PRELIMINARY PROGRAM

CGIV 2010/MCS'10

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

12th International Symposium on Multispectral Colour Science

CGIV 2010 Cooperating Societies

Applied Light and Colour Working Group of the Centre of the Hungarian Academy of Sciences, Veszprém (VEAB-AFSzMB)

The Color Group (Great Britain)

Comité Español del Color

Deutsche Gesellschaft für Angewandte Optik, DGaO

Finnish Colour Association

Flemish Innovation Centre for Graphic Communications VIGC

The French Color Imaging Group

German Society for Color Science and Application (DfwG)

Gruppo del Colore (Italian Color Group)

Inter-Society Color Council

The Royal Photographic Society of Great Britain

Swedish Colour Centre Foundation

University of Eastern Finland
Joensuu, Finland

June 14-17, 2010

www.imaging.org/ist/conferences/cgiv/

UNIVERSITY OF EASTERN FINLAND

IS&T
imaging.org

sponsored by the Society for Imaging Science and Technology
in cooperation with the University of Eastern Finland

CGIV 2010 Organising Committee

General Chairs
Jussi Parkkinen
University of Eastern Finland
jussi.parkkinen@uef.fi
Timo Jääskeläinen
University of Eastern Finland
timo.jaaskelainen@uef.fi

Programme Chairs
Theo Gevers
University of Amsterdam
gevers@science.uva.nl
Alain Trémeau
Université Jean Monnet
alain.tremeau@univ-st-etienne.fr

Coordinating Chair
Markku Hauta-Kasari
University of Eastern Finland
markku.hauta-kasari@uef.fi

Workshop Chair
Jarkko Mutanen
University of Eastern Finland
jarkko.mutanen@uef.fi

Public Relations Chairs
Europe
Graham Finlayson
Univ. of East Anglia
g.finlayson@uea.ac.uk

Asia
Shoji Tominaga
Chiba University
shoji@faculty.chiba-u.jp

AV Chair
Jukka Antikainen
University of Eastern Finland

Local Committee Chair
Oili Kohonen
University of Eastern Finland

Social Program Chair
Tuija Jetsu,
University of Eastern Finland

Technical Area Chairs
Art in Colour Imaging
Harald Arnkil, University of Art and Design Helsinki

Colour Difference Equations
Rafael Huertas, University of Granada
Colour Image and Video Processing
Faouzi Alaya Cheikh, Gjøvik University College
Colour Reproduction
Roger D. Hersch, EPFL
Colour Science
Alessandro Rizzi, Università degli Studi di Milano
Colour Vision/Psychophysics
David H. Foster, University of Manchester
Computational Colour
Ewert W. Bengtsson, Uppsala University
Multispectral Colour Science MCS'10
Juan Luis Nieves, University of Granada

Paper Review Committee
Harald Arnkil, Univ. of Art and Design Helsinki
Ewert W. Bengtsson, Uppsala Univ.
Cristian Bonanomi, Univ. Degli Studi di Milano
Marco Carli, Univ. of Rome TRE
Faouzi Alaya Cheikh, Gjøvik Univ. College
Vien Cheung, Univ. of Leeds
Cheng-Chin Chiang, National Dong Hwa Univ.
Bibhas Chandra Dhara, Jadavpur Univ.
Philippe Colantoni, Univ. of St. Etienne
Eric Dinet, Univ. of St. Etienne
Graham D. Finlayson, Univ. of East Anglia
David H. Foster, Univ. of Manchester
Davide Gadia, Univ. Degli Studi di Milano
Arjan Gijsenij, Univ. of Amsterdam
Yeong-Ho Ha, Kyungpook National Univ.
Hideaki Haneishi, Chiba Univ.
Jon Yngve Hardeberg, Gjøvik Univ. College
Markku Hauta-Kasari, Univ. of Eastern Finland
Javier Hernández-Andrés, Univ. of Granada
Roger D. Hersch, EPFL
Yuukou Horita, Univ. of Toyama
Francisco Hideki Imai, Canon Development Americas, Inc.
Arto Kaarna, Lappeenranta Univ. of Technology
Hubert Konik, Institut d'Ingenierie de La Vision
Patrick Lambert, Univ. of Savoie
Mohamed-Chaker Larabi, Univ. of Poitiers
James Larimer, ImageMetrics LLC
Olivier Le Meur, Thomson – Technicolor
Olivier Lezoray, Univ. de Caen
Peihua Li, Heilongjiang Univ.
Chiunhsiun Lin, National Taipei Univ.
Marcel Lucassen, Univ. of Amsterdam
Ludovic Macaire, Univ. des Sciences et Tech
Ivan Marín-Franch, Univ. of Turin
Birgitta Martinkauppi, Univ. of Eastern Finland
John J. McCann, McCann Imaging
Yoichi Miyake, Chiba Univ.
Kimiyoshi Miyata, National Museum of Japanese History
Jim Mjshyu, Chinese Culture Univ.
Nathan M. Moroney, Hewlett-Packard Co.
Damien Muselet, Université Jean Monnet
Jarkko Mutanen, Univ. of Eastern Finland
Toshiya Nakaguchi, Chiba Univ.
Shigeki Nakauchi, Toyohashi Univ. of Technology
Göte S. Nyman, Univ. of Helsinki
Pirkko Oittinen, Helsinki Univ. of Technology
Jussi Parkkinen, Univ. of Eastern Finland
Carinna E. Parraman, Univ. of the West of England
Alessandro Rizzi, Univ. Degli Studi di Milano
Frédérique Robert-Inacio, Institut Supérieur d'Electronique et du Numérique
Ishwar K. Sethi, Oakland Univ.
Jurgen Stauder, Thomson – Technicolor
Sabine Süsstrunk, EPFL
Ingeborg Tastl, Hewlett-Packard Co.
Shoji Tominaga, Chiba Univ.
Alain Trémeau, Univ. Jean Monnet
Norimichi Tsumura, Chiba Univ.
Eva M. Valero,Univ. of Granada
Koen E.A. van de Sande, Univ. of Amsterdam
Joost van de Weijer, Univ. Autònoma de Barcelona
Nicolas Vandenbroucke, EIPC
Maria Vanrell, Univ. Autònoma de Barcelona
Francoise Vienot, Muséum National d'Histoire Naturelle
Xiaqian Xu, KLA-Tencor Corporation
Xiangyang Xue, Fudan Univ.

