

# **15th International Conference on Digital Printing Technologies 1999**

**(NIP 15)**

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# The Papers Program

## Keynote Papers 8:00 – 8:50 am

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Tuesday	<b>Management of Innovation in Large Corporations</b> Rafik Loutfy, Xerox Corporation, <i>USA</i>	6
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## Track I

Monday Morning, October 18, 1999—9:10 to 10:10 am

### Printing Systems—Engineering/Optimization

*Session Chairs: John Stanton, The Technology Partnership plc and  
Yee Ng, NexPress Solutions, L.L.C.*

9:10 am	<b>Constraint Solving for Inkjet Print Mask Design</b> Jonathan Yen, Hewlett Packard Laboratories, HP; Mats Carlsson, Swedish Institute of Computer Science; Michael Chang, Home Imaging Division, HP Joan Manel Garcia, IJBU-Barcelona, HP Hugh Nguyen, Internet Imaging Operation, HP, Hewlett Packard Laboratories, Palo Alto, California, <i>USA</i>	11
9:30 am	<b>A Study on the Improvement of the Performance in Ink Jet Head</b> Sung-Cheon Jung, Hyun-Suk Jang, Jung-Hwa Lee, Byung-Soo Kim and Kwang-Gyun Jang, Samsung Electromechanics Co., Kyungi-Do, <i>Korea</i>	15
9:50 am	<b>A New Approach for Analysis of Ink Jet Devices System</b> Sung-Cheon Jung, Hyun-Suk Jang, Jung-Hwa Lee, Woo-Seong Yang and Kwang-Gyun Jang, Samsung Electromechanics Co., Kyungi-Do, <i>Korea</i>	18
10:10 am	<b>BREAK</b>	

Monday Morning, October 18, 1999—10:30 to 11:40 a.m.

### Ink Jet Processes

*Session Chairs: Eiichi Suzuki, Canon Inc.; Michael Willis, Pivotal Resources Ltd;  
and Ashok Murthy, Tektronix*

10:30 am	<b>Focal paper—Wetting on Real Surfaces</b> Abraham Marmur, Department of Chemical Engineering, Technion – Israel Institute of Technology, Haifa, <i>Israel</i>	22
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11:00 am	<b>Momentum Fluctuations in and Break-up of an Ink-Jet</b> Geoffrey Luxford, Domino UK, Bar Hill, Cambridge, <i>England</i>	26
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*Session Chairs: Eiichi Suzuki, Canon Inc.; Michael Willis, Pivotal Resources Ltd;  
and Ashok Murthy, Tektronix*

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1:30 pm	<b>Crosstalk Study of a High Speed Shear Mode Piezo Ink Jet Printhead</b> Marlene McDonald, Yong Zhou, Spectra, Inc., Hanover, New Hampshire, <i>USA</i>	40
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2:40 pm	<b>BREAK</b>	

Monday Afternoon, October 18, 1999—3:00 to 5:30 p.m

### **Interactive Session**

Consecutive five-minute oral previews will be followed by displays and one-on-one discussions with the authors.

### **Printing Systems, Engineering/Optimization, Ink Jet Processes, Ink Jet Materials**

*Session Chairs: Linda Creagh-Dexter, Spectra, Inc.; Hiromichi Noguchi, Canon, Inc.  
and John Stanton, The Technology Partnership pcl*

	<b>The Influence of Feeding Accuracy of Gear Train on Printing Quality for Printers</b> Chin-Tai Chen, Optics-Electronics System Labs, Industrial Technology Research Institute, Chutung, Hsinchu, <i>Taiwan R.O.C.</i>	52
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Tuesday Morning, October 19, 1999—9:10 to 11:40 a.m.

## **Ink Jet Materials**

*Session Chairs: Eiichi Suzuki, Canon Inc.; Nigel Caiger, Coates Electrographics;  
Linda Creagh-Dexter, Spectra, Inc.*

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9:50 am	<b>Imaging and Evaluation of Droplet Generation Technologies for Pigment Based Inks</b> Henry M. Dante, Arup K. Basak and Georgios Karles, Digital Printing Group; Research, Development & Engineering, Philip Morris USA; Richmond, Virginia, USA	102
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10:30 am	<b>Focal paper—The Effect of Extent of Cure of an Epoxy Adhesive in an Inkjet Printhead</b> James M. Mrvos, Jeanne M. Saldanha Singh, and Sean T. Weaver, Lexmark, International Lexington, Kentucky, USA	106
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### **Ink Jet Materials (continues)**

*Session Chairs: Eiichi Suzuki, Canon Inc.; Nigel Caiger, Coates Electrographics; and Linda Creagh-Dexter, Spectra, Inc.*

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### **Specialty Printing Applications**

*Session Chairs: Hiromichi Noguchi, Canon Inc.; Will Eve, Cambridge Consultants Ltd.; and Judith Auslander, Pitney Bowes*

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3:20 pm	<b>InkJet Printing for Mailing Applications</b> Judith Auslander, Donald Mackay, and Claude Zeller, Pitney Bowes, Shelton, Connecticut, <i>USA</i> John C. Briggs and Ming-Kai Tse, QEA, Inc., Burlington, Massachusetts, <i>USA</i>	141
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### **Media for Digital Printing**

*Session Chairs: Masaru Kato, Oji Paper; Paul Adair, Brady Corp.*

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### **Media for Digital Printing (continues)**

*Session Chairs: Masaru Kato, Oji Paper; Paul Adair, Brady Corp.*

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### **Textile and Fabric Printing**

*Session Chairs: Marc Van Parys, Unitex and Wallace W. Carr, Georgia Institute of Technology*

