

Getting the Best from State-of-the-Art Display Systems

An International Tutorial and Conference

***Sainsbury Lecture Theatre
The National Gallery
Trafalgar Square
London
February 21-23, 1995***

***Sponsored by:
The Society for Information Display (Europe Region)***

Aim and Scope of the Conference

The Society for Information Display (SID) Europe Region is pleased to announce a major international meeting on the capabilities of display systems and their contemporary applications. Given the strategic importance of displays in a wide range of developments in industry and academia, this conference affords a unique opportunity to obtain an update from international speakers on the state of the art in the field and its implications for the future.

The motive for organising this conference is to bring together the complementary disciplines of display technology and display usage by providing a forum in which experts from both fields can participate. The focus will be on the performance, assessment and optimum utilization of new display technologies, especially flat-panel, projection, virtual-reality and head-mounted displays.

The level of presentations will be pitched at the professional engineer engaged in the development of applications that depend on displays. The intention will be to give attendees at the conference practical guidance on standards and procedures that can be applied directly, as well as an overview of the current state of the art and guidance as to the major trends that will shape future applications of displays and display systems. The expectations and needs of the display user community will also be considered in the context of technical and economic feasibility.

The principal themes will be:

- Visual performance and what users need/expect from displays
- Assessment and specification of displays for different applications
- Measurement, calibration and traceability to national standards
- Viewing environments and their effect on display quality
- Key limiting factors to advances in display technology
- How best to match the display type to the application

Venue

The conference will be held in the Sainsbury Wing Theatre in the new extension to the National Gallery, which is situated in Trafalgar Square in Central London. The National Gallery has a long tradition of displaying images of the finest quality. It also features a state-of-the-art computerized Microgallery for viewing and studying a range of works of art wider than that on view in the Gallery, so it is fitting that it should be the venue for this important event.

Registration

Advance registration is required for both the Tutorial and the Conference. Registration rates are given on the attached Registration Form. The registration fee covers coffee, teas and, as appropriate, the Tutorial and/or Conference Proceedings. **In view of the topical nature of the conference and the limited number of places, you are advised to apply early to avoid disappointment.** Delegates may apply for either or both days of the conference, but there is a discount for both days.

Cancellations will be accepted only if received in writing not later than 7 days before the Conference, but substitutions will be allowed. SID reserves the right to make programme changes without notice, if required.

Accommodation

We regret that, with the limited resources available from our volunteer organisation, we are unable to offer an accommodation service. However, there is no shortage of hotels in Central London, and we suggest that you use the services of your local travel agent to find accommodation.

Programme Committee

Mr Lindsay MacDonald	Crosfield Electronics
Dr Tony Lowe	IBM (SID United Kingdom/Ireland)
Dr Jean Glasser	CNET (SID, France)
Prof Ernst Lüder	University of Stuttgart (SID Mid-Europe)

Conference Co-Chairs

Mr Lindsay MacDonald
Dr Tony Lowe

Tuesday, February 21

REGISTRATION

8:45-11:30

TUTORIAL SESSION

09:30

Display Requirements for Computer Graphics Applications:

Dr Carl Machover

Machover Associates Corporation, White Plains, NY, USA

Computer Graphics has moved from being a 'cure for no known disease' in the early 1960s to being a 'cure for every known disease' in the 1990's, and the range of current technical and non-technical applications is enormous. Although the display has been characterized as the 'window on the application', it is in fact the application that determines the display requirement. Among the display characteristics that need to be related to the application are Addressability, Brightness, Colour, Contrast ratio, Cost, Grey scale, Photorealism, Portability, Refresh rate, Reliability, Resolution, Response time, Screen size, and Stereo capability. This tutorial will review the requirements of representative applications, discuss how these requirements can be translated into display requirements, suggest appropriate display characteristics for each of these representative requirements, and suggest some desirable future features.

BREAK

11:00-11:30

11:30

Design Principles for Visual Information Seeking:

Prof Ben Shneiderman

University of Maryland, Maryland, USA:

The next generation of databases, CD-ROMs and the information superhighway will offer directory browsing, information retrieval, hypermedia, video-on-demand, home shopping, scientific data management, and library systems through novel graphical and direct manipulation user interfaces. This tutorial will cover dynamic query methods with continuous visual presentation of results as the query is changed (using sliders, buttons, maps), colour-coded 2-D space-filling tree maps to show hierarchies in a single display (hundreds of directories and more than 3000 files can be seen at once), and the starfield display (a zoom-able 2-D display with thousands of selectable points of light). Examples and empirical data from usability studies and controlled experiments will be presented.

