



IS&T REPORTER

"THE WINDOW ON IMAGING"

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SELECTED CONFERENCE ABSTRACTS: NIP25/Digital Fabrication 2009

Drops-on-Drops Micro-film Formation by Stable Electrostatic Jets

Kazuyuki Tada, Masato Nishiura, Noritaka Hara, Kiyohito Maruo, Nozomi Yoshida, and Hiroyuki Kawamoto, Waseda University (Japan)

Abstract: Applying micro spray state of electrostatic inkjet to precision film coating was examined experimentally. High quality coating could be expected by drops-on-drops of super fine and monodiameter droplets. At first, the most preferable jetting condition was determined through experiments for two types of coating liquid, one of which was dilute dispersion and the other was viscous solution. Then, with those parameters examined, the surface quality of the coated films was evaluated through several coating tests. Along increasing applied voltage, jetting mode was varied from Mode 1, dripping mode, to Mode 2, jetting mode. The basics of jetting mode variation was equivalent for both types of coating liquid, although a larger nozzle had to be used for the viscous solution to avoid clogging. The most favorable condition for coating was the stable cone-jet mode in Mode 2, where a well-oriented thread was jetted from the stable Taylor cone at the nozzle tip and broken up into mist during flight. Both types of quality coating, a submicron film with the dilute dispersion and a thick film, over 10 micrometers, with the viscous liquid could be demonstrated by piling up the single-digit-micron-size droplets.

Do We Need Better Materials than Teflon in Marking?

Kock-Yee Law, Hong Zhao, Xerox Research Center (USA)

Teflon materials such as PTFE and PFA are generally known to be chemical inert and thermally stable with low surface energy. They have been the favorite materials for a variety of applications, ranging from filler in photoreceptor to additive in toner to release layer in oil less fusing to overcoat in inkjet printhead. In this work, we systematically investigate its wetting and adhesion properties using static and dynamic contact measurement techniques. In addition to model liquids such as water and hexadecane, we also studied the wetting and adhesion performance with ink and toner. Our results indicate PTFE, although, is highly hydrophobic, it is actually oleophilic and sticky towards traditional imaging materials. In most applications in xerography and inkjet printing, being non-stick with low adhesion is paramount. The requirement of a high static contact angle may be secondary. Here we also report the fabrication of a superoleophobic model surface by photolithographic technique and superior anti-offset performance was demonstrated. The need of easy clean, non-stick surfaces for future xerographic and inkjet printers is evident.

Fundamental Characteristics of Printed Cell Structures Utilizing Micro-Drop Injection

Shinjiro Umezu,^{1,2} Takashi Kitajima,² Hitoshi Ohmori,² and Yoshihiro Ito;² ¹Tokai University ²RIKEN (Japan)

Abstract: Micro-drop injection took place when

To view full papers go to www.imaging.org/pubs/reporter/

* These papers were presented at the NIP25/Digital Fabrication 2009 Conference, held September 20-24, 2009, in Lexington, KY.

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high voltage was applied between a capillary tube filled with ion conductive liquid and a metal plate electrode. Micro-drop injection has two merits; those are high resolution to print and ability to eject highly viscous liquid. Recently many researchers applied commercial inkjet for bio-printing. Main problem of this application is difficulty to print relatively highly viscous liquid. I think the merits of micro-drop injection will clear this problem. So, I applied the micro-drop injection for printing living cells and highly viscous scaffolds to make 3D cell structures. Cells were not killed in spite that high voltage was applied by micro-drop injection. Because current did not flow inside cell but around cell. In this paper, we cleared the fundamental characteristics of patterning living cells and gelatin and fabricated 3D cell cylinder utilizing micro-drop injection.

A Model for Jet Shortening in Drop-On-Demand Ink-Jet Printing

Stephen D. Hoath, Graham D. Martin, and Ian M. Hutchings,
University of Cambridge (UK)

A new model has been developed for the surface energydriven shortening of a free, cone-shaped fluid ligament of finite length, as a function of ligament diameter, length, mass and head speed. It differs significantly from classical models based on infinitely long cylindrical (Taylor) or conical (Keller) shapes, but leads to overall shortening speeds which are very similar to those provided by Taylor's model for typical drop-on-demand fluids.

However, if a realistic initial velocity distribution along the length of the ligament is included, the model predicts more rapid shortening, by as much as 2 m/s for a jet speed of 6 m/s. Such effects should be taken into account when analyzing the behavior of real jets.

The model's predictions of shortening speeds for free drop-on-demand jets fail to account for all experimental observations, which for some polymer solutions can be as much as 2-3 times as high. This effect is attributed to elastic retraction, and may be a general feature linked to the polymer relaxation time.

Fabrication of Two and Three-Dimensional Structures by Using Inkjet Printing

J. Perelaer,^{1, 2, 3} P. Kröber,¹ J. T. Delaney,^{1, 2, 3} U. S. Schubert;^{1, 2, 3}

¹Friedrich-Schiller-University (Germany), ²Eindhoven University of Technology (Netherlands), and ³Dutch Polymer Institute (Netherlands)

Abstract: Inkjet printing is a nascent technology that is developing from only printing text and graphics into a major topic of scientific research and R&D, where it can be used as a highly reproducible non-contact patterning technique to print at high speeds either small or large areas with high quality features. Inkjet

printing is an additive technique, which requires only small amounts of functional materials, which can vary from a simple polymer solution to advanced nanoparticle dispersions. The latter form of ink has been investigated more and more during the last few years, in order to produce conductive features that require a reduced amount of processing steps.