3:00 pm	<b>Xerographic Printing of Textiles</b> P. H. Pfromm, Institute of Paper Science and Technology, Atlanta, Georgia, USA W. W. Carr, F. L. Cook, L. Wang, S. Shi, and H. Yan, H. Park, School of Textile and Fiber Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA	192
3:20 pm	<b>Pigmented Latex System for Ink Jet Printing on Textile</b> Olivia Y. Tian, Encad Inc., San Diego, California, USA Wayne C. Tincher, Georgia Institute of Technology, Atlanta, Georgia, USA	196
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## ***Forum and Exhibit*** **Digital Textile Printing**

*Forum Chair: Vince Cahill, IT Strategies*

*Panel Chair: Ray Work, DuPont*

This Forum will provide a unique opportunity for the public free exchange of ideas, opinions and information on digital textile printing. Dr. Work will moderate the panel discussion focusing on digital textile ink issues. We will feature presentations by ink specialists from digital ink manufacturing companies. Then, the audience will have an opportunity to pose questions and offer ideas for discussion about ink and other digital printing issues. Mr. Cahill will organize the Exhibit of Digitally Printed Textiles to be on view before and during the Forum.

Thursday Morning, October 21, 1999—9:10 to 10:10 a.m.

## Computer-to-Plate Technology

*Session Chair: My T. Nguyen, American Dye Source*

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## Digital Printing Instrumentation

*Session Chair: David Wolin, KDY Inc.*

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## Thermal Printing

*Session Chair: Takao Abe, Konica Corporation*

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	Masaru Kinoshita *, Katsuyoshi Hoshino **, and Takashi Kitamura **,	
	* Graduate School of Science and Technology;	
	** Information and Image Sciences Department, Faculty of Engineering, Chiba University, Chiba, <i>Japan</i>	

2:40 pm      **BREAK**

Thursday Afternoon, October 21, 1999 — 3:00 to 5:30 p.m.

## **Interactive Session**

Consecutive five-minute oral previews will be followed by displays and one-on-one discussions with the authors.

### **Digital Printing Instrumentation Thermal Printing Advanced and Novel Printing Media for Digital Printing Textile and Fabric Printing**

*Session Chairs: Elliott Eklund, Xerox Corporation; Makoto Omodani, Tokai University;  
and Helmut Kipphan, Heidelberger Druckmaschinen AG*

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M. Van Parys, Technical University Gent, <i>Belgium</i>	

Friday Morning, October 22, 1999—8:00 a.m. to Noon

## **Advanced and Novel Printing**

*Session Chairs: Makoto Omodani, Tokai University;  
Helmut Kipphan, Heidelberger Druckmaschinen AG; and Elliott Eklund, Xerox Corporation*

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R. W. Stowe, Fusion UV Systems, Gaithersburg, Maryland, <i>USA</i>		

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## TRACK II

Monday Morning, October 18, 1999—9:10 to 11:40 a.m.

### Color Science and Image Processing

*Session Chairs: Hiroaki Kotera, Chiba University; Michael Has, Océ-Nederland B.V.; and Ping Wah Wong, Hewlett Packard*

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10:40 am	<b>Virtual Color Target and Its Application for Testing Input Devices</b> Hiroaki Kotera, Chen Hung-Shing, Ryoichi Saito, Department of Information and Image Sciences, Chiba University, <i>Japan</i>	338
11:00 am	<b>Adaptive Dynamic Range Improvement Method for Personal Printer Device</b> Kosei Takahashi, Masato Nakajima, Department of Electronic and Electrical Engineering, Keio University, Yokohama, <i>Japan</i>	342
11:20 am	<b>Adaptive Gamut Mapping Method Based on Image-to-Device</b> Chen Hung-Shing, Minoru Omamiuda and Hiroaki Kotera, Graduate School of Science and Technology, Chiba University, Chiba, <i>Japan</i>	346

Monday Afternoon, October 18, 1999—1:10 to 2:30 p.m.

### **Color Science and Image Processing (continues)**

*Session Chairs: Hiroaki Kotera, Chiba University; Michael Has, Océ-Nederland B.V.;  
and Ping Wah Wong, Hewlett Packard*

1:10 pm	<b>Improved Dot Diffusion For Image Halftoning</b> Murat Mese and P. P. Vaidyanathan, Department of Electrical Engineering 136-93, California Institute of Technology, Pasadena, California, <i>USA</i>	350
1:30 pm	<b>Redistributing Dot Connections to Avoid Visible Tile Replication in AM Halftone Screens</b> Rudi Bartels, Agfa Gevaert N.V., Mortsel, <i>Belgium</i>	354
1:50 pm	<b>Digital Halftoning using Green-Noise Masks</b> Daniel L. Lau and Gonzalo R. Arce, Department of Electrical and Computer Engineering at the University of Delaware, Newark, Delaware, <i>USA</i>	358
2:10 pm	<b>Does Still Some Philosophy Exist for the Halftone Frequency Selection?</b> Jury V. Kouznetsov, Sankt-Petersburg Institute of the Moscow State University of Printing, <i>Russia</i>	362
2:30 pm	<b>BREAK</b>	

Monday Afternoon, October 18, 1999—3:00 to 5:30 p.m.

### **Interactive Session**

Consecutive five-minute oral previews will be followed by displays and one-on-one discussions with the authors.

