PRELIMINARY PROGRAM

CGIV 2008

4th European Conference on Colour in Graphics, Imaging, and Vision

10th International Symposium on Multispectral Colour Science

Centre for Sensors, Instruments, and Systems Development (CD6)

Department of Optics and Optometry

Universitat Politècnica de Catalunya (UPC)

Terrassa – Barcelona, España

June 9-13, 2008

www.imaging.org/conferences/cgiv2008/

Cooperating Societies

The Color Group (Great Britain)
Comité Español del Color
EOS (European Optical Society)
Flemish Innovation Centre for Graphic Communications (VGIC)
French Color Imaging Group
ISCC Inter-Society Color Council
German Society for Color Science and Application (DfwG)
Gesellschaft für Informatik e.v. (GI)
The Royal Photographic Society of Great Britain
Swedish Colour Centre Foundation

Sponsored by
Society for Imaging Science and Technology

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Scholarships Available

The Catalonian Government, Spanish Ministry of Education, Ajuntament de Terrassa, and UPC have generously donated funds to CGIV2008 to support conference registration for a limited number of PhD students.

If you are interested in applying for one of these scholarships, please visit the conference website for more details.

Sponsors

CGIV is sponsored by the Society for Imaging Science and Technology with the generous support of:

UNIVERSITAT POLITÈCNICA DE CATALUNYA

CENTRE FOR SENSORS, INSTRUMENTS, AND SYSTEMS DEVELOPMENT

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MUSEU DE LA CIÈNCIA I DE LA TÈCNICA DE CATALUNYA

Ajuntament de Terrassa
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Conference Overview

IS&T and the Centre for Sensors, Instruments, and Systems Development (CD6) invite you to CGIV 2008, the 4th European Conference on Colour in Graphics, Imaging, and Vision, to be held at the School of Industrial Engineering of the Technical University of Catalonia (UPC) in Terrassa, Spain. The 10th International Symposium on Multispectral Colour Science (MCS'08) is collocated with this event.

CGIV 2008 covers a wide range of topics related to colour and visual information; MCS'08 reviews the current state of the art and addresses major challenges and future directions in multispectral colour science. The single-track structure of the conference encompasses technical areas that strike a balance between academia and industry, and provide ample opportunities for networking.

There were approximately 200 high-quality papers submitted to CGIV 2008 by researchers working in a broad range of colour-related fields from industry, academia, and national and international standards communities. After a diligent peer-review, the CGIV 2008 Organising and Technical Program Committees sessioned 45 oral and 84 interactive paper presentations in seven technical areas. Rounding out the conference are nine short courses—some of which have never been offered before—and an industry exhibit.

In addition to meeting with colleagues and hearing the latest research in a broad range of technical areas, attendees have the opportunity to enjoy the city of Terrassa, an industrial, Modernista gem. Social functions have been planned to allow participants to see more than just the university campus. After a complementary city tour that will take you tp the Mercat de la Independència and the Masia Freixa, the Welcome Reception will be held at the lovely Alegre de Sagrera, a former private residence and the pride of the Terrassa. On Wednesday, join colleagues for the Conference Banquet at the famous Museu de la Ciència i de la Tècnica de Catalunya (see page 3; s eparate fee required).

CGIV 2008 promises to be an exciting week and we look forward to seeing you in Terrassa where many colourful attractions and experiences await!

—Jaume Pujol, General Chair

CGIV 2008 Organising Committee

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Colour Image Quality
Christine Fernandez-Maloigne,
Univ. of Poitiers, France
Colour in Computer Graphics
Werner Purgathofer,
TU Wien, Austria
Colour Reproduction
Jan Morovic, Hewlett-Packard
Española, Spain
Colour Science
Joaquín Campos Acosta,
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Colour Vision/Psychophysics
Sergio Nascimento, Univ. of
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Conference At-a-Glance

Registration in lobby of Escola Industrial Building, Carrer de Colom 1, see p. 20.

Mon. 9 June: 14:00 – 19:00
Wed. & Thurs. 11 &12 June: 7:30 – 18:00
Tues. 10 June: 7:00 – 18:00
Fri. 13 June: 8:00 – 11:00

Monday, June 9
- CGIV Short Courses (see page 13)

Tuesday, June 10
- Keynote Speaker: Johan M. Lammens
- Technical Sessions
  - Colour Science
  - Interactive Papers: *Colour Science, Colour Image Quality, and Colour in Computer Graphics*
  - Colour Image Quality
  - Colour in Computer Graphics
- City Tour and Welcome Reception at La Casa Alegre de Sagrera

Wednesday, June 11
- Keynote Speaker: Jose Luis Caivano
- Technical Sessions
  - Colour Vision/Psychophysics
  - Interactive Papers: *Vision/ Psychophysics, Computational Colour, Colour Image Processing, and Colour Reproduction*
  - Computational Colour
- Conference Banquet (Museu de la Ciencia i de la Tecnica de Catalunya; separate fee required)

Thursday, June 12
- Keynote Speaker: Sabine Süsstrunk
- Technical Sessions
  - Colour Image Processing
  - Interactive Papers: *Multispectral Imaging*
  - Colour Reproduction

Friday, June 13
- Keynote Speaker: Keigo Hirakawa
- Technical Session
  - Multispectral Imaging

CGIV2008 Conference Banquet

Museu de la Ciència i de la Tècnica de Catalunya • June 11, 2008

The building that houses the Museu de la Ciència i de la Tècnica de Catalunya—formerly a textile mill—is considered the finest example of Modernista industrial architecture in the country. Construction of the factory began in 1907 and it opened barely a year later.

Join collegues for a tour of the Textile Mill and other expositions, followed by a reception and dinner, featuring delicious Catalonian cuisine.

Separate registration is required;
guests accompanying conference participants are welcome.
Cost: €75/person

more information on the museum is found at www.mnactec.cat/

Venue, Accommodations, and Transport

See map on page 20.

About Terrassa

Nestled at the foot of Sant Llorenç del Munt Natural Park, surrounded by the forests and mountains of Catalonia, and located a short-train ride from Barcelona, Terrassa played a leading role in Spain's Industrial Revolution of the 19th century. Today Terrassa is more than just an industrial city. It is also a dynamic, university town with a rich artistic and historical heritage, where many factories, textile mills, and gems of Modernista architecture can be found. CGIV2008/MCS'08 will take advantage of this unique history and architecture by highlighting it through the location of the conference's technical sessions and social events.

Technical Sessions

The conference's technical sessions will take place in the main hall of the Technical University of Catalonia (Universitat Politècnica de Catalunya—UPC), a beautiful building in the Modernista style.

UPC and The Centre for Sensors, Instruments, and Systems Development (CD6)—an institution within UPC—are proud sponsors of CGIV2008. CD6 (www.cd6.upc.es/) is a research centre whose purpose is to provide services to companies and to carry out technological innovation projects in the field of optical engineering. CD6 is active in colour technology research focused on colour imaging, multispectral imaging, and industrial colourimetry.

Housing

As the commute time between Barcelona and the UPC building where the techical sessions take place will take a minimum of 75 minutes, we recommend that you stay in Terrassa over the conference dates and then make arrangements to move to lodging in Barcelona if you plan to combine sightseeing with conference attendance. To this end, IS&T has made special arrangements for accommodations at three local Terrassa hotels. You must use the hotel reservation form for the hotel you wish to stay at to make your reservations. These forms can be found at and downloaded from www.imaging.org/conferences/cgiv2008. Fax reservation forms directly to the hotel. In brief, the hotels are:

Hotel Don Candido (4-star)
www.hoteldoncandido.com
located 3000 meters from UPC and a 45 minute walk or short bus ride
Single/double: €82/€102; breakfast €11.50

Hotel Terrassa Park (3-star)
www.hotelterrassapark.com
located 1500 meters from UPC and a 25 minute walk
Single/double: €64/€72; breakfast €7.40

Hotel Vapor Gran (4+-star)
www.hotelvaporgran.com
located 1000 meters from UPC and a 20 minute walk
Single/double: €95/€119; breakfast €11.90

Prices do not include 7% IVA or breakfast. Reservations deadline is May 8, 2008.