In recent years inkjet printing has been used for the production of microelectronic structures on (flexible) substrates and for the rapid production of 2D and 3D microstructures. In order to create these microstructures we present 'reactive inkjet printing' as a technology to create micron-scale polyurethane structures, such as dots, lines and pyramids. These structures were fabricated in-situ and cured within five minutes by inkjet printing successively two separate inks respectively from two separate print heads, with one ink containing isophorone diisocyanate, and the other consisting of an oligomer of poly(propylene glycol), a catalyst, and a cross-linking agent. The fast polymerisation reaction that forms polyurethane at the surface opens a new route for rapid prototyping, as well as the use of inkjet as a technique for handling moisture-sensitive reactions.

Influence of the Rotation of Inkjet Printing Heads on the Print Quality

Christophe Mercier, Olivier Morel, and James Fox, Xennia Technology Ltd, and Ron Todd and Lindsay MacDonald, London College of Communication (UK)

Abstract: In this study, we focus on the design specifications of industrial inkjet printers. In these systems, the printing heads are mounted individually on a carriage. The in-plane print head rotation has been identified as one of the reasons for the ink dots misplacement. This study aims to work out the influence of the angles of CMYK printing heads on the print quality. Ultimately, some mechanical tolerances are given to achieve different levels of print quality.

A two-step approach is used: one colour, then the four CMYK colours are considered. In the first step, a layout of the nozzles plate is used in a computer simulation. In parallel, a prototype has been built to validate the simulations. In the second step, a CMYK virtual printer is introduced in place of a four colours experimental system. A criterion on dots superposition is introduced to assess the influence of the heads rotation on the colour reproduction.

The nozzle plate layout has been added to a CMYK virtual printer to characterise the printing heads rotation. The model has been tested with XAAR 760 GS8 print head. Experiments are in a fair agreement with simulations for the one-colour approach. A cone angle for one and four colours has been derived. ▲

Growth in a Challenging Time

by NIP25 General Chair Huoy-Jen Yuh and The Americas Publicity Co-chairs Devon Strain and Eric Stelter

This year, IS&T celebrated the 25th anniversary of the NIP International Conference on Digital Printing Technologies and the 5th anniversary of the Digital Fabrication conference in Louisville, Kentucky, on September 20 - 24.

General Chairs Huoy-Jen Yuh (NIP25) and Reinhard Baumann (DF2009), along with the conference committees hosted 530 participants

from around the world during the intense four day period. More than 200 oral and interactive papers were presented within the four technical tracks, as well as seven Print Gallery displays and 36 company exhibits. Both conferences were very successful with many exciting new technologies, innovations, and concepts being shared and discussed.

The Sunday night welcome reception in the well-known Louisville Slugger Museum & Factory and Wednesday night conference reception in The Gillespie, a show case of local Art Deco style architecture, also provided the attendees the opportunities to enjoy some of the local culture. Even though the subscription to the short courses has declined and the total attendance was 20% down from 2008,

the technical content presented and the excitement and enthusiasm of conference attendees remained at a high level. This was remarkable considering the current world-wide economic situation.



Technical Program Highlights Current Trends

A total of 28 traditional oral sessions along with two interactive sessions

made a solid foundation for the conferences. In addition, the committees organized several special programs to focus on the future of our industry. These included two panels, Digital Packaging and Mass Customization, and two special sessions, Printing Technologies from Drupa 2008 and Fundamental Physics and Chemistry for Printing Technologies. Five keynote speeches were presented by world leaders to cover a wide range of current and future issues, focusing especially on environmental sustainability and forefront technology developments.

Monday morning opened with a plenary by Marcel Slot (Océ) on "The Future of R&D in the Digital Printing Industry". Industrial R&D has taken advantage of the digitally connected world for open innovation, external sourcing, and partnership. He argued that the digital printing industry will develop a similar business model which is as important as product innovation. He believes that environmental sustainability will be the key driving force for digital printing's growth into the offset and graphic market

NIP25/DIGITAL FABRICATION 2009 STATISTICS

Dates: September 20-24, 2009
Location: Louisville, KY
General Chairs: Huoy-Jen Yuh (NIP) and Reinhard Baumann (DF)
Attendance: 530 (476 tech. attendees)
Oral Papers: 169
Interactive Papers: 66 (44 presented)
Short Courses: 13
Exhibitors: 36

and digital fabrication/ manufacturing applications. Digital printing's on-demand capability has the advantages of reducing energy and wastes compared to offset printing by eliminating pre-press and unnecessary printing. What our industry should do is to work together on ecological innovation for deinkability to enable complete paper recycling. This concept has been put into practice in the Netherlands by the Dutch PrintValley. This is a Dutch Open Innovation Ecosystem, formed by 23 parties to join force in the Dutch high tech systems industry to develop green printing technologies aiming for global competition.

The Wednesday keynote speaker Koji Hiraokura (Ricoh and president of ISJ), devoted his entire talk to environmental sustainability "Environmental Strategy of the Japanese Digital Printing Industry". Substantial data and information were presented on the Japanese government environmental regulations and carbon footprints (environmental loads) associated with all ranges of printers. According to the data, the environmental load of ink jet is greater than that of xerography mostly due to the lower running cost in CO₂ for xerographic printers. He showed how Ricoh developed their products with a whole life cycle approach by reducing the carbon footprint at each step of the supply chain, from suppliers, to design (smaller, longer life, and lighter), production (low energy and on-demand), and for cus-



Digital Fabrication General Chair Reinhard Baumann confers with Brian Derby, just prior to Brian's keynote address on Applications for Inkjet Printing in Biology and Medicine

tomers (quick-start fusing system, eco-toner, duplex, and no print). The environmental load of paper is the greatest of the whole life cycle, so Ricoh is studying a paper-less office environment by setting up a paperless test office in Tokyo.

