



IS&T

REPORTER

"THE WINDOW ON IMAGING"

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Archiving 2016

Obsolete Media Award for Best Interactive (Poster) Paper Fulfill Your Digital Preservation Goals with a Budget Studio

Yongli Zhou, Colorado State University Libraries (USA)

Abstract: In order to fulfill digital preservation goals, many institutions use high-end scanners for in-house digitization of historical print and oversize materials. However, high-end scanners' prices do not fit in many small institutions' budget. As digital single-lens reflex (DSLR) camera technologies advance and camera prices drop quickly, a budget photography studio can help to achieve institutions' preservation goals. This paper compares images delivered by a high-end overhead scanner and a consumer level DSLR camera, discusses pros and cons of using each method, demonstrates how to set up a cost efficient shooting studio, and presents a budget estimate for a studio.

Quality Assurance in Mass Digitization Projects

Martina Hoffmann, National Library (the Netherlands)

Abstract: QA can vary from simple procedures to highly developed workflows. Within one of the largest digitization programs in the Netherlands (Metamorfoze) the National Library has the task to ensure the quality of digitized images for preservation. To accomplish that task the National Library has taken several steps and is constantly improving its own process of quality management to ensure high speed, high volume and high standard controls for a huge amount of terabytes of data that will be stored permanently and made available for [papers continue on page 4](#)

To view the full papers of these abstracts for no fee go to <http://bit.ly/2h391Vo>

* Papers were presented at Archiving 2016, held April 19-22, in Washington, DC.

INSIDE THIS ISSUE

| | |
|--|----|
| Highlighted Abstracts: Archiving 2016 | 1 |
| Highlighted Abstracts: Printing for Fabrication 2016 | 1 |
| Archiving 2016 Conference Report | 2 |
| Printing for Fabrication 2016 Conference Report. | 5 |
| IS&T Annual Report | 7 |
| Standards Update | 11 |

Printing for Fabrication (NIP32)

Newly Developed Patterning Technologies for Three-Dimensional (3D) Printed Electronics

Shizuo Tokito, Yasunori Yoshida, and Konami Izumi, Yamagata University (Japan)

Abstract: We report on two newly developed patterning methods for three-dimensional (3D) printed electronics applications, which are known as soft blanket gravure (SBG) and omnidirectional inkjet (OIJ) printing technologies. These technologies make it possible to print various inks directly onto non-flat or 3D object surfaces, and have a capability that could enable new electronic applications and markets.

Measurement of Inkjet Printhead Reliability by Detecting Every Single Droplet in Flight

Ingo Reinhold,^{1,2} Tomáš Černý,³ Maik Müller,¹ Werner Zapka¹; ¹XaarJet AB (Sweden), ²Royal Institute of Technology (KTH) (Sweden), and ³Xaar plc (UK)

Abstract: Inkjet printing is adapted for many digital imaging systems including graphical, industrial and advanced manufacturing applications. Reliability was identified to be one of the key challenges for inkjet printheads due to their susceptibility to variations in temperature, ink consistency, debris or external vibration. Hence, lengthy tests with printouts on kilometers of papers are necessary to establish a measure of reliability, which is time-consuming and extends the development cycle for a given application.

Application of Antibacterial Coatings on Resin Composite Implant Materials Using Inkjet Printing Technology

Henrika Wickström,¹ Annette Anthoni,¹ Mirja Palo,¹ Johan O. Nyman,¹ Anni Määttänen,¹ Mari Nurmi,¹ Niko Moritz,² Terhi Oja,¹ Maren Preis,¹ and Niklas Sandler¹; ¹Åbo Akademi University and ²University of Turku (Finland)

Abstract: Fiber-reinforced composite (FRC) implants have shown to be a favorable option as an implant material, compared to titanium, in terms of [papers continue on page 16](#)

To view the full papers of these abstracts for no fee go to <http://bit.ly/2h391Vo>

* Papers were presented at Printing for Fabrication, held September 12-16, 2016, in Manchester, UK.

HIGHLIGHTS FROM ARCHIVING CONFERENCE 2016 IN WASHINGTON, DC

By General Chair Kari Smith (MIT Libraries, Institute Archives and Special Collections), and Program Chair Ulla Bøgvad Kejser (The Royal Library, Denmark)

Archiving 2016 was hosted by US National Archives and Records Administration. A short course program on Tuesday, April 19, preceded the main conference. Through the courses, participants could take advantage of learning more from experts participating in the conference and go into details about subjects including imaging techniques and performance, quality assurance as well as collection management and archiving.

The technical conference began on Wednesday, April 20 with a fascinating keynote by Roger L. Easton (Rochester Institute of Technology) and Keith T. Knox (Early Manuscripts Electronic

| ARCHIVING 2016 | |
|--|-------------------|
| Attendees*: | 207 |
| Oral Papers: | 32 |
| Interactive (Poster) Papers | 10 |
| Short Courses: | 12 |
| Exhibitors: | 8 |
| Dates: | April 19-22, 2016 |
| Location: | Washington, DC |
| *includes Short Course only and guests | |

Library) on the spectral imaging of manuscripts. Their talk nicely set the scene for the proceeding talks on advanced imaging techniques. The conference day also included a series of interesting talks on asset management and preservation formats and frameworks, each followed by time for questions and answers.

Thursday, April 21, started by presentation of this year's IS&T service award given to Christoph Voges (Hochschule für Angewandte Wissenschaft und Kunst) in acknowledgement of his chairing the



Interactive Papers allow attendees to delve deeper into workflows and other process details.

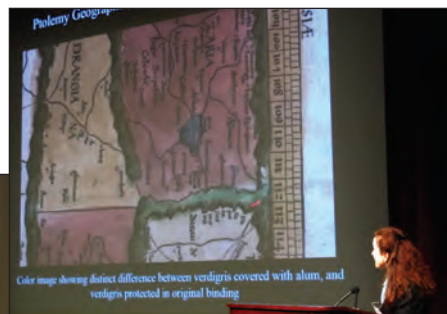
Archiving Conference in Berlin 2014. Tom Rieger (US Library of Congress) opened the technical program of the day with a comprehensive talk on the latest activities within the Federal Agencies Digitization Guidelines Initiative (FADGI) Still Image Working Group, discussing especially new initiatives in the area of imaging quality. Further talks on imaging standards and quality assurance followed and lead onto sessions on imaging strategies and workflows, dissemination, and use.

Emily Gore, Digital Public Library of America held the keynote on the last conference day, Friday, April 22 on implementing practices that lead to (re)use of digital collections. This enlightening talk was followed by sessions on metadata standards and implementation, image color science and analysis tools, and evaluation and impact.

In addition to the oral presentations the conference featured Interactive (Poster) Papers. Participants were invited to discuss presentations during special poster



Short courses allow attendees to develop and expand their professional knowledge.



The use of advanced imaging techniques, including spectral imaging, was a theme of this year's event. A joint keynote by Keith Knox (above) and Roger Easton (right) kicked off the first day of the conference. Fenella France (Library of Congress) taught a short course on the topic as well as presented on the Library's use of the technology (upper right).

Photos: Mogens Bech.

Photo: Mogens Bech.



General Chair Kari Smith (MIT Libraries), below center, opened the conference that brought 207 participants to NARA in Washington, DC (left). IS&T President Geoff Woolfe (CISRA) presents a Service Award to 2015 Archiving General Chair Christoph Voges.



Photos: Mogens Bech.

sessions. They were also asked to vote for the best presentation. This year's winner of the Obsolete Media Award for Best Interactive Paper was Yongli Zhou (Colorado State University Libraries, USA) for "Fulfill your Digital Preservation Goals with a Budget Studio."

This year it was also possible for participants to join topical lunch discussions, where participants could suggest topics that they would like to discuss during the lunch break.

During the conference selected exhibitors had the opportunity to present and discuss their products.

One of the things the Archiving Conference is also famous for the tours to local institutions of special interest. This year it was possible for participants to go behind the scenes at the Library of Congress, NARA, or the National Gallery of Art,

and all tours were fully booked.

The conference also provided opportunities for more informal conversations between participants at the welcome gathering at a local bar and during the conference reception featuring a Texas style barbecue and karaoke.