Getting to/from Terrassa

Terrassa is served by Barcelona's International Airport (BCN; www.barcelona-airport.com/). Attendees can get to Terrassa from the airport via taxi or train.

A taxi to Terrassa is €50-70 and takes about 30 minutes.

By train, you take a RENFE train from the airport to Barcelona, and then take a RENFE or FGC train to Terrassa. The trip from the airport to Terrassa is approximately 2 hours.

Driving directions are available at the conference website.

Detailed information on how to get to Terrassa is posted on and will be updated periodically at www.imaging.org/conferences/cgiv2008.

Technical Program*

Tuesday June 10, 2008

8:30 – 9:30

Keynote Session

Session Chair: Jaume Pujol, Technical University of Catalonia (Spain)

Applications of Color Science and Technology in Digital Printer R&D, *Johan M. Lammens, Hewlett-Packard LFP (Spain)*

9:30 – 12:30

Colour Science

Session Chair: Joaquín Campos Acosta, CSIC (Spain)

Performance of Recent Color Difference Equations Around a CIE Blue Color Center, *Renzo Shamey, David Hinks, Seung Geol Lee, and Warren Jasper, North Carolina State University (USA)*

Evaluating for Colour Differences for Images, *Lee Don Gyou, University of Leeds (UK) and LG. Philips, LCD Co., Ltd. (Korea); and M. Ronnier Luo and Guihua Cui, University of Leeds (UK)*

Experimental Investigation of Distortion of Colour Harmony: A Harmony Distortion Index, *Ferenc Szabó, László Antos, Peter Bodrogi, and János Schanda, University of Pannonia (Hungary)*

Modeling Interference Color on Surface Structured Fibers, *Peter Zolliker, Empa, Duebendorf (Switzerland); Safer Mourad, Wenjing Shi, and Marcel Halbeisen, Empa, St. Gallen (Switzerland); and Hartmut Schmidt, University of Applied Sciences Darmstadt (Germany)*

Predicting Spectral Halftone Measurements for Different Instruments Using a New Multi-Scale Approach, *Milos Sormaz, Swiss Federal Institute of Technology (ETH); Safer Mourad and Tobias Stamm, Federal Laboratory for Materials Testing and Research (EMPA); and Patrick Jenny, Swiss Federal Institute of Technology (ETH) (Switzerland)*

Analyzing Observer Metamerism in CIECAM02 Using Real Observers, *J.M. Ezquerro and J.M. Zoido, University Complutense of Madrid; E. Perales and F. Martínez-Verdú, University of Alicante; and M. Melgosa, University of Granada (Spain)*

Correcting Veiling Glare of Refined CIECAM02 for Mobile Display, *Yung-Kyung Park, Chang-Jun Li, and M. Ronnier Luo, University of Leeds (UK); and Youngshin Kwak, Du-Sik Park, and Chang-Yeong Kim, Samsung Institute of Technology (Korea)*

12:30 – 14:00 Conference Lunch

14:00 – 16:00

Interactive Papers**

Session Chairs: Jon Y. Hardeberg, Gjøvik University College (Norwary), and Rafael Huertas, University of Granada (Spain)

Colour Science

Is There a Better Non-Parametric Alternative to von Kries Scaling?, *David H. Foster and Kamila Zychaluk, University of Manchester (UK)*

Challenges of Embedding a Spectrophotometer Inside a Printer, *Óscar Martínez, Hewlett-Packard Española (Spain)*

Optimal Parameters for CIECAMS2 Based Upon Surround Size Effect, *Chenyang Fu and M. Ronnier Luo, University of Leeds (UK)*

Colour Analysis of Inhomogeneous Stains on Textile Using Flatbed Scanning and Image Analysis, *Gerard van Dalen, Aat Don, Jegor Veldt, Erik Krijnen, and Michiel Gribnau, Unilever Research Laboratory (The Netherlands)*

A Study of Office and Indoor Lighting at Leeds, *Cai Li, Guihua Cui, and M. Ronnier Luo, University of Leeds (UK)*

A Measure of Colour Contrast Correlated

**Note: All papers are oral unless otherwise indicated; Interactive Papers are presented in poster format.*
*** Posters will be available for preview beginning in the morning; the session will include dessert and coffee.*

with Human Perception, *Alain Trémeau, Rafaël Nicolas, and Eric Dinet, University Jean Monnet (France)*

Training Data Selection Study for Surface Colour Measurement Data Correlation, *Thorsten Steder, M. Ronnier Luo, and Chang-Jun Li, University of Leeds (UK)*

Analyzing the Color Uniformity of the ATTD05 Perceptual Space, *Elísabet Chorro, Francisco M. Martínez-Verdú, and Dolores de Fez, University of Alicante; and Pascual Capilla and María J. Luque, University of Valencia (Spain)*

The Effect of Spectrocolorimeter Reproducibility on a Fully Color-Managed Print Production Workflow, *Danny C. Rich, Yoshio Okumura, and Veronika Lovell, Sun Chemical Corporation, (USA)*

Calculation of Number of Distinguishable Colors by Real Normal Observers, *Esther Perales, Francisco Martínez-Verdú, and Valentín Viqueira, University of Alicante (Spain)*

Assessing Large Color Differences Using 3-Step Color Series, *Rafael Huertas, María J. Rivas, and Manuel Melgosa, University of Granada (Spain)*

Evaluation of Colour Difference Formula for Different Colour Difference Magnitudes, *Han Wang, University of Leeds (UK) and Zhejiang University (China); Guihua Cui and M. Ronnier Luo, University of Leeds (UK); and Haisong Xu, Zhejiang University (China)*

Colour Matches Using RGB LEDs, *Peter Csuti, Laszlo Beke, and Janos Schanda, University of Pannonia (Hungary)*

Colour Image Quality

Watermark Detection with Digital Capture Systems, *Alastair Reed and John Stach, Digimarc Watermarking Solutions (USA)*

No-Reference Metric Based on the Hue Feature: Application to Quality Assessment of Color Displays, *Ludovic Quintard, University of Poitiers, and Laboratoire National d'Essais; and Mohammed C. Larabi and Christine Fernandez-Maloigne, University of Poitiers (France)*

Reconstruction of Surface Reflectance Spectra by Means of Tristimulus Values, *Angel I. Negueruela, Fernando Ayala, and José F. Echávarri, Universidad de Zaragoza (Spain)*

Objective Quality Measurement Based on Anisotropic Contrast Perception, *Vincent Rosselli, Mohamed-Chaker Larabi, Ghislain Anciaux, and Christine Fernandez-Maloigne, University of Poitiers (France)*

Experimental Filters for Estimating IQ, *Zhaohui Wang and M. Ronnier Luo, University of Leeds (UK)*

Quantification of Color Motion Picture Quality Considering a Human Visual Sensitivity, *Shinichi Yasukawa, Tokiya Abe, and Hideaki Haneishi, Chiba University (Japan)*

Rank Order and Image Difference Metrics, *Marius Pedersen and Jon Yngve Hardeberg, Gjøvik University College (Norway)*

Modelling Image Naturalness, *Seo Young Choi, M. Ronnier Luo, and Michael R. Pointer, University of Leeds (UK)*

