dfwg Report 1/92

Deutsche farbwissenschaftliche Gesellschaft e.V.

Herausgegeben vom Vorstand der DfwG
Verantwortlich: Prof.Dr.W.Kunz, Schatzmeister

Sehr geehrtes DfwG-Mitglied,

Sie haben den ersten **DfwG-Report** in der Hand. Dieses Mitteilungsblatt soll in Zukunft vier Mal im Jahr erscheinen und soll die Information auf dem Gesamtgebiet der 'Farbe' verbessern und damit auch die Kommunikation zwischen den Mitgliedern fördern. Es soll Sie vor allem auch frühzeitig über nationale und internationale Veranstaltungen informieren. Auch soll über interessante Arbeiten und Veröffentlichungen, zu mindest in Kurzform, berichtet werden.

Wenn dieses Blatt lebendig und für alle Mitglieder nützlich werden soll, ist dies ohne die Hilfe der DfwG-Mitglieder nicht möglich. Sie werden deshalb gebeten, durch Informationen, die in Ihrem speziellen Bereich anfallen, und die für einen größeren Kreis von Interesse sind, unser Vorhaben zu unterstützen.

DfwG Nachrichten

DfwG-Tagung 1992

Um unseren Schweizer Mitgliedern endgegenzukommen, findet die diesjährige DfwG-Tagung mit dem Thema:

Qualitätssicherung durch Farbmessung

am Donnerstag, dem 22. Oktober 1992 im Atlas-Hotel in Weil am Rhein (Nähe Basel) statt. Voraussichtlich findet am Vorabend im Hotel ein Empfang statt.
Ein entsprechendes Zimmerkontingent wurde im Atlas-Hotel bereits reserviert.

Alle Mitglieder werden gebeten uns baldmöglichts Themenvorschläge zu unterbreiten und Referenten zu nenen, die evtl. bereit sind zum o.g. Thema einen Vortrag aus ihrem speziellen Fachgebiet zu halten.

Betr.: DfwG - Förderpreis 1993

Der DfwG - Förderpreis wird weiterhin alle zwei Jahre verliehen.

Ab 1993 wird er aufgeteilt in einen

1. Preis mit DM 2.000 und einen
2. Preis mit DM 1.000

Ausgezeichnet werden Arbeiten, die sich wissenschaftlich oder anwendungstechnisch mit dem Thema *FARBE* in praktisch allen Lebensbereichen befassen.
Einreichungstermin für 1993: 15. Januar 1993

Neuerscheinung auf dem Buchmarkt:

Auf das u.g. Buch möchten wir besonders hinweisen, denn sowohl die Autorin als auch der Verlag und der Rezensent sind Mitglieder der DfwG seit ihrer Gründung.

Dr. Anni Berger-Schunn, **Praktische Farbmessung**
ein Buch für Anfänger; eine Gedächtnisstütze für Könner
184 S. 16*24 cm, DM 68,- Verl. Muster-Schmidt, Göttingen (1991)

In allen farbgebenden Industrien, aber auch in allen Industriezweigen, die gefärbte Materialien zur Endprodukten verarbeiten, ist die praktische Farbmessung zu einem unentbehrlichen Hilfsmittel geworden. Die entsprechende Technik hat mit den modernen Farbmeß-Systemen einen hohen Stand erreicht. Ein Problem stellt sich aber immer noch in bezug auf die ungenügenden Möglichkeiten einer notwendigen Ausbildung der Sachbearbeiter. Es fehlt an leichtverständlicher und ausführlicher Dokumentation für das erforderliche Fachwissen,insbesondere hinsichtlich der praktischen Meß- und Anwendungstechnik. Das vorliegende Buch wird maßgeblich helfen, diese Lücke zu schließen.