### **Color Science and Image Processing; Print and Image Quality**

*Session Chairs: Mashiko Yuasa, International Paper; Hiroaki Kotera, Chiba University;  
and Michael Has, Océ-Nederland B.V.*

	<b>Improved Error Diffusion Modified with AM/FM Periodic Noise</b> Yasuhiko Kishimoto, Ryoichi Saito, and Hiroaki Kotera, Graduate School of Science and Technology, Chiba University, Chiba, <i>Japan</i> Masaki Nose, Fujitsu Co. Ltd, <i>Japan</i>	366
	<b>Dependence of Print Quality on Minimum Dot Size and Binarization Method II</b> Shigeru Kitakubo and Yasushi Hoshino, Nippon Institute of Technology, Miyashiro, Saitama, <i>Japan</i>	370
	<b>Filter Designs for Multiresolution Halftoning</b> Nancy Breau, Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia, <i>USA</i> Chee-Hung Henry Chu, The University of Southwestern Louisiana, Center for Advanced Computer Studies, Lafayette, Louisiana, <i>USA</i>	374
	<b>Perception Condition of False Contour in JPEG</b> Tsutomu Shohdohji, Ken'ichiroh Murata and Yasushi Hoshino, Department of Systems Engineering, Faculty of Engineering, Nippon Institute of Technology, Saitama, <i>Japan</i>	378

<b>Color Transformation to Photography Tone in Digital Camera Printing System</b>	382
Takashi Watanabe, Ryo Kuroda and Yasushi Hoshino, Nippon Institute of Technology, Saitama, <i>Japan</i>	
<b>Comparison of Thinking Efficiency between Softcopy and Hardcopy</b>	386
Naoto Uchiyama, Makoto Omodani and Yasusuke Takahashi, Department of Electro-Photo Optics, Faculty of Engineering, Tokai University, Kanagawa-ken, <i>Japan</i>	
<b>Softcopy and Hardcopy as an Information Carrier: Whether or Not Existing a Difference in Interaction with Human Brain</b>	390
Hirotaka Watanabe, Makoto Omodani and Yasusuke Takahashi, Tokai University, Department of Electro Photo Optics, Kanagawa-ken, <i>Japan</i>	
<b>Color Cross Talk Correction for Digital Image Printing System</b>	394
Fred Fang Cao, Horst Schaaf, Cymbolic Sciences, Richmond, BC, <i>Canada</i> and Susan Shuping Zhang, ACZ Computing & Modeling Consultants, Richmond, BC, <i>Canada</i>	
<b>Image Quality Measurement and Analysis on Color Ink Jet Outputs</b>	398
Ludwik Buczynski, Warsaw University of Technology, Warsaw, <i>Poland</i>	
<b>Tone Reproduction Characteristics of Offset Press Printing</b>	402
Makoto Matsuki, Tooru Sadakata, R&D division, NTT Printec Corporation, Iruma-shi, <i>Japan</i>	
<b>Differential Gloss in Electrophotography</b>	406
C. Jeffrey Wang, NexPress Solutions L.L.C., Rochester, New York, <i>USA</i>	

Tuesday Morning, October 19, 1999—9:10 to 11:40 a.m.

## Print and Image Quality

*Session Chairs: Makoto Matsuki, NTT Printec Co.; Paul Delabastita, Agfa Gevaert N.V.;  
and Mashiho Yuasa, International Paper*

9:10 am	<b>Print Performance Evaluation of Ink-jet Media: Gamut, Drying, Permanence</b>	408
R. Hofmann, E. Baumann, M. Schaer, ILFORD Imaging Switzerland GmbH, Marly, <i>Switzerland</i>		
9:30 am	<b>The Effect of the Drop Size on the Print Quality in CIJ Printing</b>	412
Jali Heilmann and Ulf Lindqvist, VTT Information Technology, Espoo, <i>Finland</i>		
9:50 am	<b>Focal paper—High-Intensity Fluorescent Light-Fading Tests for Digital Output Materials</b>	416
Edward Zinn, Douglas W. Nishimura and James Reilly, Image Permanence Institute, Rochester, New York, <i>USA</i>		
10:20 am	<b>BREAK</b>	
10:40 am	<b>Living with ISO-13660: Pleasures and Perils</b>	421
John C. Briggs, David J. Forrest, Alice H. Klein, and Ming-Kai Tse, QEA, Inc., Burlington, Massachusetts, <i>USA</i>		
11:00 am	<b>Print Quality in Contact and Non-Contact Fixing</b>	426
Katja Sipi, Markku Lamberg*, Pirkko Oittinen, Helsinki University of Technology, Laboratory of Media Technology, Espoo, <i>Finland</i>		
11:20 am	<b>Digital Proof Systems: Are Sublimation Devices Compatible With ISO 12647-2 Standard?</b>	430
Gerard Baudin, Ecole Française de Papeterie et des Industries Graphiques, Saint-Martin d'Hères, <i>France</i> Guy Dizambourg, Imation-France, Cergy-Pontoise, <i>France</i>		



Tuesday Afternoon, October 19, 1999—1:10 to 2:30 p.m.

### **Print and Image Quality (continues)**

*Session Chairs: Makoto Matsuki, NTT Printec Co.; Paul Delabastita, Agfa Gevaert N.V.; and Mashiho Yuasa, International Paper*

1:10 pm	<b>Perceptual Scaling of Quality Metrics for Hardcopy Image Evaluation</b> Michael H. Brill, Jeffrey Lubin, Sarnoff Corporation, Princeton, New Jersey, USA David Wolin, KDY Inc., Nashua, New Hampshire, USA	435
1:30 pm	<b>Evaluation of Legibility for Color Texts</b> Soh Hirota and Tetsuya Itoh, Toyokawa Development Center, Minolta Co., Ltd., Toyokawa, Aichi, Japan	439
1:50 pm	<b>Topics for the Fulfillment by Inkjet Materials of Permanence Requirements for Digital Printing</b> Werner Sobotka, College of Telecommunications and Media, St. Poelten, Austria	443
2:10 pm	<b>Focal paper—Factors Influencing the Sharpness of Digital Prints</b> Rodney Shaw, Hewlett-Packard Research Laboratories, Palo Alto, California, USA	446
2:40 pm	<b>BREAK</b>	

Tuesday Afternoon, October 19, 1999—3:00 to 5:30 p.m.