Many thanks to the authors, reviewers, conference and session chairs, sponsors and exhibitors, and cooperating societies, who all worked hard to make the conference a success. Special thanks to NARA and its staff for their support of Archiving 2016. All pictures kindly provided by Mogens Bech, The Royal Library, Denmark.

We look forward to seeing you in 2017 at the National Library in Riga, Latvia, May 15-18, for another exciting event. The program will be released in late January 2017. ▲

Archiving provides plenty of opportunities to learn from colleagues, as well as about imaging products designed to help digital archivists. Right: Technical Program Chair Ulla Bøgvad Keyser enjoys the reception with fellow attendees.



Photos: Mogens Bech.

papers continued from page 1

(online) use. In this paper you can find the questions we had to answer in order to set up the QA workflow, the workflow we did implement, the current status of our workflow and the lessons we learned along the way.

Making Digitization Count: Assessing the Value and Impact of Cultural Heritage Digitization

Emily Frieda Shaw, *The Ohio State University Libraries (USA)*

Abstract: Over the past five years, the Ohio State University Libraries has made a series of strategic decisions and resource allocations aimed at significantly increasing the creation and responsible stewardship of digitized collections by centralizing the management of digital reformatting and overhauling the Libraries' digital collections infrastructure. As the digital reformatting program begins to mature and the organization prepares to migrate legacy content to new local and remote repositories, now is an ideal time to develop and implement a meaningful, achievable strategy for assessing the outputs, values and impacts of these strategic realignments. This paper argues for the importance of assessing digitization and digital collection-building activities, explores some of the challenges associated assessing this work, and the range of methods and metrics that have been employed. The goal of this early research is to engage with past and ongoing work in this field in order to build a foundation for meaningful assessment of digitization and digital collection building at the OSU Libraries and other cultural heritage organizations looking to assess their own efforts in this area.

Securing Defense Visual Information in a Commercial Environment

Juan Vargas-Matos and Paul Robinson, *Defense Media Activity (DMA) (USA)*

Abstract: The Defense Visual Information (DIMOC) mission is to archive and distribute media assets to the Department of Defense (DoD), government, non-Federal agencies, commercial organizations, and general public. This necessitated an efficient low-cost solution to store and maintain records as well as to provide a delivery platform accessible to these aforementioned entities. DIMOC has entrusted a commercial system to accomplish this. Leveraging commercial capabilities has been a recent government paradigm in order to increase efficiency and reduce cost in an increased level of fiscal austerity. However it is equally important to consider how secure these systems are in handling potentially sensitive data. The consensus that the government needs to be more like business is equally countered by the need for business to be

more like government in the area of cyber security. This paper discusses the challenges that DIMOC encountered in ensuring the security of DoD media in a commercially hosted environment.

Going Digital at the Wellcome Library: The Evolution of Digital Imaging and Innovation

Danae Dracht, *Wayne State University (USA)*

Abstract: This report focuses specifically on practices within the Wellcome Library and Archives in London, United Kingdom, and what the Library is doing to promote and maintain its hybrid collections, both analog and digital. To remain a thriving and relevant information agency in a time when the value of brick-and-mortar institutions are constantly questioned, the Wellcome Library has worked to develop methods worth sharing to other institutions who are striving to preserve cultural and artistic heritage around the world. In light of its creativity and innovation, the Wellcome Library warrants further discussion, especially in countries outside the UK.

The Role of Digital Collections in Scholarly Communications

Harriett Green, *University of Illinois at Urbana-Champaign, and Angela Courtney, Indiana University Bloomington (USA)*

Abstract: This paper examines the role of digital collections in scholarly communications and the needs of scholars as they build digital scholarship projects and scholarly networks for digital humanities research. Through a comprehensive analysis of the data drawn from a survey and interviews of humanities scholars and faculty, this paper explores how scholars use digital collections as part of their exchange of ideas in research and in teaching. Through discussion of the needs for library-researcher collaborations, digital literacies, and building shared ecosystems for inter-project communications, this paper ultimately will explore how scholars need robust scholarly communications systems and virtual collaboratories in order to advance digital humanities research. ▲

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IS&T focuses on all aspects of imaging, with particular emphasis on digital printing, electronic imaging, image perception, photo fulfillment, color imaging, image preservation, digital fabrication, and the physics and chemistry of imaging processes. For more information, visit imaging.org. IS&T publishes the *Journal of Imaging Science & Technology* and *Journal of Electronic Imaging* (with SPIE).

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MANCHESTER, UK, HOSTS PRINTING FOR FABRICATION (NIP32) ON ITS RETURN TO EUROPE—FIRST TIME SINCE NIP 1

By Conference General Chair 2016 Brian Derby (University of Manchester)

Printing for Fabrication (formerly NIP) was held at the University of Manchester in the UK, September 12-16, 2016, with a full program of short courses on the first day. This is the first time the conference series has been held outside of North America since 1993, and only its second time in Europe. Nearly 300 delegates attended with representatives coming from 21 countries, including 12 in Europe, 4 in Asia, and as far as Brazil, Columbia, and Australia.

The short course program was organized by Patrick Smith, with 15 courses provided for delegates. Of these, four were on the physics and mechanics of inkjet printing; five covered aspects of ink and toner chemistry; formulation and surface interactions; and four presented topics in the area of digital printing and additive manufacturing. There were also individual courses on the patent landscape and security printing. All the classes were well attended and this continues to be a popular and worthwhile aspect of the conference. This and future conference committees are keen to extend the range of short courses offered to delegates and are always receptive of suggestions for new short course topics and themes.

The technical sessions were supported and introduced by five keynote speakers. A highlight of these was the opening keynote “Materials in the Flatland” by Nobel Laureate Kostya S. Novoselov (University of Manchester, UK), who gave an insightful and appropriate presentation on the properties and applications of 2D materials and discussed applications where printing may be used to deliver them. The other keynote speakers covered a broad area of applications for printing technologies including: “HP’s Jet Fusion 3D Printing Technology—Enabling the Next Industrial Revolution” by Tim Weber (HP Inc., USA); “Low-

| PRINTING FOR FABRICATION 2016 | |
|--|-----------------------|
| Attendees*: | 298 |
| Oral Papers: | 98 |
| Interactive Papers: | 26 |
| Short Courses: | 15 |
| Exhibitors: | 11 |
| Dates: | September 12-16, 2016 |
| Location: | Manchester, UK |
| *Includes Short Course only and guests | |

Temperature Organic and Oxide Transistors for Printable Electronics” by Henning Sirringhaus, (University of Cambridge, UK); “The Objectives of a National Project of ‘Manufacturing Innovation through Development of Next Generation 3D Printers’ in Japan” by Hideki Kyogoku (Kindai University, Japan); and “Materials and Fabrication Methods for Biofabrication” by Jürgen Groll, (University of Würzburg, Germany). All the keynote



speakers gave excellent presentations providing a broad overview of their subject area.

The technical sessions provided a platform for the presentation of research and development work across the field of printing for manufacture and related applications with more than 120 papers presented to well-attended parallel sessions during the symposium. The



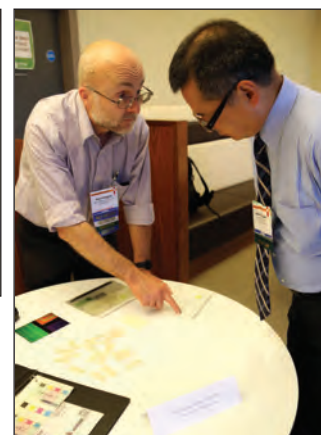
General Chair Brian Derby and Jim Mrvos (Lexmark) enjoy the conference reception.

technical sessions covered a wide area of topics and they often led to active questions and discussion after the presentations. I would like to mention a few of the presentations to give a flavour of the breadth of coverage that epitomises this conference series (see page 1 for full abstracts):

- Newly Developed Printing Technologies for 3D Printed Electronics, Shizuo Tokito *et al.*, Yamagata University (Japan).
- Measurement of Inkjet Print-head Reliability by Detecting Every Single Droplet in Flight, Ingo



The Demonstration Session allows authors to physically show hardware and software talked about during presentations.