Der im Buch beschriebene Stoff entspricht in seinem Umfang weitgehend dem Wissen, das ein Anwender der industriellen Farbmessung besitzen sollte. Dazu gehören die Voraussetzungen und das Vorgehen zur Festlegung von wahrgenommenen Farben mittels Zahlenwerten und die darauf beruhende Berechnung von Farbabständen, einschließlich der Erläuterung der Metamerie. Kenntnisse, auf denen Farbkontrolle und Farbqualitätssicherung aufgebaut sind. Die Ausführungen über die Farbrezeptberechnung umfassen die Theorie, soweit nötig, die Ermittlung der Eichdaten, sowie die Berechnung und die Korrektur der Rezepte. Auch die Weißmetrik und die Messung von fluoreszierenden Materialien finden ihren Platz. Die Meßtechnik wird ausführlich beschrieben, ausgehend von den Bausteinen und der Funktionsweise der Farbmeßgeräte, die richtige Aufbereitung der Meßmuster, bis zur Beurteilung der Meßgenauigkeit.

Die Autorin hat verstanden, den nicht ganz einfachen Stoff leicht verständlich zu fassen. Die Anmerkung im Titel 'Ein Buch für Anfänger' besteht zu Recht. Die vielen praktischen Anwendungsbeispiele sind für den Leser einerseits eine gute Verständ-

nishilfe, anderseits eine wertvolle Anweisung für die eigene Arbeit. Man spürt, daß die Verfasserin des Buches auf eine langjährige praktische Erfahrung zurückgreifen konnte. Das in den Text eingearbeitete Bildmaterial läßt in der Qualität manchmal etwas zu wünschen übrig.
Das Buch ist als Lehrmittel zu empfehlen, insbesondere als begleitende Dokumentation für fachbezogene Lehrkurse und Seminarien.

Dr. Ernst Rohner

Was gibt es Neues auf den Farbmeßgerätesektor ?

Anläßlich der ITMA-Nachlese 1991 des VTCC am 15./16.11.91 in Mainz hat Herr *Dr. Rieker* von den Hohensteiner Instituten einen Vortrag mit dem Thema ***Labor und Farbmessung*** gehalten. Er bezieht sich primär auf den Bereich der Textilindustrie und informiert - ohne Anspruch auf Vollständigkeit - über die wesentlichsten Neuerungen nach der ITMA 1987. Große Teile des Vortrages sind von allgemeinem Interesse, und mit seiner freundlichen Genehmi-gung können wir Ihnen diese zur Kenntnis bringen.

1. Farbmeßgerätemarkt

In Tabelle 1 sind die Firmenzusammenschlüsse der letzten Jahre dargestellt.

Eichhof-Gruppe
- Datacolor International
- ACS
- ICS
Kollmogen-Gruppe
- Macbeth
- Johne + Reilhofer, Abt. Elektronik
Byk-Gruppe
- Gardner Laboratory (früher Pacefic Scientiific)

Tabelle 1 Konzentration auf dem Farbmeßgerätemarkt

Diese Konzentration auf dem Markt kann eine Gefahr, aber auch eine Chance für dem Meßgeräteanwender sein: eine Gefahr in Gestalt aller negativen Begleiterscheinungen (Marktbeherrschung, weniger Alternativen), die mit einer Marktkonzentration generell einhergehen; eine Chance, wenn die großen Firmen ihr neu gewonnenes großes technologisches Potential für verstärkte Entwicklungen auf dem Meß-Sektor einsetzen. Alles weitere wird die Zukunft zeigen.

Nicht unerwähnt bleiben darf die Tatsache , daß es auf dem Markt auch einige Einzelfirmen unterschiedlicher Größe gibt (Tab. 2).

Gretag
Hunter
Lange
Minolta
Optronik
Techkon

Tabelle 2 Einzelfirmen auf dem Farbmeßgerätemarkt

Von ihnen kann der Anwender möglicherweise ein größeres Maß an Flexibilität erwarten als von den großen Firmengruppen.

2. Entwicklungsstand der Farbmeßgeräte-Hardware

Die wichtigsten Neuerungen enthält Tabelle 2.

Neue Labor-Farbmeßgeräte
- Chroma Sensor CS-5 (früher ACS)
- Chroma Sensor CS-3 (früher ACS)
- Chroma-Meter CR 300 (Minolta)
- Color Eye 3000 (Macbeth)
- Color Eye 7000 (Macbeth)
- Colorflash 500 (früher ICS)
- Texflash 2000 (Datacolor)
- Weißmessung:
- White Eye (Macbeth) (spektral)
- Vibrochrom (Lenzing)(3 Filter)

Neue portable Farbmeßgeräte
- CM 1000 (Minolta)
- CM 2002 (Minolta)
- ColorChecker (Macbeth)
- ColPorter (Orintex)
- Textile MiniScan (Hunter)

Tabelle 3 Entwicklungsstand der Meßgeräte-Hardware

Auch für die Weißmessung gibt es neue Geräte.

