The beautiful city of Montreal, Quebec, Canada is the backdrop for the 2003 TAGA Annual Technical Conference which will take place at the Omni Mont-Royal Hotel (formerly the Four Seasons) on April 6–9, 2003.

Our Local Conference Chair is André Dion, Director of the Graphic Communications Institute of Quebec (ICPQ) and assisting on the Local Committee is Hans Heintze formerly of Domtar.

An exciting technical program is being planned by Dr. Richard Goodman (Kodak Polychrome Graphics), TAGA Vice President Technical Papers and Technical Program Chair. Building on the successes from the Asheville Conference and the recent MicroTech Forum, the 2003 TAGA Annual Technical Conference (ATC) promises even more of what print technologists want . . .

Continued on page 4
TAGA’s First MicroTech Forum is a Run Away Success

By James E. Harvey, President of Media4theWorld

In conjunction with GraphExpo, TAGA hosted its first MicroTech Forum at The University of Chicago’s Gleacher Center in downtown Chicago on October 7, 2002. Not only was the room full, but the event clearly generated a lot of excitement among the attendees. Rather than running off to the refreshment table, during breaks most attendees quickly gathered into groups to continue conversations that began on the floor. This program was the first public event to bring together innovators and manufacturers from the “silicon” industries with graphic arts technology providers and printers.

WHY THE BUZZ?

Dan Gamota of Motorola said that the cost of a chip fabrication plant is projected to be $40 billion dollars for chips to be introduced in 2007. Even some of the world’s largest companies find it challenging to amass capital resources of that magnitude.

The prospect of manufacturing electronics inexpensively using modified printing technology is a powerful motivator for the semiconductor manufacturers, and the prospect of opening a large new market for the printing industry is a powerful motivator for the graphic arts community. It has been proven in the laboratory that circuitry and displays can be printed.

For instance, Motorola modified an $8,000 press with $100,000 of control modifications to produce printed electronics. This is a hell of a lot cheaper than traditional electronics manufacturing devices—a single silicon wafer costs about $25,000.

Motorola also worked with an unnamed printer to print a 500-foot roll at 300 feet per minute that consisted of printed circuits for a display … so it can be done! IBM, Philips, and many silicon industry startups also have developed intellectual property and initiatives in the areas of printed circuitry and printed displays.

The challenge to the silicon community is to commercialize these technologies and move production out of the laboratory to the real world. For this reason, the silicon community is looking to printers and printing technology companies for help. Potential end-user applications may include:

- Retail point-of-purchase signage
- Outdoor advertising
- Smart Card Display
- Auto dashboards/control panels
- Electronic books
- Tags
- Small mobile electronics
- Digital wall coverings/banners
- Flat panels (computer monitors)

Commercialization of printed displays and circuitry is not without its challenges. The basic concept is to build electronics by layering conducting and semi-conducting materials down on a substrate, as opposed to conventional inks. In discussion, the groups agreed that this is akin to finely controlled printing of line art as opposed to printing four-color halftone images. Process control and precision are of great importance. The printing industry presently operates in the 20 µm to 1 µm scale of precision, whereas the microelectronics scale is in the 1µm to 200 nm scale of precision. Roughness and planarity are important, and other key factors may include:

- Temperature (may promote or inhibit quality film formation)
- Humidity (temporarily or permanently affects ink and or electronic properties)
- Air/Nitrogen/Argon environment control (reduce material degradation and increases device lifetime)
- “Cleanliness” (effects of dirt and other contaminants)

Unlike TAGA’s Annual Technical Conference, in which technical papers are presented, the MicroTech Forum was organized as an introduction between interested companies with open discussion. Nine organizations provided introductions to their companies; their research in printable electronics and displays; and their companies’ needs for partners, collaboration, investment, and so on.

The companies that provided introductions included equal representation from both the silicon and graphic arts communities. Not surprisingly, several major graphic arts materials and graphic arts companies are already committed to research and investment in printable displays and graphic arts. Organizations that provided introductions are:

- CREO
- Plastic Logics
- Dow Chemical Company
- Topflight Corporation
- Adeptient
- University of Illinois at Chicago
- AGFA
- Motorola
- INX International

The attendees of the TAGA MicroTech Forum agreed to follow up the meeting by developing requirements documents for process requirements and substrate surface properties through the TAGAMicroTech@printplanet.com forum. The forum volunteers have agreed to create straw man documents for each that will be circulated in November.

If you are interested in this subject area, but are not yet a member of the TAGAMicroTech@printplanet.com online forum, please send an email to TAGAofc@aol.com to request that you be added to the TAGAMicroTech community.
PRESIDENT’S MESSAGE
TAGA President Bruce Blom, MeadWestvaco Corp.

I was fortunate to be able to represent TAGA at the International Printing and Graphic Arts Conference (IPGAC) held this past September in Bordeaux, France. TAGA co-hosted this bi-annual paper industry conference, organized this year by former TAGA President Patrice Mangin. As always, the presentations were excellent, and we hope to see several of them appearing in forthcoming issues of our own Journal of Graphic Technology.

While in Bordeaux we also had our first European meeting of the TAGA Board of Directors! Convening in Europe was long overdue given the international nature of TAGA, and we were fortunate for the opportunity to do this. As you will read elsewhere, the Board has made the decision to launch our own refereed technical journal this January. Distribution will be via the TAGA web site. A print version, printed “on demand,” will be offered separately.