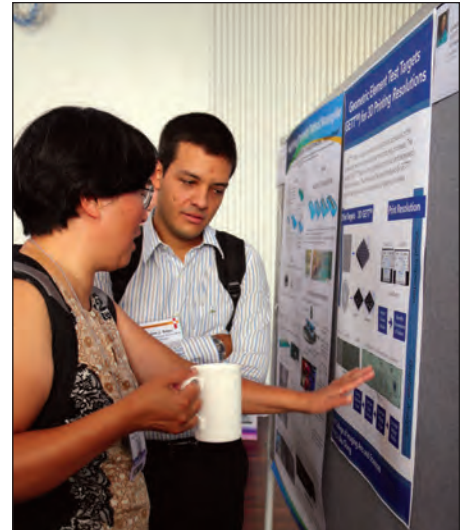
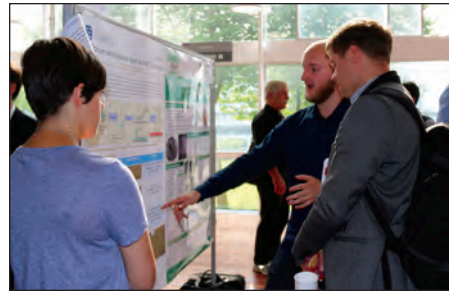


Reinhold *et al.*, Xaar (Sweden and UK).

- Application of Antibacterial Coatings on Resin Composite Implant Materials Using Inkjet Printing Technology, Henrika Wickström *et al.*, (Åbo Akademi University and University of Turku (Finland).
- Flexible Pressure Sensor Driven by All-Printed Organic TFT Array Film, Shinichi Nishi *et al.*, JAPER, Konica Minolta Inc., Dai Nippon Printing Co., Ltd., NEC Corporation, and AIST (Japan).
- The Impact of 3D Printing on US Copyright and Trademarks, Scott M. Slomowitz *et al.*, Caesar Rivise, PC (USA).

The technical program was, as ever, the highlight of the meeting and provided a forum for the presentation and discussion of exciting new results as well as benchmarking progress in the Printing for Fabrication interest area.

Two technical sessions of the meeting covered the topic, Technologies in Digital Photo Fulfillment 2016, and was co-sponsored by the Royal Photographic Society (UK). These sessions supported a further nine presentations at the meeting.



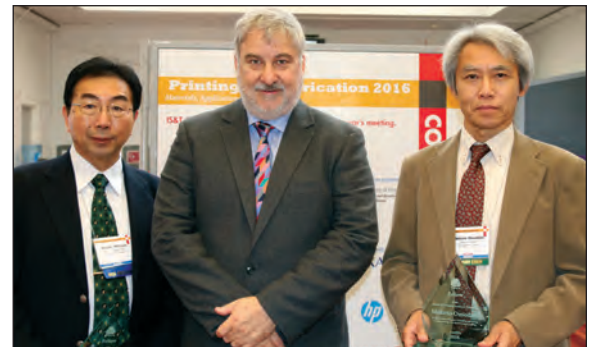
A small exhibitor show and tabletop exhibition ran in parallel with the presentations for two days of the meeting. This allowed a good interaction between the industry suppliers and delegates. The social program also gave a good opportunity for delegates to network. The welcome reception was kindly sponsored by Manchester City Council and was held in the famous Victorian Town Hall building in the center of the city. The main conference reception was held in the Manchester Museum

The Interactive Paper Session and Exhibit enhance opportunities for networking at the event.

of Science and Industry, which is itself housed in the world's first passenger railway station. ▲

IS&T Awards and Honors

A number of IS&T Awards and Honors were presented at Printing for Fabrication by IS&T President Geoff Woolfe (CISRA). **Right:** The Chester F. Carlson Award for outstanding work in the science or technology of electrophotography was given to Dr. Mark Enzien (Xerox) for his work as system architect and developer of workflows and control schemes for digital printing presses. **Below left:** The Johann Gutenberg Prize for an outstanding technical achievement in, or contribution to, printing technology was presented to Werner Zapka (Xaar) for leadership in the printing community and in surface manufacturing. **Below center:** Dr. Maria Cristina Rodriguez-Rivero (University of Cambridge) accepted the Charles E. Ives/Journal Award, given in recognition of the best engineering paper published in an IS&T journal for the preceding year, on behalf of her colleagues (Jose Rafael Castrejon-Pita, Queen Mary University of London, and Ian M. Hutchings, Univ. of Cambridge, for "Aerodynamic Effects in Industrial Inkjet Printing," JIST 59 #4. **Below right:** IS&T Fellows are selected for their outstanding achievement in imaging science or engineering. Dr. Teruaki Mitsuya (Ricoh) was honored for outstanding achievement in imaging engineering of electrophotographic fusing technology and Analysis Lead Design (ALD) systems. Prof. Makoto Omodani was inducted into the list of IS&T Fellows for outstanding achievement in imaging engineering, ion flow printing, and electronic paper printing.





IS&T President's Annual Report — July 1, 2015 to June 30, 2016

As I write my first annual report as president of IS&T, I am excited to tell you about a year of change that has placed the Society on a path of greater internationalization, stronger financial performance, and a positive outlook for the future. The changes have required much hard work and attention to detail from our dedicated and hardworking staff, led by Executive Director Suzanne Grinnan. The staff are supported by a large contingent of volunteer members who make up our board of directors, governance committees, editorial boards, and conference committees. Without the efforts of these people, the Society would not be able to bring you the conferences and publications that are so important for your ongoing professional development.

My predecessor, Alan Hodgson, presided over a period of increasing internationalization of IS&T and this has continued during my first year as president. The Board of Directors cur-

rently includes members from seven countries: Australia, Germany, Japan, South Korea, Sweden, the United Kingdom, and the United States. International representation on the board is increasingly important as imaging science and technology has become globalized.

October 2015 marked the first occasion that IS&T's Color and Imaging Conference (CIC23) was held outside the US. The conference began in 1993 and the first 14 CICs were held in Scottsdale, Arizona. From CIC15 (2007) onward, the conference moved to various cities in the US. At the same time, The European Conference in Colour in Graphics, Imaging, and Vision (CGIV) was being held in Europe (2002-2012). As part of the Societies strategic vision, the two communities worked together to merge the events and establish CIC as a conference that not only attracted attendees from around the world, but also would be held throughout the world. The result [continues on page 9](#)

Publications Annual Report

July 1, 2015 to June 30, 2016

Journal of Imaging Science and Technology (JIST)

by Chunghui Kuo, editor-in-chief, JIST

In the increasingly competitive landscape of scientific publication, establishing a clear brand and identity is essential for a scientific journal to achieve broad recognition among academic researchers, industry practitioners, and other readers. Such a broad-based recognition will increase citations of articles published in this journal and consequently strengthen the overall quality of journal publication. As indicated in the JIST annual report last year, 2014-2015 was the year of transformation, reversing the trend of publication delays. The primary objectives in my first year as the Editor-in-Chief were twofold: First, to ensure the timely production of every bimonthly issue. Second, to elaborate the publication philosophy and to clarify objectives of the Journal, *i.e.*, emphasizing the importance of inter-disciplinary collaboration in tackling scientific challenges in the field of imaging science. I am glad to report that since I took over the editorship all issues starting from July/August 2015 have been published on schedule. Plus, all articles have been sent to Thomson Reuters to be included in the Science Citation Index. With a healthy pipeline of manuscript submission and indispensable contribution from all reviewers and associated editors, I am

confident that the problem of journal publication delay is behind us and we will turn our attention to the next task of expanding readership and recognition of the journal across the broader research community of imaging technologies.

Using the Earth as a metaphor for the entire research landscape of imaging science, each scientific and engineering journal can be regarded as an individual satellite circling the Earth on its own specific orbit. First, most journals dedicate their published articles to a specific scientific discipline and could be viewed as Geostationary Earth Orbit (GEO) satellites that remain at the same orbiting position relative to the Earth. Importantly, given the interconnected nature of new technological challenges, there is underserved demand in scientific journal publications to provide extensive and concurrent coverage of a wide range of imaging technology topics, including image processing, remote sensing, digital manufacturing, and other subject areas crucial for the field. This approach is similar to the Low Earth Orbit (LEO) satellite that quickly scans the earth surface in more details. This is also the differentiating approach I have adopted and plan to continue for the JIST to strengthen its recognition and contribution to the imaging science field. For example, the newly crafted avenue of publishing JIST-first issues for every IS&T international technical conference began

to take shape in the past year. The topics of these special issues range from image archiving, digital fabrication and fulfillment, and color science, to electronic imaging in a cyclic order. These accepted JIST-first special issue articles from a wide variety of IS&T conferences present the latest technological advancement in different aspects of imaging science, and consequently strengthen the identity of the JIST as a premier scientific idea exchange platform for the future by presenting the latest scientific and technological developments and promoting collaboration across the boundaries of many disciplines within the modern imaging research community. It has also been well received among potential authors as demonstrated by the increasing number of submitted manuscripts over the past year.

