

# **18th International Conference on Digital Printing Technologies 2002**

**(NIP 18)**

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# The Papers Program

## The Keynote Papers

*Session Chair: Rita Hofmann, Ilford Imaging Switzerland GmbH*

8:00 am to 9:10 am

Monday	<b>Will Displays Be Everywhere?</b> Maarten Buijs, Royal Philips Electronics ( <i>The Netherlands</i> )	1
Tuesday	<b>The Evolution of Display World, The Present and The Future</b> Masaya Hikikigawa and Yutaka Ishii, Sharp Corporation ( <i>Japan</i> )	4
Wednesday	<b>Digital Color Printing: The New Business of Printing</b> Rafik Loutfy, Xerox Innovation Group ( <i>Canada</i> )	5
Thursday	<b>Pigments and Dyes for Non-Impact Printing Applications</b> Hans-Tobias Macholdt, Clariant GmbH ( <i>Germany</i> )	6

## Track I

### Toner Based Printing Processes

*Session Chairs: Koji Hirakura, Ricoh; Detlef Schulze-Hagenest, NexPress GmbH;  
Eric Stelter, Heidelberg Digital LLC; and Bill Hanson, Torrey Pines Research*

Monday, September 30, 9:40 to 11:50 am

9:40 am	<b>(Focal) Particle Removal with High Electric Fields and Repeated Bombardment</b> , Howard Mizes and Jim Beachner, Xerox Corporation ( <i>USA</i> )	7
10:10 am	<b>Analysis of Mono-Component Toner Charging and Design of a High Durability Development Roller</b> , Koji Takagi and Manabu Takeuchi, Ibaraki University ( <i>Japan</i> ); G.S.P. Castle, University of Western Ontario ( <i>Canada</i> )	12
10:30 am	<b>An Experimental Design for Non-Contact Type Single Component Non-Magnetic Development System</b> , Jong Moon Eun, Hyun Cheol Lee, Ki Jae Do, Hyun Wook Bae, and Duck Hee Lee, Samsung Electronics Co., Ltd. ( <i>Korea</i> )	17
10:50 am	<b>Electric Field Calculation Based on PIDC in Monocomponent Development Systems</b> , Jang Yi and Richard B. Wells, University of Idaho; and Tom Camis, Hewlett Packard Company ( <i>USA</i> )	23
11:10 am	<b>Resonance Frequency and Stiffness of Magnetic Bead Chain in Magnetic Field</b> , Hiroyuki Kawamoto, Nobuyuki Nakayama and Satoshi Yamada, Waseda University ( <i>Japan</i> )	28
11:30 am	<b>Visualization Study of an Interaction Between Airflow and Scattering Toner</b> , Keisuke Uchida, Ricoh Company, Ltd. ( <i>Japan</i> )	36

## Toner Based Printing Processes (*continued*)

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1:10 pm	<i>(Focal)</i> <b>Electrostatic Adhesion Forces in Electrophotography,</b> Eric Stelter, Ulrich Mutze and Joseph Guth, Heidelberg Digital LLC ( <i>USA</i> )	40
1:40 pm	<b>New Corona Charging System For Low Cost Printers,</b> R. W. Gundlach, Aetas Technology Inc. ( <i>USA</i> ); and A. Fornalik and W. Mey, Torrey Pines Research ( <i>USA</i> )	41
2:00 pm	<b>The Adhesion of Spherical Toner Particles to an Organic Photoconductor: Contributions of van der Waals and Electrostatic Interactions,</b> S. Cormier, D. S. Rimai, NexPress Solutions LLC ( <i>USA</i> ); and D. J. Quesnel, University of Rochester ( <i>USA</i> )	45
2:20 pm	Coffee Break	
2:40 pm	<b>Characteristics of Intermediate Transfer Process,</b> Tsuneo Mizuno and Jun-ichi Hanna, Tokyo Institute of Technology ( <i>Japan</i> )	49
3:00 pm	<b>Reinforced Elastomer Roller for Toner Transfer,</b> Diane Herrick, Bonnie Patterson and Biao Tan, NexPress Solutions, LLC ( <i>USA</i> )	53
3:20 pm	<i>(Focal)</i> <b>Color Radiant Fusing with Continuous and Flash Radiation,</b> Domingo Rohde and Detlef Schulze-Hagenest, NexPress GmbH ( <i>Germany</i> )	58
3:50 pm	<b>Fuser Roll Material Effects on Digital Print Quality,</b> Velliyur R. Sankaran, Sankaran Consulting ( <i>USA</i> ); and James Smith, OCE Printing Systems USA, Inc. ( <i>USA</i> )	65

## Award Talks Session

*Session Chairs: David Weiss, Heidelberg Digital LLC; Kuniki Seino, Minolta Co.;  
and Rita Hofmann, Ilford Imaging Switzerland GmbH*

Tuesday, October 1, 9:40 am to 11:40 am

9:40 am	<i>(Invited)</i> <b>A Century of Image Science,</b> Rodney Shaw, Hewlett-Packard Research Laboratories ( <i>USA</i> )	67
10:10 am	<i>(Invited/NIP17)</i> <b>The Design of High Performance Organic Photoconductors,</b> Tetsuo Murayama, Mitsubishi Chemical Corporation ( <i>Japan</i> )	73
10:40 am	<i>(Invited)</i> <b>The Impact of Digital Xerography on Marking Materials,</b> Robert Nash, Consultant, Hafren Associates ( <i>USA</i> )	77
11:10 am	<i>(Invited)</i> <b>Study of High Definition Thermal Transfer Ink Ribbon,</b> Ikuro Hibino, Alps Electric Co., Ltd. ( <i>Japan</i> )	83

# Printing Systems Engineering/Optimization

Session Chairs: Randy Sanders, Torrey Pines Research; Bart Verlinden, Agfa Gevaert NV;  
and Toshihiko Oguchi, Morimura Chemicals, Ltd.