IS&T
Alan Hodgson, 3M, *Conference VP*
Suzanne E. Grinnan, *Executive Director*

Conference Highlights

We extend special thanks to the University of Eastern Finland and Company Specim for their support of the conference.

CGIV2010 will take place on the campus of the University of Eastern Finland, home to more than 8,000 students (www.uef.fi/uef/english). The campus provides a welcoming environment in which to share research during the conference and lunches. We've also planned a social program that allows for networking in culturally interesting and enjoyable venues—and includes the opportunity to experience a famous Finnish sauna!

Hightlights of—and some change to—this year's program include:

- A day of complimentary workshops—open to all at no cost. Pre-registration is required and space is limited; see page 5 for details or visit http://spectral.joensuu.fi/cgiv2010/.
- Inclusion of the Conference Banquet in the registration fee so all can attend!
- A papers program created from full-length papers submitted for review; this process was designed to improve the overall quality of conference.
- Three full days of technical sessions, including three keynotes and two Interactive Paper Sessions; a listing of the full program begins on page 7.

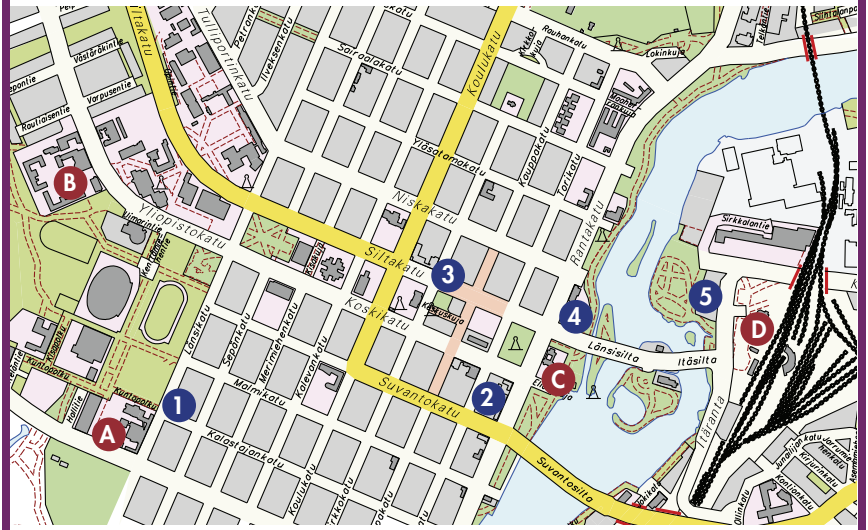
We look forward to seeing you in Joensuu!

—Jussi Parkkinen and Timo Jääskeläinen, General Chairs
Theo Gevers and Alain Trémeau, Programme Chairs

The city of Joensuu and the University of Eastern Finland are the perfect location for a conference. On the cover, the University library. Above: Taitokortteli (art and craft center); above right: Teatteri Ravintola, site of the conference banquet; right: view from "Home of the Polar Bears," site of the Conference Reception.

Photos: Suzanne Grinnan.

Location of Events & Hotels



EVENTS

A Joensuu Science Park,InFotonics Center, *Länsikatu 15*
CGIV2010 Workshops
see image for identification purposes:
www.ifc.joensuu.fi/index.php?page=find

B Metria Building, *Yliopistokatu 7*
CGIV Registration and Technical Sessions
see image for identification purposes:
http://commons.wikimedia.org/wiki/File:Metria2009.jpg

C Teatteriravintola
Conference Banquet
www.jns.fi/teatteriravintola/index.php

D Bus and train stations

HOTELS

(see page 4 for details)

1 Summer Hotel Elli

2 Hotel GreenStar

3 Cumulus Joensuu

4 Hotelli Atrium

5 Sokos Hotel Kimmel

CGIV2010 Conference Banquet

Teatteriravintola • June 16, 2010

This year's conference fee includes a banquet of local specialties.
All are welcome to join in the festivities at no extra cost.
The banquet will be held in a building that also houses the City Hall and City Theater.
Designed by Eliel Saarinen in the Art Nouveau style, the building was completed in 1914.

Conference At-a-Glance

Workshop Registration: Monday 8.00-13.30 in the InFotonics Center, 1st Floor.

The Conference Registration desk will be open in the lobby of the Metria Building:

Mon. 14 June: 15.00 – 17.30
Tues. 15 June: 7.30 – 18.30
Wed. 16 June: 8.00 – 18.00
Thurs. 17 June: 8.00 – 16.00

Monday, June 14

- CGIV2010 Complimentary Workshops, see p. 5
  - Modeling the Interaction of Light, Paper, and Ink Halftones
  - Spectral Color Measurements
- Welcome Reception sponsored by the City of Joensuu

Tuesday, June 15

- Keynote Speaker: Karl Gegenfurtner, Justus-Liebig-Universität, see p. 7
- Technical Sessions
  - Colour Vision/Psychophysics
  - Interactive Paper Session I
  - Colour Reproduction I
- Conference Reception at the "Home of the Polar Bears"

Wednesday, June 16

- Keynote Speaker: Alexander Logvinenko, Glasgow Caledonian University, see p. 9
- Technical Sessions
  - Colour Image and Video Processing
  - Interactive Paper Session II
  - Colour Science
- Conference Banquet at Teatteriravintola

Thursday, June 17

- Keynote Speaker: Jon Y. Hardeberg, Gjøvik University College, see p. 11
- Technical Sessions
  - Colour Reproduction II
  - Colour Difference Equations
  - Multispectral Colour Science MCS'10

Venue and Transport

Photo: Suzanne Grinnan.