### **Environmental Issues**

*Session Chair: Quintin Phillips, Hewlett Packard*

3:00 pm	<b>Effects of Impending EU Regulations on the Search for “Safe” CIJ Inks</b> Richard Marsden, Linx Printing Technologies plc, St. Ives, Cambridgeshire, United Kingdom	450
3:20 pm	<b>Environmental Considerations Relevant to Electrophotographic Toner Cartridges</b> Susanne Gallivan and Quintin Phillips, Hewlett-Packard Company, Boise, Idaho, USA	455
3:40 pm	<b>Emissions From Office Equipment</b> A. W. Worthan and M. S. Black, Air Quality Sciences, Inc., Marietta, Georgia, Cobb, USA	459
4:00 pm	<b>Eco-Labels: Their Impact on Toner Colorants</b> R. Baur and H.-T. Macholdt, Clariant GmbH, Business Unit Pigments, Frankfurt/Main, Germany	463

Tuesday, October 19, 1999, immediately following Environmental Issues Session

## **Environmental Panel Discussion**

**Environmental Regulations and their Effect on Materials Choices for Digital Printers**

*Moderator: Quintin Phillips, Hewlett Packard*

Following the Environmental Session, the presenters will hold a panel discussion to delve further into environmental regulations and their effect on materials choices for digital printers. Expected topics include:

- new legislation
- testing methods for verification
- environmentally safe products
- product design response to the new legislation
- exploration of potential problems associated with non-impact printing

Audience participation will help focus the discussion to areas of common interest.

Wednesday Morning, October 20, 1999—9:10 to 11:40 a.m.

### **Toner Based Marking: Processes**

*Session Chairs: Koji Hirakura, Ricoh Co., Ltd.; Serge Tavernier, Agfa-Gevaert N.V.  
and William Hanson, Torrey Pines Research*

9:10 am	<b>Particle Simulation of Xerographic Line Images</b> John G. Shaw and Ted Retzlaff, Xerox Corporation, Webster, New York 14580, <i>USA</i>	467
9:30 am	<b>Laser Printing with Multiple Beams from Optical Fiber Array</b> Keiji Kataoka*, Yasuyuki Shibayama*, and Koji Doi** R&D Lab.*, Printer Div.***, Hitachi Koki Co., Ltd., Hitachinaka-City, Ibaraki-Pref., <i>Japan</i>	470
9:50 am	<b>Focal paper—Color Laser Printer Using Four All-in-One Cartridges</b> Hajime Yamamoto, Hiroshi Terada, Noboru Katakabe and Yoshihito Urata, Document Technology Development Center, Matsushita Electric Industrial Co., Ltd., Moriguchi, Osaka, <i>Japan</i>	474
10:20 am	<b>BREAK</b>	
10:40 am	<b>High-Speed Transfer Method for Colorprinter Using Dielectric Belt</b> Tsuneo Mizuno, Kunihiko Sato, Masatoshi Kimura, and Masao Konishi, Fujitsu LTD., Tokyo , 206-8503 <i>Japan</i>	478
11:00 am	<b>Modeling of Heat Transfer Phenomena with Air Existing in Fusing Region</b> Masahiro Samei, Kazuki Takenouchi*, Takuo Shimokawa and Kazuaki Kawakita** Documents Technology Research Lab., Kyushu Matsushita Electoric Co., Ltd., <i>Japan</i> *Department of Industrial Design, Kyushu Institute of Design, <i>Japan</i> ** Department of Mechanical Eng., Osaka Electro-Communication Univ., <i>Japan</i>	482
11:20 am	<b>Electrical Characterization of Semi-insulating Devices for Electrophotography</b> Inan Chen and Ming-Kai Tse, QEA, Inc., Burlington, Massachusetts, <i>USA</i>	486

Wednesday Afternoon, October 20, 1999—1:10 to 4:00 p.m.

### **Toner Based Marking: Processes (continues)**

*Session Chairs: Koji Hirakura, Ricoh Co., Ltd.; Serge Tavernier, Agfa-Gevaert N.V.  
and William Hanson, Torrey Pines Research*

1:10 pm	<b>Charging Behavior of Toner Layer in Contact-type Non-magnetic Single Component Developing Process</b> Chiseki Yamaguchi, PPC Engineering and Production, NEC Niigata, Ltd., Kashiwazaki, Niigata, <i>Japan</i>	490
1:30 pm	<b>The Structure of Toner Sediments Simulated with Random Ballistic Deposition</b> Howard Mizes, Xerox Corporation, Webster, New York, <i>USA</i>	495
1:50 pm	<b>Mechanistic Statistical Study of the Speed Dependence of Magnetic Background</b> Jean-Jacques P. Eltgen, Nipson, a Xeikon Company, Belfort, <i>France</i>	499

2:10 pm	<b>Focal paper—Satellite Formation in Transfer Gaps</b> R. D. Fields, A. J. Rushing, Heidelberg Digital L.L.C., Rochester, New York, USA D. S. Rimai, NexPress Solutions, Rochester, New York, USA and A. H. Hoskins, University of Rochester, Rochester, New York, USA	503
2:40 pm	<b>BREAK</b>	
3:00 pm	<b>Ozone Generation in Corona Discharge at Pin Electrode of Electrophotography Charger</b> Hiroyuki Kawamoto, Department of Mechanical Engineering, Waseda University, Tokyo, Japan	508
3:20 pm	<b>Microscopic Particle Simulation of Air Ionization</b> Meng H. Lean, John O'Brien, Ken Pietrowski, Hideo Okuda, Xerox Corporation, Wilson Center for Research & Technology, Sleepy Hollow, New York, USA	513
3:40 pm	<b>Analysis of the Magnetic Force Acting on the Magnetic Toners from the Adjoining Magnetic Transition Regions in Magnetography</b> Norio Kokaji, Department of Electrical Engineering, Meisei University, Hino, Tokyo, Japan	517
4:00 pm	<b>Measuring Cleaning Performance in an Electrophotographic Process</b> Michelina Molongoski, Heidelberg Digital L.L.C., Rochester, New York, USA and James Maher, NexPress, Rochester, New York, USA	601

Thursday Morning, October 21, 1999—9:10 to 11:40 a.m.