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1:00 pm	<b>(Focal) Photo-Quality Printing on a Digital Printing Press,</b> A. Ufuk Agar, Gary Dispoto, Ingeborg Tastl, Kok-Wei Koh, and Niranjan Damera-Venkata, Hewlett-Packard Laboratories (USA)	87
1:30 pm	<b>(Focal) Robust Spatial-sampling Controller Design for Banding Reduction in Electrophotographic Process,</b> Cheng-Lun Chen, George T. C. Chiu and Jan P. Allebach, Purdue University (USA)	91
2:00 pm	<b>A High Consistency Color Correction System in an Inkjet Printer,</b> Ferran Vilanova and Ramon Borrell, Hewlett-Packard (Spain)	98
2:20 pm	<b>Extending Life of Thermal Inkjet Printheads for Commercial Applications,</b> Xavier Bruch, Hewlett-Packard (Spain)	103
2:40 pm	<b>A Numerical Method Predicting the Paper Velocity at the Roller Transfer Unit in an Electrophotographic System,</b> Satoshi Okano, Osamu Takehira and Yuko Hayama, Ricoh Co., Ltd. (Japan)	108
3:00 pm	<b>Semi-Conductive Polyurethane in EP Systems,</b> Charles J. Matteliano, Winfield Industries, Inc. (USA)	114

Tuesday Evening, October 1

## Interactive Sessions

3:50 to 6:30 pm

Five minute oral previews will be followed by a conference-wide poster session beginning at .  
The poster presenters will be standing by their posters to discuss their work with participants.  
*The Interactive Papers Program begins on page xxvi.*

## Print Gallery

Five-minute oral previews will be given from 3:50 to 4:50 pm on Tuesday in Track I room.  
A Gallery of state-of-the-art print samples will be maintained Tuesday through Thursday.

## Textile Forum

7:30 to 9:00 pm

After the panel members present, attendees are encouraged to question panelists and  
offer their own viewpoints. The exhibit of digitally printed textile and fabrics will be maintained  
Tuesday through Thursday.

\* paper not available at time of publication

## Special Topic: Digital Printing Commercial and Industrial Applications

*Session Chairs: Huoy-Jen Yuh, Xerox Corporation; Eric Stelter, Heilderberg Digital LLC;  
and Hiromichi Noguchi, Canon Inc.*

Wednesday, October 2, 9:20 to 11:20 am

9:20 am	<b>Digital Color Printing: Expanding Solutions and Applications,</b> Christopher Bondy, NexPress Solutions LLC (USA)	*
10:00 am	<b>Ink Jet Printing in Industrial and Commercial Applications,</b> Nathaniel R. Schwartz, Flint Ink Corporation (USA)	118
10:40 am	<b>High Speed Inkjet Technology in the Corrugated Packaging Market - A Business Case,</b> Niels Frederiksen, Scitex Digital Printing, Inc. (USA)	*

## Special Topic: Digital Printing Commercial and Industrial Applications (*continued*)

Wednesday, October 2, 1:00 to 3:00 pm

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2:20 pm	<b>Printing for an Audience of One,</b> Robert J. Barbera, Xeikon America, Inc. (USA)	130

## Production Digital Printing

*Session Chairs: Peter Bracke, Dotrix; Eric Stelter, Heidelberg Digital LLC; and  
Huoy-Jen Yuh, Xerox Corporation*

Thursday, October 3, 9:20 to 11:30 am

9:20 am	( <i>Focal</i> ) <b>Short Run Digital Color....Where is the Market?</b> Barbara A. Pellow, Rochester Institute of Technology (USA)	131
9:50 am	<b>The Production Digital Printing Market: Opportunities and Trends,</b> Ron Gilboa, CAP Ventures Inc. (USA)	134
10:10 am	<b>MICR Laser Printing and High Speed Reader/Sorter Performance,</b> James C. Maher, Daniel Charles and Francisco Aponte, Rosetta Technologies Corporation (USA)	139
10:30 am	<b>Intelligent Cut Sheet Media Handling,</b> Chuck Bennett, Xerox Corporation (USA)	143
10:50 am	<b>ToneJet: A New Standard in Digital Printing,</b> John Teape, Peter Taylor, Owen Crees, Stephen Nicholls, and Neil Emerton, ToneJet Limited (UK)	145
11:10 am	<b>Developing Print Applications for Both Offset and Electrophotographic Printing,</b> Leonard R. Christopher, Heidelberg Digital LLC (USA)	*

\* paper not available at time of publication

# Ink Jet Printing Processes

Session Chairs: Shinri Sakai, Seiko Epson and Ramon Borell, HP Spain

Thursday, October 3, 12:50 to 3:30 pm

12:50 pm	<i>(Focal)</i> <b>The Development of Static Electricity Actuated Inkjet Head for POS Printers</b> , Masahiro Fujii and Taro Takekoshi, Seiko Epson Corporation ( <i>Japan</i> )	148
1:20 pm	<b>Operating Voltage Effects on Bubble Growth Dynamics of Thermal Inkjet Printheads</b> , Jinn-Cherng Yang, Ching-Long Chiu and Charles C. Chang, OES/ITRI ( <i>China</i> )	153
1:40 pm	<b>The Quality Plan for the Manufacture of an Ink Jet Print Assembly with 1536 Jets</b> , Carl Tracy and Dave Grose, Spectra, Inc. ( <i>USA</i> )	157
2:00 pm	<i>(Focal)</i> <b>Large Drop Volumes from Xaar-Type Inkjet Printheads</b> , W. Zapka, R. Kaack, W. Voit, M. Schulz, M. Zimmerman, L. Levin and W. Ahlemeier, XaarJet AB ( <i>Sweden</i> )	161
2:30 pm	<b>Ink Jet Modeling For Development of New High Performance Ink Jet</b> , Robert Hasenbein, Spectra, Inc. ( <i>USA</i> )	166
2:50 pm	<b>Transient Phenomena During Drop Formation in DOD Printing</b> , Brice Lopez, Damien Vadillo and Pascal Pierron, ARDEJE ( <i>France</i> ); and Arthur Soucemarianadin, LEGI, University Joseph Fourier at Grenoble ( <i>France</i> )	170
3:10 pm	<b>Systematic Consideration for the Thermodynamic Stability of Pigmented Inkjet Dispersions and Inks</b> , Jie Wang, Graphic Sciences, Inc. ( <i>USA</i> )	176

## Interactive Sessions

Thursday, October 3, 3:40 to 6:30 pm

Five minute oral previews will be given at the end of the oral sessions in the appropriate track rooms and followed by a conference-wide poster session. The poster presenters will be standing by their posters to discuss their work with participants. *The Interactive Papers Program begins on page xxvi.*

## Thermal Printing

Session Chairs: Richard Henzel, Eastman Kodak Company;  
Robert Weiss, MAN Roland; and Takashi Kitamura, Chiba University

Friday, October 4, 8:00 to 10:30 am

8:00 am	<i>(Focal)</i> <b>Media Advances in Dye Diffusion Thermal Transfer to Facilitate a Multihead Printer System</b> , David G. Foster and Maurice L. Gray, Eastman Kodak Company ( <i>USA</i> )	180
8:30 am	<b>Kodak Professional ML-500 Digital Photo Print System</b> , David E. Coons, Eastman Kodak Company ( <i>USA</i> )	184
8:50 am	<b>Scanner-based Granularity Measurement on a Continuous Density Wedge</b> , Dirk W. Hertel and Bror O. Hultgren, Polaroid Corporation ( <i>USA</i> )	189
9:10 am	<b>Scanner-Based Measurement of Print Line Placement</b> , Suhail S. Saquib, Dirk W. Hertel, James W. Slack, Brian Busch and Richard G. Egan, Polaroid Corporation ( <i>USA</i> )	195