You may recall an earlier column where I discussed “90-Day Challenges” made to the Board to develop new programs for TAGA. One of those challenges resulted in the development and sponsorship of the very successful “MicroTech” conference held in Chicago during the recent GraphExpo exhibition. Hats off to Jim Harvey and others for their fine efforts on behalf of TAGA. We look forward to building upon this initial effort at our Annual Technical Conference in Montreal and at future forums.

Finally, you will note in your membership renewal that we have increased the dues slightly over previous years. Our last increase was in 2000. In order to keep TAGA financially viable, the Board felt a modest increase was necessary. We hope you agree and will renew your support for TAGA. There is no other organization that covers the breadth of graphic arts science and technology quite like TAGA, and we can only continue to do this with your support.

Our Technical Papers Vice President Richard Goodman (Kodak Polychrome Graphics) is planning a great program for the Montreal ATC. I look forward to seeing all of you there to help us celebrate TAGA’s 55th Anniversary!

Bruce E. Blom, TAGA, President & Manager, Paper & Graphics Education, MeadWestvaco Corp.

ELECTION 2003
Election of TAGA Officers and Directors for 2003

TAGA Bylaws, Article III, Section I states, “Nominations for each regular elective office shall be made by a Nominating committee consisting of five voting members appointed annually by the President and chaired by the Immediate Past President or by petitions each signed by twenty voting members.”

Section 2 states, “On or before November 1st of each year, the Nominating Committee shall have made its nominations and secured the written consent of each nominee.

The proposed nominees shall then be reported to the membership in a regular newsletter publication to permit the addition of nominees by member petition prior to the preparation of a final ballot.”

The TAGA Nominating Committee chaired by TAGA Immediate Past President Richard Holub has submitted nominations for the open positions on the TAGA Board for terms beginning June 1, 2003.

The candidates are:

FOR PRESIDENT:
Dr. William J. Ray, Group InfoTech

FOR EXECUTIVE VICE PRESIDENT:
Dr. Richard Goodman, Kodak Polychrome Graphics
James Harvey, Media4theWorld

FOR 4 DIRECTORS’ POSITIONS
Anne Blayo, EFP (France)
Don Carli, Nima Hunter
William Esler, Quoin Communications (Graphic Communications World)
Dr. Edward Granger, Ontario Beach Systems and RIT
Yung-Cheng Hsieh, National Taiwan University of Arts
Helene Juhola, VTT Information Technology (Finland)
Bjorn Kruse, Linkoping University (Sweden)
Eric Neuman, Fuji Photo Film USA
Erwin Widmer, System Brunner AG
Bjorn Zittig, IKEA Catalog Services AB (Sweden)

Election packets will be mailed in February 2003.
TAGA 2003 MONTREAL
The World of Printing from MicroTechnology to Ink

Continued from page 1

- More on MicroTechnologies, which incorporates printing technologies in value-driven processes to manufacture electronic devices, displays, smart cards, etc.
- More on “How to find the Sweet Spot” to ensure best possible on press performance.
- More on how to employ the new Hybrid and Stochastic Screening technologies to print more vibrant images.
- More on how to control “Color Management” in an end-to-end process from image capture to final copy.
- More on new Digital Printing technologies: how they work, what they can do.
- More on front-end software developments, including Job-Messaging and Automation techniques.
- More from cutting edge technology published in TAGA’s new Journal of Graphic Technology presented in a special peer reviewed session.

The program will also offer the opportunity to hear from senior representatives of some of the largest printers in North America, such as Quebecor World, Transcontinental, and RR Donnelly. The program will also provide networking opportunities to meet with representatives from major paper manufacturers such as Cascade Fine Papers, Domtar Papers, and research institutes such as PAPRICAN and ICGQ.

SUBMITTED TITLES
The following are a sampling of titles that have already been submitted for the Technical Program:

MICROTECHNOLOGIES
Characterization of Fine Lines as used in manufacture of microelectronics
Flow Visualization Studies in Scaled-Up Gravure Grooves and Cells provides a good fundamental background on the impact of groove size and microprinting
Customized Information on Packaging-Business Opportunities and Customer Value detailing some new technologies for “smart packages”

FINDING THE SWEET SPOT
Print Quality Specifications of Sheetfed Offset Lithography in Taiwan describes efforts in Taiwan to characterize key press attributes
Influence of Coating Ink Setting Rate on Ink Transfer describes methods to model transfer characteristics in the printing nips

HYBRID SCREENING
Hybrid Halftoning in Flexography describing the impact of new screening technologies on packaging printing
The Lithographic Impact of Microdot Halftone Screening describes one of the latest hybrid screening technologies

IMPACTS OF PAPER TO PRINTING
Linting and Surface Contamination from PAPRICAN
New Breed of Hickeys in Offset Lithography describes how to spot new sources of “white spot” defects

FRONT-END TECHNOLOGIES AND COLOR MANAGEMENT
Production of Print-ready Data using XML on latest front-end concepts
The Design of Advanced Gamut Mapping Algorithms in Color Management Systems to provide methodologies to determine truly device independent color matching
Hi-Fi Soft Proofing Using DLP describing new methods for implementation of soft proofing concepts

PACKAGING APPLICATIONS
Runnability in Digital Package Printing describes the opportunities to combine exciting digital printing technologies with package printing requirements
Evaluation of Pressures in Flexographic Printing provides a good fundamental study of the growing flexographic printing process

SUNDAY TUTORIALS
The following topics have been proposed for the Sunday Tutorial Program:

MEASURING AND CONTROLLING THE VARIABLES OF INK AND THE SUBSTRATE
Dennis Jaynes, Director of Quality Control, Safety, Security, & Training at Jet Lithocolor, Inc.