Colour in Computer Graphics

The Wall of Inspiration: A Computer Aided Color Selection System, *Seth Berrier and Clement Shimizu, University of Minnesota; Patrick Chong, Benjamin Moore & Co.; and D'nardo Colucci and Gary Meyer, University of Minnesota (USA)*

HDR Image Rendering by Combining Single-Scale Local and Global Tone Mapping Operators, *Takahiko Horiuchi, Yoshiaki Koike, and Shoji Tominaga, Chiba University (Japan)*

Efficient Light-Field Measurement for Rendering with Mirror Spheres Array, *Natsumi Yano and Takao Makino, Chiba University; Toru Ishii, Dainippon Ink and Chemical Inc.; and Norimichi Tsumura, Toshiya Nakaguchi, and Yoichi Miyake, Chiba University (Japan)*

Simulating Images Perceived by Subjects with Abnormal Colour or Spatial Vision,

M.C. García-Domene and M.D. de Fez, Universidad de Alicante; and M.J. Luque and P. Capilla, Universitat de València (Spain)

16:00 – 17:40

Colour Image Quality

Session Chair: Christine Fernandez-Maloigne, University of Poitiers (France)

Quality Assessment of HDPhoto—The New Proposed Compression Algorithm, *Mohamed-Chaker Larabi, University of Poitiers (France), and Thomas Richter, University of Stuttgart (Germany)*

Investigation of Image Immersive Enhancement, *Kaida Xiao, Hoyoung Lee, Jiyoung Hong, and Du-Sik Park, Samsung Advanced Institute of Technology (Korea)*

Effect of Color-Space Variation of TV Still Pictures on Psychological Dimensions for Image Quality Evaluation, *Hae-Youn Kim, Jeong-Won Weon, Sun-Hee Cho, Ju-Mi Lee, Na-Keung Lee, and Soo-Keun Shin, Ewha Womans University (Korea)*

Orthogonal Polyhedra in 3D Time-Color Space as a Geometric Model for Representation of Video Sequences with Low or Inexistent Redundancy, *Ricardo Pérez-Aguila, Universidad Tecnológica de la Mixteca (México)*

Colour Difference Modelling for Moving Images, *Jin-Seo Kim, Maeng-Sub Cho, and Bon-Ki Koo, Electronics and Telecommunications Research Institute (Korea); and M. Ronnier Luo and S. Westland, University of Leeds (UK)*

17:40 – 18:20

Colour in Computer Graphics

Session Chair: Werner Purgathofer, TU Wien (Austria)

Appearance of High-Dynamic Range Images in a Uniform Lightness Space, *John J. McCann, McCann Imaging (USA) and Alessandro Rizzi, University of Milano (Italy)*

Modelling the Effect of Simultaneous Contrast on Perceived Whiteness, *Ludovic G. Coppel and Siv Lindberg, STFI-Packforsk (Sweden)*

Wednesday June 11, 2008

8:30 – 9:20

Keynote Session

Session Chair: Jaume Pujol, Technical University of Catalonia (Spain)

Title TBA, *Jose Luis Caivano, SI-FADU-UBA (Argentina)*

9:20 – 12:40

Colour Vision/Psychophysics

Session Chair: Sergio Nascimento, University of Minho (Portugal)

Psycho-Physical Evaluation of a Chromatic Model of Mesopic Visual Performance, *Zoltán Vas, Peter Bodrogi, and János Schanda, University of Pannonia (Hungary)*

Comparing Objective and Subjective Error Measures for Color Constancy, *Marcel P. Lucassen, Arjan Gijsenij, and Theo Gevers, University of Amsterdam (The Netherlands)*

WhitebalPR—A New Method for Automatic White Balance, *Gregor Fischer, Cologne University of Applied Sciences (Germany)*

Correction of Color-Weakness by Matching of Discrimination Thresholds, *Rika Mochizuki, Tatsuya Nakamura, and Jinhui Chao, Chuo University (Japan); and Reiner Lenz, Linköping University (Sweden)*

Evaluation and Modelization of Cromatic Discrimination Effects on Image Palette, *Mari Carmen García-Domene and Dolores de Fez, Univeristy of Alicante; and María José Luque, University of Valencia (Spain)*

Modelling Inter-Colour Regions of Colour Naming Space, *C. Alejandro Parraga, Robert Benavente, Maria Vanrell, and Ramon Baldrich, Universitat Autònoma de Barcelona (Spain)*

Effect of Spatial Uncertainty and Familiarity on Memory for Surface Colour in Natural Scenes and Mondrian Patterns, *Kinjiro Amano and David H. Foster, University of Manchester (UK)*

Color Classification Using Color Vision Models, *Tuija Jetsu, Yasser Essiarab, Ville Heikkinen, Timo Jääskeläinen, and Jussi Parkkinen, University of Joensuu (Finland)*

12:40 – 14:00 Conference Lunch

14:00 – 16:00

Interactive Session*

Session Chairs: Jon Y. Hardeberg, Gjøvik University College (Norway), and Rafael Huertas, University of Granada (Spain)

Colour Vision/Psychophysics

Edge Classification for Color Constancy, *Arjan Gijsenij, Theo Gever, and Joost van de Weijer, University of Amsterdam (The Netherlands)*

Impacts of Package Colours on Consumers' Preferences in Image Colour, Contrast and Sharpness, *Shuo-Ting Wei, Li-Chen Ou, and M. Ronnier Luo, University of Leeds (UK)*

The Realistic Texture Reconstruction on Display, *Ji-Young Hong, Ho-Young Lee, Du-Sik Park, and Chang-Yeong Kim, Samsung Advanced Institute of Technology (Korea)*

Measuring Colour Dissimilarities Under Neutral Light Sources Differing in Intensity, *R. Tokuanga and A. Logvinenko, Glasgow Caledonian University (UK)*

A Modified Algorithm for Perceived Contrast Measure in Digital Images, *A. Rizzi, G. Simone, and R. Cordone, University of Milano (Italy)*

Evaluation of Contrast Measures in Relation to Observers Perceived Contrast, *Marius Pedersen,[1] Alessandro Rizzi,[2] Jon Yngve Hardeberg,[1] and Gabriele Simone[2]; [1]Gjøvik University College (Norway) and [2]University of Milano (Italy)*

Dichromatic Illumination Estimation via Hough Transforms in 3D, *Lilong Shi and Brian Funt, Simon Fraser University (Canada)*

Surface Chromaticity Distributions of Natural Objects Under Changing Illumination, *Yazhu Ling, Milena Vurro, and Anya Hurlbert, Newcastle University (UK)*

Consideration on Crispening Phenomenon Based on Maximum Color Separation Model, *Nobuhito Matsushiro, OKI Data Corp. (Japan)*

Computational Colour

Estimation of Reflectance Spectra Using Multiple Illuminations, *Ville Heikkinen,[1] Reiner Lenz,[2] Tuija Jetsu,[1] Jussi Parkkinen,[1] and Timo Jääskeläinen[1]; [1]University of Joensuu (Finland) and [2]Linköping University (Sweden)*

Riemannian Framework for Color Characterization and Mapping, *Jinhui Chao, Reiner Lenz, Daisuke Matsumoto, and Tatsuya Nakamura, Linköping University (Sweden)*

Assessment of Affine Transforms for Illumination Compensation of Colour Images Using a Mixture of Gaussian's Model, *Pedro Latorre Carmona and Filiberto Pla, Jaume I University (Spain)*

A Novel Approach to Hue Ordering, *David Connah and Graham Finlayson, University of East Anglia; and Marina Bloj, University of Bradford (UK)*