9:30 am	<b>Model-Based Thermal History Control,</b> Suhail S. Saquib and William T. Vetterling, Polaroid Corporation ( <i>USA</i> )	200
9:50 am	<b>Digital Ceramics and Glass Decoration with Thermal Transfer Printing,</b> Daniel J. Harrison and Pam Geddes, IIMAK ( <i>USA</i> )	205
10:10 am	<b>Development of an In-line Cross-linked Thermal Dye Transfer Receiver,</b> Teh-Ming Kung, Dave Bailey, George Bodem, and Brian Pope, Eastman Kodak Company ( <i>USA</i> )	*

## Track II

### Special Topic: Security Printing

*Session Chair: Annette Jaffe, Consultant*

Monday, September 30, 9:40 am to 11:40 am

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10:20 am	<b>The Use of Non Impact Printing in Security Documents such as Passports,</b> Ronald K. Seguss, Canadian Passport Office ( <i>Canada</i> )	209
11:00 am	<b>Is Your Document Safe: An Overview of Document and Print Security,</b> Edward J. Delp, Purdue University ( <i>USA</i> )	*

### Special Topic: Security Printing (*continued*)

Monday, September 30, 1:10 to 4:10 pm

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1:50 pm	<b>InkJet Counterfeiting on the Desktop: A Problem to be Faced,</b> Tony Harris, Software 2000 (UK) Ltd. ( <i>UK</i> )	213
2:30 am	Coffee Break	
2:50 pm	<b>Document Verification and Traceability Through Image Quality Analysis,</b> David Wolin, ImageXpert, Inc. ( <i>USA</i> )	214
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### Panel Discussion on Security Printing

Monday, September 30, 5:00 to 6:30 pm

*Moderators: Sara Church, Bank of Canada; Lorelei Pagano, U. S. Secret Service*

\* paper not available at time of publication



## Special Topic: Nontraditional Ink Jet Applications

*Session Chair: Linda Creagh, Spectra, Inc.*

Tuesday, October 1, 9:40 am to 11:40 am

- |          |  |     |
|----------|--|-----|
| 9:40 am  | <b>Inkjet Printing of Materials as a Mimic of Biological Growth,</b><br>Yuka Yoshioka, Ghassan Jabbour and Paul Calvert, University of Arizona (USA)   | 223 |
| 10:20 am | <b>Digital Ink-jet-based Printing: Beyond Color,</b><br>James Caruso, Toivo Kodas and Mark Hampden-Smith,<br>Superior MicroPowders (USA)   | 227 |
| 11:00 am | <b>Solder Jet™ - Optics Jet™ - AromaJet™ - Reagent Jet - Tooth Jet<br/>and Other Applications of Ink-Jet Printing Technology,</b><br>David B. Wallace and Donald J. Hayes, MicroFab Technologies, Inc. (USA) | 228 |

## Textile and Fabric Printing

*Session Chairs: Ming Xu, Sawgrass; and Jos Notermans, Stork Digital Imaging BV*

Tuesday, October 1, 1:10 to 3:00 pm

- |         |  |     |
|---------|--|-----|
| 1:10 pm | <i>(Focal)</i> <b>Effects of Pretreatments on Print Qualities of Digital Textile Printing,</b><br>Qinguo Fan, Yong K. Kim, Armand F. Lewis and Melynda K. Perruzzi,<br>University of Massachusetts Dartmouth (USA) | 236 |
| 1:40 pm | <b>Developments in Textile Ink Jet Printing with Pigment Inks,</b><br>Ulrike Hees, Mike Freche, Michael Kluge, John Provost, and Juergen Weiser,<br>BASF Aktiengesellschaft (Germany)                              | 242 |
| 2:00 pm | <b>The Use of Cycolor Technology in Textile Printing,</b><br>Ibrahim Katampe and Joseph C. Camillus, Cycolor Inc. (USA)  | 246 |
| 2:20 pm | <b>Virtual Designing in 3D for Textile Printing,</b><br>Lisa Parrillo Chapman and Cynthia L. Istook, North Carolina State University (USA)   | 249 |
| 2:40 pm | <b>Textile Design Education in Digital Inkjet Fabric Printing,</b><br>Hitoshi Ujiie, Philadelphia University (USA)   | 254 |

## Interactive Sessions

Tuesday, October 1, 3:50 to 6:30 pm

Five minute oral previews will be given at the end of the oral sessions in the appropriate track rooms and followed by a conference-wide poster session. The poster presenters will be standing by their posters to discuss their work with participants. *The Interactive Papers Program begins on page xxvi.*

## Toner Based Printing Materials

*Session Chairs: Patricia Burns, Xerox Corporation; Mary McStravick, Xerox Corporation;  
Ian Neilson, Coates Electrographic; and Suda Kiatkamjornwong, Chulalongkorn University*

Wednesday, October 2, 9:20 to 11:40 am

- |         |  |     |
|---------|--|-----|
| 9:20 am | <i>(Focal)</i> <b>The Toner for Low Energy Fusing by Using Crystalline Polyester,</b><br>Eiji Shirai, Katsutoshi Aoki and Masayuki Maruta, Kao Corporation (Japan) | 258 |
|---------|--|-----|

9:50 am	<b>Toner Binder Resins with Improved Fusing Properties,</b> Klaus Berger and Matthias Bruch, Ticona GmbH ( <i>Germany</i> ); Toru Nakamura, Ticona Japan Ltd. ( <i>Japan</i> )	262
10:10 am	<b>Study on Shear Rate and Particle Shape-dependency of Viscosity for Electrophotographic Liquid Toners,</b> Joong-Hwan Choi and Kyung-Yol Yon, Samsung Electronics Co. Ltd. ( <i>Korea</i> )	266
10:30 am	<b>Properties and Printer Performance of Wax-containing Polyester Toners Prepared by Chemical Milling,</b> Eui-Jun Choi, Chul-Hwan Kim, Tae-Ho Park and Hyun-Nam Yoon, DPI Solutions, Inc. ( <i>Korea</i> )	270
10:50 am	<b>Tailoring Resin Properties of In-situ Suspension Polymerized Toner,</b> Jun Yang, New Jersey Institute of Technology ( <i>USA</i> ); Hong He, Ting-jie Wang and Yong Jin, Tsinghua University ( <i>P. R. China</i> )	274
11:10 am	<i>(Focal)</i> <b>Study of the Effect of External Additives on Toner Performance,</b> Maria R. Nargiello-Tetreault, Degussa Corporation ( <i>USA</i> ); Paul Brandl and Hirokuni Shirono, Nippon Aerosil Co., Ltd. ( <i>Japan</i> )	278

