Volume 2, Issue 3

December 2013

IEA Visual Ergonomics Newsletter—December 2013

New technology and new ideas

As the year draws to a close, I would like to thank everyone who has made this IEA VE TC a success—Hans Richter, Magne Helland and Marino Menozzi for serving on the executive, and the many contributors to the newsletter.

It appears that everyone has been very busy promoting visual ergonomics over the past few months. This edition gives a taste for the many and varied activities of our members. I have broken my own 2-page rule this edition and decided to include a 1-page supplement "Focus on LED and flicker" which brings together the work of many people around the world. I am interested to hear if you like this initiative and if you have any ideas which could be presented in this way. Finally, I hope that you have a safe and happy festive season and that the new year brings you lots of good things.

Jennifer Long
IEA Visual Ergonomics TC
Chairperson

Around the world

JULY 2013—USA

HCI International 2013 is the world renowned international forum for the exchange of scientific information on theoretical, generic, and applied areas of Human Computer Interaction. This year's conference in Las Vegas, U.S.A, attracted 2300 participants from 61 countries, and topics for discussion included eye-lens accommodation, 3D viewing and body sway. Hans Richter presented a paper (co-authored by Camilla Zetterberg and Mikael Forsman) "Temporal dependence of trapezius muscle activation during sustained eye-lens accommodation at near". Conference proceedings are available through http://www.hcii2013.org/.

JULY 2013—ENGLAND

The biannual International Colour Vision Symposium was held in Winchester, England, 14-18 July. Although many presentations were highly specialized and theoretical, the symposium included sessions on colour in visual demanding occupational environments, colour vision testing and age-related colour vision changes.

NOVEMBER 2013—INDIA

A workshop on vision and occupations was conducted by the India Vision Institute, Hyderabad (22-23 November). Facilitated by Professor James Sheedy, the workshop addressed a wide variety of topics, including eye injuries, sunglasses and laser protection, vision loss assessment, lighting, driving, computers, occupational task analysis and sports vision. Workshop attendees included clinical and academic optometrists who work within occupational optometry in India, and attendees were asked to prepare presentations and share insights from their work. Chandan Shettigar (Manipal University) presented on the Indian National Lighting Code 2010, which included discussion on interior lighting systems in industry, offices, educational settings and hospitals. The final session discussed future plans for occupational optometrists in India.

NOVEMBER 2013—SWEDEN

The Nordic Institute for Advanced Training in Occupational Health (NIVA) ran a 2 day course in Sweden on the 14-15 November titled 'Lighting, visual ergonomics and musculoskeletal implications". Led by Jörgen Eklund and Per Nylén (Royal Institute of Technology, Sweden) and Kristina Teär Fahnehjelm (St Erik Eye Hospital, Sweden), the course explored how lighting and visual ergonomics influences health, in particular musculoskeletal consequences and organizational performance. There were 25 lecturers and participants from Norway, Sweden, Belgium, Netherlands, Austria, Italy and the US, including IEA VE members Hanne-Marie Schiotz Thorud, Hans Richter, and Per Nylén.

Upcoming Events

Nordic Ergonomics Society Annual Conference, Copenhagen 17-20 August 2014 (will include parallel sessions on visual ergonomics)

International Ergonomics Association World Congress, Melbourne Australia 9-14 August 2015. Call for papers will be announced soon. www.iea2015.org

AUGUST 2013—ICELAND

The Nordic Ergonomics Society Conference (NES2013) was held on the 11-14 August at the Grand Hotel, Reykjavik, Iceland. Hosted by the Icelandic National Ergonomics Association, "Vinnuvistfræðifélag Íslands", the conference attracted 150 participants from 19 nations. The program consisted of 75 oral presentations, 11 posters and one workshop. Visual ergonomics was an important part of the conference, with a key note in the plenary sessions, several parallel sessions and a workshop.

In his keynote address, Professor Jan Dul from Rotterdam School of Management (Erasmus University, Rotterdam) discussed the challenges for getting ergonomics accepted in business settings.

Not everyone with an interest in ergonomics is familiar with visual ergonomics. Jennifer Long's keynote address discussed "What is Visual Ergonomics?" and presented case studies to illustrate various types of visual ergonomics interventions.

Professor Knut Inge Fostervold (left) from Department of Psychology at the University of Oslo, Norway, did a great job moderating all the visual ergonomics sessions. Associate Professor Frode Volden (right) from the Department of Informatics and Media Technology at Gjøvik University College, Norway, presented his work on image quality in visual displays.

Very active workshop participants! Doctoral student Camilla Zetterberg (left) from the Centre for Musculoskeletal Research at University of Gävle, Sweden, demonstrates novel ways to measure and assess computer work stations.

Randi Wold, Research Fellow at the Department of Optometry and Visual Science, Buskerud University College, Kongsberg, Norway, discussed the relationship between visual stress and neck pain.

Recent publications by members of our TC

Some recent publications by members of our TC include:

- Long J (2013) Workplace lighting—adjustability is the key. *Lighting.: Art & Science for International Designers.* October/November, p 42-44.
- Nylén P (2013) *Syn ock belysning I arbetslivet* (Seeing is believing). A book in Swedish about visual ergonomics and lighting for workers such as safety representatives, engineers, ergonomists, architects and project planners.
- Orfield SJ (2013) Aging research, design education, and the perceptual limits in seniors housing design: Development of a research-based design model for better aging environments. *Seniors Housing & Care Journal* 21(1): 136-144.
- Rosenfield M and Bass S (2013) Global Vision Part 6. Globalisation and advances in eye care deliver. *Optician* 232; 30/8/13, p 17-21
- Rosenfield M (2013) Global Vision Part 7. The spread of technology. *Optician* 232; 27/9/13, p 36-37
- Zetterberg C, Forsman M, Richter HO (2013) Effects of visually demanding near work on trapezius muscle activity. *Journal of Electromyography and Kinesiology* 23: 1190-1198.