More specifically, JIST received 108 manuscripts from July 2015 to June 2016, a 27% increase over last year. Among these submissions, 28 manuscripts were accepted for publication; 37 were rejected; and 7 were withdrawn. Importantly, more than 120 reviewers contributed their time and effort to the peer reviewing process.

We expanded the family of associate editors by the addition of Dr. Steven Simske (HP Inc.) and Dr. Vien Cheung (University of Leeds) to the editorial board. Simske, prolific author and contributor to JIST, currently also serves as the IS&T executive vice president. Cheung not only was instrumental in guiding the CIC24 JIST-first submitted manuscripts through the entire editorial process, but also continues to play a significant role in the peer reviewing process in the field of color science.

Growing from a strong background in the photographic sciences, my vision of the publication philosophy of the *Journal of Imaging Science and Technology* is to further the latest scientific discoveries and application developments across multiple disciplines in the field of modern imaging technology. In my point of view, what has been achieved last year is a significant steppingstone to bring the JIST to the right direction. With our combined effort, I truly believe that the JIST will continue to grow and become an indispensable research resource for all IS&T members and readers around the globe.

Journal of Electronic Imaging (JEI)

by Karen Egiazarian, editor

In 2015, JEI received 711 submissions, including 618 contributed papers, 70 special section papers, and 23 letters, and published 215 papers, including 180 contributed papers, 34 special section papers, and 1 letter in a total of 2,618 pages. This represents a continuing trend of significant increase in submissions over past years (in 2011, 2012, 2013, and 2014 JEI had 278, 434, 566, and 655 submissions, respectively).

The last two issues of JEI in 2015 included special sections on Ultrawide Context- and Content-Aware Imaging (Guest Editors: François Brémond, Ljiljana Platiša, and Sebastiano

Battiato) and Quality Control by Artificial Vision: Nonconventional Imaging Systems (Guest Editors: Fabrice Mériaudeau, Amir Malik Saeed).

JEI has several upcoming special sections planned for 2016 and 2017. The first of these is on Advances on Distributed Smart Cameras (Guest Editors: Jorge Fernández-Berni, François Berry, and Christian Micheloni). Three others planned for 2016 are on Intelligent Surveillance for Transport Systems (Guest Editors: Louahdi Khoudour, Yassine Ruichek, and Sergio Velastin), Color in Texture and Material Recognition (Guest Editors: Raimondo Schettini, Joost van de Weijer, Claudio Cusano, and Paolo Napoletano), and Perceptually Driven Visual Information Analysis (Guest Editors: Mohamed-Chaker Larabi, Sanghoon Lee, Mohammed El Hassouni, Frédéric Morain-Nicolier, and Rachid Jennane). In 2017, JEI is planning special sections on Image Processing for Cultural Heritage (Guest Editors: Aladine Chetouani, Robert Erdmann, David Picard, and Filippo Stanco) and Retinex at 50 (Guest Editors: Alessandro Rizzi, John J. McCann, Marcelo Bertalmío, and Gabriele Gianini).

The following new associate editors have joined the editorial board: Jenny Benois-Pineau (University of Bordeaux), Kunal Narayan Chaudhury (Indian Institute of Science), Peter Corcoran (National University of Ireland Galway), Pasi Fränti (University of Eastern Finland), Iuri Frosio (NVIDIA), Atanas Gotchev (Tampere University of Technology), Zhen He (Intel), Janne Heikkila (University of Oulu), Arto Kaarna (Lappeenranta University of Technology), Fabrice Mériaudeau (Universiti Teknologi Petronas), Christian Micheloni (University of Udine), Dmytro Rusanovskyy (Qualcomm Technologies), Ivan Selesnick (New York University), Svyatoslav Voloshynovskiy (University of Geneva), and Lei Zhang (Hong Kong Polytechnic University). We have also had several retirements and thank the outgoing associate editors for their dedicated service.

Information relating to the journal, including subscription options, tables of contents of current and past issues, prospective author guidelines, calls for papers, and the editorial schedule for upcoming special sections can be found at the journal website: <http://jelectronicimaging.org>.

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continued from page 7

was realized with a highly successful CIC23 held in Darmstadt, Germany. The meeting was characterized by increased attendance, more paper submissions, and stronger short-course enrollment compared to the preceding few years. The European imaging community strongly supported the conference and, as a

Conference Data: July 2015 – June 2016

Meeting: NIP30/Digital Fabrication 2015

Dates: September 27-October 1, 2015 / **Location:** Portland, OR

General Chair: Masahiko Fujii (Fuji Xerox)

Attendance: 351 (314 technical attendees)

Oral Papers: 103 **Interactive Papers:** 9

Short Courses: 16 **Exhibitors:** 16

Meeting: Color and Imaging Conference) 2015 (CIC23

Dates: October 19-23, 2015 / **Location:** Darmstadt, Germany

General Chair: JVien Cheung (Univ. of Leeds, UK)

Attendance: 189 (175 technical attendees)

Oral Papers: 28 **Interactive Papers:** 18

Short Courses: 15 **Exhibitors:** 3

Meeting: Electronic Imaging Symposium 2016

Dates: February 14-18, 2016 / **Location:** San Francisco, CA

General Chairs: Choon-Woo Kim (Inha Univ.) and Nitin Sampat (RIT)

Attendance: 856 (792 technical attendees)

Oral Papers: 449 **Interactive Papers:** 69

Short Courses: 17 **Exhibitors:** 8

Meeting: Archiving 2016

Dates: April 19-22, 2016 / **Location:** Washington, DC

General Chair: Kari Smith (MIT)

Attendance: 207 (181 technical attendees)

Oral Papers: 32 **Interactive Papers:** 10

Short Courses: 12 **Exhibitors:** 8

consequence of this success, the Color and Imaging Conference will be a truly international event going forward. The conference location will now rotate between a US location and a non-US location each year. CIC24 was held in San Diego, while CIC25 will be held in Lillehammer, Norway.

Within IS&T, conference globalization was pioneered by the Archiving conference which has been held in North America beginning in 2004 with a significant number being held in Europe since 2008. The Printing for Fabrication (NIP) conference has also returned to having a more international make-up with Printing for Fabrication (NIP) 2016 held in Manchester, UK. This is the first time the conference has been held outside North America since NIP9 (1993) when it was held in Japan, and the first time it was held in Europe since NIP1 (Venice, Italy, 1981). Positioning our conferences as global events has allowed IS&T to extend its geographic reach and better serve our members in countries outside North America. However planning, organizing, and executing conferences requires strong involvement from our members to serve as volunteers on conference committees and to liaise with local businesses and authorities in our conference locations. I would like to appeal, particularly to our non-North American members, to get involved as a volunteer for the Society to help us maintain the momentum towards being a truly international imaging society.

In another very significant change concerning conferences, IS&T assumed sole responsibility for the Electronic Imaging Symposium with the February 2016 event. Electronic Imaging began as an IS&T conference in 1988. However, from 1989 to 2015 EI was jointly managed in a partnership between IS&T and SPIE. This partnership ended after EI 2015. The planning, funding, organization, and execution of EI symposia from EI2016 and

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beyond passed to IS&T. The EI2016 symposium was a major success for IS&T and reflects the organizational skills and hard work of our office staff and the many member volunteers on the conference and symposium committees. This success also reflects the long-term loyalty and cohesiveness of the EI community. Thank you to everyone involved for making EI2016 such a success. On assuming sole responsibility for EI, IS&T has begun implementing a number of popular changes to the way the symposium is run, with a long term goal of continuous improvement in member and attendee satisfaction.