Eindeutig ist ein Trend zum *portablen Farbmeßgeräten* festzustellen. Sie messen durchweg spektral und erlauben die Darstellung von Remissionskurven, Farbmaßzahlen und CIELAB-Farbabständen auf einem LDC-Display, Schnittstellen für Rechner, Drucker und Auswerteeinheiten (auch portable) sind vorhanden.
Sie haben unterschiedliche Meßgeometrien; bei Geräten mit d/8-Geometrie sind jedoch nur teilweise Glanzfallen vorhanden, um bei der Messung eventuellen Glanz ausschalten zu können.

Auch auf dem Gebiet der *On-line-Farbmessung* gibt es Neuerungen, wie Tabelle 4 zeigt.

Neue Online-Farbmeßgeräte
- Teleflash (Optronik)
- OMK 311 (Zeiss)
- ColorSensor (Minolta)

Online-Farbmeßgeräte in Kontroll- und Regelsystemen
- Colorscan (Mahlo)
- Matex-Color (Monforts)

Tabelle 4 Entwicklungsstand bei der Meßgeräte-Hardware

Einige Einzelneuerungen sind in Tabelle 5 dargestellt:

Spezielle Neuheiten:
- motorisierte Meßblende, Glanzfalle und UV-Kalibrierung (Spektralflash)
- LCD-Anzeigen für UV-Anteil (Texflash)
- weiterer Vormarsch der Blitzlampe (MiniScan)
- allgem. Trend zu kleineren Meßschritten: spektrale Auflösung 10 nm (bei fast allen neuen Geräten)
- neue Spektrometerbausteine (Texflash, Minolta)
- Einsatz leistungsfähiger Mikroprozessoren (Spektraflash, Texflash
- Verbesserung der Probenhalterung und Probenanlage (Colorflash-Tex)
- Online-Farbmessung: Trend zu großen Meßentfernungen (Eagle Eye, Teleflsh) gleichzeitige Erfassung der Warentemperaturt (Teleflash)

Tabelle 5 Entwicklungsstand bei der Meßgeräte-Hardware

- Die automatische Meßblendeneinstellung, UV-Kalibrierung und die LCD-Anzeige für den UV-Anteil vereinfachen und erleichtern das Arbeiten (Datacolor *Spectralflash*)

- Die Blitzlampe ist weiter auf dem Vormarsch, das *MiniScan* ist das einzige Gerät von *Hunter* mit dieser Lampe.

- Allgemein gibt es einen Trend zur höheren spektralen Auflösung von 10 nm, sie ist bei fast allen neuen spektral messenden Geräten realisiert. Man erwartet hiervon eine bessere Übereinstimmung der Meßergebnisse zwischen den Geräten eines Types.

- Neue Spektrometerbausteine, wie z.B. ein neuer Monochromator von der Größe einer Streichholzschachtel (Datacolor *Texflash*), vermindern den Raumbedarf und dürften in der Zukunft zu kleineren Geräten führen. Das Gleiche gilt für die kompakt kombinierten Filter und Empfängerdioden im Epfängerarray der spektral messenden Geräte von *Minolta* (CM-1000, CM-2002).

- Der Einsatz von Mikroprozessoren mit höherer Speicherkapazität, wie z.B. der 80386 mit mindestens 2-MB-Memory, ermöglicht es die Vorteile eines anwenderfreundlichen Betriebssystems wie Windows 3.0 optimal zu nutzen.

- Eine verbesserte Probenhalterung und Probenamnlage wird dadurch erreicht, daß der Meßkopf an einem Stativ um 180 Grad drehbar befestigt werden kann, so daß sich die Meßöffnung oben, an der Seite oder unten befindet; dies kann je nach Probe von Vorteil sein. Durch das Ausklappen der Probenhal-terung ist eine exakte Positionierung der zu messenden Probe möglich (*Optronik Colorflash-Tex*).