## **Toner Based Printing Materials (*continued*)**

Wednesday, October 2, 1:00 to 3:00 pm

1:00 pm	<b>Toner Charging Characteristics in the Rotation Mixing System of Toner and Carrier,</b> Y. Hoshino, Y. Ando, H. Yoshida, and Y. Nakamura, Nippon Institute of Technology ( <i>Japan</i> ); S. Kiatkamjornwong, Chulalongkorn University ( <i>Thailand</i> )	284
1:20 pm	<b>The First Measurement of Cohesive Force Distributions in Powder Flow: New Insights into Effects of Metal Oxide Surface Additives on Xerographic Toner,</b> Richard P. N. Veregin and Mandy Lam, Xerox Research Centre of Canada ( <i>Canada</i> )	287
1:40 pm	<b>A Method to Confirm the Accuracy of the Blow-Off Tribo and Charge Spectrograph Measurement Techniques,</b> E. J. Gutman, Consultant ( <i>USA</i> )	290
2:00 pm	<b>Novel Sol-gel Materials with Charge Transporting Properties,</b> Xin Jin, David S. Weiss and Louis Sorriero, Heidelberg Digital LLC ( <i>USA</i> ) Wayne T. Ferrar, NexPress Solutions LLC ( <i>USA</i> )	294
2:20 pm	<b>The Effect of Toner and Carrier Physical Properties on Developer Conductivity,</b> R. J. Nash, C. A. Hanzlik, R. J. Hodgson (deceased), and R. N. Muller, Xerox Corporation ( <i>USA</i> )	297
2:40 pm	<b>Charging Characteristics of Electron Donor-Acceptor Complexes Formed by Combination of Positive and Negative Charge Control Agents,</b> Keiki Suganami and Manabu Takeuchi, Ibaraki University ( <i>Japan</i> ) Toshihiko Oguchi, Morimura Chemicals Ltd. ( <i>Japan</i> )	302

## **Image Permanence**

*Session Chairs: Henry Wilhelm, Wilhelm Research;  
Rita Hofmann, Ilford Imaging Switzerland GmbH; and Toshihiko Oguchi, Morimura Chemicals*

Thursday, October 3, 9:20 to 11:40 am

9:20 am	<i>(Focal)</i> <b>A Comparison of the Image Stability of Digital Photographic Prints Produced by Various Desktop Output Technologies,</b> Douglas E. Bugner and Peter Artz, Eastman Kodak Company ( <i>USA</i> )	306
9:50 am	<b>Photo Imaging with Ink Jet Inks,</b> Sandra L. Issler, DuPont Performance Coatings ( <i>USA</i> )	310

10:10 am	<b>Image Permanence of Ink Jet Print System for Portrait,</b> Hiroyuki Onishi, Hidemasa Kanada, Tsuyoshi Sano, and Kiyohiko Takemoto, Seiko Epson Corporation ( <i>Japan</i> )	315
10:30 am	<b>Assessing Humid Permanence of Inkjet Photos,</b> Shilin Guo, Nils Miller and Dan Weeks, Hewlett-Packard Company ( <i>USA</i> )	319
10:50 am	<b>Image Stability of Printpix Paper,</b> Eiichi Sakai, Fumiya Tabata and Shoujirou Sano, Fuji Photo Film Co., Ltd. ( <i>Japan</i> )	326
11:10 am	<i>(Focal)</i> <b>Image Stability of Digital Photographic Printing Materials,</b> Yoshihiko Shibahara, Hiroshi Ishizuka, Naotsugu Muro, Yukihiko Kanazawa, and Yoshio Seoka, Fuji Photo Film Co., Ltd. ( <i>Japan</i> )	330

## Image Permanence (*continued*)

Thursday, October 3, 1:00 to 3:10 pm

1:00 pm	<b>Features of Reciprocity Failure and Ozone Fading in Ink Jet Images,</b> Paul Wight, Avecia ( <i>UK</i> )	334
1:20 pm	<b>Light Fading and Pollution Tests of Proofing Materials,</b> Christina Almeida and Franziska Frey, School of Print Media Pilar Martinez, Image Permanence Institute, Rochester Institute of Technology ( <i>USA</i> )	337
1:40 pm	<i>(Focal)</i> <b>Designing Lightfast Inks and Media for Multi-Dyeload Printers,</b> Eric Burch, Nils Miller, Bor-Jiunn Niu, and Shilin Guo, Hewlett-Packard/San Diego ( <i>USA</i> ) Alexey Kabalnov, Charles Dupuy, Pat Wang, Paul Tyrell, and Larrie Deardurff Hewlett Packard Company/Corvallis ( <i>USA</i> )	342
2:10 pm	<b>Influence of UVA Spectral Absorption and Photopermanence on the Weatherability of Laminated Ink Jet Graphics,</b> Joseph C. Suhadolnik, Andrea Smith, Nancy Cliff, Harry J. Evers, III, Mervin Wood, Michael Amone, and Walter Renz, Ciba Specialty Chemicals Corporation ( <i>USA</i> )	348
2:30 pm	<b>Image Stability and Performance of a New Silver Halide Color Paper for Digital Printers: Crystal Archive Paper Type One,</b> Shin Soejima, Hiroyuki Yoneyama, and Naoto Ohshima, Fuji Photo Film Co., Ltd. ( <i>Japan</i> )	353
2:50 pm	<b>Finishing! How Does it Affect Ink Jet Photo Prints?</b> Ray A. Work, III, Work Associates, Inc. ( <i>USA</i> ); Edwin S. Iracki, DuPont Company ( <i>USA</i> )	356

## Interactive Sessions

Thursday, October 3, 3:40 to 6:30 pm

Five minute oral previews will be given at the end of the oral sessions in the appropriate track rooms and followed by a conference-wide poster session. The poster presenters will be standing by their posters to discuss their work with participants. *The Interactive Papers Program begins on page xxvi.*

# Ink Jet Printing Materials

*Session Chairs: Jim Stasiak, Hewlett-Packard; Guido Desie, Agfa Gevaert NV; and Jun-ichi Hanna, Tokyo Institute of Technology*