The third NIP keynote speech was "Electronic Paper comes of Age", presented by Mike McCreary (E-ink). McCreary summarized the technology advancements and how they are accepted in the market. There are now about 40 eBook readers offered in the market. The current challenges for this technology are the brightness, contrast, speed, color, flexibility, and cost. Properties that are driving their acceptance over conventional LCD displays are the paper-like look, daylight readability, low power consumption, view angle independence, and low cost. The general feeling is that the price needs to come down to \$100 or so for them to really take off. The E-ink electrophoretic display can be used as the front plane on the new generations of flexible and printed electronic backplanes. A color proto-type eBook from E-ink was demonstrated.

The other two keynotes focused on digital fabrication. Brian Derby from the (University of Manchester) presented "Applications for Inkjet Printing in Biology and Medicine". He believes that inkjet printing is a viable technique for biomaterial research. He demonstrated the printing of biosensors via inkjet printing and the building of three-dimensional structures through a range of printing technologies. The cells and biomaterials could survive the printing process. However, new materials must be developed for printing scaffold structures.

Takao Someya (University of Tokyo) presented "Ambient Electronics and Digital Fabrication: Print Electronics Everywhere". He talked about printed organic transistors, stretchable robot skins, and printed wireless power sheets with printing machines as the manufacturing process. Most interestingly, Someya showed the fabrication of flexible and stretchable 3-D rubber-like organic active matrix sheet with skin-like sensitivity which can be used for humanoid robots in the next generations. He also fabricated high frequency organic TFTs for ultrasonic sensor sheets. Such stretchable OLED displays have the potential for many unique applications, such as a human body display for diagnosis and a robot face, etc.

Special Sessions

Drupa has always been the show case for major advances in Printing Technologies. Several major players in 2008 Drupa participated in the "Printing Technologies from Drupa 2008" session. Eric Hanson (HP) summarized their digital commercial print portfolio,

including several new technologies: charge rollers and fusing blanket for their high speed liquid electro-photographic application and their new aqueous latex inks. Len Christopher (Eastman Kodak) talked about NexPress SE3600 color press, featuring an intelligent calibration system for image quality and a 5th developer housing for 3-D raised printing. Marcel Slot (Océ) described in detail the printhead technology used in the CrystalPoint Toneperal solid inkjet printer. Osamu Namikawa (Ricoh) discussed Ricoh's business strategy and their production systems: Pro C9000 and Injet IP5000. Xaar compared the "Inkjet products and technologies shown in Drupa" from their prospective. Digital 'Commercial' printing, as they observed, no longer automatically means electrophotography. Single-pass ink jet printing is becoming established. UV curable ink is presently limited to the narrow-web label press.

- The "Fundamental [continued on page 11](#)



The Interactive Paper Sessions (left) provided authors and attendees the opportunity to discuss papers in depth. Top row left, Yuichi Nobusawa shares his data while, top row right, Behnam Bastani explains a concept behind his work. Kuanjun Fang (above center) discusses his work with another attendee; Urska Bogataj (above right) in front of her paper.



IS&T President's Annual Report

July 1, 2008 to June 30, 2009

This has been quite a tumultuous year in the worldwide economy, with major disruptions in financial markets and significant downturns in many business sectors. The economic slowdown has had widespread impact on companies and institutions in the imaging field, and the Society for Imaging Science and Technology has not been immune from the ripple effects of these difficult economic times. However, the health of IS&T remains strong. Attendance at IS&T conferences in the second half of 2008 was essentially equal to the prior year, and for those in the first half of 2009, attendance was down by only about 10% year-over-year. Journal submissions during this 12 month period were virtually the same as the year before. Looking ahead, preliminary indications are that the conferences scheduled in the second half of 2009 (none of which have yet taken place as of the time of this writing) will have somewhat larger year-over-year declines than those in the first half, but these conferences are continuing to at-

tract very solid levels of attendance from their communities.

IS&T focuses on creating and organizing science and technology communications channels for the imaging community, such as conferences, publications, and local chapters. Through these, IS&T assists individuals and organizations in the imaging world to gain access to information on advances in imaging science and technology, plus it provides forums at which interpersonal and inter-organizational networks and collaborations can be expanded. In addition it creates opportunities for imaging scientists and technologists to gain professional exposure and recognition. These channels have significant value for imaging professionals and employers, and this is the key to the health of IS&T.

The activities of the Society are planned and implemented by two different groups of people: volunteers from the imaging community and the professional staff of the Society. The staff is very ably led

by Executive Director Suzanne Grinnan, who continues to improve the operations of our conferences and of the Society of office. Suzanne has managed costs very effectively, and as a result our organization has a good financial cushion from which to pursue new programs and expand on current offerings. She and the staff provide the infrastructure that makes IS&T work. One major initiative of the staff this year has been a much improved imaging.org website. If you haven't used it yet, I suggest you check it out.

Volunteers from our imaging science and technology communities play a critical role in the success of the Society. The technical organization of IS&T's conferences is entirely dependent on the contributions of time, energy, and knowledge made by members of our Conference Committees—from General Chairs who lead the overall technical focus of a meeting to program committee members who review countless papers and act as Session Chairs.

IS&T BOARD OF DIRECTORS

2008-2009

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2009-2010

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IS&T Executive Director: Suzanne E. Grinnan

Two very important IS&T volunteers are Mel Sahyun and Jan Allebach, who lead JIST and JEI, our two journals. (Their reports on the state of the journals can be found within this annual report.) They are assisted by many skilled Associate Editors and Reviewers who allow us to publish these two well-respected journals.