### **Toner Based Marking: Materials**

*Session Chairs: Yoichi Yamamoto, Sharp Corporation; Manabu Takeuchi, Ibaraki University; Ian Neilson, Coates Electrographics; and James Anderson, Heidelberg Digital*

9:10 am	<b>The Effect of Mixing Intensity on the Admix Performance of a Xerographic Developer</b> Robert J. Nash†, Michael L. Grande and Richard N. Muller, Xerox Corporation Webster New York, USA; † Present address: Fuji Xerox, Kanagawa-ken, Japan	521
9:30 am	<b>Characterization of Microstructures Found on the Surface of and Within Toner Particles -Particle Analyzer Dispersion Evaluation-</b> Toshiyuki Suzuki, and Hisao Takahara, Yokogawa Electric Corporation, Particle Analyzer Business Center, Tokyo, Japan Soji Sakamoto, HORIBA, Ltd., Kyoto, Japan	531
9:50 am	<b>Focal paper—The Effects of Surface Treatment on Toner Adhesion Force</b> Haruo Iimura, Hisao Kurosu and Takeo Yamaguchi, Imaging Technology Division, Ricoh Co., Ltd., Yokohama, Japan	535
10:20 am	<b>BREAK</b>	
10:40 am	<b>Why Does the Tribo Value Appear to be Independent of Toner Concentration in Some Two-Component Electrophotographic Developers?</b> E. J. Gutman, R. S. Naumchick and A. M. Webb, Xerox Corporation, Webster, New York, USA	539
11:00 am	<b>Effects of Carbon Black on Toner Tribocharging in Two-Component Electrophotographic Developers</b> J. H. Anderson, Heidelberg Digital L.L.C., Rochester, New York, USA	544

- 11:20 am      **New Functional Dry Toners For Digital Printing Applications, Using The Flexdesign-Concept**      548  
S. M. F. Tavernier, D. Heitzmann, A. Verhecken, P. Marksch, S. De Meutter and G. Desie, Agfa Gevaert NV, *Belgium*

Thursday Afternoon, October 21, 1999—1:10 to 2:30 p.m.

### **Toner Based Marking: Materials (continues)**

*Session Chairs: Yoichi Yamamoto, Sharp Corporation; Manabu Takeuchi, Ibaraki University; Ian Neilson, Coates Electrographics; and James Anderson, Heidelberg Digital*

- 1:10 pm      **Study on Positively Chargeable Polyester Toner**      549  
Hidenori Tachi, Shinichi Sata and Shinji Moriyama, Kao Corporation, Performance Chemical Research Laboratories, Wakayama, *Japan*
- 1:30 pm      **Positively Chargeable Full Color Toners Using Polyester Resin**      553  
Yutaka Kanamaru and Koji Akiyama, Kao Corporation, Performance Chemicals Research Laboratories, Wakayama, *Japan*
- 1:50 pm      **The Influence of Particle Size, Shape and Particle Size Distribution on Properties of Magnetites for the Production of Toners**      556  
Ulrich Meisen and Hendrik Kathrein, Bayer AG, Krefeld-Uerdingen, *Germany*
- 2:10 pm      **Focal paper—Chemical Surface Modification of Alumina and Titania Surface Additives for Charge Control of Xerographic Toners**      561  
Richard P. N. Veregin, Carl P. Tripp, and Maria N. V. McDougall, Xerox Research Centre of Canada, Ontario, *Canada*
- 2:40 pm      **BREAK**

Thursday Afternoon, October 21, 1999—3:00 to 5:30 p.m.

### **Interactive Session**

Consecutive five-minute oral previews will be followed by displays and one-on-one discussions with the authors.

### **Toner Based Marking: Materials Liquid Toner Processes and Materials Toner Based Marking: Processes**

*Session Chairs: James Anderson, Heidelberg Digital; Manabu Takeuchi, Ibaraki University; and Yoichi Yamamoto, Sharp Corporation*

- A New Technique for Measuring the Charge-to-Mass Ratio of Toner Particles**      565  
Keiji Taniguchi, Syuichi Morikuni, Yutaka Nakano, Takanori Sakai, Hiroaki Yamamoto, Information Science Dept., Fukui University, Fukui, *Japan*  
Sadakazu Watanabe and Yoichi Yamamoto, Product Development Lab., SHARP Co., Nara, *Japan*