Friday, October 4, 8:00 to 10:10 am

8:00 am	<b>(Focal) Influence of Substrate Properties in Drop on Demand Printing,</b> G. Desie, S. Allaman, O. Lievens, and K. Anthonissen, Agfa-Gevaert N.V. ( <i>Belgium</i> ); Arthur Soucemarianadin, LEGI, University Joseph Fourier, Grenoble ( <i>France</i> )	360
8:30 am	<b>UV Curable Ink Jet Raw Material Challenges,</b> Jeffrey A. Klang and James Balcerski, Sartomer Company ( <i>USA</i> )	366
8:50 am	<b>The Development of Pigment Ink for Plain Paper,</b> Minoru Usui, Hiroko Hayashi, Kazuhiko Hara, and Tsuyoshi Kitahara Seiko Epson Corporation ( <i>Japan</i> )	369
9:10 am	<b>Color Reproducibility of the Encapsulated Pigment,</b> Isao Tsuru, Takehiro Tsusumi and Michitaka Sawada, Kao Corporation ( <i>Japan</i> )	374
9:30 am	<b>(Focal) Measurement and Modeling of Drop Absorption Time for Various Ink-Receiver Systems,</b> Kwok L. Yip, Anthony R. Lubinsky, Dennis R. Perchak, and Kam C. Ng, Eastman Kodak Company ( <i>USA</i> )	378
9:50 am	<b>Coagulation Kinetics of Surface Modified Pigment Particles,</b> Yuan Yu and Friedrich von Gottberg, Cabot Corporation ( <i>USA</i> )	383

## Track III

### Special Topic: Plastic Electronics

*Session Chairs: Jim Stasiak, Hewlett-Packard; and Andronique Ioannidis, Xerox Corporation*

Monday, September 30, 9:40 to 11:00 am

9:40 am	<b>Printing Techniques and Plastic Electronics for Paperlike Displays,</b> John A. Rogers, Bell Laboratories, Lucent Technologies ( <i>USA</i> )	388
10:20 am	<b>Advances in Printed Organic Photonics and Photovoltaics,</b> G. E. Jabbour, Optical Sciences Center, The University of Arizona ( <i>USA</i> )	392

### Special Topic: Plastic Electronics (*continued*)

Monday, September 30, 1:00 to 2:20 pm

1:00 pm	<b>Monochrome and Full-Color Polymer Light-Emitting Displays Fabricated by Ink-Jet Printing,</b> Ian D. Parker, G. Yu, M. Anzlowar, E. Baggao, J. Innocenzo, W. Lehr, G. Srdanov, M. Stainer, M. Stevenson, and B. Zhang DuPont Displays ( <i>USA</i> )	393
1:40 pm	<b>Thin Film Electronics-Electronics Anywhere,</b> Thomas N. Jackson, Pennsylvania State University ( <i>USA</i> )	397

# Organic Electronics

Session Chairs: George Malliaras, Cornell University; Jin Mizuguchi, Yokohama National University;  
Susanne Heun, Covion Organic Semiconductors GmbH

Monday, September 30, 2:40 to 4:30 pm

2:40 pm	<b>(Focal) Time-resolved Spectroscopic Study on Photocarrier Generation Process in Layered Organic Photoreceptors</b> , Yutaka Sasaki and Kan Takeshita, Center for Analytical Chemistry and Science, Inc. ( <i>Japan</i> ); Takayuki Shoda and Tetsuo Murayama, Mitsubishi Chemical Corporation ( <i>Japan</i> )	400
3:10 pm	<b>Nature of Latent Images Formed on Single Layer Organic Photoreceptors</b> , Inan Chen, Quality Engineering Associates, Inc. ( <i>USA</i> )	404
3:30 pm	<b>Electronic Structure of Thioindigo Derivatives as Studied by Polarized Reflection Spectra on Single Crystals</b> , Jin Mizuguchi and Misato Mochizuki, Yokohama National University ( <i>Japan</i> )	409
3:50 pm	<b>Hole Mobility in Substituted N, N'-bis-(m-tolyl)-N-N'-diphenyl-1, 1'-biphenyl-4,4'-diamine (TPD) Derivatives Doped into Poly(styrene)</b> , Max Bishop, Jose-Luis Maldonado, Canek Fuentes-Hernandez, Benoit Domercq, Steve Barlow, S. Thayumanavan, Massimo Malagoli, Mariappan Manoharan, Jean-Luc Brédas, Seth R. Marder and Bernard Kippelen, University of Arizona ( <i>USA</i> )	413
4:10 pm	<b>Dipole-Dipole Interaction Between a Fluorescent Dye and a Phosphorescent Dopant in Solid Thin Films: A Concentration and Excitation Intensity Study</b> , G. Ramos-Ortiz, B. Domercq and Bernard Kippelen, Optical Sciences Center, University of Arizona ( <i>USA</i> ) Y. Oki, <i>currently at</i> Kyushu University ( <i>Japan</i> )	418

## Organic Electronics (*continued*)

Tuesday, October 1, 9:40 to 11:30 am

9:40 am	<b>(Focal) Polymer Light Emitting Diodes Made by Inkjet Printing</b> , Jürgen Steiger and Susanne Heun, Covion Organic Semiconductor GmbH ( <i>Germany</i> ); and Neil Tallant, Avecia Ltd. ( <i>UK</i> )	424
10:10 am	<b>Patternable Polymers as Hole Transport Materials for Organic Light-Emitting Diodes</b> , Benoit Domercq, Richard D. Hreha, Nathalie Larribeau, Joshua N. Haddock, Christopher Schultz, Yadong Zhang, Seth R. Marder and Bernard Kippelen, Optical Sciences Center, The University of Arizona ( <i>USA</i> )	428
10:30 am	<b>Jet Printing for Large Area Electronics</b> , Steven Ready, William Wong, Kateri Paul and Bob Street, Palo Alto Research Center, Inc. ( <i>USA</i> )	429
10:50 am	<b>Advances in Piezoelectric Deposition of Organic Electronic Materials</b> , Marlene McDonald, Spectra, Inc. ( <i>USA</i> ); Susanne Heun, Covion Organic Semiconductors GmbH ( <i>Germany</i> ); and Neil Tallant, Avecia Ltd. ( <i>UK</i> )	433
11:10 am	<b>Charge-Injection-Controlled Organic Transistor</b> , Ken-ichi Nakayama, Shinya Fujimoto and Masaaki Yokoyama, Osaka University ( <i>Japan</i> )	437

## Advanced and Novel Imaging

Session Chairs: Aharon Korem, Aprion Digital and Norio Kokaji, Meisei University

Tuesday, October 1, 1:10 to 3:00 pm

1:10 pm	<b>(Focal) Exposing Cycolor Film using Telegen's New Linear Head,</b> Joseph C. Camillus, Cycolor Inc. (USA)	441
1:40 pm	<b>Photography via Photoacid Generation and Amplification,</b> John L. Marshall and Stephen J. Telfer, Polaroid Corporation (USA)	445
2:00 pm	<b>Jet-printed Lithography for Semiconductor Device Fabrication,</b> W. S. Wong, S. E. Ready, J. Ho, J. P. Lu, and R. A. Street Palo Alto Research Center (USA)	450
2:20 pm	<b>Simulation of Traveling Wave Toner Transport,</b> Ralph Kober, Aachen University of Technology (Germany)	453
2:40 pm	<b>Electron Emission Properties of Carbon Nanocoils,</b> Yoshikazu Nakayama, Lujun Pan and Taichi Hayashida, University of Osaka Prefecture (Japan)	458