A Mixed Perceptual and Physical-Chemical Approach for the Restoration of Faded Positive Films, *Alessandro Rizzi, Lorenzo*

** Posters will be available for preview beginning in the morning; the session will include dessert and coffee.*

Gatti, Balázs Kránicz, and Anna Berolo, University of Milano (Italy)
Influence of the Size and Distribution of Filler Particles on the Color of Resin Composites, *Razvan Ghinea, Laura Ugarte-Alván, Ana Maria Ionescu, Juan de la Cruz Cardona, Ana Yebra, and Maria del Mar Pérez, University of Granada (Spain)*
Automatic Color Patch Selection for Painting Identification, *Virginie Vurpillot,[1] Anne-Claire Legrand,[1] Raimondo Schettini,[2] and Alain Tremeau[1]; [1]University of Saint Étienne (France) and [2]University of Milano (Italy)*
Distribution of Information Within and Across Colour Spaces, *Ivan Marin-Franch and David H. Foster, University of Manchester (UK)*
Assessing Gloss of Tooth Using Digital Imaging, *Wen Luo and Stephen Westland, University of Leeds; and Roger Ellwood and Iain Pretty, Colgate-Palmolive (UK)*

Colour Image Processing

A Color Morphology Based on Pareto-Dominace Relation and Hypervolume Measure, *Mario Koeppen, Kyushu Institute of Technology (Japan), and Katrin Franke, Norwegian Information Security Lab (NISlab) (Norway)*
Neighborhood and Haralick Feature Extraction for Color Texture Analysis, *Alice Porebski,[1, 2] Nicolas Vandenbroucke,[1, 2] and Ludovic Macaire[2]; [1]EIPC and [2]Université des Sciences et Technologies de Lille; (France)*
Underwater Images Enhancement by Light Propagation Model Inversion, *Frederic Petit, Philippe Blasi, and Anne-Sophie Capelle-Laize, University of Poitiers; and Jean-Christophe Burie, University of La Rochelle (France)*

Colour Reproduction

Improving the Gray Tracking Performance of LCD, *Xiao-Fan Feng and Yasuhiro Yoshida, Sharp Labs of America, Inc. (USA)*
Color Compensation for Projected Image Under Dim Illumination with CIECAM02, *Sayuri Kamimigaki,[1] Keisuke Taki,[1] Keita Hirai,[1] Shoji Yamamoto,[2] Norimichi Tsumura,[1] Toshiya Nakaguchi,[1] and Yoichi Miyake[1]; [1]Chiba University and [2]Tokyo Metropolitan College of Industrial Technology (Japan)*
Time-Stable RGB LED Backlighting Control Using Time-Varying Transform Matrix, *Kee-Hyon Park and Yeong-Ho Ha, Kyungpook National University (Korea)*
New Developments in Spatial and Color Adaptive Gamut Mapping Algorithms, *Nicolas Bonnier,[1, 2] Francis Schmitt,[1] and Christophe Leynadier[2]; [1]École Nationale Supérieure des Télécommunications and [2]Océ Print Logic Technologies (France)*

16:00 – 18:20

Computational Colour

Session Chair: Reiner Lenz, Linköping University (Sweden)

Contrast Maximizing and Brightness Preserving Color to Grayscale Image Conversion, *Min Qiu, South China University of Technology (China); Graham D Finlayson, University of East Anglia (UK); and Guoping Qiu, Hong Kong Baptist University (China) and University of Nottingham (UK)*
Compact Color Descriptor for Object Recognition Across Illumination Changes, *Damien Muselet and Alain Trémeau, LIGIV (France)*
Multi-Resolution Image VQ Compression by Color Codebook Reordering, *Christophe Charrier and Olivier Lezoray, Université de Caen Basse Normandie (France)*
Histogram Compression and Image Retrieval Through Padua Points Interpolation, *Roberto Montagna and Graham Finlayson, University of East Anglia (UK)*
Color Emotions for Image Classification and Retrieval, *Martin Solli and Reiner Lenz, Linköping University (Sweden)*
Towards a Psychophysical Evaluation of Colour Constancy Algorithms, *Javier azquez, Maria Vanrell, Ramon Baldrich, and Carlos A. Párraga, Universitat Autònoma de Barcelona (Spain)*
Color Descriptors for Object Category Recognition, *Koen E.A. van de Sande, Theo Gevers, and Cees G.M. Snoek, University of Amsterdam (The Netherlands)*

Thursday June 12, 2008

8:30 – 9:20

Keynote Session

Session Chair: Jaume Pujol, Technical University of Catalonia (Spain)

Retinal Modeling in Digital Photography, *Sabine Süsstrunk, EPFL (Switzerland)*

9:20 – 12:40

Colour Image Processing

Session Chair: Dietrich Paulus, University of Koblenz (Germany)

Colour Image Segmentation in Presence of Shadows, *Eduard Vazquez and Ramon Baldrich, Universitat Autónoma de Barcelona (Spain)*

Contour and Detail Detection for Spatially Adaptive Color Median Filtering, *Jesus Angulo, Ecole des Mines de Paris; Frederique Robert-Inacio, ISEN-L2MP; and Eric Dinet, Université Jean Monnet (France)*

Addition of Noise to a Color Decomposition Model for Improving Color Texture Extraction, *Sloven Dubois, Mathieu Lugiez, Renaud Peteri, and Michel Menard, Laboratoire Informatique Image Interaction (France)*

Spatiotemporal Extension of Color Decomposition Model and Dynamic Color Structure-Texture Extraction, *Mathieu Lugiez, Sloven Dubois, and Ménard Michel, L3i; and Abdallah El Hamidi, MIA (France)*

A Color Topographic Map Based on the Dichromatic Reflectance Model, *Michèle Gouiffès and Bertrand Zavidovique, University of Paris XI (France)*

Adaptive Spatio-Colorimetric Classification, *Michèle Gouiffès, University of Paris XI (France)*

Quaternion Colour Representations and Derived Total Orderings for Morphological Operators, *Jesus Angulo, Ecole des Mines de Paris (France)*

Unsupervised Image Segmentation Based on Texems for Hyperspectral Data, *Adolfo Martínez-Usó, Filiberto Pla, and Pedro García-Sevilla, University Jaume I (Spain)*

12:40 – 14:00 Conference Lunch

14:00 – 16:00

Interactive Papers*

Session Chairs: Jon Y. Hardeberg, Gjøvik University College (Norwary), and Rafael Huertas, University of Granada (Spain)

Multispectral Colour Science

Measuring and Analyzing the Colour of the Iris with a Multispectral Imaging System, *Meritxell Vilaseca, Rita Mercadal, Jaume Pujol, Montserrat Arjona, and Marta de Lasarte, Technical University of Catalonia (Spain); Rafael Huertas and Manuel Melgosa, University of Granada (Spain); and Francisco H. Imai, Samsung Advanced Institute of Technology (USA)*

Color Correction of Red Blood Cell Area in H&E Stained Images by Using Multispectral Imaging, *Tokiya Abe and Hideaki Haneishi, Chiba University (Japan); Pinky A. Bautista, Yuri Murakami, Masahiro Yamaguchi, and Nagaaki Ohyama, Tokyo Institute of Technology (Japan); and Yukako Yagi, Harvard University (USA)*

Influence of the Size of the Training Set on Colour Measurements Performed Using a Multispectral Imaging System, *Marta de Lasarte, Jaume Pujol, Montserrat Arjona, and Meritxell Vilaseca, Technical University of Catalonia (Spain)*

The Number of Colours Perceived by Dichromats when Appreciating Art Paintings Under Standard Illuminants, *João M. M. Linhares, Paulo D. Pinto, and Sérgio M. C. Nascimento, University of Minho (Portugal)*