Publications are another important component of IS&T's mission. As most of you are aware, the Society publishes two technical journals as well as numbers conference proceedings. Over the past few years we have migrated our digital library to a new platform to better serve our members. This migration is now largely complete and the new platform is operating smoothly. Many thanks to the staff members for their efforts in making this a successful migration.

Those of you who follow the *Journal of Imaging Science and Technology* will have noticed both an increase in the number of papers per issue and an improvement in the timeliness of each issue's release. This improvement has come about as a result of much hard work by the editorial board, the IS&T publications chair, and the IS&T staff. Thank you to all involved.

Related to publications and the Electronic Imaging Symposium, the Society made the bold move to allow complete online access to the full papers of the conference proceedings. Additionally, the JIST-first option now being offered for all IS&T conferences has allowed authors to present their journal papers at IS&T events and have them reprinted within the proceedings.

I would like to close this annual report with an appeal to our members. An involved, active, and representative membership is vital for the successful operation and governance of the society and I encourage all members to consider serving the society either on the Board of Directors, a governance committee, a conference organizing committee, or through involvement in one of our publications as an associate editor or referee. Your involvement will make the Society stronger and better able to satisfy member's needs. I would also like to encourage you to recommend membership of the society to your colleagues and friends involved in imaging. Please continue helping us to grow the society and provide world-class conferences and publications to the imaging community.

Respectfully submitted,



Geoff Woolfe, IS&T President

IS&T 2015 Financial Statement

STATEMENT OF INCOME

Fiscal Years Ending December 31, 2015 and December 31, 2014

| | 2015 | 2014 |
|--------------------------|--------------------|--------------------|
| INCOME | | |
| Conferences | \$1,101,307 | \$817,605 |
| Publications | 400,667 | 304,035 |
| Membership | 87,970 | 92,330 |
| Standards | 154,100 | 135,300 |
| Other | <u>25,825</u> | <u>5,366</u> |
| TOTAL INCOME | \$1,769,868 | \$1,354,636 |
| EXPENSE | | |
| Conference | \$989,433 | \$777,499 |
| Publications | 413,818 | 275,227 |
| Membership | 61,903 | 59,452 |
| Standards | 102,149 | 83,884 |
| Other | <u>27,517</u> | <u>21,975</u> |
| TOTAL EXPENSES | \$1,594,821 | \$1,218,038 |
| NET OPERATIONS | | |
| Admin | (374,092) | (351,169) |
| Investment Income | 78,763 | 148,249 |
| Unrealized Gain (Loss) | <u>(125,366)</u> | <u>(128,344)</u> |
| NET INCOME (Loss) | \$(245,648) | \$(194,666) |

BALANCE SHEET

Fiscal Years Ending December 31, 2015 and December 31, 2014

| | 2015 | 2014 |
|---|--------------------|--------------------|
| ASSETS | | |
| Cash and Cash Equivalents | \$ 237,228 | \$ 275,390 |
| Accounts Receivable, net | 562 | 1,335 |
| Prepaid Expenses | 146,284 | 65,399 |
| Inventory | 76,113 | 83,468 |
| Restricted Cash | 24,422 | 32,174 |
| Investments | 1,089,192 | 1,301,570 |
| Property and Equipment, net | <u>30,773</u> | <u>33,025</u> |
| TOTAL ASSETS | \$1,604,574 | \$1,792,361 |
| LIABILITIES | | |
| Accounts Payable and Accrued Expenses | \$138,149 | \$101,309 |
| Deferred Revenue | 250,328 | 224,349 |
| Funds Held for Others | <u>24,422</u> | <u>32,174</u> |
| TOTAL LIABILITIES | 412,899 | 357,83 |
| NET ASSETS | | |
| Unrestricted | \$1,101,156 | \$1,339,268 |
| Temporarily restricted (Davis Fund) | 41,671 | 46,498 |
| Permanently restricted (Davis Fund) | <u>48,848</u> | <u>48,763</u> |
| TOTAL NET ASSETS | \$1,191,675 | \$1,434,529 |
| TOTAL LIABILITIES AND NET ASSETS | \$1,604,574 | \$1,792,361 |

Balance Sheet Notes

- Income (Loss) from operations in 2015 was \$(245,648).
- IS&T's 2015 Annual Report is available to members upon request.

Statement of Income Notes

General Administration and Labor allocations in 2015 (2014) were as follows: conferences 42% (37%); publications 18% (13%); membership 2% (2%); standards 2% (1%), Admin 36% (47%). These percentages were applied to labor expenses to determine a net gain (loss) for conferences, publications, membership, and standards.

IS&T's investments are administered through Morgan Stanley in Washington, DC. The investments are currently invested in Money Market Funds, PIMCO Mutual Funds, and in the TRAK stock portfolio. As of December 31, 2015, these investments had a market value of \$1,089,192 (in 2014 valued at \$1,301,570). 2014 was re-stated for the new Admin reporting method. Net Income did not change. \$1,488,362).

Standards News: Imaging and Graphic Arts

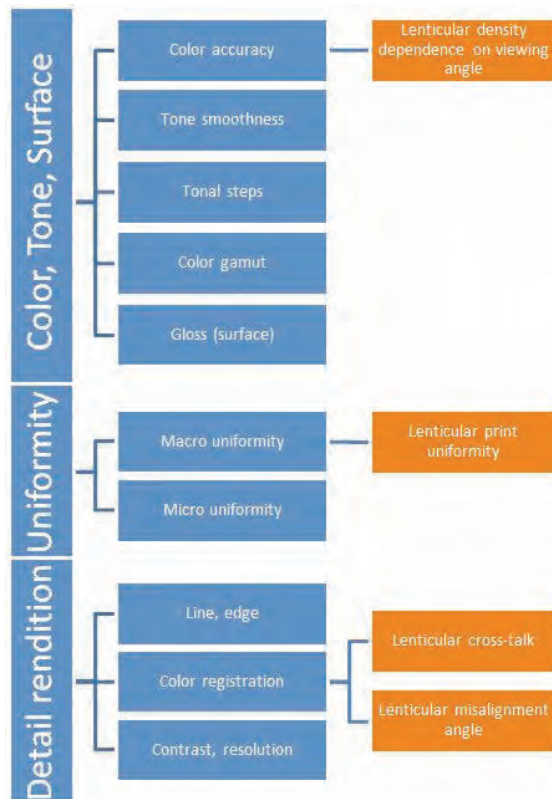
by Ann L. McCarthy, IS&T Standards Coordinator

ISO/TC 42 Photography

ISO/TC 42 Standards Working Groups and Projects TC 42/WG3

Image quality, including understanding of attributes, and ways to measure them, is a key undertaking in various standards committees. Often, measurements and assessments are tuned to particular use cases, and to particular industries. At the May 2016 meeting of TC 42/ WG 3, *Image measurement, viewing, and sensitometry*, the image quality assessments of ISO/TC 130/JWG 14, *Print quality measurement methods*, were reviewed in comparison to those in various ISO/TC 42 standards. Despite differences in the details of the methods, the chart of attributes shown was found applicable to both.

TC 42/ WG 3, *Image measurement, viewing, and sensitometry*, has proposed a new work item, NP TS 20793, *Photography — Lenticular print for changing images — Measurements of image quality*, to describe measurement methods and specifications of image quality of lenticular prints that are used for changing images. The proposed image quality attributes specific to the lenticular print technology are shown in the diagram, organized hypothetically to align with the traditional image quality attributes. Lenticular prints are used for such applications as signage, display posters, business cards, multilingual message boards, and packages with changing images or 3D effects.



The current market size of lenticular prints is estimated to be over 100 million m² and the market is growing, spurred by the improvements in lines per inch technology.

Also in TC 42/WG 3, the new project ISO/PWI 20792, *Characterization of physical aspects and print quality of photo books*, has been registered with an initial working draft. ISO/PWI 20791, *Test targets for image quality measurements on small size photographic prints*, has also been initiated. Work on ISO/PWI 20792 begins with evaluation of image quality assessment methods used in the photographic industry.

TC 42/WG5

While work in other TC 42 standards evaluates color differences using delta E related measures, the image permanence work in TC 42/WG 5, *Physical properties and image permanence of photographic materials*, has been based on density measures. Particularly in image permanence, maintaining comparison to historical measures is essential. Nonetheless, WG 5 is considering the use of delta E measures in certain of its new standards. In part, the challenge lies with the museum community, to determine the applicability of delta E to the work of monitoring the preservation of materials. For example, common variations of delta E do not convey the direction of a color change and that can certainly impact perceptual acceptability.