About Joensuu

Located in far eastern Finland near the country's border with Russia and 440 km northeast of Helsinki, Joensuu is part of the North Karelia region of the country. The city's proximity to Russia informs its architecture, cuisine, arts, and history. Located on the banks of the Pielisjoki River— Joensuu means "mouth of the river"—the city is located in the middle of a region that includes the richest concentration of the 180,000 lakes found in the country.

The location offers participants the opportunity to explore a gorgeous part of the world seen by few. We encourage attendees to stay an extra day or two to experience the nearby countryside. Highlights include the Koli Region and Valamo Monestary. More information on Joensuu can be found at http://en.wikipedia.org/ wiki/Joensuu. To learn about North Karelia and all it has to offer, visit www.visitkarelia.fi/. PDFs of their brochures are also available for download on the IS&T website.

Getting to/from Joensuu

There is direct service from Helsinki to Joensuu Airport (JOE) on FinnComm Airlines (www.fc.fi/home.html) and Finnair (www.finnair.com). FinnComm has discounted rates as little as €19. You may also reach Joensuu by train (www.vr.fi/eng/) or bus.

Accommodations

The following hotels are offering special rates for conference participants. All are within a 15-25 minute walk of the Metria Building. *When making a reservation, please be sure to tell the hotel you are with the CGIV Conference and use the reservation method indicated.*

Summer Hotel Elli
www.summerhotelelli.fi
- located ~800 m from the Metria bldg. (#1 on map, page 2)
- Single/double: €45-50/€55-62
  Triple: €75-80
  Apartment (4 beds): €95-100
- price includes breakfast, laundry, and sauna (Mon-Sat, 17.00-21.00); all rooms are smoke-free and have kitchenettes.
- Check in: 15.00 Check out: 12.00
- Reservations:
  reservation@summerhotelelli.fi
  confirmation email should arrive within 48 hours of booking.
  Reservation deadline: May 30, 2010
- *Cancellation without penalty by June 4; after that, one night is due.*

Hotel GreenStar
www.greenstar.fi/
- located ~1300 m from the Metria bldg. (#2 on map, page 2)
- Room for up to 3 people: €50
  room has two beds and a chair that turns into a bed, plus a refrigerator
- breakfast €6 prepay/€7 same day
- parking €5
- Check in: 15.00 Check out: 12.00
- Reservations:
  info@greenstar.fi OR
  +358 10 423 9390
  Reservation deadline: April 15, 2010
- *Cancellation without penalty: 24 hour notice.*

Hotel Atrium
www.hotelliatrium.fi/
(#4 on map, page 2)
- located ~1500 m from the Metria bldg.
- Single/double: €68-77/€80
- price includes breakfast and parking
- Check in: 14.00 Check out: 12.00
  (earlier check in okay, if room available)
- Reservations:
  myyntipalvelu@hotelliatrium.fi OR
  www.hotelliatrium.fi OR
  +358 13 255 888
  Reservation deadline: April 13, 2010
- *Cancellation without penalty before June 9; after that, one night is due.*

Cumulus Hotel Joensuu
www.cumulus.fi
- located ~1100 m from the Metria bldg. (#3 on map, page 2)
- Single/double: €92/€117
- price includes breakfast and sauna
- Check in: 14.00 Check out: 12.00
- Reservations:
  joensuu.cumulus@restel.fi OR
  +358 13 5112 100 OR
  +358 13 5112 101(fax)
  Reservation deadline: April 14, 2010
- *Cancellation without penalty if notified by 18.00 of the day prior to arrival.*

Sokos Hotel Kimmel
www.sokoshotels.fi/hotellit/joensuu/kimmel/
- located ~1700 m from the Metria bldg. (#5 on map, page 2)
- Single/double: €97/€117
- price includes breakfast and use of sauna, gym, and swimming pool
- Check in: 14.00 Check out: 12.00
- Reservations:
  sokoshotel.kimmel@sok.fi OR
  +35 820 123 4663
  provide arrival/departure and credit card number
  Reservation deadline: April 30, 2010
- *Cancellation without penalty must be made 5 days prior to arrival*

CGIV Workshops: Monday June 14

Workshop 1: Modeling the Interaction of Light, Paper, and Ink Halftones

8.30-12.00 (3.5 hours)

Instructor: Roger D. Hersch (EPFL), assisted by Romain Rossier

Note: This workshop is limited to 30 people. Please register early to insure your place.

Explore the physical phenomena governing the interaction of light, paper, and ink halftones, which 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 trapping and ink spreading. Review classical reflectance prediction models: the spectral Neugebauer model, the Yule-Nielsen modified spectral Neugebauer model, and the multiple reflection Clapper-Yule model. Discuss the phenomena of dot gain and ink spreading, and show how to account for them.

A lecture by Prof. Hersch is followed by a "hands-on" laboratory where work on a computer allows participants to engage in their own experience and get an inside view of the different elements governing the interaction of light, ink halftones, and paper. Then, participants experiment with a fully functional spectral prediction model (extended Yule-Nielsen modified Neugebauer), for which they will receive a license free of charge.

The course concludes with a short discussion of the results and an overview of advanced topics: impact of paper fluorescence, predicting the transmittance of prints, applying spectral prediction models for characterization, and color separation.

Intended Audience: Scientists, engineers, and managers involved in the research and design of inks, printers, printing presses, imaging products or systems.