## Interactive Session

Tuesday, October 1, 3:50 to 6:30 pm

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## Print and Image Quality

Session Chairs: Peter Engeldrum, Imcotek; Eggert Jung, NexPress GmbH; and  
Makoto Matsuki, NTT Quaris Corporation

Wednesday, October 2, 9:20 to 11:30 am

9:20 am	<b>(Focal) Perceptibility of Non-sinusoidal Bands,</b> Wencheng Wu, Edul N. Dalal and René Rasmussen, Xerox Corporation (USA)	462
9:50 am	<b>Differential Gloss Visual Threshold Under Normal Viewing Conditions,</b> Chunghui Kuo, Yee Ng and Jeffrey C. Wang, NexPress Solutions LLC (USA)	467
10:10 am	<b>Shape-Changing Spot Function for Digital Clustered-Dot Halftoning,</b> J. Q. Trelewicz, IBM Almaden Res. Ctr. (USA); Danielle Dittrich and Yue Qiao, IBM Printing Systems (USA); and Chai-Wah Wu and Gerry Thompson, IBM T. J. Watson Res. Ctr. (USA)	471
10:30 am	<b>Interpretation of Dot Area and Dot Shape of Inkjet Dots Based on Image Analysis,</b> Paul D. Fleming, James E. Cawthorne, Falguni Mehta, Saurabh Halwawala and Margaret K. Joyce, Western Michigan University (USA)	474
10:50 am	<b>Measurement of Mechanical and Optical Dot Gain of Ink Jet Printings and Its Application to Estimate the Reflectances of the Images,</b> Chawan Koopipat, Norimichi Tsumura and Yoichi Miyake, Chiba University (Japan); Makoto Fujino, Seiko Epson Corporation (Japan)	478
11:10 am	<b>Modelling Ink-jet Printing - Does the Kubelka-Munk Theory Apply?,</b> Li Yang, Linkoping University (Sweden)	482

## Print and Image Quality (*continued*)

Wednesday, October 2, 1:00 to 1:40 pm

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| 1:00 pm | <b>Precision Tone Reproduction Curve Measurement Technique for High Image Quality and Halftone Design Applications,</b><br>Howard Mizes, Xerox Corporation ( <i>USA</i> ) | 486 |
| 1:20 pm | <b>An Evaluation Method of Gradation Reproduction Based on Micro Colorimetry,</b><br>Jun Abe and Toshihiko Inagaki, Fuji Xerox Co., Ltd. ( <i>Japan</i> )                 | 490 |

## Media for Digital Printing

*Session Chairs: Vera Bares, Weyerhaeuser and Katja Sipi, Helsinki University of Technology*

Wednesday, October 2, 1:50 to 4:20 pm

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|---------|---|-----|
| 1:50 pm | <i>(Focal)</i> <b>Photomedia for Digital Minilabs,</b><br>Aidan Lavery, Felix Schoeller Imaging ( <i>UK</i> );<br>and Harald Siegers ( <i>Germany</i> )   | 494 |
| 2:20 pm | <b>Fastness Properties of Ink Jet Prints on Modified Conventional Coatings,</b><br>Katri Vikman, Helsinki University of Technology ( <i>Finland</i> )   | 499 |
| 2:40 pm | <b>Application of Ultrasonic and Porometric Techniques to Measure Liquid Penetration in Digital Papers,</b><br>John F. Oliver, Alberta Research Council ( <i>Canada</i> )<br>Errol D'Souza and Robert E. Hayes, University of Alberta ( <i>Canada</i> ) | 505 |
| 3:00 pm | Coffee Break  |     |
| 3:20 pm | <b>Lightfastness Studies of Water-based Inkjet Inks on Coated and Uncoated Papers,</b><br>Russell H. Tobias, Scitex Digital Printing Inc. ( <i>USA</i> )<br>Eric T. Everett, Q-Panel Lab Products ( <i>USA</i> )  | 509 |
| 3:40 pm | <b>Comparison of Photograde Media for Wide Format Ink Jet Poster Printing,</b><br>M. Graindourze, H. Kanora, L. Oelbrandt and H. Friedel, Agfa-Gevaert N.V. ( <i>Belgium</i> )  | 515 |
| 4:00 pm | <b>Dry Toner Based Electrophotographic Printing of Extrusion Coated Packaging Boards,</b> Johanna Lahti, Tampere University of Technology ( <i>Finland</i> );<br>and Jari P. Räsänen and Tapani Penttinen, Stora Enso Oyj ( <i>Finland</i> )            | 520 |

## Specialty Printing Applications

*Session Chairs: Paul Morgavi, GEMPLUS; and Yee Ng, NexPress Solutions, LLC*

Thursday, October 3, 9:20 to 10:50 am

- |         |   |     |
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| 9:20 am | <i>(Focal)</i> <b>Industrial Digital Color Printing Press for the Plastic Card Industry,</b> Paul Morgavi, Gemplus ( <i>France</i> )  | 525 |
| 9:50 am | <b>Metal Printing - A Strategic Research Program Transforming Your Designs to Physical Objects and Beyond....,</b><br>Øyvind Kolnes, SINTEF Electronics and Cybernetics ( <i>Norway</i> ) | 532 |

10:10 am	<b>Thermally Stable Aqueous Pigmented Inks for Printing on Vinyl,</b> Dheya M. Alfekri, Encad, Inc., A Kodak Company (USA)	536
10:30 am	<b>Emerging Applications for Inkjet Technology,</b> Carl Thomas Ashley, BIBLIO-tec (USA)	540

## Digital Printing/Quality Control Instrumentation

*Session Chairs: Eric Zeise, NexPress Solutions, and Marcel Slot, Océ*

Thursday, October 3, 11:00 to 11:40 am

11:00 am	<b>Simulation of Print Quality Defects,</b> Woonyoung Jang and Jan P. Allebach, Purdue University (USA)	543
11:20 am	<b>A Comparative Study on Analog and Digital Printing Systems Performances,</b> Jean-Pierre Gervasoni, Eliane Rousset and Gerard Baudin, Française de Papeterie et des Industries Graphiques (France)	549