Other volunteers serve on the Board of Directors, chapter councils, and special committees. I would like to express my personal thanks to each person who has invested time, energy, and expertise in making the Society such a useful organization to all of us in the field of imaging.

If you haven't volunteered so far, I urge you to consider doing so! It is a great way to expand your horizons in the imaging community, meet new people, and have some fun as well. There are many

volunteer roles which contribute to IS&T activities. It is easy to get started—just contact me, or another member of the Board, or a member of the staff, and let us know that you are interested in playing an active role.

Board of Directors

IS&T Board of Directors sets the policies and strategic directions for the Society. It meets three times per year, with one-day meetings in the fall and winter plus a two-day planning meeting in late spring. The board spends most of its time charting the evolution of conferences and other offerings of the society to address the changing



During NIP25/Digital Fabrication 2009, the IS&T executive committee of the Board of Directors met with the leadership of ISJ, the Imaging Society of Japan.

field of imaging technology, and also on adapting those offerings in response to new developments in the communication and information landscape.

One ongoing Board activity is the creation of new conferences. In some cases, members come to us with a proposal

IS&T 2008 Financial Statement

Statement of Income

Fiscal Years Ending December 31, 2008 and December 31, 2007

	2008	2007
Income		
Conferences	\$1,617,974	\$1,458,635
Publications	587,075	525,252
Membership	119,502	107,839
Other	<u>92,531</u>	<u>109,501</u>
Total Income	\$2,417,082	\$2,201,227
Expense		
Conference	\$1,558,098	\$1,314,349
Publications	543,142	533,010
Membership	117,992	133,837
Other	<u>32,756</u>	<u>49,957</u>
Total Expenses	\$2,031,159	\$2,115,263
Net Operations	165,094	170,069
Realized Gain (Loss)	-9,942	0
Unrealized Gain (Loss)	<u>-159,190</u>	<u>9,628</u>
NET INCOME (Loss)	\$ -4,038	\$ 179,697

Balance Sheet Notes

- Income from operations exceeded expenses in 2008 by \$ 165,094
- IS&T's 2008 Annual Report is available to members upon request.

Statement of Income Notes

General Administration and Labor allocations in 2008 were as follows: Publications 20.6%; meetings 71.7%; membership 7.7%. These percentages were applied to administration and labor expenses to determine a net gain (loss) for publications, meetings, and membership.

IS&T's investments are administered through Smith Barney in Washington, DC. The investments are currently invested in Money Market funds, Corporate bonds, CD's and in the TRAK stock portfolio. As of December 31, 2008, these investments had a market value of \$417,422.

Balance Sheets

Fiscal Years Ending December 31, 2008 and December 31, 2007

ASSET	2008	2007
Current Assets		
Checking and Petty Cash	\$ 271,479	\$ 208,162
Money Market / CD's	1,880,765	1,384,912
Investments	417,422	564,079
Accounts Receivable	25,328	9,789
Book Inventories	59,102	59,102
Prepaid and deferred expense	<u>47,289</u>	<u>86,439</u>
Total Current Assets	\$2,738,340	\$2,312,482
Property and Equipment		
Land	\$29,000	\$29,000
Building and Improvements	156,291	156,291
Furniture and Equipment	<u>268,145</u>	<u>266,833</u>
Subtotal	453,436	452,124
Less Accumulated Depreciation	<u>-397,688</u>	<u>-389,744</u>
Total Fixed Assets	55,748	62,380
Total Assets	\$2,794,088	\$2,374,862
LIABILITIES AND FUND BALANCES		
Current Liabilities		
Accounts Payable	\$113,359	\$40,379
Accrued Expenses	312,946	104,561
Due to Chapters	----	4,984
Deferred Income, Dues, Subscriptions	198,090	189,388
Meetings	<u>409,374</u>	<u>270,130</u>
Total Liabilities	1,033,769	609,442
Net Assets		
Unrestricted	\$1,703,283	\$1,707,503
Davis Scholarship Fund	57,036	57,918
Total Liabilities and Net Assets	\$2,798,088	\$2,374,863

for a new conference. In the past several years we have launched Digital Fabrication, the Archiving Conference, and the International Symposium on Technologies for Digital Photo Fulfillment. We have also collaborated with other societies on a number of imaging conferences in various parts of the world. We are always

interested in exploring ideas for new conferences which address imaging topics that are not well covered by existing meetings, and we also have a goal of expanding the geographic scope of our conferences. Let me know your suggestions – I very much value your ideas for new conferences to help us serve all of the communi-

ties which are active in the imaging field.

Conferences

IS&T held six major conferences during the July 2008 – June 2009 year. These conferences included large and diverse events such as the Electronic Imaging Symposium and the NIP Digital Printing/Digital

Publications Annual Report

July 1, 2007 to June 30, 2008

Journal of Imaging Science and Technology (JIST)

by M. R. V. Sahyun, editor

The Journal has successfully completed another year of publishing with on-line delivery as the primary method of distribution. One advantage of web distribution is the ability to make papers available as soon as they are accepted, composed, and approved; this feature, E-first, was successfully implemented for us by the American Institute of Physics during 2008.

During this past year JIST published 69 papers, the same number as in 2007. By historical standards this number is low, though improved from 2006. Specifically, during 2008 we received 100 submissions, of which 14 papers were rejected, consistent with our historic acceptance rate. The review process involved 85 individuals. Given our high acceptance rate, the review process continues to focus more on mentoring authors to enable them to make the best possible presentation of their work than on gatekeeping, though the latter remains essential to our technical credibility.