Influence of Colour Ranges on Colour Measurements Performed with a Colormetric and Multispectral Imaging System, *Marta de Lasarte, Jaume Pujol, Montserrat Arjona, and Meritxell Vilaseca, Technical University of Catalonia (Spain)*

Multispectral Analysis of the Oriental W atercolor Painting on Rice Paper, *M. James Shyu and Cheng-Yu Chen, Chinese Culture University (Taiwan)*

Adaptive FPGA NoC-based Architecture for

** Posters will be available for preview beginning in the morning; the session will include dessert and coffee.*

Multispectral Image Correlation, *Linlin Zhang and Anne-Claire Legrand, LIGIV; and Virginie Fresse and Viktor Fischer, University of Saint Etienne (France)*

NRC Robot-Based Gonioreflectometer for Spectral BRDF Measurement, *Réjean Baribeau, National Research Council (Canada)*

MTF Spectral-Variation Comparison of Detector Arrays Used in Multispectral Imaging Systems by Speckle Patterns, *Alicia Fernández-Oliveras, Antonio M. Pozo, and Manuel Rubiño, Universidad de Granada (Spain)*

Spectral Color Image Segmentation Using Hidden Markov Models, *Vladimir Bochko, Jussi Parkkinen, Markku Hauta-Kasari, and Timo Jääskeläinen, University of Joensuu (Finland)*

Conditional Simulation and Marker-Driven Stochastic Watershed: Application to Multi-spectral Segmentation, *Guillaume Noyel, Jesus Angulo, and Dominique Jeulin, Ecole des Mines de Paris (France)*

Spectral Characterization of a Digital Still Camera Through a Single Integrating Exposure, *Darrin Hawkins, Royal London Hospital, and Phil Green, London College of Communication (UK)*

Computer Controlled Set of Light-emitting Diodes for 2D Spectral Analysis, *Ervin Nippolainen and Alexei Kamshilin, University of Kuopio (Finland)*

Spectral Color Reproduction of Paintings, *Roy S. Berns, Lawrence A. Taplin, Philipp Urban, and Yonghui Zhao, Rochester Institute of Technology (USA)*

Accurate Reflectance Prediction in Multi-angle Measurement, *Pesal Koirala, Markku Hauta-Kasari, Jouni Hiltunen, and Jussi Parkkinen, University of Joensuu (Finland)*

Kernel Based Spectral Image Segmentation, *Hongyu Li, Fudan University (China) and University of Joensuu (Finland); and Vladimir Bochko, Timo Jääskeläinen, and Jussi Parkkinen, University of Joensuu (Finland)*

NTF vs. PCA Features for Searching in a Spectral Image Database, *Alexey Andriyashin, University of Joensuu; Arto Kaarna, Lappeenranta University of Technology; and Timo Jääskeläinen and Jussi Parkkinen, University of Joensuu (Finland)*

Illuminant Spectrum Maximizing the Number of Perceived Colors in Art Paintings, *Paulo D. Pinto, João M. M. Linhares, and Sérgio M. C. Nascimento, University of Minho (Portugal)*

Near-Infrared Images of Skin, *J. Birgitta Martinkauppi, Juha Lehtonen, and Jussi Parkkinen, University of Joensuu (Finland)*

Advantages of JPEG2000 for Multispectral Imaging, *Rulon E. Simmons, ITT Space Systems Division (USA)*

Combining Spectral and Photometric Stereo Techniques for Reflectance Estimation Using an RGB Digital Camera, *Clara Plata, Juan L. Nieves, and Javier Romero, Universidad de Granada (Spain)*

Supervised Training Sample Selection for the Estimation of Spectral Reflectance Using a RGB Camera, *Clara Plata, Eva M. Valero, Juan L. Nieves, and Javier Romero, Universidad de Granada (Spain)*

Unsupervised Classification Algorithms Applied to RGB Data as a Preprocessing Step for Reflectance Estimation in Natural Scenes, *Eva M. Valero, Juan L. Nieves, Clara Plata, and Javier Romero, Universidad de Granada (Spain)*

Robustness of Watermarking Spectral Images with 3D Wavelet Transform Subject to Various Illumination Conditions, *Konstantin Krasavin and Jussi Parkkinen, University of Joensuu; Arto Kaarna, Lappeenranta University of Technology; and Timo Jääskeläinen, University of Joensuu (Finland)*

Broadband Filter Selection by Approximating Principal Components of Reflectance Spectra, *Stephan Helling, Aachen University of Technology (Germany)*

Two-Shot Type 6-Band Still Image Capturing System Using Commercial Digital Camera and Custom Color Filter, *Masaru Hashimoto and Junko Kishimoto, NTT Data Corporation (Japan)*

16:00 – 18:20

Colour Reproduction

Session Chair: Jan Morovic, Hewlett-Packard Española (UK)

A Micro-Scale View on Color Reproduction, *Daniel Nystrom, Linköping University (Sweden)*

Spectral Gamut Mapping Framework Based on Human Color Vision, *Philipp Urban, Mitchell R. Rosen, and Roy S. Berns, Rochester Institute of Technology (USA)*

Imaging Flesh: Skin-Customized Profiling, *Mitchell R. Rosen and Hongqin Zhang, Munsell Color Science Laboratory; Robert Velthuizen, Unilever; and Qun (Sam) Sun, Micron Technology (USA)*

Multilevel Vector Error Diffusion with Solvent Control, *Serge Cattarinussi and Ana Dimitrijevic, Olivetti Engineering SA (Switzerland)*

New Method for Reproducing Fluorescent Colors, *Jarkko Mutanen, Tokyo Institute of Technology (Japan); Jussi Kinnunen, University of Joensuu (Finland); Masahiro Yamaguchi and Nagaaki Ohyama, Tokyo Institute of Technology (Japan)*

Six Color Scanning, *Andrew Hunter, Jeffrey DiCarlo, and Stephen Pollard, Hewlett-Packard Laboratories (UK)*

Verification and Extension of a Camera-Based End-User Calibration Method for Projection Displays, *Espen B. Mikalsen, Jon Y. Hardeberg, and Jean-Baptiste Thomas, Gjøvik University College (Norway)*

Registration Scholarships Available for PhD Students

See the inside front cover for details.

Friday June 13, 2008

8:30 – 9:30

Keynote Session

Session Chair: Javier Hernández-Andrés, University of Granada (Spain)

MCS Keynote: Beyond Bag of Pixels: Spatio-Spectral Sampling in Multispectral Imaging, *Keigo Hirakawa, Harvard University (USA)*

9:30 – 13:00

Multispectral Colour Science (MCS'08)

Session Chair: Javier Hernández-Andrés, University of Granada (Spain)

Spectral Reflection Modeling for Image Rendering of Water Paint Surfaces, *Shogo Nishi, Osaka Electro-Communication University, and Shoji Tominaga, Chiba University (Japan)*

Image Color Mapping and Clustering in Luma/Chroma Fundamental Color Space, *Hiroaki Kotera, Kotera Imaging Laboratory (Japan)*

Comparison of Spectral Image Reconstruction Methods Using Multipoint Spectral Measurements, *Yuri Murakami, Kunihiko Ietomi, Ayumi Tadano, Masahiro Yamaguchi, and Nagaaki Ohyama, Tokyo Institute of Technology (Japan)*

Robust Averaged Projections Onto Convex Sets, *Ali Alsam, North Carolina State University (USA), and Casper Find Andersen, Graphic Arts Institute of Denmark (Denmark)*