This session will cover the different types of substrates and the many variables that go into printing a job on the unusual: how to measure; what to measure; and what to do with that information once you have it. If you can measure it, you can control it; if you can control it, you can repeat it without issues and lost time and material.

You will learn how to recognize the often overlooked simple parts of the equation that most printers never see and seem never to control: the simple things to control that do not cost any extra but can save a lot of profit dollars; the jobs that sometimes end up in rework and lost revenue. Knowing the variables and understanding those variables gives the wise printer the edge and the ability to keep the customer happy and returning as a repeat customer.

This session will be geared to the printer as much as to the R&D people, where Graphic Arts becomes Graphic Science. The black veil of mystery will be removed and replaced by the light of understanding.

FUNDAMENTALS OF COLOR MANAGEMENT
Dr Abhay Sharma, Associate Professor, Department of Paper and Printing Science at Western Michigan University.

Color management is now well established in terms of hardware, software and workflows. However there is still a lot of confusion and misunderstanding about the basic principles of this technology. This tutorial will provide a complete overview of color management. Crayons, toys and video clips will be used to explain device dependence, device-independence, IT8 charts, calibration, characterization, conversion, CIE LAB, Delta E, ICC, profiles, gamut mapping, profile accuracy, soft proofing and press proofing. Color management in Photoshop 7, Internet Explorer and Mac OS X will be demonstrated. Part of the session will explain how to evaluate color management.
on Paper

software and will rank profile making software from all the major vendors—ColorBlind, Creo, FujiFilm, GretagMacbeth, Heidelberg, Kodak, Monaco, etc. This is a unique industry study that you must see before you invest in a color management system.

FINDING THE SWEET SPOT ON THE PRESS
Miles Southworth, Graphic Arts Publishing

Pressroom productivity and profit is the name of the game. This tutorial will focus on understanding the affects of materials and implementing procedures that could improve your print quality and pressroom proficiency. A panel of experts will describe important material interactions and control procedures you can implement in your own operation. An early list of topics includes the following:

- How to maximize a press print characteristics
- How to keep the press print characteristics consistent
- Ten easy ways to foster consistency in a pressroom
- Affects of blankets, ink, plates and paper on print quality
- Which print variables are the most important to control
- What to do if you cannot meet or exceed GRACoL suggestions

- Printing at high densities
- Mixing blankets on a press
- Dot gain on long presses
- Color control for the medium and large printer (sheet and web)
- How to manage a very fast (pit-stop style) makeready
- Tricks with spot coating plates
- Using gray balance to control color
- Screening tricks to help printing
- Closed-loop color control accuracy and proficiency improvement
- How to determine your press’s sweet spot
- Press pre-sets for quick makeready

If you have a topic you would like to see presented, email it to the moderator at MFSouth@aol.com. This will help our experts prepare their presentations. Time permitting, following the presentations, the experts will answer participant’s questions in a troubleshooting roundtable, which will be continued at the evening Focus Group Session.

NANO AND MICROTECHNOLOGIES IN THE GRAPHIC ARTS: AN INTRODUCTION
James Harvey, President, Media4theWorld

Mr. Harvey will provide a brief history of events in the nanotechnology R&D world and will discuss current and developing initiatives in which nano and micro technologies are being applied to new and current markets using modified printing techniques. This tutorial will include an overview of printable display and printed circuitry; concepts, structures, and methods. Mr. Harvey will also provide a review of who the technology players are in this market, the research and development questions that remain to be answered, and the opportunities for printers and printing technology providers.

FOCUS GROUP DISCUSSIONS

In what has become a TAGA tradition, the ATC will feature the opportunity for a “rough and tumble” informal discussion on key subjects surrounding our conference theme: Color Management, Ink / Paper / Press interactions, and opportunities in Microtechnology; And let us never forget that TAGA ATC is one of the outstanding venues for good old-fashioned networking.

FINAL CALL FOR PAPERS

We are still looking for more papers for the following technical program tracks:

PRESSROOM OPERATIONS AND TECHNOLOGIES

As a follow-up to last year’s highly successful “How to find the Sweet Spot on the Press”, there will be a conference-long track dedicated to pressroom operations and technologies. Sessions within this track will focus on pressroom operations including ink, paper, and fountain solution interactions; plate technologies; advances in stochastic screening and its application; current press problems and related studies; and pressroom automation initiatives, including JDF-Job Messaging Format applications.

ADVANCED ENGINEERING TRACK

We plan to expand the advanced engineering track to encompass several sessions. In addition to new front-end design software, new materials, techniques and applications, we will have sessions that also focus on advancements in packaging materials and technologies [such as applications of Radio Frequency Identification (RFID) and “smart packing”]; printable display technologies; and Organic Field Effect Transistors (OFET) developments and related printing studies.