## Digital Printing/Quality Control Instrumentation (*continued*)

Thursday, October 3, 1:00 to 2:50 pm

1:00 pm	<b>(Focal) Capacitance Based Scanner for Thickness Mapping of Thin Dielectric Films,</b> John Graham and Zoran Popovic, Xerox Research Centre of Canada (Canada)	554
1:30 pm	<b>Electrostatic Defect Mapping of Xerographic Photoreceptors with a Capacitive Probe,</b> Zoran Popovic, Steven Dejak, Philip Waldron, Johann Junginger, and John Graham, Xerox Research Centre of Canada (Canada) Satchidanand Mishra, Xerox Corporation (USA)	558
1:50 pm	<b>On-line Vision System for Ink-jet Printed Media,</b> D. Borman, F. Jahanshah, A. A. Dehghani, T. King, and P. Gaskell University of Leeds (UK)	562
2:10 pm	<b>On-Line Wide Format Printer Diagnostics,</b> Yair Kipman and Kate Johnson, ImageXpert, Inc. (USA)	568
2:30 pm	<b>Image-based Cylinder Surface Inspection System,</b> Yair Kipman and Kate Johnson, ImageXpert Inc. (USA)	571

## Interactive Sessions

Thursday, October 3, 3:40 to 6:30 pm

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# Color Science and Image Processing

Session Chairs: Jan Allebach, Purdue University; Anne Blayo, EFPG;  
and Hiroaki Kotera, Chiba University

Friday, October 4, 8:00 am to 12:00 noon

8:00 am	<i>(Focal)</i> <b>JPEG 2000: Get the Bit You Want,</b> Michael J. Gormish, Ricoh Innovations, Inc. (USA)	574
8:30 am	<b>Nonorthogonal Halftone Screens,</b> Shen-Ge Wang, Zhigang Fan and Zhenhuan Wen, Xerox Corporation (USA)	578
8:50 am	<b>Quasi-continuous Dot Position Error Diffusion,</b> Kazuhisa Yanaka and Hideo Kasuga, Kanagawa Institute of Technology (Japan) Yasushi Hoshino, Nippon Institute of Technology (Japan)	585
9:10 am	<b>Multi-Scale Image Sharpening with Noise Reduction,</b> Hiroaki Kotera and Wang Hui, Chiba University (Japan)	590
9:30 am	<b>A Simple Procedure for the Restoration of Shadows and Highlights in Digital Prints,</b> Rodney Shaw, Hewlett Packard Research Laboratories (USA)	595
9:50 am	<i>(Focal)</i> <b>Shutterfly's Printing Infrastructure,</b> Dhiraj Kacker and Russell Muzzolini, Shutterfly, Inc. (USA)	599
10:10 am	Coffee Break	
10:30 am	<i>(Focal)</i> <b>Image Appearance Improvement by Adaptive Scale-Gain Center/Surround Retinex Model,</b> Hiroaki Kotera and Masafumi Fujita, Chiba University (Japan)	603
11:00 am	<b>3D Image-to-Device Gamut Mapping Using Gamut Boundary Descriptor,</b> Ryoichi Saito and Hiroaki Kotera, Chiba University (Japan)	608
11:20 am	<b>Updating ICC Profiles With Ink Cartridge Characterization Data For Color Inkjet Printers,</b> Chia-Lin (Charlie) Chu, Alp Bayramoglu, Tam Duong and Henry D'Souza, Hewlett-Packard Company (USA)	612
11:40 pm	<b>A Three Dimensional Method for Gamut Mapping,</b> Swati Bandyopadhyay, Jadavpur University (India)	616

## Tuesday Interactive Session

3:40 to 6:30 pm

Five minute oral previews will be given at the end of the oral sessions in the appropriate track rooms and followed by a conference-wide poster session. The poster presenters will be standing by their posters to discuss their work with participants.

### TRACK II

*Session Chairs: Patricia Burns, Xerox Corporation; Ian Neilson, Coates Electrographic; and Tsutomu Shohdohji, Nippon Institute of Technology*

### Textile and Fabric Printing

- Situation and Vision of Using Digital Inkjet Printer to Print on Fabrics,** 619  
Thomas Poetz, 3P InkJet Textiles AG (*Germany*)
- Interactions of a Single Ink jet Droplet with Well-Characterized Surfaces,** 620  
H. Park and W. W. Carr, Georgia Institute of Technology (*USA*)  
J. Zhu, Institute of Paper Science and Technology (*USA*)

### Toner Based Printing Materials

- Two Component Electrophotographic Developer Time Dependent Charge Properties,** 627  
Robert D. Fields and Jason Morgan, Heidelberg Digital LLC (*USA*)
- (NIP17) Standardization of the Blow-off Charge Measurement Procedure and Standard Developer,** 631  
Toshihiko Oguchi, Morimura-Chemicals Ltd.; Masatoshi Kimura, Fujitsu Ltd.; Noboru Sawayama, Ricoh Co. Ltd.; Chiaki Suzuki, Fuji Xerox Co. Ltd.; Yasusuke Takahashi, Tokai University; Manabu Takeuchi, Ibaraki University; Tatsuya Tada, Canon Inc.; Katsuyoshi Hoshino, Chiba University (*Japan*)
- Compact Draw-off Type Instrument for Measuring Toner Charge,** Akira Shimada and Toru Miyasaka, Hitachi, Ltd. (*Japan*) Toshio Uehara, TREK Japan K.K. (*Japan*) 632
- (NIP17) Effect of CCA Particle Configuration on the Charging Behavior of CCA/Binder Matrix Film Surface,** Keiki Suganami and Manabu Takeuchi, Ibaraki University (*Japan*) Toshihiko Oguchi, Morimura Chemicals Ltd. (*Japan*) 636
- Analysis of Tribo-charging Characteristics on Toner Particles in Two-component Developer via Shaker with Different Arm Length,** Youichi Nakamura, Zhou Ye, Hironori Hayashi, Pranchalee Rattanasakornchai, Yasushi Hoshino, Yutaka Terao and Yasuyuki Suzuki, Nippon Institute of Technology (*Japan*) 637
- Possibility of Long Life Developer by Using Cyclo Olefin Copolymer Resin,** Nobuyuki Aoki and Shunji Konda, Tomoegawa Paper Co. Ltd. (*Japan*) 641
- Fluorescent Staining Technique for Visualizing Thin Films,** Thomas J. Budny, Xerox Corporation (*USA*) 644
- Sediment Studies of Magnetic Dispersions,** Iryna Ye. Opaynych, Igor I. Maleyev, Anatolii S. Voloshinovskii, and Mykola S. Tsvetkov, Ivan Franko L'viv National University (*Ukraine*) 648
- Silica Adhesion on Toner Surfaces Studied by Scanning Force Microscopy,** Sabine Hild, Sigrid Koenig and Carl Stefan Imhof, University of Ulm (*Germany*); Mario Heinemann, Ute Voelkel and Herbert Barthel, Wacker-Chemie GmbH (*Germany*) 651

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### Advanced and Novel Imaging

- Estimation Method of Rotation Characteristic of a Ball for Electrical Twisting Ball Display,** Ryushi Ishikawa and Makoto Omodani, Tokai University (*Japan*) 657