Colorimetric Evaluation of a Set of Spectral Sensitivities, *Mikiya Hironaga and Noriyuki Shimano, Kinki University (Japan)*

Multispectral Imaging with Flash Light Sources, *Johannes Brauers, Stephan Helling, and Til Aach, RWTH Aachen University (Germany)*

Building an Optimum Computer-Designed Multispectral System for Skylight Acquisition, *Miguel A. López-Álvarez, Javier Hernández-Andrés, and Javier Romero, University of Granada (Spain)*

Short Course Program

TRACK 1: COLOUR APPEARANCE

T1A: Colour Vision and Colour Appearance

15:00 – 17:00 (2 hours)

Instructor: David H. Foster, University of Manchester

This course introduces the physiology, physics, and psychophysics of human colour vision and colour appearance. The first part concentrates on the absolute and relative spectral sensitivities of the rods and cones of the eye, the luminosity function, adaptation and von Kries scaling, post-receptoral coding, colour-opponency, and spectral sharpening. In the second part, critical complicating factors are reviewed, including spectrally selective absorption in the lens, ocular media and macular pigment, and retinal inhomogeneity and rod intrusion. The third part introduces the sensory and perceptual cues to colour appearance and colour constancy, including chromatic induction and spatial ratios of cone signals, mean chromaticity, surface highlights, chromatic variance, and the role of cognition and memory in surface-colour perception. It concludes with the experimental evaluation of surface-colour perception, including colour naming, achromatic adjustment, and asymmetric colour matching, as well as provides an analysis of the limitations of visual judgments with geometric stimuli and images of natural scenes.

Benefits

This course will enable the attendee to:

- Describe the spectral sensitivities of the eye's receptors, as well as the major chromatic and achromatic properties of post-receptoral coding
- Appreciate the complicating effects on colour perception of pre-receptoral absorption, its variation from individual to individual, and rod intrusion
- Identify key sensory and perceptual cues underlying colour appearance, their relative significance, and the role of memory and cognition in surface-colour judgements
- Compare the main experimental methods of evaluating human surface-colour perception and analyze the limits of visual judgments with synthetic and naturalistic stimuli
- Assess the adequacy of colour-appearance models and display devices in relation to these visual limits

Intended Audience

This course is intended for scientists, engineers, analysts, and students interested in colour appearance and colour reproduction. No specialist background in biology or psychology is required.

David Foster, professor of vision systems in the Faculty of Engineering and Physical Sciences, University of Manchester, received his BSc (1966) and his PhD (1970) in physics from Imperial College London, under the supervision of W. D. Wright and K. H. Ruddock. He also holds a DSc in biophysics (1982) from London University. Foster was appointed lecturer at Imperial College in 1970 and has subsequently held professorships at Keele University, Aston University, UMIST, and Manchester University. His research, concentrating on visual psychophysics and colour vision, has led to the publication of more than 150 papers. Foster is a Fellow of the Institute of Physics, the Institute of Mathematics and its Applications, and the Optical Society of America. He co-founded the journal Spatial Vision *and is now advisory editor. Foster is also a senior editor of* Vision Research *and an associate editor of* Computers in Biology and Medicine.

T1B: Colour Appearance Modelling

17:15 – 19:15 (2 hours)
Instructor: M. Ronnier Luo,
University of Leeds

This course covers five areas: techniques for generating experimental data; the structure of the CIE 1997 and 2002 colour appearance model (CIECAM97s and CIECAM02) and the correlates provided by the model; visual phenomenon predicted by the model; more recent development for removing some anomalies; and the model's capability in predicting colour differences.

Benefits

This course will enable the attendee to:

- Learn experimental techniques for scaling colour appearance
- Compare the performances of colour appearance models
- Understand the structure, correlates, and predicted visual phenomenon of CIECAM97s and CIECAM02
- Use colour appearance model in image reproduction

Intended Audience

Colour engineers and research scientists involved with colour reproduction, imaging device developers, and computer software developers. Knowledge of fundamental colorimetry is assumed.

Ronnier Luo is a Professor of Colour and Imaging Science at the Department of Colour Science, University of Leeds, and the Director of CIE Division 1 (Vision and Colour). He has over 350 publications in colour and imaging science. He is a Fellow of the Society for Imaging Science and Technology and the Society of Dyers and Colourists. He is also the recipient of the Centenary Medal from the Society of Dyers and Colourists in 2004, Royal Photographic Society's Davies Medal in 2003, and Bartleson Research Award in 1994.

TRACK 2: MEASUREMENT

T2A: Practical Applications of Measurement Systems in Colour Engineering

15:00 – 19:15 (4 hours)
Instructor: Danny C. Rich,
Sun Chemical Corporation

The engineering of colour imaging systems requires both a fundamental and practical understanding of colour measurement systems. When the goal of an engineering design is to optimize colour reproduction, the results can only be as good as the input colour measurements on which the optimization is based. This course will start with a foundation of colour measurement theory. From this beginning, various applications will be covered, each including the instrument setup and associated measurement implications. The course will close with a hands-on demonstration of several modern instruments with the focus on measurements that facilitate device profiling.

Benefits

This course will enable the attendee to:

- Identify the components of a spectrocolorimeter and the functions of each
- Determine the right instrument requirements for the device to be profiled
- Define the calibration and standardization process of spectrocolorimeters
- Interpret measurement requirements and select appropriate measurement geometries for various applications
- Consider the implications of materials properties such as fluorescence or translucence as they relate to colour measurement.
- Perform the colour measurements required for device profiling
- Assess the use of instruments for the specific application of device profiling
- Understand the various software tools available to improve the inter-instrument agreement to levels better than factory specifications

Intended Audience

This course will be of interest to colour engineers and technologists responsible for making and interpreting colour measurements of all types, especially those working in image reproduction. It will also interest those who must create device profiles that produce the highest level of predictability in the communication and reproduction of coloured images. An engineering background is not required, although an understanding of basic scientific principles will be very helpful.

Danny C. Rich has a BS and MS in optical physics and a PhD in color science from the Rensselaer Color Measurement Laboratory under the direction of the late Fred W. Billmeyer, Jr. He has been published on all aspects of colour science and technology and is active in colour measurement standards organizations such as ASTM E12 on Colour & Appearance, ISO TC130 on Graphic Arts and in CIE Division 2 on Measurement of Optical Radiations. Rich is currently head of the Color Research Laboratory in the Sun Chemical Corporation, the world's largest producer of printing inks.

Short Course Fees

if you register:	by May 12	after May 12
4-hour Member	€150	€185
4-hour Non-member	€170	€205
2-hour Member	€100	€135
2-hour Non-member	€125	€150

Students may register for short courses for €35 until May 12; €-50 after May 12.

We are in search of a monitor for each class. Monitors assist instructors, collect admission tickets, distribute class notes, and collect course evaluations in exchange for class attendance. If you'd like to be a monitor, please contact Diana Gonzalez (cgiv@imaging.org).

IS&T reserves the right to cancel classes in the event of insufficient advance registration. Please indicate your interest early.

TRACK 3: MULTISPECTRAL COLOUR

T3A: Spectral Reflectance Prediction Models for the Characterization and Control of Colour Printers

15:00 – 17:00 (2 hours)

Instructor: Roger D. Hersch, Ecole Polytechnique Fédérale de Lausanne (EPFL)

This course aims to explain the physical phenomena governing the interaction of light, paper, and ink halftones, and presents classical spectral reflectance prediction models. Physical phenomena comprise surface reflections and refractions at the air-paper interface, the propagation of light within the paper, internal reflections at the paper-air interface, and ink spreading and trapping. The course reviews classical reflectance prediction models such as the spectral Neugebauer model, the Yule-Nielsen modified spectral Neugebauer model, the multiple reflection Clapper-Yule model, and the Kubelka-Munk scattering-absorption model. A discussion of the phenomena of dot gain and ink spreading, as well as how to account for them is included, as is how to apply the spectral prediction models to characterize printers and control their actuation parameters (*e.g.*, the ink volume).