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 obtained his PhD degree from EPFL in 1985. In 2008, he received the IS&T fellowship award. He has published many scientific papers and is an inventor in several patents describing methods for document protection. He develops new approaches for color reproduction, artistic imaging and document security.

Romain Rossier is a graduate of EPFL and started his PhD research in the field of color reproduction. He contributes to the development of advanced spectral prediction models.

Complimentary Workshops

All workshops are included in the conference registration fee, however space is limited so you must pre-register for the event. Places will be given to attendees on a first to register basis. Your participation will be confirmed with your conference registration confirmation.

More information on the workshops will be posted at http://spectral.joensuu.fi/cgiv2010/ as it beomes available.

Workshop 2: Spectral Color Measurements

13.00-17.00 (4 hours)

Instructor: University of Eastern Finland, Joensuu Color Group (Jukka Antikainen, Ville Heikkinen, Jouni Hiltunen, Tuija Jetsu, Jussi Kinnunen, and Pertti Silfsten)

Note: This workshop is limited to 60 people. Please register early to insure your place.
(Depending on need, this workshop may be repeated 8.00-12.00; see registration form.)

This workshop focuses on the measurement of spectral reflectance and fluorescence data using high-quality instruments in a laboratory environment. The workshop introduces participants to the color measurements of surfaces, focusing on the spectral reflectance factor and spectral reflectance. In addition, fluorescent samples are discussed. In the practical session, measurements are done using a spectrophotometer, a custom made bispectrometer, and spectral cameras.

The workshop begins with a lecture on the theory and terminology of color measurements, and a general introduction to the practical part of the workshop. The lecture is followed by three "hands-on" laboratory practicums, as described below.

Lab 1: Measuring with integrating spheres and bidirectional geometries

Instructors: Pertti Silfsten and Jouni Hiltunen

Both matte and glossy samples are measured with the integrating sphere with 0/d and d/0 standard geometries. 0/45 and 45/0 measurements are performed with the spectroradiometer and stabilized light sources. Specular reflectances are also studied in various angles with the Universal Reflectance Accessory of the PerkinElmer Lambda 1050 spectrophotometer.

Lab 2: Bispectral fluorescence measurements and simulation

Instructor: Jussi Kinnunen

The bispectral radiance factors of the fluorescent samples are recorded by the two-monochromator method. The achieved factors, in the form of the Donaldson matrix, are used to simulate the sample under various illuminants. In addition, the samples are measured under polychromatic light sources and the obtained results are compared to the simulations.

Photo: Suzanne Grinnan.

The "Home of the Polar Bears" hosts this year's Conference Reception on Tuesday night.

Lab 3: Line scanning and LCTF spectral image capturing

Instructors: Tuija Jetsu and Jukka Antikainen

When capturing spectral images, there are several aspects that need to be carefully considered and controlled. To familiarize participants with these aspects, we take a look at two different spectral image capturing systems and the necessary post-processing steps.

Intended Audience: Masters and PhD students and young researchers

Jukka Antikainen holds an MSc in computer science (2006) from the University of Kuopio, Finland. His master's thesis was on the parallelization of matrix operations. Currently he is working on his doctoral thesis on spectral color research in industrial applications in the School of Computing, University of Eastern Finland.

Ville Heikkinen received his MSc in applied mathematics (2004) from the University of Joensuu. He is currently a researcher with the School of Computing, University of Eastern Finland where he works with method development in spectral data analysis and classification.

Jouni Hiltunen holds a PhD in physics (2002) from the University of Joensuu and is currently working as a laboratory engineer at the University of Eastern Finland, InFotonics Center Joensuu. Hiltunen is a member of the Finnish Optical Society.

Tuija Jetsu received her MSc in computer science (2004) from the University of Joensuu and is currently a researcher with the School of Computing, University of Eastern Finland. Her research is related to understanding and modeling human color vision.

Jussi Kinnunen is a researcher and post-graduate student at the University of Eastern Finland. He obtained his MSc in physics from the University of Joensuu (2007) where he studied bispectral fluorescence measurements for his master's thesis. His post-graduate studies concentrate on spectral analysis of cartilage tissue.

Pertti Silfsten received his PhD in physics from the University of Joensuu (1991). He was a lecturer of physics at Lappeenranta University of Technology (1993-2009) and is currently a senior researcher at the University of Eastern Finland, Department of Physics and Mathematics, Joensuu campus.

Technical Program*

Tuesday June 15, 2010

8.30 - 9.30
KEYNOTE

Cortical Mechanisms of Color Vision, *Karl Gegenfurtner, Justus-Liebig-Universität (Germany)*

9.30 - 12.40
COLOUR VISION/ PSYCHOPHYSICS

Session Chair: David H. Foster, University of Manchester (UK)

Adding Texture to Color: Quantitative Analysis of Color Emotions, *Marcel P. Lucassen, Theo Gevers, and Arjan Gijsenij, University of Amsterdam (the Netherlands)*

Testing the Color Harmony for Painting Exhibition, *Sabrina Lachheb and Philippe Colantoni, C2RMF; and Eric Dinet, Laboratoire Hubert Curien (France)*

Visual Attention Simulation in RGB and HSV Color Spaces, *Frédérique Robert-Inacio[1, 2], Quentin Stainer[2], Remy Scaramuzzino[2], and Edith Kussener[1, 2]; [1]IM2NP and [2]ISEN (France)*

Online Colour Naming Experiment Using Munsell Colour Samples, *Dimitris Mylonas and Lindsay MacDonald, London College of Communication (UK)*

A Compact Singularity Function to Predict WCS Color Names and Unique Hues, *Javier Vazquez-Corra[1], Graham D. Finlayson[2], and Maria Vanrell[1]; [1]Universitat Autónoma de Barcelona (Spain) and [2]University of East Anglia (UK)*