<b>Charging Mechanism of Polymers with CCA (II)</b>	569
Shinji Otani, and Manabu Takeuchi, Ibaraki University, Hitachi, Ibaraki, <i>Japan</i> Yuto Matsumoto, Hodogaya Chemical Co. Ltd., Kawasaki, Kanagawa, <i>Japan</i>	
<b>Design of Toner for Electrophotographic Printers and Copiers with a Collected Toner Recycle Function (T.R.F.)</b>	573
Takayuki Sano, R&D in Chemical product Division, Tomoegawa Paper Co., Ltd., Shizuoka, <i>Japan</i>	
<b>Toner Having Low Energy Fusibility for High Speed Non-magnetic Mono-component Process</b>	578
Tatsuru Matsumoto, Hiroki Totsuka and Akihiro Sano, Technical Research Laboratory, Tomoegawa Paper Co., Ltd., Shizuoka, <i>Japan</i>	
<b>Particle Adhesion Force Measurements by Toner Jumping Method</b>	582
Yutaka Fukuchi and Manabu Takeuchi, Department of Electrical and Electronic Engineering, Ibaraki University, Hitachi, <i>Japan</i>	
<b>New Colorant for NIP Applications: Magenta</b>	586
R. Baur, H.-T. Macholdt, Clariant GmbH, Business Unit Pigments, Frankfurt/Main, <i>Germany</i>	
<b>The Use of Conductive Core Fibers in the Constuction of Cleaning Brushes for Electrophotographic Engines</b>	588
James Maher, Theodore Morse, David Thompson, John Locke, Michelina Molongoski, Dean Smith, Steven Kepner, Douglas Anderson, Kenneth Brown, and Graham Wright, Eastman Kodak Company, Rochester, New York, <i>USA</i>	
<b>New Toner Display Device Using Conductive Toner and Charge Transport Layer</b>	590
Gug-Rae Jo * , Katsuhiko Sugawara ** , Katsuyoshi Hoshino*,** and Takashi Kitamura*,** , * Graduate School of Science and Technology, Chiba University; ** Information and Image Sciences Department, Faculty of Engineering, Chiba University, Chiba, <i>Japan</i>	
<b>Wave Image Artifacts in Monocomponent Development System</b>	594
Tadahiro Kaneko, Hitachi Koki Imaging Solutions, Inc., Simi Valley, California, <i>USA</i>	
<b>Dot Formation by Toner Beam from Toner Cloud</b>	598
Y. Hoshino and H. Hirayama, Nippon Institute of Technology, Saitama, <i>Japan</i>	
<b>Color Laser Printer Color Registration by QLPT Mechanism</b>	604
Kenji Asakura, Masanori Yoshika wa, Masahiro Aiza wa, and Noriyuki Tajima, Document Technology Development Center, Matsushita Electric Industrial Co., Ltd. Moriguchi, Osaka, <i>Japan</i>	
<b>Electrophotographic Machines for Digital Colour Printing. The Tendencies of Development</b>	608
Oleg R. Kharin, NIFTI-Slavich (Scientific Research Phototechnical Institute on Slavich Co.), Pereslavl-Zalessky, <i>Russia</i> Emilis Suveizdis, UAB "SPELA", Vilnius, <i>Lithuania</i>	

Friday Morning, October 22, 1999—8:00 to 11:30 a.m.

## Liquid Toner Processes and Materials

*Session Chairs: Koji Hirakura, Ricoh Co., Ltd.  
and Dale Russell, Boise State University*

8:00 am	<b>Liquid Toner Charging Mechanisms: Electrophoretic Mobilities of Copper Phthalocyanine Pigment Dispersions</b>	611
	Roland I. Keir, Anthony Quinn, Paul Jenkins, John C. Thomas, John Ralston, University of South Australia, Adelaide, S.A., <i>Australia</i> , and Olga Ivanova, Research Laboratories of Australia, Adelaide, S.A., <i>Australia</i>	
8:20 am	<b>Charging Characterization of Colloidal Dispersions by a Plate-Out Cell</b>	615
	F. James Wang, Fa-Gung Fan, and Richard Blum, Xerox Corporation, Wilson Center for Research and Technology, Webster, New York, <i>USA</i>	
8:40 am	<b>Pixel-Pixel Electrical “Cross Talk” Through Liquid Toner Developer and Resultant Image Degradation</b>	619
	Arthur R. Kotz, ARKO Research, Inc., St. Paul, Minnesota, <i>USA</i>	
9:00 am	<b>Electrophoretic Deposition of Liquid Toners in a Plate-Out Cell – An Numerical Analysis</b>	623
	F. J. Wang, G. A. Domoto, H. R. Till, and J. F. Knapp, Xerox Corporation, Wilson Center for Research and Technology, Webster, New York, <i>USA</i>	
9:20 am	<b>Development with Image-wise Charged Toner Layer</b>	627
	Chu-heng Liu and Weizhong Zhao, Xerox Corporation, Webster, New York, <i>USA</i>	
9:40 am	<b>BREAK</b>	
10:00 am	<b>Focal paper—Fluids for New Generation Printing Technologies</b>	631
	Thomas M. Larson and Bruce M. Jarnot, Exxon Chemical Company and Exxon Chemical Americas, Baytown, Texas and Houston, Texas, <i>USA</i>	
10:30 am	<b>Contact Development Using Highly Concentrated Liquid Toner</b>	634
	Akira Mori, Shogo Matsumoto, Junichi Matsuno, Mechanical Engineering Research Laboratory, Hitachi, Ltd., Ibaraki, <i>Japan</i> and Keiji Kamio, Office Information Products Division, Hitachi, Ltd., Ibaraki, <i>Japan</i>	
10:50 am	<b>Stabilization of Liquid Developed Images</b>	638
	Shu Chang, Palghat Ramesh, Jack LeStrange, Jerry Domoto and John Knapp, Xerox Corp., Wilson Center for Research and Technology, Webster, New York, <i>USA</i>	
11:10 am	<b>Effects of Paper Properties on Liquid Toner Transfer</b>	642
	Ed Caruthers and Weizhong Zhao, Joseph C. Wilson Center for Research & Technology, Webster, New York, <i>USA</i>	

## TRACK III

Thursday Morning, October 21, 1999—9:10 to 11:40 a.m.

