print and Image Quality

4:45 pm	Stochastic Frequency Distribution Analysis as Applied to Ink Jet Print Mottle Measurement, Roy R. Rosenberger, Verity IA LLC (<i>USA</i>)	808
4:50 pm	Comparative Study Between Digital and Offset Litho Printing Systems, George Nubar Simonian, Helwan University (<i>Egypt</i>)	813
4:55 pm	3-D Convex Outputs for the Blind - Image Quality Analysis Ludwik Buczynski, Warsaw University of Technology (<i>Poland</i>)	820
5:00 pm	Applications of Human Vision Modeling Theories in Image Quality Valuation of Ink Jet Hardcopy Outputs, Arkadiusz Pietrzak, Warsaw University of Technology (<i>Poland</i>)	825

Interactive Session: Digital Printing/Quality Control Instrumentation

- 5:05 pm **The Automatic Primary Charge Roller Detecting System** 830
Hungjing Tiong and Hsu Jonathan, OES, ITRI (*Taiwan*)

Interactive Group TH-A

Thursday, October 4, 2001

Interactive Session: Toner Based Printing Material

- 3:50 pm **Relationship between Tribocharge and Contact Potential Difference in Toner-Carrier Systems**, Masahide Yamaoka and Manabu Takeuchi, Ibaraki University (*Japan*) 834
- 3:55 pm **Toner Charging Behavior in Mono-Component Developing Process** 838
Norimasa Iwai and Manabu Takeuchi, Ibaraki University (*Japan*)
Yoichi Yamamoto, Sharp Corp. (*Japan*)
- 4:00 pm **High Performance Magenta for NIP Applications** 842
Ruediger Baur and Hans-Tobias Macholdt, Clariant GmbH (*Germany*)
- 4:05 pm **Morphology of Toner-Silica Interfaces** 845
Mario Heinemann, Herbert Barthel, Ute Volkel, Sabine Hild, Wasker-Chemie GmbH (*Germany*); University of Ulm (*Germany*)

Interactive Session: Toner Based Printing Processes

- 4:10 pm **The Effect of Relative Humidity on the Toner in the Developing Process** 848
Liu Howard and Hungjing Tiong, OES/ITRI (*Taiwan*)
- 4:15 pm **MICR Performance and the Relationship to MICR Toner Adhesion** 852
James C. Maher, Richard Chatfield, Francisco Aponte, and Daniel Charles, Rosetta Technologies Corporation (*USA*)
- 4:20 pm **An Improved Technique for the Driven Characteristics for Toner Transportation**, Keiji Taniguchi, Tatsuaki Yagi, Yutaka Nakano, Takanori Sakai, Hiroaki Yamamoto, and Sadakazu Watanabe, Fukui University (*Japan*) 856
- 4:25 pm **Measured Specific Toner Charge Dependence on Suction Pressure in Blow off Method**, R. Ohtsuka, T. Fujita, K. Konnai, and Yasushi Hoshino, Nippon Institute of Technology (*Japan*) 860
- 4:30 pm **Characteristic Analysis for Color Development Process Using Liquid Toner**, Inyong Song, Junhee Cho, Joong-Gwang Shin, and Kwangho No, Samsung Electronics Co., Ltd. (*Korea*) 864

Interactive Group TH-B

Thursday, October 4, 2001

Interactive Session: Media for Digital Printing

- 3:50 pm **Analysis of Inkjet Paper Print Quality: Filling the “Quality Gap”** 869
Frank Huskey, Engelhard Corporation (*USA*)
- 3:55 pm **Humidity Effects on Plain Paper in Inkjet Printing** 874
Olle Högberg, Stora Enso Fine Paper (*Sweden*)
Minna Talaskivi, Stora Enso Research (*Finland*) and
Göran Ström, Stora Enso Research (*Sweden*)

Interactive Session: Ink Jet Materials

- 4:00 pm **Fluorescent Nanocolorants Based on Dye-Packaging Technology for Ink Jet Application**, Nikolay N. Barashkov and Ronghua Liu, 878
Radiant Color (*USA*)

Interactive Session: Ink Jet: Commercial and Industrial

- 4:05 pm **Optimization Fiber Density Design of Fibrous Ink Retaining Member in the Ink jet Cartridge**, Leonid Yuan and Chien-Chang Lai, 881
OES, ITRI (*Taiwan*)

Interactive Session: Ink Jet Processes

- 4:10 pm **Acoustic Phenomena in a Demand-Mode Piezoelectric Ink-Jet Printer** 885
Bogdan V. Antohe and David B. Wallace, MicroFab Technologies Inc. (*USA*)
- 4:15 pm **Designing and Optimizing New Microchannel Architectures to Approach High Frequency Inkjet**, Chien-Hung Liu, Je-Ping Hu, Shu-Chuan Cheng, and Chun-Jung Chen, Industrial Technology Research Institute (*Taiwan*) 890

Interactive Session: Specialty and Security Printing

- 4:20 pm **Reproduction of Depth of Scene in Some Kinds of Printing** 895
Hideki Shirai and Makoto Miyahara, JAIST, School of Information Science (*Japan*)