Error Estimation of Paired Comparison Tests for Thurstones Case V, *Peter Zolliker and Zofia Baranczuk, Swiss Federal Laboratories for Materials Testing and Research (Switzerland)*

Chromatic Effects of Metamers of Daylights, *Sérgio M.C. Nascimento, Paulo E.R. Felgueiras, and João M.M. Linhares, University of Minho (Portugal)*

Accurate Mapping of Natural Scenes Radiance to Cone Activation Space: A New Image Dataset, *C. Alejandro Parraga, Ramon Baldrich, and Maria Vanrell, Universitat Autónoma de Barcelona (Spain)*

14.00 - 16.00
INTERACTIVE PAPER SESSION I

Color Image Processing and Color Analysis

Chromatic Diversity Index—An Approach Based on Natural Scenes, *Joao Manuel Maciel Linhares, Paulo Daniel Pinto, and Sérgio Miguel Cardoso Nascimento, University of Minho (Portugal)*

Regularized Color Demosaicing Via Luminance Approximation, *Johannes Herwig and Josef Pauli, University of Duisburg-Essen (Germany)*

Medical Image Colorization Using Learning, *Vladimir Bochko[1], Petri Valisuo[1], Timo M. R. Alho[1], Severi Sutinen[1], Jussi Parkkinen[2], and Jarmo T. Alander[1]; [1]University of Vaasa and [2]University of Eastern Finland (Finland)*

Framework for the Evaluation of Color Prints Using Image Quality Metrics, *Marius Pedersen[1, 2], and Seyed Ali Amirshahi[1], [1]Gjøvik University College (Norway) and [2]Océ Print Logic Technologies SA (France)*

Color Reproduction and Color Science

Effect of Colorimetric Attributes on Perceived Blackness of Materials, *Reid Clonts, Renzo Shamey, and David Hinks, North Carolina State University (USA)*

Evaluating Smoothness of 3D LUT-based Color Transformations, *Zhaohui Wang, Anna Aristova, and Jon Yngve Hardeberg, Gjøvik University College (Norway)*

Modeling of Fluorescent Color Mixing by Regression Analysis, *Petri Turunen, Jussi Kinnunen, and Jarkko Mutanen, University of Eastern Finland (Finland)*

**Note: All papers are 20-minutes unless listed under the keynote or Interactive Paper heading. Interactive papers are presented in poster format and will be available for preview beginning in the morning of the session.*

The Influence of Colored Backgrounds on Mura Detection in TFT-LCDs, *Guo-Feng Wei, M. Ronnier Luo, and Peter A. Rhodes, University of Leeds (UK)*

Experiments in Inkjet Colour Tests for Printmaking, *Carinna Parraman, University of the West of England (UK)*

Estimation of Spectral Bands of Metallic Coatings Assessed by Multi-Angle Spectrophotometers, *Esther Perales[1], Jose Medina[2], Elisabet Chorro[1], and Francisco Martínez-Verdú[1]; [1]University of Alicante (Spain) and [2]University of Minho (Portugal)*

Recovering Spectral Data from Digital Prints with an RGB Camera Using Multi-Exposure Method, *Mikko Nuutinen and Pirkko Oittinen, Aalto University School of Science and Technology (Finland)*

Camera-Supervised Monitor Shading Correction for Softproofing Systems, *Johannes Brauers, Julie Klein, Bernhard Hill and Til Aach, RWTH Aachen University (Germany)*

New Experiments on Color in Context and Organic-Based Artificial Photoreceptors, *Davide Gadia[1], Gianluigi Lasco[1], Alessandro Rizzi[1], Daniele Marini[1], Maria Rosa Antognazza[2], Stefano Perissinotto[2], and Guglielmo Lanzani[2, 3]; [1]Università degli Studi di Milano; [2]CNST-IIT@POLIMI, and [3]Politecnico di Milano (Italy)*

Estimation of an Individual's Human Cone Fundamentals from their Color Matching Functions, *Casper F. Andersen, Danish School of Media and Journalism (Denmark), and Graham D. Finlayson, University of East Anglia (UK)*

Digital Reproduction of Small Gamut Object: A Profiling Procedure Based on Custom Color Target, *Giorgio Trumpy, Institute of Applied Physics (Italy)*

Validating Photometric and Colorimetric Consistency of Physically-Based Image Synthesis, *Jakob Bärz, Niklas Henrich, and Stefan Müller, University of Koblenz (Germany)*

Dimensions of Light Source Color Quality, *Peter Bodrogi, Stefan Brueckner, and Tran Quoc Khanh, Technische Universität Darmstadt (Germany)*

Wifi will be available in the building where the technical sessions are held.

16.00 - 18.20
COLOUR REPRODUCTION I

Session Chair: Roger D. Hersch, EPFL (Switzerland)

Supporting Good Enough Colour Reproduction in Non-Colour Managed Workflow, *Jutta Willamowski, Frederic Roulland, and David B. Martin, Xerox Research Centre Europe (France)*

Electronic Image Color Conversion Between Different Illuminants by Perfect Color-Constancy Actuation in a Color-Vision Model Based on the OSA-UCS System, *Claudio Oleari, University of Parma (Italy)*

Softproofing for Accurate Color Matching and Study of Observer Metamerism, *Bernhard Hill, RWTH Aachen University (Germany)*

Estimation of Backing Influence on Halftone Reflection, *Andreas Kraushaar and Berthold Oberhollenzer, Fogra; Hanno Hoffstadt, GMG GmbH & Co KG (Germany); and Matthias Scheller Lichtenauer and Peter Zolliker, EMPA Swiss Federal Institute for Materials Testing and Research (Switzerland)*