Continued on page 11
COLOR PRINTING’S GREAT ADVANTAGE

The unsurpassed quality of the finest printed color reproductions is due largely to the properties of the substrate and inks that constitute the printed product. What sets print apart from television, computer displays and photography is choice: a vast array of substrates and an unrestricted number of inks. This cornucopia provides print’s creative workers with the elements they need to move far beyond the mere image processing capabilities of other media.

A printed product engages us on many levels other than just the visual one. The tactile sensation is easily the next most important after the visual. The texture and smoothness variations that impart appealing tactile qualities to printed products are also well known by professional photographers. Customers are usually offered such choices of photograph surfaces as: glossy, pebble, silk, or matte finishes. These surface variations also influence optical properties: the interaction between the illumination, the image and the surface allows us to adjust our individual perceptions by holding the printed product or photograph at the desired angle and distance.

The odor of the printed product and even the sound of pages being turned provide still further aspects of physical involvement that helps form and strengthen emotional attachments to print’s message. The cultural attachment to print is not merely one of habit; rather, it is grounded in a recognition that the printed image provides a “truth” or reality that eludes the transitory nature of electronic images. Beatrice Warde’s phrase from her famous broadsheet *This is a Printing Office, “...BUT FIXED IN TIME HAVING BEEN VERIFIED IN PROOF...”, is as true today as when she wrote it in 1932.

WHAT ABOUT “STANDARDS”?

The creative impulses of print designers are constrained by such specifications as SWOP, a set of conditions established for the production of magazines. These specification were established to help ensure that the disparate color separations supplied for a given publication are comparable with each other, and are structured to suit the established printing conditions. Typically, the substrate and ink choices for such specifications are driven by economic factors. Lighter weight papers are often used to reduce mailing costs, and restricted-gamut rubine magentas are commonly used instead of the purer but more expensive rhodamine magentas.

The logic of print specifications for such products as magazines and newspapers is clear to knowledgeable designers. These designers do, however, have every right to feel that their creative options are being unreasonably restricted when SWOP or similar specifications are unnecessarily imposed upon other print markets.

There was a time when complicated color separation procedures and fixed-characteristic photochemical proofing systems made it somewhat desirable for color separation providers to strive for a “one size fits all” approach to color separation. This era has long gone: digital imaging systems and flexible proof options have greatly simplified the process of crafting the separations to suit any given printing condition.

It is perverse to strive for fixed printing conditions when no compelling reason exists. Simplification, *per se*, must not be used as a club to unreasonably restrict the designer’s creative choices. The human need for variety ensures that the creative use of substrates and inks will always find a receptive market.

DESIRABLE PAPER CHARACTERISTICS

The unambiguous reflective quality requirements for color printing substrates are high whiteness (neutrality) and high brightness (total light reflectivity). High opacity is also desirable: many otherwise excellent reproductions are spoiled by the show-through from images printed on the reverse side of the page.

Uncoated vs. coated, gloss vs. matte, smooth vs. textured? These choices are often driven by creative factors that are influenced by the type of original (photograph or drawing), the type of product (greeting card, annual report, folding carton), and the subject matter (a sleek automobile or fine woven fabric). Desirability, in this sense is a creative choice rather than a set of scientifically defined optical and physical parameters.

Surface characteristics are, of course, constrained by the printing process. Gravure, for example, requires smooth substrates whereas offset lithography can readily print on textured substrates. Substrate fluorescence and absorptivity will also affect the appearance of the printed ink film. Such factors, together with the internal light scattering that is especially characteristic of uncoated substrates, are often inseparable aspects of a given substrate choice.

DESIRABLE INK CHARACTERISTICS

Theoretical or “ideal” subtractive process inks should absorb one third of the visible spectrum and transmit the remaining two thirds. The exact nature of the desired spectral absorption curves (straight-sided or slope-sided) will influence the subsequent gamut. The key practical issue regarding the spectral absorption properties of inks, however, is whether commonly available pigments have sufficient gamut to satisfy most reproduction needs. In fact, this is usually the case despite the considerable deviation of cyan and magenta pigments from the stated ideal.
Recent advances in stochastic screening, spectral imaging, and related
digital technologies have reduced the need for ideal subtractive primary
pigments. These developments have made it much easier to use extra
gamut-enhancing inks (“high fidelity color”) in those cases where normal
process inks are inadequate. In principle, any number of extra inks may
be used to expand the gamut as needed.
The colorimetric properties of printed ink films are also dependent upon
factors other than pigment choice. In the case of magentas, for example,
thinner ink films produce bluer hues (the “undertone”) than is the case
when thicker films are printed. The “masstone” effect that results when
thicker ink films are printed shifts magenta hues towards red. The masstone
vs. undertone difference declines when ink opacity increases.

Fluorescent and metallic inks may be chosen to enhance printed color
reproductions, but otherwise, regular inks should be free of such
effects as fluorescence or bronzing.

Process inks should be perfectly transparent: in practice they are adequate,
but not perfect. Printers take into account transparency/opacity and ink
trap issues when choosing a color sequence. If the results are less than
optimal, the use of gamut-enhancing extra colors may be justified.