Auf dem Gebiet der Online-Farbmessung ist ein Trend zu großen Meßentfernungen erkennbar, wie die Neuentwicklung von *Optronik* zeigt. Diese Firma mißt zusätzlich zur Farbe auch die Temperatur der laufenden Warenbahn mit einem IR-Pyrometer, so daß Thermochromieeffekte kontrolliert und evtl. berücksichtigt werden können.

3. Entwicklungsstand der Farbabmusterungskabinen

Trotz der Vorteile der Farbmessung soll bei ihrer Anwendung nie auf die visuelle Abmusterung verzichtet werden. daher ist Tabelle 6 der Entwicklungsstand bei Farbabmusterungskabinen dargestellt, und einige spezielle Neuheiten sind angeführt.

Spezielle Neuheiten:
- Zusammenklappbar, portabel und schnell aufbaubar (*Macbeth*)
- Lampenwechsel per Fernsteuerung (*Macbeth*)
- Kippbare Probenebene (*Olbrich Know how, Atlas*)

Tabelle 6 Entwicklungsstand der Farbabmusterungskabinen

Tragbare Kabinen haben den Vorteil, daß man sie z.B. im Reklamations- und Streitfall leicht zu Verhandlungen mit dem Kunden transportieren und dort die beanstandete Lieferung unter identischer Beleuchtung wie z.B. im Färbereibetrieb vorzeigen und abmustern kannm (*Macbeth The Judge*). Die Lampenwahl per Fernsteuerung ermöglicht die Betrachtung von Proben auch in Gruppen. Kabinen mit kippbarer Probenebene erlauben die Bewertungen unter definierten Betrachtungswinkeln, was besonders bei glänzenden Materialien und kritischen Artikeln wie dunklem Velour von großem Vorteil ist (*Atlas* Chec Gerät). Interessant ist auch ein Mehrwinkelinspektionstisch, der in fast allen vorhandenen Abmusterungskabinen eingesetzt werden kann (*Olbrich Know how*)

5. Entwicklungsstand der Farbdatenverarbeitung

Die schon seit 1987 erkennbare Entwicklung der Programme in Richtung von mehr Bedienungsfreundlichkeit und Schnelligkeit setzt sich fort (Tabelle 7). Das Multitasking ermöglicht es, an einem PC mehrere Programme gleichzeitig abzuarbeiten, ohne erst lange aus einem Menü aussteigen und ein neues aufsuchen zu müssen; hierzu trägt vor allem die übersichtliche Darstellung der Menüs in der Fenstertechnik bei. Sofern mit Windows 3.0 gearbeitet wird, kann man sogar Texte und Grafiken frei gestalten.

Entwicklung zu mehr Bedienungsfreundlichkeit *Beispiele:* - schnellere Bearbeitung durch Multitasking und Verwendung schnellerer Rechner - schnellere Bearbeitung mit Bildschirmfenstertechnik durch übersichtliche Menüführung (z.B. *Optronik Seraph, Minolta/Treepoint Prisma*) - schnellere Bearbeitung und übersichtlichere Bildschirmdarstellung bzw. Ausgabe (Hardcopies) durch ein Betriebssystem wie Windows 3.0 (z.B. *Datacolor Futura*) Darstellung durch den Benutzer frei gestaltbar. *Vernetzung einzelner Workstations über Server und Zentralrechner mit unmittelbarem Zugriff auf eine einzige Datenbank (Multiuser-Systeme)*

Tabelle 7 Entwicklungsstand der Farbdatenverarbeitung

Die *Vernetzung einzelner Workstations (Multiuser)* z.B. von der Farbküche (Waagen) über das Labor (Farbrezeptierung, Färbegeräte, Laborautomaten usw.) bis zur Produktion (Maschinensteuerung usw.) über eine einzige Datenbank in einem zentralen Rechner (Server) ermöglicht es an allen Arbeitsplätzen, sofort nach Erstellung von Daten auf diese zurückzugreifen, ohne daß, wie früher, ein seperates Überspielen der Daten vom PC auf den Zentralrechner nötig ist. Voraussetzung ist, daß die Hersteller der einzelnen Stationen die Datenschnittstellen aufeinander abstimmen und harmonisieren. Die Federführung in der Entwicklung und im Vertrieb solcher Multiuser-Systeme muß dabei nicht beim Farbmeßgerätehersteller liegen; so bieten neben *Datacolor* auch Maschinenhersteller wie *Then* und Hersteller von Steuerungsanlagen wie *Barco Sedo* Multiuser-Systeme an.