LUNCH**13:00-14:00**

14:00**Colorimetric Modelling and Optimisation of Visual Display Systems:**

Dr Louis D Silverstein

VCD Sciences Inc., Scottsdale, Arizona, USA

The technology for the control and display of colour images has undergone great advances in recent years, and a variety of both emissive and non-emissive information display technologies are currently colour capable. These include cathode-ray tube (CRT), plasma, electroluminescent (EL), vacuum fluorescent (VFD), light-emitting diode (LED) and an assortment of liquid crystal display (LCD) devices. In order to achieve high-quality colour performance and precise control of the colour rendering capabilities of these devices, it is necessary to colorimetrically characterize and optimize all of the components of the display system. This tutorial will focus on the basic operating principles of colour CRT and LC displays, their means of producing and controlling colour, and quantitative methods for characterizing, modelling and optimizing the colour performance of each type.

BREAK**5:30-16:00**

16:00**Principles of Display Measurement and Calibration:**

Dr Jean Glasser

CNET, Lannion, France

Display measurement implies the evaluation of great number of parameters, the relative and importance of which is not always obvious. In this tutorial these parameters will first be organized in a comprehensive and classified manner. Critical issues regarding display measurement will then be presented, namely photo-colorimetric calibration, lighting environment and display alignment. Measurement methods currently used for all display parameters will be discussed. This overview will refer more particularly to current and future IEC and ISO standards. As an illustration, a closer look at the recent progress on specific LCD measurement problems will make it possible to focus on colour fidelity, uniformity and crosstalk.

CLOSE**17:30**

Wednesday, February 22

REGISTRATION

8:15-11:00

CONFERENCE, Day 1

Session A

9:00-12:15

DEFINING REQUIREMENTS FOR DISPLAYS

09:00

Keynote Address: How Applications Drive Display Requirements:

Dr Carl Machover

Machover Associates, White Plains, USA

09:45

Display Requirements for Desktop Electronic Imaging:

Lindsay MacDonald

Crosfield Electronics, Hemel Hempstead, UK

BREAK

10:15-10:45

10:45

Exploiting Colour Displays through Interactive Perceptual Gamut Representations

Dr Philip Robertson

CSIRO, Australia:

11:15

The Application of Display Technology in Head-mounted Virtual Reality Systems

Dr Richard Holmes

Virtuality, UK

11:45

Translations: Display Requirements for Engineering Design in the Year 2020

Prof Robert Spence

Imperial College, London, UK

LUNCH

2:15-13:15

Session B 13:15-15:30

HUMAN FACTORS OF DISPLAYS

13:15

Keynote Address:

**Evaluating the Perceptual, Cognitive
and Motor Aspects of Displays**

*Prof Ben Shneiderman
University of Maryland, USA*

14.00

**The Electronic Agora: a Video Environment for Remote
Collaborative Working**

*Dr David Travis
British Telecom, UK*

14:30

Evaluating Stereoscopic Displays for 3D Imagery

*Dr Ian Sexton and Dr Tim Bardsley
De Montfort University, UK*

15:00

Evaluating the Usability of Workstation Displays:ehp2.

*Nigel Heaton, Jim McKenzie and Andrew Baird
Human Applications, UK*

BREAK

15:30-16:00

Session C

16:00-17:45

MODELLING AND OPTIMISATION OF DISPLAYS

16:00

Keynote Address:

**Color Matrix Displays: a Paradigm Shift
for the Future of Electronic Color Imaging**

*Dr Louis Silverstein
VCD Sciences Inc., Scottsdale, Arizona, USA*

16:45

Estimation of the Visibility of Small Image Features on a VDU

*Prof Dick Bosman
University of Enschede, NL*

17:15

The Dynamic Performance of CRT and LC Displays

*Dr David Parker
Philips Research Labs, UK*

CLOSE

17:45

Thursday, February 23

REGISTRATION

08:30-11:00

CONFERENCE, Day 2

Session D **09:00-12:45**
WHAT CURRENT DISPLAY TECHNOLOGY CAN DELIVER

09:00

Keynote Address:
Matching Display Technology to the Application
Dr Tony Lowe
IBM TJ Watson Research Center, USA

09:45

Active Matrix Addressing of LCDs: Merits and Shortcomings
Prof Ernst Lüder
University of Stuttgart, Germany