Currently the review process takes, on average, nine weeks; we look for authors to follow up with requested revision within six weeks. The publication queue (time from acceptance until appearance of the paper on-line) averages 12 weeks, for a total of seven months from receipt until on-line publication of an individual paper.

The Editorial Board continues to evolve to reflect the technical topics addressed in the Journal. Raja Bala, Michel Molaire, and Philip Laplante have rotated off the Board, the first two after only one year's service. This unexpected development appears to reflect the evolution of corporate cultures during difficult economic times. Howard Mizes, with expertise in electrophotography, will be joining as Associate Editor in 2009, and I am actively recruiting at least two additional Associate Editors, particularly with expertise in color science, image analysis, and/or image processing. Michael Lee continues to coordinate reviews of papers relating to digital printing technologies, while David Whitcomb and myself handle papers dealing

with materials science aspects of imaging and historical technologies. Kok-Wei Koh has the personal background and scientific network to deal with a broad range of imaging specialties.

Journal of Electronic Imaging (JEI)

by Jan Allabech, editor

The *Journal of Electronic Imaging* received an impact factor of 0.563 for 2008, ranking 9th out of 11 journals in Imaging Science & Photographic Technology, 161st out of 229 in Electrical & Electronic Engineering, and 49th out of 64 in Optics.

In 2008, JEI:

- received 182 submissions, including 156 contributed papers and 26 letters.
- published 111 papers, including 80 contributed papers, 26 special section papers, and 5 letters in total of 1,212 pages.

In the first half of 2009, JEI:

- received 109 submissions, including 74 contributed papers, 28 special section papers, and 7 letters.
- published 32 papers, including 28 contributed papers and 4 letters, in a total of 316 pages.

JEI published two special sections in 2008:

- *Biometrics: Advances in Security, Usability, and Interoperability* (Claus Vielhauer, Berrin Yanikoglu, Sonia Garcia-Salicetti, Richard M. Guest, and Stephen J. Elliott, guest eds.)
- *Quality Control by Artificial Vision* (Hamed Sari-Sarraf, David Fofi, and Nelson Yung, guest eds.)

The following special sections are planned for issues in 2010:

- *Image Quality* (Susan Farnand and Frans Gaykema, guest eds.)
- *Digital Photography* (Peter B. Catrysse and Sabine Süstrunk, guest eds.)
- *Quality Control by Artificial Vision II* (Shaun S. Gleason, Kurt S. Niel, and Edmund Lam, guest eds.)

Fabrication co-located meeting. They also included medium-sized, more-focused meetings such as Archiving and Color Imaging, as well as the smaller Symposium on Technologies for Digital Photo Fulfillment.

Corporate Members

In addition to our individual members, IS&T has 22 corporate members. These companies have recognized the value that IS&T delivers to them by disseminating information and providing professional

services for their imaging scientists and engineers. New technologies have made imaging important to an ever wider range of products, so many new companies, large and small, have become interested in imaging science. We appreciate their financial support.

Honors and Awards

Ken Lindblom chaired the Honors and Awards Committee this year, which selected 15 excellent imaging scientists, two important papers, and a worthy student for

recognition. All have contributed substantially to the technology of imaging, the work of Society, and/or the communication of new technology to the community. Congratulations to each of them! Nominations are open now for the 2010 Honors and Awards.



Eric G. Hanson,
IS&T President, 2007 - 2009

2008 — 2009 MEETING DATA

Meeting: NIP24/Digital Fabrication 2008

Dates: September 6-11, 2008 / **Location:** Pittsburgh, PA
General Chair: Detlef Schulze-Hagenest (NIP) and Ross Mills (DF)
Attendance: 706 (638 technical attendees)
Oral Papers: 197 / **Interactive Papers:** 42
Short Courses: 21
Exhibitors: 43

Meeting: CIC16 (Color Imaging Conference 2008)

Dates: November 10-15, 2008 / **Location:** Portland, OR
General Chairs: James Larimer and Nathan Moroney
Attendance: 249 (241 technical attendees)
Oral Papers: 29 / **Interactive Papers:** 37
Short Courses: 17

Meeting: EI2009

Dates: January 18-22, 2009 / **Location:** San Jose, CA
General Chairs: Nitin Sampat and Jan Allebach
Attendance: 1,029 (944 technical attendees)
Oral Papers: 600 / **Interactive Papers:** 115
Short Courses: 16
Exhibitors: 6

Meeting: TDPF2009

Dates: February 28-March 1, 2009 / **Location:** Las Vegas, NV
General Chair: Stuart Gordon
Attendance: 33 (26 technical attendees)
Oral Papers: 25

Meeting: Archiving 2009

Dates: May 4-7, 2009 / **Location:** Arlington, VA
General Chairs: William G. LeFurgy
Attendance: 186 (172 technical attendees)
Oral Papers: 29 / **Interactive Papers:** 24
Short Courses: 4
Exhibitors: 7

Meeting: NIP25/Digital Fabrication 2009

Dates: September 20-24, 2009 / **Location:** Louisville, KY
General Chairs: Huoy-Jen Yuh (NIP) and Reinhard Baumann (DF)
Attendance: 530 (476 technical attendees)
Oral Papers: 169 / **Interactive Papers:** 66 (44 presented)
Short Courses: 13
Exhibitors: 36

Meeting: CIC17 (Color Imaging Conference

Dates: November 9-13, 2009 / **Location:** Albuquerque, NM
General Chairs: Karen Braun and Moshe Ben-Chorin
Attendance: 170 (155 technical attendees)
Oral Papers: 43 / **Interactive Papers:** 23
Short Courses: 15

IS&T REPORTER

Executive Editor: Peter Burns / Managing Editor: Donna Smith / Standards Editor: David McDowell

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Articles and letters to the editor published here do not necessarily constitute endorsement or reflect the opinions of the editors or IS&T.