Ink gloss (and the use of overprint coatings or varnishes) is a creative
element choice akin to that of substrate gloss. Higher gloss images have
better tone reproduction, color saturation and image sharpness, but
may be degraded by too much glare. A target 60–70 percent gloss
value has been recommended by Dalal and Swanton (1996) when
reproducing photographic images.

INK-PAPER INTERACTION
The spectral absorption of the printed ink film is greatly influenced by
the characteristics of the substrate. The actual pigment color is most
closely achieved when printed on a non-absorbent high gloss substrate.
Frank Preucil (1962) has described the distortions (grayer cyan, redder
magenta) that result when using lower gloss and/or higher absorption
substrates. He developed a substrate measure called “Paper Surface
Efficiency” to help predict these ink film color shifts.

The significance of the interaction effects between ink and substrate may
be illustrated by applying an identical thickness magenta ink film to
coated and uncoated papers. The resulting CIELAB color shift is -2.68 L*,
+8.87 a*, and +0.75 b*. The densitometric shifts, from coated to uncoated,
are: 1.08 to 0.92 density and, in the Preucil ink evaluation system, 42
to 51 percent hue error, and 9 to 12 percent grayness.

PERMANENCE OBJECTIVES
Such products as packages, newspapers, advertising brochures, catalogs
and most magazines are designed to have a short life. Substrate discol-
oration and ink film fading are not important issues for these products.
The opposite is true for many books, some magazines, outdoor posters,
calendars, fine art prints, some business documents and certain kinds
of securities printing.

Archival-grade substrates and inks have always been available to the
printer. Indeed, the first printed books are among the few 500-year old
products that may still be used for their intended purpose today. The
question of choice arises again: archival choice issues join the previously
described creative choice factors when making the all-important selection
of substrates and inks. The printed product range is indeed vast, but the
substrate and ink availability easily satisfies the economic, archival,
aesthetic and technical requirements of any given product.

COLOR PRINTING THRIVES
The reasons for the continued growth of color printing are not difficult
to find: real cost has declined, population has increased, quality has
increased, production times have declined, disposable income has
increased, and the print-consuming public has come to expect color as
the norm, rather than the exception. There is every reason to believe
that we have entered a new era where luxury-level printing is becoming
more common. Indeed, the proliferation of five, six (or higher) color
presses provides clear evidence that the markets for higher print quality
levels are growing.

The basis for the higher grades of printed color that are becoming
increasingly routine is found in today’s great variety of substrates and inks.
Paper, in particular, is the vital element that establishes the aesthetic,
technical excellence, permanence, and cultural foundations for printed
words and pictures. We must encourage designers to make ample use of
the creative qualities of the available materials in order to help satisfy the
public’s desire for color printing excellence. Now, more than ever, their
counterparts in print manufacturing have the skills and technology required
to consistently convert a creative vision into a beautiful printed image.

FOR FURTHER INFORMATION
Dalal, Edul N. and Paul C. Swanton, Preferred Gloss Levels for Color Images,

Field, Gary G., Color and Its Reproduction, Second Edition, Graphic Arts

Preucil, Frank M., A Paper Surface Efficiency Factor for Color Reproduction,

ABOUT THE AUTHOR
Gary G. Field is an Imaging Scientist and Professor at the California
Polytechnic State University.
Editor Dr. Juanita Parris of Sun Chemical Corporation has officially closed the first edition of the new TAGA Journal of Graphic Technology, which is due for release on January 1, 2003.

FEATURE ARTICLE
The first edition’s feature article is titled JDF: Where to Begin? written by James E. Harvey, of Media4theWorld. Recently, the International Cooperation for the Integration of Processes in Prepress, Press and Postpress (CIP4) Association released version 1.1 of the Job Definition Format (JDF) specification to the public. JDF is a significant development in the graphic arts industry, and version 1.1 provides a very clear introduction to XML’s use in e-business and process automation, an easy to follow explanation of JDF’s role, and it is much more mature than JDF 1.0. Now that the standard is established, there are a variety of questions to be answered:

- How can users and providers of graphic technology implement JDF?
- What are the issues to watch out for?
- Where do users begin?
- Which companies are introducing JDF-enabled software and systems?
- Will the standard stick?

Mr. Harvey’s article answers all of these questions regarding JDF and offers valuable insight into this new specification.

Following are the abstracts of the peer-reviewed papers that will be included in the First Edition:

EFFECT OF LATEX SWELLING ON INK SETTING ON COATED PAPER
Yang Xiang and Douglas W. Bousfield, Paper Surface Science Program, Department of Chemical Engineering, University of Maine; Peter C. Hayes, BASF Corporation; John Kettle and Lena Hultgren, SCA Graphic Research
AB Penetration of the ink mobile phase into coatings containing swellable binders is analyzed theoretically based on a modified Lucas-Washburn capillary model and a solvent diffusion mechanism. The rate of this penetration is linked to ink tack and ink gloss dynamics during process of ink setting. The effect of binder swellability on ink setting was examined experimentally by measuring ink gloss and ink tack dynamics on a series of model calendered coatings varying in the type and amount of latex binders. The effect of latex swellability on ink setting depends on the binder level. For pure latex films and coatings with high binder levels (30 pph), ink setting was controlled by ink-latex interactions. Ink setting rate increases with increasing latex swellability. For coatings with low binder levels (14 pph), ink setting was controlled in large part by the coating pore structure.