10:15

The Structure, Performance and Future of Passive LCDs
Dr Alan Mosley
GEC Hirst Research Centre, UK

BREAK **10:45-11:15**

11:15

**Emissive Displays: the Relative Merits of ACTFEL,
Plasma and FEDs**
Dr Jean-Pierre Budin
University of Paris Sud, France

11:45

The CRT as the Display of the Future
Mr Seyno Sluyterman
Philips Display Components, NL

12:15

LC Projection Systems
Patrick Candry
Barco Graphic Systems, Belgium:

LUNCH **12:45-13:45**

Session E **13:45-17:00**

MEASUREMENT, CALIBRATION AND STANDARDS

13:45

Keynote Address: Test Measurement Procedures & Standards for Characterizing Display Performance

Dr Jean Glasser

CNET, Lannion, France

14:30

Measurement and Standardization in the Colorimetry of CRT Displays

Andrew Hanson

National Physical Laboratory, UK

BREAK **15:00-15:30**

15:30

Optical Characterisation of Colour LCDs: Pitfalls and Solutions

Ludwig Selhuber and Ambroise Parker

Sagem, France

16:00

Techniques and Applications for High-quality Colour Measurement of CRTs

Tom Lianza

Sequel Imaging, USA

16:30

Techniques for Matching Displays to Hard Copy Proofs and Originals

Tony Johnson

Crosfield Electronics, UK

CLOSE **17:00**

Travel and Transport

Access is easy by air or rail. If you travel by car (not recommended) a car park is situated in Whitcomb St, adjacent to the National Gallery.

Airports: The nearest airports are

- London Heathrow
(Use Underground or taxi to Central London)
- London Gatwick
(Use British Rail to Victoria Station for Central London, then Underground or taxi to the National Gallery)
- London City (Use Underground or taxi to the National Gallery)

Nearest Underground Stations:

Charing Cross, Leicester Square, Embankment, Picadilly Circus

Buses:

3, 6, 9, 11, 12, 13, 15, X15, 23, 24, 29, 53, 53X, 77A, 88, 91, 94, 109, 139, 159, 176, 177Ex, 184, 196

Facilities for Disabled Attendees:

Access is at the Sainsbury Wing and Orange Street entrances. The Sainsbury Wing Theatre (but not the Tutorial room) is equipped with an induction loop system to assist the hard of hearing.

REGISTRATION INSTRUCTIONS

GETTING THE BEST FROM STATE-OF-THE-ART DISPLAY SYSTEMS

21-23 February, 1995

You may register for any combination of the three days. Please note that the *per day* registration is reduced for those attending both days of the conference.

Rates for full-time students may be obtained by application to the Secretariat at the address below.

If claiming the SID membership rate and you have only recently become a SID member, please enclose a photocopy of your SID 1994-5 membership card with your application.

Please make all cheques payable to SID UK Payments or purchase orders MUST BE INCLUDED WITH THE BOOKING. Delegates from outside the UK should purchase a sterling bank draft from their bank. Cheques in foreign currency or Eurocheques will NOT be accepted due to high conversion costs charged on them in the United Kingdom.

Please return this Booking Form and Payment (by Airmail if from overseas) to:

The Conference Secretariat	Tel:	+44 (0)532-336100 or
Conference Office		+44 (0)532-336103
University of Leeds	Fax:	+44 (0)532-336100
LEEDS LS2 9JT		
United Kingdom		

Name:

Organisation:

Address for correspondence:

Telephone No. (non-UK include country code)

Fax No (non-UK include country code)

Please reserve the following tutorial/conference places, as indicated below.

Please enter the amounts due in the appropriate spaces

TUTORIAL February 21

SID Member	£95.....£
Non-Member.....	£125.....£

CONFERENCE - SINGLE DAY

February 22

SID Member (Industrial/Commercial)	£110	£
SID Member (Educational/Academic)	£85	£
Non-Member (Industrial/Commercial)	£140	£
Non-Member (Educational/Academic)	£110	£

February 23

SID Member (Industrial/Commercial)	£110	£
SID Member (Educational/Academic)	£85	£
Non-Member (Industrial/Commercial)	£140	£
Non-Member (Educational/Academic)	£110	£

CONFERENCE - BOTH DAYS

SID Member (Industrial/Commercial)	£195	£
SID Member (Educational/Academic)	£160	£
Non-Member (Industrial/Commercial)	£240	£
Non-Member (Educational/Academic)	£200	£

TOTAL REMITTANCE £