Advertising and copy are subject to acceptance by the editor.

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STANDARDS UPDATE

David Q. McDowell, Editor

TC 130 held its 23rd Plenary meeting in Beijing, China on Sept 26, 2009. During the week of Sept 21-25 many of its Working Groups also held their semi-annual meetings. The following is a summary of key accomplishments and items associated with those meetings.

WG1 Terminology

WG1 work revolves around two documents. The ISO 12637 series which are the basic vocabulary documents of TC 130 and ISO 5776 which is the standard on text proof correction marks.

ISO has recently introduced something called Concept Data Base (CDB), which will be a way in which documents can be maintained in an interactive rather than static form. The intent is that ISO 12637 will be moved to the CDB as part of the current review and revision.

WG2 Prepress Data Exchange

WG2 Task Force 2 (PDF) met in Beijing and will be reported on later in this summary. WG2 Task Force 3 (vPDF) did not meet in Beijing as ISO 16612-2 (*Graphic technology — Variable data exchange — Part 2: Using PDF/X-4 and PDF/X-5 (PDF/VT-1 and PDF/VT-2)*) is currently in DIS ballot and no action is possible until the comments from that ballot are available.

The bulk of the meeting was devoted to a review of the progress on ISO 17972, *Graphic technology — Prepress data exchange — Colour data exchange format (cdfs)*, which is based on The X-Rite CxF3 file format specification.

The CxF3 file format itself contains many Core Resources which identify various elements and their definition. In addition CxF3 makes provision for Custom Resources which the standards community will use to define use of the CxF3 format for specific graphic arts applications. Because most Core Resources are intended for use in a variety of application environments they are considered to be optional.

However, Custom Resources can point to Core Resources and identify them as required for a specific application.

The standards effort will focus on building a series of Custom Resources to define the use of CxF3 for specific applications in the graphic arts. Key decisions resolved that:

—ISO 17972 will be a multi-part document where part one is a description of the use of both CxF3 and Graphic Arts Specific Custom Resources.

—Parts 2 and onward will each be a description of a custom resource container applicable to a specific task or application area.

—In the initial proposal Part 2 will address scanner targets and Part 3 will address printer targets.

It was reported that the CxF3 schema is now complete and published. The basic software development kit (sdk) is available for download at www.colorexchangeformat.com.

The Japanese representatives reported on research being done concerning RGB workflow in Japan. They noted that RGB data submission to the printing workflow is very important. Using the reversal film as an example they pointed out that reversal film was generally a perfect input because it could be easily viewed by everyone in the process and was not subject to interpretation. The goal is to find a way to allow digital camera RAW data to also be such an input.

It was noted that looking at the characteristic curves of several digital still cameras (DSC) shows that in the middle density range they all have nearly the same tone characteristics. Further when these are compared to the tone characteristics of a typical reversal film and the RIMM/ROMM tone conversion curve in the middle density range they are all very similar. This leads to the possibility that there might be some standard viewing transform that could be applied to allow these data to be evaluated in a consistent way.

WG2TF2, PDF/X

Although ISO 15930-7 (*Graphic technology — Prepress digital data exchange using PDF — Part 7: Complete exchange of printing data (PDF/X-4) and partial exchange of printing data with external profile reference (PDF/X-4p) using PDF 1.6*) and ISO 15930-8 (*Graphic technology — Prepress digital data exchange using PDF — Part 8: Partial exchange of printing data using PDF 1.6 (PDF/X-5)*) have been published, a question has been raised about their use for packaging data.

The Packaging Subcommittee of the Ghent PDF had presented the issue that they are unable to use PDF/X-4 today specifically because of the way in which the optional content feature of PDF language (layers) is restricted. The ability to interactively control the display and output of individual portions of the optional content is more limited than it should be for their needs. In addition there have been issues raised with respect to other features unique to package printing needs.

After much discussion it was decided to move forward with a minor revision of both ISO 15930-7 and ISO 15930-8 to provide a solution to the optional content issue and to add a series of minor editorial corrections. By selecting the minor revision route the documents can go directly to an FDIS ballot after a 30 day review by the member bodies of TC 130. A longer term project will be started to consider the changes needed to incorporate the additional concerns raised

WG3, Process Control and Related Metrology

ISO 14981:2000 (*Graphic technology — Process control — Optical, geometrical and metrological requirements for reflection densitometers for graphic arts use*) was withdrawn in light of the recent approval of the revised ISO 5 (*Photography and graphic technology — Density measurements*) family of standards.

In discussing ISO 12647-7, *Graphic technology — Process control for the manufacture of half-tone colour separation, proofs and production prints — Part 7: Proofing processes working directly from digital data*, it was noted that although the document was only recently published, it needs to be reviewed for potential changes to help provide better differentiation from ISO 12647-8 (a new standard being prepared to define the requirements for design and/or composition proofs). One specific issue that was raised was the potential for tightening the colour measurement tolerances by including a method by which the uncertainty related to inter-instrument agreement could be removed.

Based on the results of the systematic review it was decided to initiate a revision of ISO 12647-4, *Graphic technology — Process control for the production of half-tone colour separations, proofs and production prints — Part 4: Publication gravure printing*, with a 48 month timeline.