Within TC 42/WG 5, the work on the overarching specifications has been on hold as test standards have been developed and approved for image permanence attributes. Three parts for ISO 18940:— are defined. The plan is for three parts, *Imaging materials — Reflection color photographic images — Specifications for image permanence for indoor applications — Part 1: Guiding principles for specifications*, *Imaging materials — Reflection color photographic images — Specifications for image permanence for indoor applications — Part 2: Consumer home*, and *Imaging materials — Reflection color photographic images - Specifications for image permanence for indoor applications — Part 3: Museum*. The museum case is considered to be essentially different from the consumer home case. In museums, the environments can be and are for the most part well controlled, while the tolerance for change in the preserved materials is much tighter. In museums, the materials being preserved may be irreplaceable, with deep cultural significance. However, even in these settings, the demands of viewing bring risks as museums come under pressure to increase light levels and provide accessible displays. Currently, the museum community is in need of a degradation model that not only takes into account light levels, but also regards more complex chemical reactions. The technical report CIE 157:2004, *Control of Damage to Museums Objects by Optical Radiation*, summarizes many of the approaches and difficulties, notably re-

porting degradations in delta E. CIE 157:2004 is also the basis for Technical Report CEN /TS 16163 of April 2014, which is currently under investigation in the EU. Be aware that if a CEN standard is accepted, it is automatically adopted by all EU countries and overrides all ISO or other standards in use. However, note that CEN 16163 is a technical specification. The recommended approach for ISO 18940: — Part 3 will be to provide a more complete system of guidance, measurements, and specifications, consistently based on the current museum practices.

TC 42/WG 5 has also published edition 2 of one of the early test standards to be completed, ISO 18935:2016 (Ed.2), *Imaging materials — Colour images — Determination of water resistance of printed colour images*. In comparison to the ISO 18935:2005 (Ed.1), this revision incorporates an edge penetration test and allows for alternative liquids other than water.

TC42/WG18

TC 42/WG 18, *Electronic still picture imaging*, has initiated a new project ballot for ISO/NP 20954 2, *Digital cameras — Measurement method for image stabilization performance — Part 2: Non-optical systems*, to address image stabilization performance in systems that use either non-optical image stabilization or a hybrid of optical and non-optical techniques. Such cameras may manipulate exposure parameters, use multiple-image capture and image fusion schemes, and other image processing methods. Note that leading smartphone systems employ a combination of optical and non-optical methods for which a new standard will be applicable. ISO/NP 20954 2 follows ISO/NP 20954 1, *Digital cameras — Measurement method for image stabilization performance — Part 1: Optical systems*, which was approved for development in November 2015.

TC 42/WG 18 has progressed work on ISO 18844, *Photography — Digital cameras — Image flare measurement*, to the DIS ballot stage. This standard method is needed in part because image flare can vary both locally within an image and from image to image. It is certainly feasible to measure image flare at different positions in different images, and due to the variability of image flare such measurements should not be compared out of context. This international standard provides a standard method for measuring image flare which can be useful for cross comparison.

In TC 42/WG 18, the new work item for revision of ISO 516:1999 (Ed. 3), *Photography — Camera shutters — Timing*, which will be ISO 516: *Photography — Camera mechanical shutters — Timing*, has been approved at the DIS stage. The key element of the revision is to clarify the applicability of the standard to mechanical shutter systems, rather than the electronic shutters in use in some digital still cameras.

TC42/JWG 20

TC 42/JWG 20, *Joint ISO/TC 42-IEC WG; Digital still cameras*, has approved the technical report, ISO/DTR 17321-3, *Graphic technology and photography — Colour characterization of digital still cameras (DSCs) — Part 3: User controls and readouts for*

scene referred imaging applications, to begin publication. The concept underlying the term ‘scene-referred’ imaging is important in the context of photography-based color management and color processing workflows. In the realm of traditional visual arts, when dealing with any physical art materials, the artist works directly in the output medium. Photography, whether captured on film negatives or using a digital camera (with sufficient flexibility), provides the option to capture an extent of scene color and lighting that cannot be viewed through any currently feasible output medium. Why is such a capture desirable? From an aesthetic perspective, such capture is advantageous because it offers flexibility for later adaptation and artistic expression. And at the opposite extreme of use cases, for example in scientific or medical applications, the objective is usually an exact capture of the scene, without any interpretive modification. This technical report provides an important step in standardizing user controls and camera readouts related to scene-referred imaging.

International Color Consortium (ICC) News

Current work in the ICC is focused in four areas: Architecture, Graphic Arts, Medical Imaging, and Profile Assessment. The Architecture Working Group develops the iccMAX specification and the ReflccMAX reference color management engine. The iccMAX specification is now available to download on the ICC (<http://color.org>) Specifications page, along with a variety of reference and tutorial materials. Essentially, iccMAX is a new color management system that goes beyond D50 colorimetry and is meant for use in cases where requirements cannot be met by ICC v4. For example, v4 color management cannot describe how color changes due to lighting or viewing angles, how goniophotometric materials interact with light, or how spectrally defined spot colors will look under a variety of observer / viewing conditions. iccMAX includes the capability to define specific subset workflows using Interoperability Conformance Specification (ICS) documents. Products can choose which ICS workflows they support. This mechanism also allows for adding new workflows without invalidating earlier implementations.

The Graphic Arts Special Interest Group is currently investigating conditions of common color appearance across differing print conditions, and standardizing methods to specify N-color data in the context of PDF and PDF/X files.

The Medical Imaging Working Group (MIWG) projects include color calibration for Petri dish imaging, assessing the accuracy of display profiles, and spectral skin imaging (e.g., scattering in skin, assessing hemoglobin). For example, consider the challenge of reading a Petri dish remotely via a display, compared to reading it in person. Specimen illumination, camera, display device calibration, and display environment, must all be controlled and calibrated to provide valid information to the remote viewer assessing the sample. The MIWG plans to produce a primer on microbiological imaging, and white papers on spectral characterization, spectral knowledge base, and spectral calibration.

Of course, profile suitability to the task is critical to any col-

or management process. The ICC provides a variety of aids in this regard. For example, tools for making, editing, and assessing ICC profiles are compared in a concise chart at www.color.org/profilingtools.xalter. Note that the ICC provides the list as a convenience to users and does not endorse or recommend individual products.

ISO/TC 130 Graphic Technology JOINT CGATS/USTAG/ IDEAlliance PPC Activities

Within the US, positions and contributions for ISO/TC 130 are coordinated through joint meetings of CGATS (Committee for Graphic Arts Technology Standards), the ISO/TC 130/US TAG, and the Print Properties & Colorimetrics (PPC) Committee, a working group of the IDEAlliance. CGATS Technical Reports pertaining to graphics industry color and tone are available at: www.npes.org/programs/standardsworkroom/toolsbestpractices/technicalreports.aspx

CGATS.5, *Spectral measurement and colorimetric computation for graphic arts images*, is a US national adoption of ISO 13655:2009, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*, which is currently being revised by TC 130/JWG 8. At the April 2016 CGATS/USTAG/IDEAlliance meeting, the decision was made that if publication of the ISO 13655 revision, currently registered as a DIS, is later than December 16th of this year, another extension for CGATS.5 will be submitted to ANSI. That is now expected.

It was also noted that action to reaffirm TR001, *Graphic technology — Color Characterization Data for Type 1 Printing*, is required. In the reaffirmation, a notation will be added indicating that TR001 is being maintained for historical purposes, while CGATS has recommended CRPC1 and CRPC2, in ISO 15339, *Graphic technology — Printing from digital data across multiple technologies*, and in the corresponding CGATS.21, since their publication. Characterization data sets are available in the NPS Standards Workroom.