At low binder levels, a reverse trend was found—ink setting rate increases with decreasing latex swellability. Swelling of the latex binder and closing of some surface pores reduce the penetration of the ink mobile phase through the pores, but this does not explain all of the experimental results. Mercury porosimetry indicates that at low binder levels, coatings with high swellable latex have larger pores and slower fluid uptake based on the proposed model. A new expression is proposed to predict the ink setting rate on a coating layer with a given pore size distribution.

TWO-DIMENSIONAL SIMULATION OF THE TRANSFER PAD IN PAD PRINTING
T.V. Korochkina, E.H. Jewell, T.C. Claypole, D.T. Gethin and M.F.J. Bohan, Welsh Centre for Printing and Coating, School of Engineering, University of Wales Swansea
A combined experimental and numerical investigation into the behaviour of the transfer pad during the printing process is described. A series of experiments was carried out to provide boundary conditions, validation and material property information. A two-dimensional finite element model of the pad when it is in contact with either the flat cliché plate or the substrate surface, including an uneven profile, is also presented. The model was compared with experimental observation on a pad press and in combination with appropriate material parameters exhibited good agreement between measured and predicted force levels.

In exploring the effect of friction it was found that it affects neither the contact pressure nor the size of the contact area developed. However, it does affect the pad distortion and hence the image distortion. The lateral displacement of the pad contact surface is reduced significantly as friction is increased. The effect of the uneven substrate was investigated for two generic forms: convex and concave.

The results show that the image distorts due to the displacement of the transfer pad by any uneven substrate surface. It was discovered that reducing either the coefficient of friction or the substrate radius increases the amount of image distortion in the first half of the contact area.
MECHANISM OF POST-PRINT LASER MARKING ON COATED SUBSTRATES: FACTORS CONTROLLING INK ABLATION IN THE APPLICATION OF HIGH BRIGHTNESS CALCIUM CARBONATE

P.A.C. Gane, M. Buri, D.C. Spielmann – Omya AG; B. Neuenschwander, H. Scheidiger, D. Bättig, Institute of Applied Laser Technology IALT, University of Applied Science Burgdorf, Switzerland

Laser marking is a technique used frequently in the packaging and materials handling industries to form an indelible identification. The technique adopts a process of ink removal by overwriting an already printed surface using a focused laser beam. This study identifies the underlying principle by which the apparent ablation of ink during the passage of the laser beam occurs.

In modern-day packaging, fibrous board, carton or label paper is coated with one or more layers of mineral pigment, such as kaolin (china clay), calcium carbonate or blends of these minerals, sometimes including talc or silica, bonded together and to the base material using synthetic latex with or without additional natural binders and thickeners, such as starch or carboxymethyl cellulose.

Typically, carbon dioxide (CO2) lasers at the characteristic wavelength of 10.6 µm, or rarer at 9.3 µm, are used. The infra red absorption spectrum of the mineral must show an absorption band correlating with the laser light. Localised heating of the pigment particles leads to thermally-driven melting and evaporation of the overlying ink assisted by vaporisation of water, hygroscopically adsorbed within the coating, and a potential for cracking of the organic components within the coating, forming a gaseous phase pressure under the continuous ink layer.

The increasing trend toward neutral or alkaline papermaking renders the current wavelength of 10.6 µm unsuitable for 100 % calcium carbonate-based coatings. The ideal wavelength for the broadest spectrum of coating minerals is identified to be ~ 11.4 µm, which the authors illustrate can be supported by CO2-lasers using selected carbon- and oxygen-isotopes and wavelength selective grating reflectors to suppress the other common characteristic wavelengths, resulting in a significantly resolution-improved image.

INK-COATING ADHESION: FACTORS AFFECTING DEPOSITS ON THE CIC IN ‘SATELLITE’ TYPE CSWO PRESSES WHEN USING VAC PAPERS

C. J. Ridgway, E. Kalela, P.A.C. Gane - Omya AG

Enhancement of image quality and reduction in print-through can be achieved by printing on so-called Value Added Coldset (VAC) papers. VAC is usually produced by filling a mechanical pulp-containing base-sheet with white pigment filler and/or applying a coating layer of suitably bound pigment to its surface.

One of the problems identified, when printing such papers in coldset web offset (CSWO) satellite type presses, is that deposits of ink, especially black, appear on the common impression cylinder (CIC) of the second satellite unit. The phenomenon appears across the cylinder in both image and non-image areas. Little or no trapping of the deposit is seen back onto the printed paper.

Surface coatings made from typical mineral pigments do not have the same absorption-porosity relationship as uncoated newsprint and it is shown that standard newsprint has a different form of deposit build-up tendency on the CIC from that of VAC paper. Independent absorption tests, model coatings, commercial ink and paper samples, together with commercial printing trials, are used to illustrate the effect of pore structure and size distribution on the rate of absorption and the relative permeability of papers and coatings on the deposit build-up tendency.

This work shows that runnability of specific ink and paper combinations is not a simple function of tack rate but rather a function of ink component penetration properties, specific for different surfaces, and its effect on ink adhesion in relation to permeability of the coating to fountain solution. This relates to the ability of the ink to be compatible with the fountain solution being used and the role of the basepaper in absorbing and retaining fountain solution.