In *Tabelle 8* sind die Vorteile des Betriebssystems Windows 3.0 zusammengefaßt, die bei der künftigen Datencolor-Software Futura zum Tragen kommen werden. Die Vorteile bestehen in der besonders bedienungsfreundlichen Benutzeroberfläche. Unter der Benutzeroberfläche versteht man die Gesamtheit der Eigenschaften eines Datenverarbeitungssystems, die für den Benutzer unmittelbar zu verspüren sind, z.B. ihm die Benutzung erleichtern. Gegenüber den anderen derzeit aktuellen Betriebssystemen ist besonders hervorzuheben, daß mehrere Programme simultan im 'Multitasking' abgearbeitet werden können; so kann z.B. das Programm für die automatische Herstellung der Färbeflotte eines ausgewählten Rezeptes mit einem Flottenansatzsystem und das Rezeptierprogramm zur Berechnung anderer Rezepte nebeneinander ablaufen. Ferner können Texte und Grafiken am Bildschirm und im Druck-Layout vom Anwender frei gestaltet werden, und die Daten sind leicht von einem Menü in das andere Übertragbar,so daß vielfältige 'Datenspiele' möglich sind. Werden z.B. in der farbmetrischen Endkontrolle nicht-tolerable Farbabweichungen entdeckt, so kann man, da auf dem Zentralrechner auch die Prozeßgrößen des Färbeprozesses abgelegt sind, diese abrufen und am Bildschirm eine systematische Ursachenforschung und Fehlersuche betreiben.

- Standardisierte Benutzeroberfläche (einheitliche und übersichtliche Wiedergabe der Menüs)
- Mehrere Programme können simultan abgearbeitet
  werden ('Multitasking')
- Einfache Bedienung durch Benutzer, die nicht 'tastaturbewandert' sind (Arbeiten mit Maus und Bildsymbolen)
- Bildschirmdarstellung und Ausgabe (Hardcopies)
  durch den Anwender freidefinierbar (Text,Grafiken),
- 'Spielen' mit Daten erleichtert durch Verbesserung der Datenkonvertierung

Tabelle 8 Vorteile vom Betriebssystem Windows 3.0

Voraussetzunmg für die Anwendung von Windows 3.0 ist ein leistungsfähiger Mikroprozessor wie der 80386. Es ist davon auszugehen, daß wegen der genannten Vorteile früher oder später auch anderer Farbmeßgerätehersteller für ihre Programme Windows 3.0 übernehmen. Da ständig Betriebssysteme verbessert bzw. entwikkelt werden, wird man in der Farbdatenverarbeitung außer Windows aber künftig sicher auch anderen Betriebssystemen mit den gleichen Vorteilen bzw. neuerlichen Verbesserungen begegnen.

Im Zusammenhang mit der Farbdatenverarbeitung ist speziell wie in Tabelle 9 gezeigt, u.a. die Möglichkeit zu erwähnen, *Maximal- und Minimalkonzentrationen* beim Rezeptieren festzulegen; z.B. Maximalkonzentrationen, um die Berechnung von Rezepten zu vermeiden, in denen Farbstoffe in Konzentrationen oberhalb ihres Aufbauvermögens enthalten sind.

Weiter ist die Möglichkeit zu erwähnen, mit Hilfe eines Programmes auf der Grundlage der neuesten ISO-Normen, farbmetrische Echtheitsbewertungen durchführen zu können, nämlich die Bewertung des Anblutens und die Bewer-tung der Änderung der Farbe. Die Echtheitsbewertungen werden dadurch wesentlich genauer.