ISO/TC 130 Working Groups and Projects TC 130/WG 2

Within TC 130/WG 2, *Prepress data exchange*, a new project ballot is initiated for ISO/NP 20616-2, *Graphic technology — File format for quality control and metadata — Part 2: Print quality exchange (PQX)*. The related ISO/PWI 20616-1, *Graphic technology — File format for quality control and metadata — Part 1: Print requirements exchange (PRX)* will begin formal development shortly. Together PRX and PQX define the file formats that enable the exchange of print quality requirements and print quality assessment data for scoring. PQX, for transmission from the print service provider to the brand, contains fields that are designed to be subject to a business agreement between the brand and a printer. PRX, for transmission from the brand to the print provider, is intended to transmit colour aims using the same data containers that are defined in ISO 17972 (CxF). While PRX and CxF are different formats with different parsing requirements,

developers can use the same strategies for reading and writing colour data in a PRX file that they use for reading and writing colour data in a CxF file. PRX is compatible with both spectral and non-spectral colour data.

TC 130/WG 2 has also initiated work on a potential new part of ISO 12641, *Graphic technology — Prepress digital data exchange*, the IT8 standard. The new part is ISO 12641-2, *Graphic technology — Prepress digital data exchange — Part 2: Advanced targets for scanner calibration*. The work is planned to retain existing targets and allow additional targets, with alterations in layout and size. One intention with the revision (relative to ISO 12641-1) is to offer improved targets for the analysis of non-linear scanner performance. Museums around the world are working to digitize cultural heritage, conducting large scale projects to digitize photos, documents, artwork, and 3D object views. Scan quality is the critical underlying technology requirement in this digitization. The new IT8 target design is proposed to increase the number of grayscale steps and provide additional saturated and pastel colors relevant to archiving applications. Members of TC 42/JWG 26, *Imaging system capability qualification for archival recording and approval*, which is focused on this area, may have an interest in this new IT8 scanner target work. In addition to the target additions, the data definition is planned to be updated to comply with ISO 17972, using the Color Exchange Format.

The ISO/TC 130 Secretariat has issued a call for experts for ISO/TC 130/WG 2/TF 5 “PDF Common Metadata”. The National Member Bodies are requested to nominate interested experts to ISO/TC 130/WG 2 via the ISO Global Directory (ISO GD). If you are an individual with expertise in this area and would like to contribute, contact your ISO/TC 130 national body or contact the ISO/TC 130 Secretariat for assistance. The preliminary work item, ISO/PWI 21812, has been registered for this work. Alternatively, experts are kindly requested to contact Ms. Debbie Orf (dorf@npes.org) for guidance in establishing the appropriate affiliations.

TC 130/WG 3

TC 130/WG 3, *Process control and related metrology*, is in the early stage of considering work to standardize the assessment and validation of the performance of spectrophotometers and spectrodensitometers. This work proposal is in response to a WG 3 action item to determine and implement a plan for addressing colour measurement errors in GA marketplace. In part, the issue arises because optoelectronic instruments have become more precise, and have outpaced the ability of national testing laboratories to produce and certify standard materials suitable for testing. Along with this progress in instrumentation, modern graphic production has moved away from artistic interpretation, to reliance on objective numerical assessments. In the current market situation, color measurement instruments from different manufacturers, or with different design intents, may not provide adequate agreement on the determination of the colour values, suitable to meet graphic workflow expectations. With that, meth-

ods to objectively assess such instrument performance are not sufficiently well understood.

In a related note for print color measurement quality, TC 130/WG 3 is also considering the issue of ink dry back, i.e., the color change that occurs as ink dries on a print, and whether steps may be warranted to address this color change in production color measurements using a prediction model. An action item group has been formed to investigate this topic further.

TC 130/JWG 7

TC 130/JWG 7 has initiated a new work item ballot for ISO/NP 20677, *Image technology colour management — Extensions to architecture, profile format, and data structure*. This standard will provide specifications for extended (iccMAX) color management profiles and recommendations for extended color workflow domains based on the ICCLabs and iccMAX work that began several years ago in the International Color Consortium (ICC). The result of this effort is that several real world scenarios can now be directly addressed by iccMAX that could not be easily addressed with previous color management solutions. For more information go to www.color.org. The purpose of the ICC is to promote the use and adoption of open, vendor-neutral, cross-platform color management systems.

TC 130/WG 13

TC 130/WG 13, *Printing conformity assessment requirements*, has created a significant body of documented preparatory work in the four years since its formation. Currently, ISO/NP 19302, *Graphic technology — Colour conformity assessment of printed products*, is proposed for standardization. This standard proposes guidelines for the definition of print quality requirements, and the assessment of tone and color print quality, for print products printed using any printing technology — offset, digital, flexography — with any color sequence, e.g., CMYK, spot, N-color. The standard is intended for use by brand owners, print buyers, and design, prepress, and print service providers. ISO 19302 is planned to reference the required International Standards pertinent to each stage of a production print workflow, and provide details for the expected setup, calibration, and process control operations required at each stage of the workflow according to the referenced standards. ISO 19302 will be written in accordance with conformity guidelines of ISO/IEC 17007 and the "neutrality principle" of ISO 19011 guidelines such that any printing workflow conformity can be assessed by print providers (first party), customers or suppliers (second party), or by independent bodies (third party). Other related new project proposals specific to particular print production markets are also being considered.

ISO/TC 130 Standards Publications

In early May 2016, TC 130/WG 2 announced publication of ISO 18620:2016, *Graphic technology — Prepress data exchange — Tone adjustment curves exchange*. Graphic arts raster image processor vendors all provide support for printing plate calibration and ad-

justment of tone curves for their digital presses using essentially the same data, using a variety of proprietary formats. As a result, companies providing tools to support print certification processes must provide support for many different file formats. This standard defines the minimum set of data required by such applications and provides a format that is easily extensible so that additional metadata can be included when agreed on between the parties. The format is suitable for use in color management, calibration, and raster image processor systems.

Following ISO 17972-1, *Graphic technology — Colour data exchange format — Part 1: Relationship to CxF3 (CxF/X)*, published last year, TC 130/WG 2 has now published ISO 17972 2:2016, *Graphic technology — Colour data exchange format (CxF/X) — Part 2: Scanner target data (CxF/X-2)*. This part provides an exchange format for target input values, color, and process control data relating to scanner targets, with the associated metadata necessary for proper interpretation, in electronic form. Scanner targets have been exchanged in digital form for some time within the graphic arts industry. This standard maps existing data to the updated CxF/X encoding.

ISO/TC 130/WG 3 has published ISO/TS 15311-1:2016, *Graphic technology — Requirements for printed matter for commercial and industrial production — Part 1: Measurement methods and reporting schema*, which defines print metrics, measurement methods, and reporting requirements for printed sheets that are suitable for all classes of printed products. The expected use is primarily with digital printing systems. This technical specification was split from the earlier PWI and new work proposals are pending for the other parts.

CIE News

CIE Publications

CIE 218:2016, *Research Roadmap for Healthful Interior Lighting Applications*, delivers a research roadmap of questions in themed groups: Fundamental Processes, Daily Pattern, Longer Patterns, Application, Application — Specific, and Individual Differences. Although light is defined as electromagnetic radiation that provides the stimulus for vision, we now know conclusively that ocular detection of this signal also has many other physiological and psychological effects in humans and other organisms. This knowledge has led some to argue for rapid adoption of lighting recommendations that incorporate "lighting for health" elements, whereas others have argued that a more cautious approach would be wiser. CIE TC 3-46 has outlined a research agenda that could lead to evidence-based recommendations for healthful interior lighting within the context of delivering good lighting quality. Design considerations and the ethics of using light to influence health also receive attention. CIE 218:2016 is a collaboration of CIE members from Austria, Canada, China, France, Germany, Italy, Japan, Netherlands, Sweden, Slovakia, and the United Kingdom under the auspices of CIE Division 3 "Interior Environment and Lighting Design."

CIE 219:2016, *Maintaining Summer Levels of 25(OH)D dur-*

ing Winter by Minimal Exposure to Sunbeds: Requirements and Weighing the Advantages and Disadvantages, provides a timely look at obtaining vitamin D using artificial UV radiation as emitted by commercial sunbeds. The cautionary note is that commercial sunbeds are not designed or optimized for this purpose, and provide a significantly higher UV-A burden than sunlight for the same vitamin D potential. Sources designed specifically for the purpose, with a lower UV-A burden and clear application guidelines, would be more appropriate for those who choose to gain vitamin D through artificial UV exposure, rather than by other means. The publication is written in English, with a short summary in French and German. It contains 29 pages with figures and tables and is available through the National Committees of the CIE or via the CIE Webshop.