Psychovisual Assessment of Tone-Mapping Operators for Global Appearance and Colour Reproduction, *Céline Villa and Raphaël Labayrade, University of Lyon (France)*

Estimating Reflectance of Halftone Image Printed on Diffusing Substrate by Markov Chains, *Zhen Liu[1], Xiao-xia Wan[1], Yan Zhang[2], and Bao-zhen Xing[1]; [1]Wuhan University and [2]Zhejiang Industry and Trade Vocational College (China)*

Ink-dependent n-factors for the Yule-Nielsen Modified Spectral Neugebauer Model, *Romain Rossier and Roger D. Hersch, Ecole Polytechnique Fédérale de Lausanne (Switzerland)*

Wednesday June 16, 2010

8.30 - 9.30
KEYNOTE

An Object-colour Space, *Alexander Logvinenko, Glasgow Caledonian University (UK)*

9.30 - 12.40
COLOUR IMAGE AND VIDEO PROCESSING

Session Chair: Faouzi Alaya Cheikh, Gjøvik University College (Norway)

Extending SURF to the Color Domain, *David Gossow, Peter Decker, and Dietrich Paulus, University of Koblenz-Landau (Germany)*

Evaluation of Perceptual Color Edge Detection Algorithms, *Aurora Sáez, Carmen Serrano, and Begoña Acha, University of Seville (Spain)*

Color Edge Saliency Boosting Using Natural Image Statistics, *David Rojas Vigo and Joost van de Weijer, Universitat Autónoma de Barcelona (Spain), and Theo Gevers, University of Amsterdam (the Netherlands)*

Unsupervised Hierarchical Spatio-Colorimetric Classification for Color Image Segmentation, *Cindy Torres, Alain Clément, and Bertrand Vigouroux, Université d'Angers (France)*

Color Image Super Resolution: A Two-Step Approach Based on Geometric Grouplets, *Aldo Maalouf and Mohamed-Chaker Larabi, University of Poitiers (France)*

Color Fractal Analysis for Video Quality Assessment, *Mihai Ivanovici, Transylvania University (Romania), and Noel Richard, University of Poitiers (France)*

Local Perceptual Weighting in JPEG2000 for Color Images, *Jaime Moreno, Xavier Otazu, and Maria Vanrell, Universitat Autónoma de Barcelona (Spain)*

Denoising of Multispectral Images via Nonlocal Groupwise Spectrum-PCA, *Aram Danielyan, Alessandro Foi, Vladimir Katkovnik, and Karen Egiazarian, Tampere University of Technology (Finland)*

14.00 - 16.00
INTERACTIVE PAPER SESSION II

Color Image Processing and Color Analysis

Perceptually Adapted Color-Texture Image Segmentation Algorithm Based on K-Dimensional Multi-Step Region Growing, *Irene Fondón, Carmen Serrano, and Begoña Acha, University of Seville (Spain)*

Imaging of Cosmetics Foundation Distribution by a Spectral Difference Enhancement Filter, *Ken Nishino[1], Mutsuko Nakamura[2], Masayuki Matsumoto[2], Osamu Tanno[2], and Shigeki Nakauchi[1]; [1]Toyohashi University of Technology and [2]Kanebo Cosmetics Inc. (Japan)*

Color Enhancement of Multispectral Images for Effective Visualization, *Noriaki Hashimoto, Yuri Murakami, Masahiro Yamaguchi, Takashi Obi, and Nagaaki Ohyama, Tokyo Institute of Technology (Japan)*

Tracking Categorical Surface Colour Across Illuminant Changes in Natural Scenes, *Kinjiro Amano and David H. Foster, University of Manchester (UK)*

Convex Color Object Recognition and Classification Using Spectral and Morphological Descriptors, *Steven Le Moan[1, 3], Alamin Mansouri[1], Tadeusz Sliwa[1], Madaín Pérez Patricio[2], Yvon Voisin[1], and Jon Y. Hardeberg[3]; [1]University of Burgundy (France), [2]Instituto Tecnológico de Tuxtla Gutiérrez (México), and [3]Gjøvik University College (Norway)*

Hyperspectral Imaging of Face for Tongue Region Extraction, *Satoshi Yamamoto, Norimichi Tsumura, Toshiya Nakaguchi, Takao Namiki, Yuji Kasahara, Katsutoshi Terasawa, and Yoichi Miyake, Chiba University (Japan)*

Combining Color Descriptors for Improved Codebook Model-Based Image Retrieval, *Aitor Álvarez Gila, Guanqun Cao, Sheikh Faridul Hasan, and Yu Hu, Erasmus Mundus CIMET Master (Finland, France, Norway, Spain)*

A Multi Color Space Approach for Texture Classification: Experiments with Outex, Vistex and Barktex Image Databases, *Alice Porebski, Nicolas Vandenbroucke, and Ludovic Macaire, University Lille 1 (France)*

Towards Automatic Colored Graphics Vectorization, *Vinciane Lacroix and Mahamadou Idrissa, Royal Military Academy (Belgium)*

Groundtruth Data for Multispectral Bidirectional Texture Functions, *Martin Rump, Ralf Sarlette, and Reinhard Klein, Universität Bonn (Germany)*

Color Texture Classification Across Illumination Changes, *Mozhdeh Seifi, Xiaohu Song, Damien Muselet, and Alain Trémeau, Université Jean Monnet (France)*

Recognition of Objects Represented in Different Color Spaces, *Marcin Grzegorzek, Alexandra Wolyniec, Frank Schmitt, and Dietrich Paulus, University of Koblenz-Landau (Germany)*

Estimating Melatonin Suppression and Photosynthesis Activity in Real-World Scenes from Computer Generated Images, *David Geisler-Moroder and Arne Dür, University of Innsbruck (Austria)*

Color Semantics for Image Indexing, *Martin Solli and Reiner Lenz, Linköping University (Sweden)*

Color Reproduction and Color Science

Prediction and Visualization of Fat and Fatty Acid Content of Beef Using Near-Infrared Multispectral Imaging, *Ken-ichi Kobayashi[1], Yasunori Matsui[2], Yosuke Maebuchi[1], Ken Nishino[1], Toshihiro Toyota[1], and Shigeki Nakauchi[1]; [1]Toyohashi University of Technology and [2]Mie Prefecture Livestock Research Institute (Japan)*

Photo: Suzanne Grinnan.