Benefits

This course will enable the attendee to:

- Understand how light is attenuated when entering the print, how it is internally reflected between the paper bulk and the print surface and how it is further attenuated when exiting the print.
- List and evaluate the classical spectral reflection prediction models, their respective properties, and limitations
- Become familiar with dot gain and ink spreading and how to model them.
- Conceive means of regulating printer actuation parameters compensating for colour shifts

Intended Audience

This course is intended for scientists, engineers, and managers involved in research and design of printers, printing presses, papers, and inks.

Roger D. Hersch is professor of computer science and head of the Peripheral Systems Laboratory at the Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland. He received his engineering and PhD degrees respectively from ETH Zurich (1975) and from EPFL (1985). He has published many scientific papers, is the editor of several books and is inventor or co-inventor in several patent applications. He develops new approaches for colour reproduction, artistic imaging and document security.

T3B: Capture and Colour Management for Spectral Reproduction

17:15 – 19:15 (2 hours)

Instructors: Roy S. Berns and Mitchell R. Rosen, Munsell Color Science Laboratory

Conventional trichromatic imaging (*i.e.*, RGB) can have a wide range of colorimetric accuracy and is always constrained by metamerism. For colour-critical, scientific, and archival applications, trichromatic imaging is often insufficient. Spectral imaging alleviates these limitations. This course provides an overview of pectral-imaging and reproduction techniques. Applications for quality-critical colour reproduction (*i.e.*, spectral colour reproduction) and scientific-based digital archives will be explored.

Benefits

This course will enable the attendee to:

- Understand the advantages and disadvantages of spectral imaging compared with trichromatic imaging
- List and compare different techniques of spectral imaging
- Become familiar with the foundations of estimating spectral reflectance from multi-channel images
- Learn about separation techniques for spectral reproduction
- Comprehend the applications of spectral imaging for multi-ink printing, spectral colour management, and scientific-based digital archiving

Intended Audience

This course is directed toward those wishing to become more familiar with the opportunities and challenges within the emerging field of spectral colour reproduction, which may include colour and imaging scientists, camera and printer designers, and image processing specialists.

Roy S. Berns is the R. S. Hunter Professor of Color Science, Appearance, and Technology at the Munsell Color Science Laboratory, and graduate coordinator of the Color Science Master's program within Rochester Institute of Technology's Center for Imaging Science. He directs a research group that has been active in spectral imaging and spectral colour reproduction for nearly a decade. The group has designed spectral imaging systems for the National Gallery of Art in Washington and the Museum of Modern Art in New York. He has also collaborated with the Art Institute of Chicago and the Van Gogh Museum in using spectral-imaging concepts for "digital rejuvenation" of cultural heritage. Berns is the author of Billmeyer and Saltzman's Principles of Color Technology, 3rd edition. *He is also an IS&T Fellow.*

Mitchell R. Rosen is a Research Professor with the Munsell Color Science Laboratory at the Rochester Institute of Technology and he directs the Infinite Pixel Liberation Laboratory. His recent projects have spanned subjects such as spectral and colorimetric colour reproduction, colour management, immersive dynamic media, digital cinema, and on-demand print quality. From 2002 – 2007, he was colour imaging editor of the Journal of Imaging Science and Technology *and he is active in organizing international conferences on spectral imaging. He co-edited the book* Color Desktop Printer Technology.

TRACK 4: HDRI

T4A: An Introduction to High Dynamic Range Imaging

15:00 – 19:15 (4 hours)
Instructor: Guoping Qiu, University of Nottingham

Throughout the history of imaging science, there has been constant quest for more advanced technologies to provide better and more real visual experiences for consumers. A new imaging technology has started to emerge that has the promise of bringing a revolution in digital imaging, namely high dynamic range imaging, or HDRI.

Almost all of today's image and video file formats, *e.g.*, jpeg, mpeg, etc, use 8 bits per colour channel, recording a luminance dynamic range of less than 2 orders of magnitude. The same is true for conventional computer monitors and other reproduction media such as printing. Yet, the real world scenes humans experience every day have far higher luminance dynamic ranges.

In HDRI, the image files record the actual colour and dynamic range of the original scene rather than the limited gamut and dynamic range of the monitor or other reproduction media. This means that image processing, manipulation, display, and other operations will no longer be limited by the number of bits used to represent each pixel.

The purpose of this course is to provide an introduction to HDRI, with an emphasis on the image processing perspective of HDRI technology. The course begins by discussing the weaknesses of current (low dynamic range) image and video formats, as well as the limitations of conventional reproduction media, such as video monitors. It then introduce the potential of HDRI and discusses topics in all stages of the HDRI pipeline including, capturing, processing, coding and compression, and displaying. It concludes by looking at potential applications of HDRI technology.

Please note:
Free wifi will be available to attendees in the building where the technical sessions are held.

Benefits

This course will enable the attendee to:

- Acquire an understanding of the limitations of current digital imaging systems as they relate to HDRI
- Explore HDRI and its potential in overcoming current technology difficulties
- Discuss HDR image and video acquisition issues
- Learn about image processing issues in HDR image and video file formats
- Understand noise removal/filtering in HDR images
- Discuss HDR image display/reproduction issues and concepts such as monitor gamma

Intended Audience

May include graduate students, researchers, engineers, and practitioners of colour and image processing; photographers, digital artists, graphical art designers, computer game makers, and display equipment makers may also benefit from this course. A basic knowledge of digital imaging is assumed.

Guoping Qiu is a Reader (associate professor) in Visual Information Processing in the School of Computer Science and Information Technology at the University of Nottingham. Before joining Nottingham in 2000, he was a lecturer (assistant professor) in the School of Computing at the University of Leeds (1999 – 2000) and the School of Mathematics and Computing at the University of Derby (1993 – 1999). He received his BSc in Electronic Measurement and Instrumentation from the University of Electronic Science and Technology of China (1984) and his PhD in Electronic Engineering from the University of Central Lancashire (1993). He has been performing research in fields related to image processing for more than 15 years and has authored more than 100 publications. More about his research can be found at www.viplab.cs.nott.ac.uk.

TRACK 5: UNIQUE COLOUR PROPERTIES

T5A: Measurement and Visual Appearance of Metallic and Pearlescent Objects

15:00 – 17:00 (2 hours)
Instructor: Werner Rudolf Cramer, consultant

Interference pigments are employed in many automotive and industrial paint formulations. Their high popularity is due, in part, to their fascinating interplays of colours and effects. These effects are the result of the various materials used in their layered structures. Multiple refractions and reflections of light at, and within, those layers cause interferences yielding selected colours. Interference pigments may be classified by either the method employed for their manufacture or by their structure. Substances—such as titanium dioxide or iron oxide—that have high refraction indices may, for example, be deposited on a transparent substrate, such as mica, as in the case of Iriodin (silicon dioxide); Colorstream (aluminium oxide); and Xirallic. Such pigments are produced using wet-chemical processes, while those having an aluminium layer as an internal reflector (Variochrom, ChromaFlair, and SpectraFlair) are manufactured in a high vacuum. Liquid crystals are also classed as interference pigments.

This course explains the physical and optical phenomena of interference pigments. It also discusses colour measurement of these pigments and new methods developed to characterize the colour and appearance of coatings and plastics.