By developing a special tack measurement technique for CSWO ink and VAC paper coatings, using the Ink-Surface Interaction Tester (ISIT), it has been possible to show that by changing the composition of CSWO ink the penetration phenomenon on the VAC paper surface can be changed.

This has been further illustrated by two different CSWO inks and two different VAC paper surfaces using a chromatographic GPC technique (Mattila, U., Tahkola, K., Nieminen, S., Kleen, M., Penetration and separation of ink resin and oils in uncoated paper studied by chromatographic methods, 11th IPGAC, Bordeaux, France, 2002). By analysing the retained print density in the pull-off areas of the ISIT test, differences in ink-coating adhesion as demonstrated by the two inks are illustrated.
We opened up the design competition to everyone, and for a small fee another story. In the works is our Greeting Card Design Competition. Industry tours are informative as well as fun, but funding the trips is in addition to the project is beginning to take flight. Check out our chapter web site at http://www.grc.calpoly.edu/taga/index.html. So far, we’ve been holding our bi-weekly meetings with great turnouts. Lorraine Donegan, a Graphic Communication instructor, was a guest speaker at one meeting and gave a brief resume workshop. TAGA officers hope to bring in more guest speakers throughout the school year. As well as inviting industry leaders to visit us, we plan to visit their respective companies. For our first industry tour in mid-November, we will be heading to the Los Angeles area for a field trip to the L.A. Times. In addition to the L.A. Times, we will visit a large format printer. Industry tours are informative as well as fun, but funding the trips is another story. In the works is our Greeting Card Design Competition. We opened up the design competition to everyone, and for a small fee anyone can submit up to five entries under five different categories. The winner will receive free greeting cards and a small cash prize. We are also printing business cards, which is our biggest annual fundraiser. The low prices attract many customers and keep repeat customers coming back.

Work on the chapter publication has already begun. Each chapter officer is heading a committee with chapter members signing up for the committee of their choice. Some committees include layout and design, content editing, and digital media. So, our chapter publication project is beginning to take flight. Check out our chapter web site at http://www.grc.calpoly.edu/taga/index.html.

We look forward to seeing everyone in Montreal!

Submitted by Mala Vang (mvang@calpoly.edu), Secretary, Cal Poly-TAGA Student Chapter.

Clemson/TAGA Student Chapter

It’s the season for giving and no one knows this better than the Clemson University chapter of TAGA. We are all working overtime and the chapter is in great shape. We are in no short supply of talented members who are always willing to help. Some particular details are still being discussed, but for the most part the blueprint for what will be presented in Montreal is almost complete.

New faces and new ideas are what make this year’s TAGA different from last. One returning member, Travis Dyar, has taken on the task of developing our packaging design for this year. Lydia Berberich presented the design after having a vision one restless night, and Dallas Pace followed up by taking a whole slew of great pictures to fulfill the design.

Kevin Burquin has taken the initiative on all fronts this year for TAGA. He is a T-shirt fundraising genius and runs a screen printing press like it’s going out of style. Jena Allison and Trish Gates are keeping all of the clerical information in order and doing a spectacular job with enforcing a new points system for fund raising.

Vice President Bryan Saffer received high regards from the industry participants in this year’s Color Measurement and Management Symposium. The Symposium is a conference in which industry leaders on a panel answer questions from student chapter members. The symposium was a learning experience for all parties involved.

Frank Bates, former vice president of TAGA is heading up a special project to print a multi-school publication that would include information about all of the participating TAGA chapters. After the success of last year’s TAGApalooza, a second one is being planned for November. Our barbeque/rock concert/all out funfest was a successful venture, and we are planning for an even larger turnout this year. After several pressruns, fundraisers, and all night think sessions we should have a very impressive package to deliver to Montreal in 2003. We look forward to seeing you all there!

Submitted by Eric Stone (ESTONE5694@aol.com), President, Clemson/TAGA Student Chapter

RIT/TAGA Student Chapter

Once again, we are back in action to prepare for yet another much anticipated publication to share, as we will be the host chapter at TAGA 2003 Montreal. Despite losing most of the crew to graduation, we have plenty of new faces that bring forth a plethora of talent in areas such as design, photography, printing, new media and graphic media majors. We are currently a group of 15+ members, with two returning members from last year, Nick Doyle and Svetlana Kirpichenko. Both of us are Grad Students in Print Media.

So far we have been in the process of deciding what this year’s publication theme will be and have narrowed it down from multiple ideas to one main theme, a surprise for all in Montreal. In getting us in the mood for planning for the publication this Fall Quarter, we toured the Cary Library Collection here at RIT, which has many resources for different styles of books created throughout the history of printing. Also, we recently visited DeRidder, who specialize in finishing for different types of packaging boxes, books, point-of-purchase displays, mailers, and novelty items. We are learning as much about the different types of structural casing, embossing, foil stamping, die-cutting, and other finishing techniques that could be used in this year’s publication and educating ourselves in these areas to incorporate ideas. Many more tours and social events are in progress for the Winter Quarter.
Elections have been held recently and currently our officers are: Nick Doyle, President; Kevin Fay, Vice-President; Dave Branca, Treasurer; Matt Coté, Secretary; Marnie Soom and Hillary Belz, Publicity/Membership. We are in the process of creating teams for production/prepress, creative, multimedia, editorial, and finishing.