The North Karelian region is full of birch trees and lakes, a perfect environment to reflect on science while swimming, fishing, or enoying a sauna.

Evaluation of the Repeatability and Reproducibility Levels for Color Measurement Obtained by Digital Imaging Capture Devices, *Elísabet Chorro[1], Meritxell Vilaseca[2], Jorge A. Herrera[2], Esther Perales[1], Francisco Miguel Martínez-Verdú[1], and Jaume Pujol[2]; [1]University of Alicante and [2]Technical University of Catalonia (Spain)*

Perceptual Reproduction of Wide-Dynamic-Range Scene Based on Local Adaptation of the Human Visual System, *Toshihiro Toyota[1], Hiroki Yokomakura[1], Koichi Kaneko[2], Akira Usui[2], and Shigeki Nakauchi[1]; [1]Toyohashi University of Technology and [2]Yamaha Corporation (Japan)*

Gamut Mapping for Motion Picture, *Jürgen Stauder, Corinne Porée, Patrick Morvan, and Laurent Blondé, Thomson R&D (France)*

Recovering Normal Vectors and Albedo Under Uncontrolled Illumination with an RGB Digital Camera, *Clara Plata, Juan Luis Nieves, Javier Hernández-Andrés, and Javier Romero, Universidad de Granada (Spain)*

16.20 - 17.40
COLOUR SCIENCE

Session Chair: Alessandro Rizzi, Università Degli Studi di Milano (Italy)

On Curvature of Color Spaces and its Implications, *Toko Kohei and Jinhui Chao, Chuo University (Japan), and Reiner Lenz, Linköping University (Sweden)*

Color and Appearance Analysis of Fruit and Vegetable Soup Using a Digital Color Imaging System, *Gerard van Dalen, Faisal Osman, and Aat Don, Unilever Research and Development (the Netherlands)*

Angular Variations of Color in Turbid Media—The Influence of Bulk Scattering on Goniochromism in Paper, *Magnus Neuman, Per Edström, Mattias Andersson, Ludovic Coppel, and Ole Norberg, Mid Sweden University (Sweden)*

A Color Matching Experiment Using Two Displays: Design Considerations and Pilot Test Results, *Abhijit Sarkar[1, 2], Laurent Blondé[1],*

Patrick Le Callet[2], Florent Autrusseau[2], Patrick Morvan[1], and Jürgen Stauder[1]; [1]Thomson Corporate Research and [2]Ploytech Nantes (France)

Evaluation of Performance of Twelve Color-Difference Formulae Using Two NCSU Experimental Datasets, *Renzo Shamey[1], David Hinks[1], Manuel Melgosa[2], M. Ronnier Luo[3], Guihua Cui[3], Rafael Huertas[2], Lina Cárdenas[1], and Seung Geol Lee[1]; [1]North Carolina State University (USA), [2]University of Granada (Spain), and [3]University of Leeds (UK)*

RAW Image Files: The Way to HDR Images from a Single Exposure, *Massimo Fierro, Tae-Hyoung Lee, and Yeong-Ho Ha, Kyungpook National University (Korea)*

Simplified Gamut Boundary Representation Using Mesh Decimation, *Arne Magnus Bakke and Ivar Farup, Gjøvik University College (Norway)*

Cubical Gamut Mapping Color Constancy, *Milan Mosny and Brian Funt, Simon Fraser University (Canada)*

Wide-gamut Image Capture, *Charles Poynton, consultant (Canada)*

Thursday June 17, 2010

8.30 - 9.30
KEYNOTE

Color by Numbers—Quantifying the Quality of Color Reproduction, *Jon Y. Hardeberg, Gjøvik University College (Norway)*

9.30 - 12.20
COLOUR REPRODUCTION II

Session Chair: Jon Y. Hardeberg, Gjøvik University College (Norway)

RGBE vs Modified TIFF for Encoding High Dynamic Range Images, *Jakkarin Singnoo and Graham D. Finlayson, University of East Anglia (UK)*

On the Use of Saliency Maps for the Detection of Print Artifacts, *Guanqun Cao[1], Marius Pedersen[1, 2], and Zofia Baranczuk[3]; [1]Gjøvik University College (Norway), [2]Oce Print Logic Technologies SA (France), and [3]Swiss Federal Laboratory for Materials Testing and Research (Switzerland)*

Spectral Image Prediction of Color Halftone Prints Based on Neugebauer Modified Spectral Reflection Image Model, *Masayuki Ukishima[1, 2], Yoshinori Suzuki[1], Norimichi Tsumura[1], Toshiya Nakaguchi[1], Martti Makinen[2], Shinichi Inoue[3], and Jussi Parkkinen[2]; [1]Chiba University (Japan), [2]University of Eastern Finland (Finland), and [3]Mitsubishi Paper Mills Ltd. (Japan)*

13.40 - 15.20
COLOUR DIFFERENCE EQUATIONS

Session Chair: Rafael Huertas, University of Granada (Spain)

Improving Color-Difference Formulas Using Visual Data, *Ingmar Lissner and Philipp Urban, Technische Universität Darmstadt (Germany)*

Analysis of the Difference of Gaussians Model in Image Difference Metrics, *Sebastien Akli Ajagamelle, Grenoble Institute of Technology (France), and Marius Pedersen and Gabriele Simone, Gjøvik University College (Norway)*