Spezielle Neuheiten
- Festlegung von Maximal- und Minimalkonzentrationen beim Rezeptieren (z.B. Datacolor 'Futura')
- Software zur farbmetrischen Bewertung des Anblutens und der Änderung der Farbe nach endgültiger ISO-Methode (z.B. Datacolor 'Futura')
- Entwicklung von Rezeptiersoftware durch Firmen die bislang noch keine eigene Rezeptiersoftware für Textil hatten (z.B. Optronik 'Seraph', Minolta/ Treepoint 'Prisma')
- vermehrt Kooperationen von Harware- und Software-Hersteller (z.B. Minolta/Treepoint 'Prisma', Hunter/CMC 'CMC-2000, Macbeth/Barco 'Coloritm')

Tabelle 9 Entwicklungsstand der Farbdatenverarbeitung

Schließlich ist in einigen Fällen zu beobachten, daß Firmen, die bislang noch keine eigene Rezeptier-Software hatten, nun eine solche entwickeln oder entwickeln lassen. Auch ist eine vermehrte Kooperation zwischen Geräte- und Software-Herstellern unverkennbar. Die Software-Entwickler warten dabei mit zum Teil sehr interessanten Neuerungen auf, wie z.B. die der Firma *ITM-Software* mit dem von Barco angebotene Programm 'Coloritm'. Dieses zeichnet sich durch sehr praktische und anwenderfreundliche Sonderroutinen aus.

Auf den folgenden Seiten finden Sie noch Mitteilungen der AIC.

Kritische Stellungsnahmen und weitere Vorschläge für die künftige Ausgestaltung des DfwG-Reports, die gern entgegengenommen werden, richten Sie bitte an:

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Brucknerstr. 69
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AIC Newsletter

NUMBER 6 APRIL 1992

President's Report

June 1991

I am very pleased to report that Dr. Kees van Trigt of the Netherlands has been confirmed as our new Secretary/Treasurer, replacing Dr. Jan Walraven, also of the Netherlands. I am very grateful to Dr Walraven for continuing to act as Secretary/Treasurer beyond his appointed term while we sought his replacement.

During the past year the Executive Committee voted to accept the Yugoslav Research Centre for Color as a new Member, bringing the total membership to 22 countries. The official representative of the Yugoslav member body is Dr Slava Jeler. Dr Jeler was previously an official Observer of the AIC.

In addition, one new Observer, Dr Todor Kehlibarov of Bulgaria was admitted bringing the total number of Observers to 7. Dr Kehlibarov recently organized an International Conference, 'Color 91 - Color as an Important Quality Feature in the National Economy'. This was not an officially sponsored AIC meeting, but of course we welcome any activities that encourage research, dissemination of information, and application of knowledge in the field of colour.

After an open nomination process involving all member countries, the Executive Committee received three nominations for the 1991 Deane B. Judd AIC Award. We had a difficult choice to make, but, after careful deliberation, decided to give the Award jointly to Hans Vos and Pieter Walraven of the TNO Institute for Perception in the Netherlands for their many contributions to the understanding of the mechanisms of colour vision. The Award will be presented during the 1991 Interim Conference in Sydney, Australia.

In addition to this good news, I must also unfortunately report on one of the saddest duties of a President, the writing of letters of condolence following the deaths of distinguished colleagues. In the last year I have been called on to perform this duty three times, following the deaths of Keith McLaren, Manfred Richter and Richard Hunter. We remember each of them, not just as colleagues, but also as friends who will be missed at our future meetings. In addition, we lost another friend whom many of us had known for many years. Dorothy Wright, the wife of our first President, David Wright, passed away in 1990.

Returning to brighter news, I was very pleased, in February of this year, to offer my congratulations to one of our founding members, the Colour Group of Great Britain, which celebrated its 50th anniversary and continues to be very active.

The Colour Society of Australia, on the other hand is one of our newer members, having been founded about five years ago. It is of great credit to them that they have been able, so soon, to organize an AIC Interim Conference. From my contacts with them over the last few months it is clear that they have many active members who have worked very hard to make the 1991 Conference a success. Already, even before the Conference begins, I am confident that they will have succeeded.

A. R. Robertson

EDITORIAL

It is disappointing not to have been able to achieve my ambitions for this newsletter and to have to begin this editorial with an apology for the long delay in publication. (I now have more sympathy for those politicians who fail to deliver their campaign promises!) Limited material for publication and the pressures from other responsibilities have each played a part. However, I would like to try one more time for the principle of an annual publication.