There was an extensive discussion of two action items relating to ISO 12647 (*Graphic technology — Process control for the production of half-tone colour separations, proof and production prints*): (1) the simultaneous revision of Parts 1, 2 and 3 proposed by Germany; and (2) the replacement of ISO 12647 by a new document tentatively titled *Process agnostic creation of printed material originating as digital data*. These discussions culminated in a decision to start work on a replacement of the ISO 12647 series as a new document for long term and prepare a Technical Report to supplement the existing ISO 12647 series.

It was agreed to add a preliminary work item (Stage 00) for the development of an International Standard on *Graphic Technology — Requirements for printed matter utilizing digital printing technologies for the commercial and industrial production* (tentative title). It was unclear whether this should be part of the ISO 12647 series or if it should be a separate document.

In discussing the subject of “certification” it was noted that since all approaches

make more or less use of ISO 9001 document management systems the requirements of the ISO Technical Management Board (TMB) and ISO/IEC Guide 72 must be followed. It was agreed to create a task group to explore steps and procedures for setting up ISO based international certification procedures for graphic arts applications.

WG4, Media and Materials

In reviewing ISO/WD 12705, *Graphic technology — Laboratory method for chemical ghosting*, questions were raised concerning the frequency of the occurrence of chemical ghosting and the associated applicability of such a standard. The outcome of the discussion was a recommendation to change the track of this project from an International Standard to a Technical Report.

Because of lack of interest and support, it was also decided to stop work on ISO/TR 20101, *Graphic technology — Cell volume measurement*.

During the WG 3 meeting in May 2009 it was decided to transfer the requirements for proofing papers presently noted in ISO 12647-7 to WG 4. In addition France had prepared a NWIP for comparison of “Proof to print papers” (N 533). Combining these WG4 decided to start a new project at Stage 0 to prepare a document called *Communication of optical and surface properties of printing substrates* (e.g. *fluorescence, gloss and colour*).

In reviewing the results of the systematic review it was decided (because of the lack of adoption or use) to withdraw ISO 15994:2005, *Graphic technology — Testing of prints — Visual lustre*.

JWG 9 — ISO 12640-5 Scene referred SCID images

JWG 9 met immediately prior to the meeting of WG2. It was agreed that as soon as we have a proposed image set, a working draft of ISO 12640-5 that incorporates the recommended image set would be prepared and distributed. In addition, a reduced resolution version of the images (with the appropriate profile embedded) would be placed on a website (ICC website

proposed), in a password-protected area, so that anyone in the working group would be able to download and review them.

In discussion it was noted that the primary purpose of this standard is to provide a set of scene referred images for use in the development and evaluation of color rendering algorithms. One issue that must be considered is that the current encoding range available for RIMM data is fixed point and it is possible that TC42 will have a floating coat encoding available in 2-3 years. When the floating point encoding is available a larger dynamic range can be encoded. The option for us will be to revise this part of ISO 12640 or to add another part to the series in the next year or two. This may have an impact on the number of images selected and the selections themselves.

Plenary Meeting

Key actions, not otherwise reported above are:

An internal liaison with ISO/TC 207/SC 7 (Environmental management) was established and Laurel Brunner, United Kingdom, was appointed as liaison officer.

TC 130 accepted the request of CEPI/CTS to establish an A-Liaison and nominated Wilco de Groot, Netherlands, as the liaison representative.

The liaison officers for the liaison with ISO/TC 6 (Paper, board and pulps) are Uwe Bertholdt, Luc Lanat

The representative to ISO/SCIT will be Bryan Sunderland,

TC 130 established a new Working Group on “Management of Security Printing Processes” provided the NWIP on Management of Security Printing Processes — to be submitted by NEN in the near future — passes the NWIP ballot. ISO/TC 130 further resolved that the convenorship for the new WG will be assigned to Mr. Rob Cornelissen, proposed by NEN. ISO/TC 130 noted that NEN is also willing to perform the secretariat function for the new ISO/TC 130/WG.

TC 130 established a new Working Group on

[continued on page 12](#)

NIP/Digital Fabrication continued from page 4

Physics and Chemistry for Printing Technologies” session was organized by Howard Mizes (Xerox) and Graham Martin (University of Cambridge). Six papers were presented, covering both electrophotography and various inkjet technologies. Kock-Yee Law (Xerox) presented a very interesting paper, “Nanotechnology and Opportunities in Digital Printing”. He argued that nano-technologies can have a major impact on printing technology advancement. Law has shown that a nano-textured surface can achieve both super-hydrophobic and super-oleophobic properties. Very high contact angles were detected with both solid inks and toners on these surfaces at elevated temperatures, which suggested potential for self-cleaning and oil-less fusing applications.

- A new panel on Mass Customization was organized and moderated by Franziska Frey (RIT). The main discussion was focused on data-driven printing. Jon Budington (CEO, Global Printing) listed 3 different kinds of customer valued solutions: data builds the product, data is the message, and data drives the message, which he thinks is the future of printing. The panelists also talked about the technical challenges for mass customization, such as IT, web to print, and management information systems. The most important thing that the digital printing industry can do to drive the digital revolution is to provide job submission software that also automates estimating and billing. The “Digital Packaging” panel followed the “Digital Packaging” session, in which 3 interesting papers were presented. Chris Lynn (Xaar) summarized the Xaar single-pass inkjet offerings for high quality packaging printing. Guy Newcombe (Tonejet Limited) talked about recent technology development and its application tonejet. He stated the advantages of tonejet vs. other printing technologies as virtually run-length-independent cost of ownership and wide sub-

strate latitude. Tonejet worked with Ball Packaging Europe to create a variable data beverage can printing machine. Steve Simske (HP) discussed “Extended Packaging through Addition of Readable Information to the Printing”. He highlighted the advantages of brand protection, security, and anti-counterfeiting through the incorporation of deterrents in labels. The panel discussed the broad potential and issues relating to applications of digital printing packaging. Safety is clearly crit-



The two-day exhibit allows attendees an opportunity to learn about new industry products as well as reconnect with vendors.

ical for food packaging. It is especially true for UV curable inks since many of the reactive initiators used in the ink can diffuse into the packed food contents.