### Optoelectronic Imaging Materials and Devices

*Session Chairs: Jin Mizuguchi, Yokohama National University;  
Jun-ichi Hanna, Tokyo Institute of Technology; Andreas Richter, SynTech GmbH;  
and James Duff, Xerox Research Centre of Canada*

- |          |  |     |
|----------|--|-----|
| 9:10 am  | <b>Small Polaron Hopping in the Inverted Regime and the Compensation Temperature</b><br>David H. Dunlap, Department of Physics and Astronomy, University of New Mexico,<br>Albuquerque, New Mexico, <i>USA</i>   | 646 |
| 9:30 am  | <b>Analysis of Molecular Properties of Hole Transport Molecules Using Molecular<br/>Orbital Theory</b><br>Takayuki Shoda, Akiteru Fujii and Tetsuo Murayama, Yokohama Research Center,<br>Mitsubishi Chemical Corporation, Yokohama, <i>Japan</i><br>Shinji Aramaki, Odawara Reprographic Products Center, Mitsubishi Chemical Corporation,<br>Odawara, <i>Japan</i> | 651 |
| 9:50 am  | <b>Synthesis, Spectroscopy and Photoconductivity of Dimeric Perylene Bisimide Pigments</b><br>James M. Duff, C. Geoffrey Allen, Ah-Mee Hor and Sandra Gardner,<br>Xerox Research Center of Canada, Mississauga, Ontario, <i>Canada</i>   | 655 |
| 10:10 am | <b>BREAK</b>   |     |
| 10:30 am | <b>Focal paper—Charge Transport in Energetically and Spatially Disordered Molecular Solids</b><br>Paul E. Parris, Department of Physics, University of Missouri-Rolla, Rolla, Missouri, <i>USA</i>   | 659 |
| 11:00 am | <b>Correlation of Hole Drift Mobility and Hole Diffusion in PTPB Polymer Films</b><br>John S. Facci and Martin Abkowitz, Xerox Corporation, <i>USA</i>   | 663 |
| 11:20 am | <b>Carrier Trapping Centers in Polysilane Film</b><br>Yoshikazu Nakayama, Akira Saitoh, Hiroyuki Inagi and Rie Sunami,<br>Department of Physics and Electronics, Osaka Prefecture University, Osaka, <i>Japan</i>  | 664 |

Thursday Afternoon, October 21, 1999—1:10 to 2:30 p.m.

### Optoelectronic Imaging Materials and Devices (continues)

*Session Chairs: Jin Mizuguchi, Yokohama National University;  
Jun-ichi Hanna, Tokyo Institute of Technology; Andreas Richter, SynTech GmbH;  
and James Duff, Xerox Research Centre of Canada*

- |         |  |     |
|---------|--|-----|
| 1:10 pm | <b>Free-Volume Trapping in Charge Generating Layers</b><br>Michel F. Molaire and Theodore Zubil, NexPress Solutions L.L.C., Rochester, New York, <i>USA</i><br>William Gruenbaum, Heidelberg Digital L.L.C., Rochester, New York, <i>USA</i>             | 668 |
| 1:30 pm | <b>Ionic Conduction in Sol-Gel Overcoats for Organic Photoreceptors</b><br>W. T. Ferrar, NexPress Solutions L.L.C., Rochester, New York, <i>USA</i><br>D. S. Weiss, and J. R. Cowdery-Corvan, Heidelberg Digital L.L.C., Rochester, New York, <i>USA</i> | 672 |

1:50 pm	<b>Effect of Ambient Gases on the Charge Acceptance of Cu-phthalocyanine/polymer Single Layer Photoreceptors</b> Kuniki Seino and Osamu Ebisu, Minolta Co., Ltd., Toyakawa, Aichi, <i>Japan</i>	675
2:10 pm	<b>Focal paper—Near-IR Absorption in Magnesiumphthalocyanine Complexes</b> J. Mizuguchi, A. Endo and S. Matsumoto, Department of Applied Physics, Faculty of Engineering, Yokohama National University, Yokohama, <i>Japan</i>	679
2:40 am	<b>BREAK</b>	

Thursday Afternoon, October 21, 1999—3:00 to 5:30 p.m.

## Interactive Session

Consecutive five-minute oral previews will be followed by displays and one-on-one discussions with the authors.

### Optoelectronic Imaging Materials and Devices

*Session Chairs: James Duff, Xerox Research Centre of Canada;  
Jin Mizuguchi, Yokohama National University; and Andreas Richter, SynTech GmbH*

	<b>Charge Transport in Organic Photoreceptors: What Theory Tells Us About Interpretation of Experimental Data</b> Sergey Novikov, A.N. Frumkin Institute of Electrochemistry, Moscow, <i>Russia</i>	683
	<b>Molecular Distortion and Exciton Coupling Effects in Metal-Free Phthalocyanine</b> Shinya Matsumoto and Jin Mizuguchi, Department of Applied Physics, Faculty of Engineering, Yokohama National University, Yokohama, <i>Japan</i>	687
	<b>Photoconductivity of C60 -H2 Pc Coevaporated Thin Films</b> Ryoichi Yasuda and Manabu Takeuchi, 4-12-1 Nakanarusawa Hitachi, 316-8511, <i>Japan</i>	691
	<b>Correlation between Electronic and Crystal Structures in Diketopyrrolopyrrole Pigments</b> Ayae Endo, Shinya Matsumoto and Jin Mizuguchi, Department of Applied Physics, Faculty of Engineering, Yokohama National University, Yokohama, <i>Japan</i>	695
	<b>The Structure-Photosensitivity Relationships of the Hydrazone-based Hole-transport Materials</b> Zhongping Huang, Qingsen Yu, Jinhong Pan, Ruisen Lin, and Hanxing Zong, Department of chemistry, Zhejiang University, Hangzhou, <i>P.R. China</i>	699
	<b>An Influence of Polycarbonate Molecular Weight and Structure on Hole Drift Mobility and Electrophotographic Properties of Photoconductors</b> Olga K. Kocheleva, Konstantin K. Kochelev, NIFTI-Slavich (Scientific Research Phototechnical Institute on Slavich Co.) Pereslavl-Zalessky, <i>Russia</i> Alek R Tameev, Alexey A. Kozlov and Anatoly V. Vannikov, A.N. Frumkin Institute of Electrochemistry of RAS, Leninsky Pr., Moscow, <i>Russia</i>	703
	<b>Analysis of Traps in OPC from the Dependence of Corona Charging Curve on Thickness of Photo Generation Layer</b> Chun-Wei Lin, Yasushi Hoshino and Shigeru Kitakubo, Nippon Institute Technology, Saitama, <i>Japan</i>	707