### Organic Electronics

- Local Similarity Between Mixed Crystals of Two Components and Crystals of Their Hybrid Single-Component in Pyrrolopyrrole Compounds,** 661  
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- Structural Characterization of Y-like Titanylphthalocyanine,** 666  
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- Photoelectrochemical Stability of Layered OPC Drums,** Konstantin K. Kochelev, 670  
Vladimir N. Bulavka, Vladimir E. Golovin, and Galina A. Kocheleva,  
Scientific Research Phototechnical Institute on Slavich Company (NIFTI) (*Russia*)  
Alexander E. Gekhman, N. S. Kurnakov Institute of General and Inorganic Chemistry RAS (*Russia*)
- Novel Hole Transport Materials and their Application for Electrophotography,** 674  
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### Print and Image Quality

- Dependence of Image Quality on the Degree of Edge Enhancement,** 678  
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- Visual Comparison of Screening Quality in Digital Printing Systems,** 682  
Christian K. Schowalter, University of Applied Science, Munich (*Germany*)
- Estimation of Basic Structural Elements of an Imaging of Digital Printing,** 687  
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- (NIP17) Comparative Study Between Different Digital and Offset Litho Printing Systems,** 691  
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- Does the Halftone Print Still Need a Photographic Quality?,** Yuri V. Kuznetsov and 692  
Paul A. Wolneykien, Saint-Petersburg State University of Technology and Design (*Russia*)  
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- Standardization of Perceptually Based Image Quality for Printing Systems (ISO/IEC XJTC1 SC28 and INCITS/W1.1),** Eric Zeise, NexPress Solutions, LLC (*USA*); 699  
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## Thursday Interactive Session

3:40 to 6:30 pm

Five minute oral previews will be given at the end of the oral sessions in the appropriate track rooms and followed by a conference-wide poster session. The poster presenters will be standing by their posters to discuss their work with participants.

### TRACK I

*Session Chairs: Diane Herrick, NexPress Solutions; Domingo Rohde, NexPress, GmbH; and Kogi Hirakura, Ricoh*

## Printing Systems Engineering/Optimization

**Improvement of Reliability of Electronic Components of Photocopying Machines and Facsimiles**, Toshinori Watabe, Ibaraki University (*Japan*); Norihiko Okada, Canon Inc. (*Japan*)  
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**Hardware Accelerator Component for Image Processing in Industrial Printer Applications**, Marc De Pauw, Koen Vande Velde, Luc Minnebo, Erick Van geel, and Paul A. Delabastita, Agfa-Gevaert N.V. (*Belgium*) 707

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**Finishing of Digital Prints - A Failure Mapping**, Johan Eklund, Bertil Österberg, and Lars Eidenvall, Mid Sweden University;  
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## Thermal Printing

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*(NIP17)* **Compact and Low Power-consuming Thermal Transfer Printer Unit for Built-in Use in Mobile Devices**, Shin'ichi Sagawai, Alps Electric Co., Ltd. (*Japan*) 717

**Metallic Donor for Direct Digital Halftone Proofing**, David A. Niemeyer, Eastman Kodak Co. (*USA*) 718

**Direct Plate-making for Lithography by Laser Heating**, Takashi Kitamura, Shigeru Morito, Sakiko Nakamura and Katsuyoshi Hoshino, Chiba University (*Japan*) 723

## Toner Based Printing Processes

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**Study on Magnetic Force Acting on the Magnetic Toner in the High Pixel Density Magnetic Printer with Longitudinal Recording (2)**, Norio Kokaji, Meisei University (*Japan*) 732

*(NIP17)* **Analysis on Stick and Slip Behavior of Cleaning Blades**, Kuniki Seino and Shizuo Yuge, Minolta Co., Ltd. (*Japan*); Masao Uemura, Toyohashi University of Technology (*Japan*) 736

<b>(NIP17) Numerical Simulation of Charging Characteristics under the Influence of Photoreceptor Defects,</b> Satoshi Hasebe and Nobuyuki Nakayama, Fuji Xerox Co., Ltd. ( <i>Japan</i> )	737
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*Session Chairs: Henry Wilhelm, Wilhelm Research, and Dieter Reichel, Celfa/Folex AG*

### Image Permanence

<b>Simplified Apparatus and Techniques for Evaluating the Stability of Color Imaging Materials to Environmental Pollutants,</b> Peter H. Roth, Applied Technology Consultants ( <i>USA</i> )	748
<b>Role of Media Polymer Chemistry on Dye/Polymer Interactions and Light Stability of Ink Jet Graphics,</b> Andrew Naisby, Joseph Suhadolnik, Anthony Debellis, Donna Pennant, and Walter Renz, Ciba Specialty Chemicals Corporation ( <i>USA</i> )	749
<b>Correlating Changes in Densitometry and Colorimetry in the Context of the Light-Induced Fade of Inkjet Photographic Prints,</b> Douglas E. Bugner and Cory McWilliams, Eastman Kodak Company ( <i>USA</i> )	753
<b>The Effect of High and Low Humidity on the Quality and Stability of Inkjet Images,</b> Mark B. Mizen and Christopher M. Mayhew, Creative Memories ( <i>USA</i> )	757

### Ink Jet Materials

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<b>Focusing on Paper Properties in Color Characterization of Printing Situations,</b> Ole Norberg and Mattias Andersson, Mid Sweden University ( <i>Sweden</i> )	774
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*Session Chairs: Eric Zeise, NexPress LLC; Shigeru Kitakubo, Nippon Institute of Technology*

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- Dot and Line Quality Analyses Using Commercially Available Measurement Systems,** 782  
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- Integration of Image Quality Inspection Equipment into Production,** 787  
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- Scanning Image System for Print Quality Measurements,** 790  
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### Color Science and Image Processing

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Jincheng Huang, Onur Guleryuz, Anoop K. Bhattacharjya, and Joseph Shu,  
Epson Palo Alto Laboratory (*USA*)
- 3D Display System Using High Resolution Transparent Printer Output,** 807  
Susumu Sasaki, Hideo Kasuga and Kazuhisa Yanaka, Kanagawa Institute of Technology (*Japan*);  
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- Wide Format Raster Compression Applied to a Printing Environment,** 811  
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- Characteristics of the Shapes of Printed Dots,** 819  
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- Estimation of Actual Image in a Brain Using Measured Results of Distributions of the Color Sensitivity and the Resolution in the Human Vision,** 823  
Hideaki Takamiya\*, Makoto Omodani\*\*, Yasusuke Takahashi,\*  
\*Department of Electro-Photo-Optics, Tokai University (*Japan*)  
\*\*Tokai University Future Science Technology Joint Research Center (*Japan*)
- Color Performance of Dye-based and Pigment-based Color Toners,** 827  
Jongkwan Kim, Chul-Hwan Kim, Eui-Jun Choi, and Hyun-Nam Yoon,  
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