LinkedIn

Recent discussions on LinkedIn IEA Group relating to visual ergonomics include "Can bifocals cause people to tilt their heads backwards to see the screen and therefore cause neck problems?" (39 comments), "Emergency EXIT: green or red?" (8 comments) and "i90 Heads-up tablet and smartphone glasses travel gadget" (4 comments). To join, connect to the International Ergonomics Association group on LinkedIn.

New website

The IEA has a new website: www.iea.cc. Our TC webpage can be found under About IEA—Technical Committees.

NEXT NEWSLETTER DEADLINE: 30th MARCH 2014
jlong@visualergonomics.com.au

Focus on LED and Flicker

There is much discussion within the lighting community around the increasingly widespread use of LED technology. Some discussions involve poorly informed customers or badly researched articles in newspapers. Whilst easy to dismiss, these questions do raise some interesting points. Current high-profile discussions include photobiological safety (e.g. blue-light hazard from LED sources) and flicker and LED technology.

This synopsis focusses on LED and flicker and highlights some of the activities IEA VE TC members (and others) have been involved in to raise the profile of this issue and initiate change for the better.

2013 CIE Centenary Conference, Paris

Some of the papers presented at this conference include:

- Flicker in solid-state lighting: measurement techniques, and proposed reporting and application criteria. Poplawski, M.E., Miller, N.M.
- Relations between flicker, glare, and perceptual ratings of LED billboards under various conditions. Hsu, S.-W., Chung, T.-Y., Pong, B.-J., Chen, Y.-C., Hsieh, P.-H., Lin, M.-
- Flicker and visual discomfort evaluations of LED panel display. Hsieh, P.H., Lin, M.W., Chang, E.C., Chen, Y.C.
- Putting multi-shadows into numbers. Yao, H., Li, X., Chen, J.

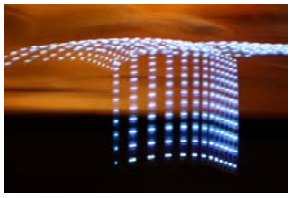
Papers are available at http://www.cie.co.at/index.php/Publications/index.php?i_ca_id=915

Lux Europa Conference, Krakow, 2013

Some of the papers presented at this conference include:

- Visual flickering perception. Dmitrij Polin, Tran Quoc Khanh.
- Evaluating the visibility of temporal light artifacts. Malgorzata Perz, Ingrid Vogels, Dragan Sekulovski.

At the NIVA course in Sweden (see page 1) Per Nylén demonstrated how flicker is more pronounced when it is dimmed. Using a method described by Pontus Hammarbäck in "LEDs and the return of the flicker?" (*Lighting: Art & Science for International Designers, Oct*/Nov 2013, 36-41, Australia) the photo on the left shows uninterrupted lines (i.e. stable light) when the LED strip is undimmed, while the photo on the right shows 13 light dots at maximum dimming. The camera was open 0.1 seconds, and flicker frequency was 136Hz (measured with a simultaneous oscilloscope)—this explains the 13 dots seen in 0.1 seconds.



Recently published

- Roberts JE, Wilkins AJ. Flicker can be perceived during saccades at frequencies in excess of 1 kHz., *Lighting Research and Technology* 2013; 45: 124-132
- Bullough JD, Sweater Hickcox K, Klein TR, Lok A and Narendran N. Detection and acceptability of stroboscopic effects from flicker. , *Lighting Research and Technology* 2012; 44: 477-483
- Hemphäla H, Nylén P. Flimmer (Flicker) *Ljuskulter* 2013, 5: 30-32 (a general interest article written in Swedish).

Presentations

In November, Jennifer Veitch gave a presentation at the joint meeting of the CIE/USA and CNC/CIE in Davis, California, titled "Light Source Flicker: What We Need to Know, and Why You Should Care". Jennifer also has a general interest article on the topic due to be published this month in the IESNA magazine "*Lighting Design & Application*".

Advocacy

Flicker generally isn't measured or reported by manufacturers. Here are some of the ways IEA VE members are trying to remedy this:

- Arnold Wilkins (UK) is a member of Brad Lehman's IEEE committee (IEE PAR 1789) which is currently drafting recommendations regarding LED flicker. For more information about the committee see http://grouper.ieee.org/groups/1789/
- David Brown (Australia) has been personally writing to manufacturers. He is also the person who initiated discussion about this on the IEA LinkedIn discussion group.
- Per Nylén (Sweden) has urged the Swedish standards committee to include light modulation data when defining LED equipment.
- Peter Thorns (Thorn Lighting Ltd, UK) gives company sponsored presentations within the UK and discusses the issue with customers on-site.

Other activities in this area includes the UK Lighting Industry Association (LED Application Panel and LIA Technical Forums), Lighting Europe (LED and Lighting for Life working groups) and TC 169 WG13 – Non visual effect of light on humans.

And now for something completely different...

You may have seen Google Glass promoted in the media. This is a wearable computer with an optical head-mounted display that displays information in a smartphone-like hands-free format. Wearers can interact with the Internet via natural language voice commands (see http://www.google.com/glass/start/)

While the frames do not currently have lenses fitted to them, Google has confirmed that Glass will eventually be wearable with normal prescription glasses. Jeff Anshel has written in for this IEA VE newsletter, stating that this poses possible visual ergonomics issues e.g. if someone does not have sight in their right eye, then they will not be able to use the device; there may be eyestrain from suppressing an unwanted image when concentrating on a task; the image might be a distraction and a safety issue. Are you aware of any work in this area? It might make an interesting "Focus on…" page.