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<b>High Performance in Photorefractive Polymers and Their Application to Transient Hologram</b>	714
Masaaki Yokoyama, Shun-ichiro Kurihara, Yasushi Komori, and Hiroshi Horikawa, Material and Life Science, Graduate School of Engineering, Osaka University, Yamadaoka, Suita, Osaka, <i>Japan</i>	
<b>Light Stability and Electrophotographic Properties of Polycarbonate Layers Doped by Organic Photoconductors</b>	718
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Friday Morning, October 22, 1999—8:00 a.m. to 11:40 am

## Optoelectronic Imaging Materials and Devices (continues)

*Session Chairs: Jin Mizuguchi, Yokohama National University;  
Jun-ichi Hanna, Tokyo Institute of Technology; Andreas Richter, SynTech GmbH;  
and James Duff, Xerox Research Centre of Canada*

8:00 am	<b>Development of a New Generation Surface Layer for an a-Si Photoreceptor Drum</b>	724
Takashi Nakamura, Akihiko Ikeda, Hideaki Fukunaga, Katsumi Okuda, Kyocera Corp., Shiga, <i>Japan</i>		
8:20 am	<b>Amorphous Silicon Photoreceptors: Homogeneity of Electrophotographic Properties</b>	728
F. Stahr, S. Röhlecke, K. Schade, Forschungs-und Applikationslabor Plasmatechnik GmbH Dresden, <i>Germany</i> M. Lutz, and S. Dreihöfer, AEG Elektrofotografie GmbH Warstein, <i>Germany</i>		
8:40 am	<b>A Study of High Resolution Latent Image Forming and Development</b>	732
Tadashi Iwamatsu, Tetsuro Toyoshima, Nobuyuki Azuma, Yoshinori Mutou, and Yoshinori Nakajima, Precision Technology Development Center, Production Technology Development Group, SHARP Corporation, Tenri, Nara, <i>Japan</i>		
9:00 am	<b>Photochromic Recording Medium Using A Diarylethene Polymer</b>	736
Eunyoung Kim, Advanced Materials Division, Korea Research Institute of Chemical Technology, Taejeon, <i>South Korea</i> Sunkyu Han and Myong-Hyun Lee, Photonic Switching Section, ETRI, Taejeon, <i>South Korea</i>		
9:20 am	<b>Focal paper—Short-Term Evolution of Injection Efficiency at Metal/Organic Interfaces</b>	739
Andronique Ioannidis <sup>1,3</sup> , John S. Facci <sup>1,2</sup> , Martin A. Abkowitz <sup>1</sup> 1. Center for Photoinduced Charge Transfer, University of Rochester, New York, <i>USA</i> 2. Xerox Corporation, Xerox Research & Technology, Webster, New York, <i>USA</i> 3. Xerox Corporation, Corporate Strategic Services, Webster, New York, <i>USA</i>		
9:50 am	<b>BREAK</b>	

10:10 am	<b>Numerical Simulations of Photocurrent Multiplication Phenomenon at Organic/Metal Interface</b> Ken-ichi Nakayama, Masahiro Hiramoto, and Masaaki Yokoyama*1,*2 *1Material and Life Science, Faculty of Engineering, Osaka University, Yamadaoka, Suita, Osaka 565, <i>Japan</i> *2 CREST, Japan Science and Technology Corporation (JST), <i>Japan</i>	743
10:40 am	<b>OLED Performance and the Use of a Hole Transport Molecule Dissolved in a High Tg Host Polymer</b> F. Santerre <sup>a</sup> , J.P. Dodelet <sup>a</sup> , Y. Sun <sup>b</sup> , A. R. Hlil <sup>b</sup> , A. S. Hay <sup>b</sup> , and M. D'Iorio <sup>c</sup> <sup>a</sup> INRS-Énergie et Matériaux, Varennes, <i>Canada</i> <sup>b</sup> Department of Chemistry, McGill University, Montréal, <i>Canada</i> <sup>c</sup> National Research Council of Canada, IMS, Ottawa, <i>Canada</i>	747
11:00 am	<b>Epitaxially-Grown Oxadiazole Layers for Light Emitting Diodes</b> R. Fan, M.J. Turon, J. E. Langseth, G.G. Malliaras, S. Gu, L. Sukhomlinova, and R. J. Twieg Department of Materials Science and Engineering, Cornell University, Ithaca, New York Department of Chemistry, Kent State University, Kent, Ohio, <i>USA</i>	751
11:20 am	<b>Photochemical Organic Recording Media for Optoelectronic Devices</b> Valery Barachevsky, Photochemistry Center of Russian Academy of Sciences, Moscow, <i>Russia</i>	754