CIE Tutorial and Practical Workshop on LED Lamp and Luminaire testing to CIE S 025:2015

In 2015 CIE published CIE S 025, the first international measurement standard for LED lamps, LED luminaires and LED modules, which provides requirements to perform reproducible and traceable photometric and colorimetric measurements on LED lamps, LED modules, and LED luminaires. The availability of correct photometric data for LED devices is essential for lighting system design and evaluation. The standard aims in particular to cover measurement methods suitable for testing the compliance of LED devices with the photometric and colorimetric requirements of LED performance standards recently published by IEC. CIE S 025 represents a consensus between National Metrology Institutes, testing laboratories, and the user community to guarantee photometrically correct, while economically affordable, measurement results. .

To facilitate an introduction to the application and use of CIE S 025, CIE Division 2 is hosting the *CIE Tutorial and Practical Workshop on LED Lamp and Luminaire testing to CIE S 025:2015*, May 08 – 11, 2017, in METAS Bern-Wabern, Switzerland. The focus of the tutorial and workshop is the implementation of CIE S 025 in industrial test laboratories and national metrology institutes. The course material will be suitable for engineers, testing-laboratory staff, and researchers in LED and solid state lighting measurement and other related fields. Participants will learn how to characterize photometric, radiometric, and spectrometric measurement devices and establish measurement uncertainty budgets according to international standards (e.g., ISO/IEC Guide 98/3).

The standard, *CIE S 025 LED Lamps, LED Luminaires and LED Modules Test Standard*, will be provided as part of the course materials. In addition, *CIE 198:2011 Determination of Measurement Uncertainties in Photometry, and Supplement 1: Modules and Examples for the Determination of Measurement Uncertainties* will be available for purchase by participants at a discount, and can be ordered prior to the tutorial.

For additional program details and to register, follow this short link: <http://bit.ly/2gbOpf2> .

In addition to the tutorial and practical workshop, meetings of CIE Technical Committees will be held and the results of two European research projects related to photometry and radiometry, *i.e.* MESaIL (www.eng62-mesail.eu) and PhotoLED will be presented.

ISO News

ISO/IEC Directives Part 1, Part 2, and Consolidated ISO Supplement (May 2016 Edition)

The following is a summary of the key changes in the new edition of the ISO directives:

- Systematic review voting is now obligatory for the P-members of the committee that developed the standard.
- Technical committee chairs have been limited to two terms, the first of six years and the second of three years. Now this term restriction is removed. Chairs may serve any number of terms, however the total number of years served is still limited to nine years, and the first term is limited to six years.
- Technical committees are now encouraged to select a “chair elect” one year before the end of the term of the current chair. “Chair elect” is established as a new ISO role.
- Minor revisions must now list the changes in the Foreword.
- Justification statements are no longer required with approval votes. Justification statements are still required with disapproval votes.
- For negative votes, if justification is not submitted with the negative vote, the negative vote is not counted. A new procedure is documented for justification statements that are not clearly technical.
- In Part 2, the revisions simplify, disambiguate, and reorganize the material to facilitate the work of standards developers. Requirements intended to normalize the structure of standards documents are added. Standards writers are encouraged to peruse the new edition. A checklist is provided to assist in adopting the new requirements.
- Concurrent with the new directives, ISO/CS has published new electronic forms applicable in standards development work: form 4 (new work item) and form 13 (report of DIS voting).

New from the ISO Technical Management Board

ISO/CS withdrawn standards procedure: Since ISO/CS started doing withdrawal ballots using e-balloting, they have noted an increase in the number of objections received. The TMB Resolution 22/2016 establishes a three months period in which a member body may gather information to demonstrate that the standard is being used in at least 5 countries. If the member body does not wish to undertake this task, the standard will be withdrawn. Note that if a standard is withdrawn, national standards bodies can still use its content as a basis to develop a national standard and withdrawn standards are still available for purchase.

Faster standards development: The TMB has approved the addition of a new 18-month development track, based on short-

ening the WD/CD development stage, and the comment resolution stage. This development track is intended for revisions and for use in committees able to accomplish rapid consensus. This track will use a new rapid “direct publication process” through the editing, proofing, and publications processes.

Remote participation in meetings: The guideline for remote participation in standards meetings (<http://bit.ly/2fehfcy>) has been revised based on pilot studies. The TMB recognizes the value of remote participation for all ISO meetings and ISO committees in support of increasing stakeholder engagement, better project management, and better coordination of the committee work.

Promoting project management skills: Project management

for standards development is one of the key issues currently being looked at by the ISO TMB. For more advice on project management and the list of Do’s and Don’ts, login to the project management page (<http://bit.ly/2gz1qmO>) on ISO Connect.

Experts are welcome to contribute to ISO standards development through their corresponding national committees. Additional information on photography standards is available from the ISO/TC 42 Secretariat, isotc42@ansi.org. Additional information on graphic technology standards is available from the ISO/TC 130 Secretariat, tc170_cyc@126.com.

For questions about the activities of TC 42, for suggestions for (or input to) future updates, or standards questions in general, please contact the IS&T Standards Coordinator at standards@imaging.org.

[papers continued from page 1](#)

biocompatibility and mechanical properties. Furthermore, application of antibacterial coatings onto these implant material have been presented as a viable strategy to prevent biofilm formation. The purpose of this study was to analyse the biofilm prevention effect on gentamicin coated fiber-reinforced composite implants, by means of inkjet technology, when exposed to *Staphylococcus aureus* ATCC 25923 bacteria. Scanning white light interferometry and scanning electron microscopy were used to characterize the surface texture and surface roughness of the pure and printed implant material and titanium (control) specimens. Quantification of the deposited gentamicin amount was performed using a colorimetric assay. Statistically significant biofilm inhibition was seen for the gentamicin coated resin specimens and a more than 100-fold reduction in viable cells was determined. It was concluded that piezoelectric inkjet technology could be a viable technology to precisely deposit anti-biofilm coatings onto implant materials. The presented work is based on results of a master’s thesis by Anthoni et al., 2016 conducted at Åbo Akademi University.

Flexible Pressure Sensor Driven by All-Printed Organic TFT Array Film

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Abstract: We have constructed a sheet-to-sheet (S2S) manufacturing line in order to prove the possibility and reality of production technologies and integrated processes of all-printed electronics devices. In our automated and continuously operated manufacturing line, we operated the reverse offset printer for electrode pattern, digital inkjet printer for organic semiconductor layer, slit-die coater for insulator layer, and screen printer for electrode and inter-layer insulator.

The average mobility of organic TFT is 0.7 cm²/Vs, average ON current is 5 μ A with less than 10% sigma in A4 size area, and ON/OFF current ratio is ten of order 6. We have been acquiring

successful results of TFT array flexible film in a reasonable high yield.

These all-printed organic TFT array back-plane is applied to the flexible and light-weight pressure sensor which is driven in active matrix mode, and which is applied for a touch pad of writing with pressure grey scale or a commodity inventory system.

The Impact of 3D Printing on US Copyright and Trademarks

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Abstract: The ubiquitous use of additive manufacturing (and subtractive manufacturing), better known as “3D Printing” has forced intellectual property (IP) owners to re-evaluate the various types of well-known IP protections available to them, namely, patents, copyrights, trademarks and trade secrets. In one aspect, by shifting the act of “manufacturing” or “making” of a product from a conventional industrial manufacturer to a consumer, the IP holder must determine which, if any, of the traditional IP protections are worth the investment. Acts which have been the signature of infringement, both patent and copyright, have been the making, using, and selling of an IP protected product. But if the entity that is doing any of those acts by printing an IP-protected product is a consumer, the IP owner may not be able to recover any significant damages from that single consumer or consumers who actually print (i.e., “make”) the product. IP owners must look to see if there are any remedy(ies) in suing the vendors who sell the software files provided to the consumer that are loaded into their 3D printers. From a trademark aspect, where a trademark identifies the source of goods or services in commerce, IP owners need to be concerned about those they license to 3D-print their products; for example, will the end product have the same quality as when the IP owner actually produced the product, since the IP owner’s trademark will appear on that printed product? With regard to copyrights, IP owners need to consider that although photographs have copyright the moment they are created, does software of optically scanned 3D objects have the same benefit? ▲