As far as fundraising ideas, we have already started on the Little Black Book pocket graphic arts glossary guide to raise funds in support of our trip this year to Montreal. We are working in collaboration with other professors to help out specific classes held here at RIT as far as the terms used between graphic design, graphic arts, printing technology and cross media. It will also serve as a guide to new and current students in the School of Print Media, Photography and Design. Other ideas that are still being kicked around are for a possible “bowl-a-thon” to put some “fun” back into the fundraising idea.

Other projects in the works are the student chapter web site as we will continue to update it before 2003 with all the new information on the group members, events, and even have an intranet chat board in the works to help us collaborate and communicate within the chapter. More insight is needed into how we can incorporate this into the full range for the student chapters worldwide as was discussed in the Asheville 2002 Conference.

Last note: 2002 was a success in meeting other students and industry leaders within this organization. Asheville was a great time in meeting everyone from the different student chapters. We look forward to hearing from you and seeing you in Montreal in 2003.

Submitted by Nick Doyle (ndoyle@rochester.rr.com), President, RIT/TAGA Student Chapter

WESTERN MICHIGAN UNIVERSITY/TAGA STUDENT CHAPTER

The school year is off to a momentous start at WMU. Our chapter exhibits a new enthusiasm this year that will culminate with the submission of our first student chapter publication at the conference in Montreal.

Students have been scouring the university archives to find material supporting our “Centennial” theme celebrating the 100th anniversary of WMU. The cover is currently in production and the body is being assembled with research papers that are unified by the theme of being behind schedule. We are currently working to gain sponsorship from corporate donations in order to fund the journal and the trip to Montreal.

We’ll see everyone in Montreal!

Submitted by Dustin Lefebvre (dustinlefebvre@yahoo.com), President, WMU/TAGA Student Chapter

COLOR MANAGEMENT TRACK

This year’s color management track will focus on end-to-end color management from image capture to final print. Topics will include soft proofing, front-end software, color modeling, color calibration techniques, and recent developments in the standards arena including new standard color characterization data sets and their application.

DIGITAL PRINTING TRACK

This new track will provide a focus on digital presses, including hybrid digital printing and large-format color digital printing. Topics will include digital press design, digital printing workflows, customization tools and techniques, and much more.

PEER REVIEW TRACK

We will expand the “Peer Review Track” taking the best papers from the Journal of Graphics Technology. (We encourage submission of papers to the journal for this session. For more information on submitting papers to the Journal of Graphic Technology, please see the paper submission guidelines at www.taga.org.)

We are looking for papers on all of the above topics, as well as other current research and technology papers for general sessions. If you are interested in submitting an abstract or participating in any of the topic tracks, please contact Dr. Richard Goodman at goodmanr@sunchem.com. The final and firm deadline for all abstracts is December 6, 2002.

TAGAofc@aol.com is the e-mail address to which to send your abstract, which should be no longer than 200 words and must include the authors’ names and contact information, as well as the name of the person who will be presenting the paper at the conference. All selected papers are due in final edited electronic form by March 5, 2003. (Instructions will be provided to accepted authors.) TAGA looks forward to an exceptionally exciting 2003 Annual Technical Conference, in Montreal.

SOCIAL PROGRAM

TAGA’s 55th Grand Welcoming Reception will be held on Sunday, April 6th at the Omni. Be sure come and look up old friends and make some new ones at this gala event. The Awards Reception and Honors Award Banquet will be held on Tuesday, April 8th as the grand finale social event of the conference. There will also be plenty of time to network with industry colleagues during the continental breakfasts, breaks, and luncheons. All of these social functions are included in full conference registration.

SPOUSE/GUEST PROGRAM

An exciting two-day venue including a Montreal city tour of Old Montreal and the Golden Square Mile area where many beautiful turn of the century mansions are located will be offered as well as a tour of the Underground City. Plan to attend the conference and bring your favorite guest, as there will be plenty for her/him to do while you attend the technical sessions.
2002 TAGA TECHNOLOGY PATRONS

Membership Level Criteria:
Contributions with total value of $5,000 or more in goods/services/cash to TAGA in 2001–02
BF&D/Favat & Associates
Group InfoTech
Printable Technologies Inc.

2002 TAGA CORPORATE SPONSORS

Membership Level Criteria:
Annual member dues of $1,000
Agfa Corp.
American Color Graphics
Appleton Coated, LLC
Baldwin Technology Co., Inc.
Creo
Enfocus Software, Inc.
Flint Ink
Fuji Photo Film USA
Group InfoTech, Inc.
Hallmark Cards, Inc.
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Kodak Polychrome Graphics
Sun Chemical Corp.
Yamatoya & Co., Ltd.

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Quebec Institute of Graphic Communications (ICGQ)
Sun Chemical Corp.
Tobias Associates, Inc.
Wikoff Color Corp.

TAGA 2003 Montreal is shaping up to be a very exciting conference.

Don’t miss out on the opportunity to maximize your company’s exposure through conference sponsorship.

E-mail us today at TAGAOfc@aol.com to reserve your event!

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