Benefits

This course will enable the attendee to:

- Describe different interference pigments and their optical properties
- Understand the colour measurement of interference pigments and how resultant colours vary with the geometries involved
- Explore new methods of colour measurement to describe colour and appearance
- Define methods of identification and characterization of interference pigments
- Understand optical interaction of interference and absorbing pigments

Intended Audience:

This course is intended for scientists and engineers involved in colour matching interference pigments.

Werner Rudolf Cramer studied industrial chemistry at the University in Münster, Germany. After working as a marketing consultant of colour and paint applications, he began working with colour measurements of interference pigments. He works as a consultant for instrument and pigment, as well as automotive and coatings manufacturers. Cramer has published many scientific papers and written several books about painting, software, and car body history. He is involved in the work of ASTM and DIN to define new geometries for measuring interference pigments.

T5B: Colour and Gloss

17:15 – 19:15 (2 hours)
Instructor: Lindsay MacDonald,
London College of Communication

This course examines the relationship between colour and gloss in reflective surfaces. Real materials exhibit varying degrees of gloss and their apparent colour may vary considerably with viewing angle, yet colour measurement and device characterisation procedures usually try to avoid the specular components from non-Lambertian surfaces. This is a significant problem for applications such as capture of 3D object geometry, scene interpretation in machine vision, and realistic rendering of surfaces in computer graphics. This course covers relevant topics, based on recent experimental results, publications and international standards.

Benefits

This course will enable the attendee to:

- Review colorimetry, the CIE system, and its limitations
- Explore the physics of gloss and the

bidirectional reflectance distribution function (BRDF)
- Learn about the measurement of gloss, for multi-angle and goniometric methods and standards
- Understand the appearance of gloss, including visual scales and interaction with colour
- Learn about modelling gloss in computer graphics, physical models, and visual models
- Discover imaging techniques, based on digital photography and laser scanning

Lindsay MacDonald is Professor of Digital Media at the London College of Communication. He was formerly a professor at the Colour & Imaging Institute in Derby. He has edited eight books on various aspects of colour image science and engineering. His research interests include the application of colorimetry and colour imaging to cultural heritage media, including paintings, stained glass, and ceramics. He has been a frequent speaker at the Colour Imaging Conference (CIC) and in 1996 was the conference co-chair. MacDonald was programme co-chair of CGIV 2002 in Poitiers. He is a Fellow of the Royal Photographic Society and of IS&T. A former member of the CIE Technical Committee TC1-65 Measurement of Visual Appearance, he is currently chairman of The Colour Group (Great Britain).

TRACK 6: ICC PROFILES

T6A: Using the New Features in the ICC Profile Format

15:00 – 17:00 (2 hours)
Instructor: Phil Green,
London College of Communication

The ICC profile format is widely used in transforming colour data between different devices, encodings, and colour spaces. Ambiguities in the previous version were resolved in the v4 specification, which also introduced a Perceptual Reference Medium to provide a well-defined intermediate gamut as a target for gamut mapping and re-rendering between source and destination data.

Since the first publication of the v4 specification, there have been a number of important amendments that extend the functionality of the ICC architecture and support smart, dynamic, and programmable colour management systems in addition to the original static processing model.

This course outlines the features added to the profile specification through recent amendments, including the Perceptual Reference Medium Gamut; the Colorimetric Intent Image State tag, which allows users to specify an input-referred colorimetry; the Floating Point Device Encoding Range, which provides support for floating point data; and Multi-Processing Elements, a new and potentially more extensible form of colour transform. These features can potentially be extended to provide a range of colour processing capabilities that are not currently available, including channel preservation and multi-spectral transforms.

Full use of the profile format, including the recently adopted elements, has the potential to support a much wider range of potential colour management applications, and also to overcome some of the implementation problems that users encounter.

Benefits

This course will enable the attendee to:
- Describe the new features of the ICC specification
- Choose v4 features for a particular workflow
- Understand how a v4 profile is generated and evaluated

Intended Audience:

Colour scientists, developers, and advanced users of colour management.

Phil Green worked in the printing industry before joining London College of Communication, where he is a Reader in Colour Imaging. He has a PhD from the Colour & Imaging Institute, University of Derby, and is currently Technical Secretary of the ICC.

Map of Terrassa

HOTELS

1 Hotel Don Candido

2 Hotel Vapor Gran

3 Hotel Terrassa Park

FUNCTIONS

A Museu de la Ciencia i de la Tecnica de Catalunya (conference banquet)

B La Casa Alegre de Sagrera (welcome reception)

C Escola Industrial Building (technical sessions)

CGIV 2008 Conference Registration

Name_____

Title/Position _____

Company _____

Mailing Address _____

_____

Telephone _____ Fax _____ Email _____

If you are not a member, join IS&T today and calculate all conference fees based on member rates. Please note that memberships are charged in US dollars. You will be contacted by IS&T staff about your complementary journal subscription options.

Please charge the card listed below with the following membership:

___ $95 US address ___$105 overseas address ___$25 Student Total $ _____

Membership paid for now begins immediately and expires Dec. 31, 2008. Student memberships expire Sept. 30, 2009.

Conference registration includes admission to all technical sessions; lunch on Tuesday, Wednesday, and Thursday; daily coffee breaks; the Welcome Reception; a city tour; and the conference proceedings. Separate registration fees are required for short courses and the Conference Banquet. *There is no online registration for this event; fax form to +1-703-642-9094. All fees charged in Euros. You must register by June 1, 2008 to use this form; after that date, registration must be done in person at the conference venue.*

Conference Registration (CHECK ONE)	until May 12	after May 12	TOTAL
___ IS&T Member	€410	€480	€ _____
___ Non-member	€485	€555	€ _____
___ Speaker/Session Chair Member	€350	€420	€ _____
___ Speaker/Session Chair Non-member	€410	€480	€ _____
___ Student (ID required) Member	€120	€135	€ _____
___ Student (ID required) Non-member	€135	€200	€ _____
___ One-day (select day below)	€245	€305	€ _____
❑ Tuesday ❑ Wednesday ❑ Thursday ❑ Friday			

Short Course Registration (be sure to multiply number of classes by per course fee and place on total line)

*Students may register for any short course for €35 until May 12; €50 after May 12.

___ 4-hour Member (per class)	€150	€185	€ _____
___ 4-hour Non-member (per class)	€170	€205	€ _____
Check all that apply: ❑ T2A ❑ T4A			
___ 2-hour Member (per class)	€100	€135	€ _____
___ 2-hour Non-member (per class)	€125	€150	€ _____
Check all that apply: ❑ T1A ❑ T1B ❑ T3A ❑ T3B ❑ T5A ❑ T5B ❑ T6A			

Other

___ Extra CGIV 2008 Proceedings (special advance purchase/on-site rate)	€60	€ _____
___ Conference Banquet Ticket (Museu de la Ciencia i de la Tecnica de Catalunya)	€75	€ _____
___ Please check if you need a vegetarian entrée		
___ Extra Welcome Reception Ticket	€35	€ _____
	GRAND TOTAL	€ _____

Payment Method: ❑ Check (Check # _____) ❑ MC ❑ VISA (Please note we cannot accept American Express, Discover, or Diner's Club for this meeting.

Card#: _____ Exp. Date: _____

Name as it appears on card: _____

Authorization Signature: _____

Return this form with signed credit card authorization or check payable in Euros to IS&T, 7003 Kilworth Lane, Springfield, VA 22151 or fax to 703/642-9094

Please note: To cover bank charges and processing fees, there is a cancellation fee of €50 until June 9, 2008. After that date, the cancellation fee is 50% of the total plus €50.

No refunds will be given after July 9, 2008. All requests for refund must be made in writing.