The Traditional Technical Sessions

In addition to these keynote speeches and special sessions, there were many interesting and exciting papers presented in the regular sessions. The following are just a few highlights:

- In the Toner-based Printing Processes session, Nobuyuki Nakayama shared information on Fuji Xerox’s particle simulation software that models toner based systems to reduce product design cycles in the focal paper, “Simulation of Two-Component Development Process for Front-loading Design”. Emi Kita demonstrated an environmentally and user friendly col-



After a long day of intense technical sessions, Omer Gila, Hila Nachlieli, Nir Mosenson, and Dror Kella enjoy some downtime at the Conference Reception.



Prior to cutting the 25th and 5th anniversary cake (see page 3), IS&T President Rita Hofmann says a few words about the history of the conferences, while ISJ Representative Makoto Omadani (far left), NIP25 General Chair Huoy-Jen Yuh (second from right) and Digital Fabrication 2009 General Chair Reinhard Baumann look on.

lapsible toner bottle from Ricoh with “The Toner Replenishment System Using Auto Volume Decreasing Soft Toner Cartridge”.

- During the Ink Jet Printing Materials session, dispersant chemistry and self dispersed pigments received considerable attention.
- The Security and Forensic printing session included an interesting paper by Glen P. Wood (Reconnaissance International) entitled “Digital Print Technology – An Opportunity for Security Print, or a Threat?”
- The Design for Environmental Sustainability session included several discussions on deinkability and the Commercial/Industrial printing session included a detailed engineering analysis of the roller charging system used in the new HP Indigo 7000, for lower cost per page and ozone

emission reduction, by Omer Gila (HP).

- In the Electronic & Paper-like Displays session, Sipix presented their micro-embossed microcups using a roll-to-toll process. HP talked about eSkins, which they use to make electronically-controllable finishes that are not pixel based. Tokai University reported a study of reading style on fatigue, comparing paper, ePaper, and an LCD in both fixed and free modes. They found that no significant difference in fatigue with all medias in free mode.

- In the Digital Fabrication Process session, Kazuyuki Tada (Waseda University) discussed their use of electrostatic ink jet printing to coat a two-layer photoreceptor, first jetting the charge generation layer and then the charge transport layer. Klaus Kruger (Helmut-Schmidt University) talked about multilayer deposition of conductive particle inks to make conductive lines, resistors, and capacitors, etc. He noted the importance of wetting on substrate, the high contact angle and surface tension through the entire process.

- In the Digital Fabrication Industrial and Commercial Applications session, Shinri Sakai (Seiko) presented the use of inkjet to fabricate OLED display. The challenge here is to have OLED materials that can be processed into dispersion in solution for jetting. Mark Cranshaw (Cambridge Display Technology) reviewed the use of inkjet to print the backplane of a 40" TV. He discussed the challenges of scaling up the inkjet printing of the backplane to a 40" TV. Takanori Tano (Ricoh) talked about all printed organic TFT backplane and flexible electrophoretic display. Tano demonstrated an improvement on fabricating an active matrix organic thin film transistor array with channel length of 5 micron using hydrophobic and hydrophilic patterning (surface energy control inkjet printing).

This year, as always, the IS&T NIP and DF joint conference was the place to see advances and new directions in digital



The Print Gallery is a perennial favorite at NIP.

printing, fabrication, and related subjects. The range of speakers and subjects covered provided an excellent overview of the field. All papers from the conference proceedings book are available at imaging.org at no charge for IS&T members.

Next Year

Next year the NIP26/DF2010 Conference will be held in Austin, Texas September 19-24. ▲

Standards continued from page 10 "Postpress requirements" provided a NWIP on this topic passes the NWIP ballot. The convenorship and secretariat for the new WG will be assigned to China. Brazil has offered to assist in the support of this working group.

TC130 established a Task Force to investigate the appropriateness and extent of a possible new work item in the area of carbon footprint issues in printing to be led by Laurel Brunner of the United Kingdom.

The spring meetings of TC 130 will be held in St. Gallen Switzerland the week of 2010-04-19 to 2010-04-24 and the fall Working Group and Plenary meetings will be held in Brazil.

For suggestions for (or input to) future updates, or standards questions in general, please contact the author at mcdowell@npes.org or mcdowell@kodak.com

UPCOMING IS&T EVENTS

January 17 - January 21, 2010; San Jose, California

Electronic Imaging 2010

General Chairs: Jan Allebach and Sabine Süsstrunk

February 24, 2010; Munich, Germany

Frontiers in Digital Imaging: Munich

General Chair: Eddy Hagen

June 1-4, 2010; Den Haag, The Netherlands

Archiving 2010

General Chairs: Simon Tanner and Astrid Verheusen

June 14-18, 2010; Joensuu, Finland

CGIV 2010: 5th European Conference on Colour in Graphics, Imaging, and Vision

General Chairs: Jussi Parkkinen and Timo Jääskeläinen

September 19-24, 2010; Austin, Texas

NIP26/Digital Fabrication 2010

General Chairs: Gerhard Bartscher (NIP) and Reinhard Baumann (Digital Fab.)

November 8-12, 2010; San Antonio, TX

CIC18 Color Imaging Conference

General Chairs: Francisco Imai and Erno Langendijk

FOR MORE IMAGING-RELATED EVENTS, VISIT IMAGING.ORG