Evaluating Color Difference Formulae by Riemannian Metric, *Dibakar Raj Pant and Ivar Farup, Gjøvik University College (Norway)*

Checking Recent Color-Difference Formulas with a Dataset of Metallic Samples and Just Noticeable Colour-Difference Assessments, *Rafael Huertas[1], Alain Trémeau[2], Manuel Melgosa, Luis Gomez-Robledo[1], Guihua Cui[3], and M. Ronnier Luo[3]; [1]Universidad de Granada, (Spain), [2]Université Jean Monnet (France), and [3]University of Leeds (UK)*

Comparison of Color Difference Methods for Natural Images, *Henri Kivinen, Mikko Nuutinen, and Pirkko Oittinen, Helsinki University of Technology (Finland)*

15.50 - 18.30
MULTISPECTRAL COLOUR SCIENCE MCS'10

Session Chair: Juan Luis Nieves, University of Granada (Spain)

Spatial and Spectral Analysis and Modeling of Transversal Chromatic Aberrations and Their Compensation, *Julie Klein, Johannes Brauers, and Til Aach, RWTH Aachen University (Germany)*

Noise Analysis of a Multispectral Image Acquisition System, *Noriyuki Shimano, Kinki University (Japan)*

Effective Illumination Control for an Active Spectral Imaging System, *Takahiko Horiuchi, Hirokazu Kakinuma, and Shoji Tominaga, Chiba University (Japan)*

Multiresolution-Based Pansharpening in Spectral Color Images, *Oili Kohonen, University of Eastern Finland (Finland)*

Enhancing Spectral Color Images by RGB-Based Sharpening, *Oili Kohonen, University of Eastern Finland (Finland)*

Spectral Variability of Light-Emitting Diodes with Angle, *O. Martínez, Hewlett-Packard España; and M. Vilaseca, C. Pizarro, E. Ferrer, M. Arjona, and J. Pujol, Technical University of Catalonia (Spain)*

Fast Non-Iterative PCA Computation for Spectral Image Analysis Using GPU, *Jukka Antikainen, Markku Hauta-Kasari, Timo Jääskeläinen, and Jussi Parkkinen, University of Eastern Finland (Finland)*

Surface Reflectance Models Based on Characteristic Functions, *Oh-Seol Kwon, Holly E. Gerhard, and Laurence T. Maloney, New York University (USA)*

YOU DO THE MATH!

€675 = **Non-member Registration**

OR

€595 **Member Registration**
+€75* **Membership**

€660 = **Conference Registration**
IS&T Membership
Access to 16,000+ papers
Access to member database
JIST or JEI online subscription
Reduced Short Course Fees
IS&T Conference discounts
***The Reporter* mailed to you**

Become a member when you register and use the member rate to calculate fees!

*Non-US address membership; based on Feb. 2010 exchange rate. Membership charged in US dollars at $105/overseas address; $95/US address; $25/students.

Joensuu provides the perfect base for day or overnight trips. Both the Valamo Orthodox Monestary (above) and the Koli region (right) are within an hour drive of the city.

Photos: Suzanne Grinnan.

CGIV 2010 Conference Registration

Name_____

Title/Position _____

Company _____

Mailing Address _____

_____

Telephone _____ Fax _____ Email _____

SAVE €!!! Not a member? Join IS&T and calculate conference fees based on member rates.*

Please charge the card listed below with the following membership:

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

CONFERENCE REGISTRATION INCLUDES

- **admission to the Monday workshops**
- **all the technical sessions**
- **lunch on Tuesday, Wednesday, and Thursday**
- **daily coffee breaks**
- **Welcome and Conference Receptions**
- **Conference Banquet**
- **Conference Proceedings (abstract book with full papers on CD)**

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 6, 2010 to use this form; after that date, registration must be done in person at the conference venue.*

Conference Registration (CHECK ONE)	until May 16	after May 16	TOTAL
___ IS&T Member	€595	€645	€ _____
___ Non-member	€675	€725	€ _____
___ Speaker/Session Chair Member	€560	€610	€ _____
___ Speaker/Session Chair Non-member	€595	€645	€ _____
___ Student (ID required) Member	€330	€380	€ _____
___ Student (ID required) Non-member	€355	€405	€ _____
___ One-day (select day below)	€360	€395	€ _____

❑ Tuesday** ❑ Wednesday** ❑ Thursday

**Tues./Wed. one-day fee does not include the Reception/Banquet. Please purchase below.

I have special dietary needs: vegetarian ____ other (please specify): _____

Workshop Registration (be sure to register; space is limited)

Please register me for:

___ Modeling the Interaction of Light, Paper, and Ink Halftones (morning workshop)

___ Spectral Color Measurements (afternoon workshop)

___ If offered, I would prefer to take Spectral Color Measurements in the morning

Other

___ Extra CGIV 2010 Proceedings (special advance purchase/on-site rate)	€85	€ _____
Extra event tickets are for guests of attendees and one-day registrants		
___ Extra Conference Reception Ticket	€35	€ _____
___ Extra Conference Banquet Ticket	€65	€ _____
	GRAND TOTAL	€ _____

Payment Method: ❑ MC ❑ VISA (We cannot accept AmEx 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 11, 2010. After that date, the cancellation fee is 50% of the total plus €50. No refunds will be given after July 14, 2010. All requests for refund must be made in writing.

* Membership is charged in US dollars. You will be contacted about your complimentary journal subscription choice. Membership paid for now begins immediately and expires Dec. 31, 2010. Student memberships expire Sept. 30, 2010.

CGIV2010/MCS'10

Society for Imaging Science and Technology
7003 Kilworth Lane
Springfield, VA 22151 USA
703/642-9090; 703/642-9094 (fax)