I am very grateful to those who have sent me reports. I hope you will be able to send more material by the end of the year and I hope other representatives will also be able to send reports. I will try to publish the next newsletter early in 1993.

This newsletter does not contain all the items that I hoped it would be possible to include on an annual basis and it contains some material that does not conform strictly to the guidelines I proposed. Rather than try to impose order on the newsletter, it would seem to be wiser to let it take whatever form emerges from the material at hand. Such a policy could liberate the newsletter from being just a collection of reports and allow it to become a forum for comment and debate.

If you think that is appropriate, I hope you will contribute. I look forward to receiving material for the newsletter, including photographs.

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FIRST CIRCULAR

The 7th Congress of the
Association Internationale de la Couleur
International Colour Association
Internationale Vereinigung für die Farbe

COLOUR 93

BUDAPEST

HUNGARY

will be held at the
Technical University of Budapest
between 14-18 June, 1993

The Congress is being organized by the Hungarian National Colour Committee on the basis of the request from AIC Executive Committee according to the decision of AIC general meeting.

General Chairman: Prof. ANTAL NEMCSICS
Co-chairman: Dr. JÁNOS SCHANDA

Congress Office:
Technical University of Budapest
Conference Office, Building Z, Room 101/b
H-1521 Budapest, Műegyetem rkp. 3-9.
Phone and Fax: (36-1) 166-2218

THE SUBJECTS OF THE CONFERENCE:

Coloured vision and the appearance of colours, adaptation of colours, colour contrast, irradiation, invariance of colours, colour memory.

Colorimetry, colour standardization, colour difference, fluorescence, colorimeters.

Colour order systems, analysis of historical and contemporary colour systems, transformation between colour systems, printed and electronical colour collections.

Research into colour dynamics, colour preference, colour association, colour physiology, colour psychology, theories in colour harmony, colour and function, colour and lighting, colour and space.

Application of colours in industry, colour reproduction, colour matching, colour TV, questions of colour identity of printed samples.

Colour design, colour formation of institutions for different functions, townscape, monuments, industrial and individual objects; colours in arts. Computer aided colour design. Basic, intermediate and advanced education of colours. Graduate and postgraduate training. Teaching aid.

LECTURES:

Internationally recognized experts on the most important subjects have been invited to deliver lectures of 40 minutes duration. In two parallel sessions there will be about 70-80 contributed papers of 20 minutes duration.

Posters will be displayed over an area of about 200 m^2. Ample time will be guaranteed for the oral explanation and discussion of posters.
6 x 60 minute forums will be held to discuss the current problems of each subject group.

Exhibitions:

The subjects of the AIC work-groups, such as colour systems, the fields of colour design and education will be displayed at study exhibitions.

It will be possible to exhibit instruments, paints, colour design equipment and books for commercial purposes.

During the conference we hope to hold other exhibitions in connection with colours, eg. on art and architecture.

Other programmes: Excursions will be organized to show the folk colour culture in different parts of Hungary.

There are preliminary plans for several other international conferences and programmes to be held at the time of the conference, such as the CIE DIV.1 and DIV.2, International Fashion Show, International Conference on Ecology and International Conference of Colour Designers.

CONFERENCE LANGUAGE

The official language of the Conference is English. No translation service will be available.

INTERNATIONAL CENTRE OF COLOUR INFORMATION, EDUCATION and MUSEUM

On the initiative of the Hungarian National Colour Committee in agreement with the AIC Executive Committee the Technical University of Budapest has endowed a FOUNDATION to create a centre as mentioned above, for which it has offered a building site in the centre of Budapest, on the banks of the Danube to the value of 600,000 Swiss francks. One of the tasks of the FOUNDATION will be to sponsor the participation of colour experts in AIC conferences and programmes.

The members of the curatorship will be appointed by the TUB, AIC EC and institutions, enterprises and organizations joining the foundation. We wish to inaugurate the centre at the time of the opening of the COLOUR 93. The detailed programme will be sent to those wishing to join the foundation.

CONTRIBUTED PAPERS

Papers, which may deal with an aspect of the science, art and technology of colour, must be submitted to the Chairman with 3 copies of an extended abstract of not more than 2 A4 pages (including figures) by August 1992.

The abstract, which will be published in the Proceedings, must be patterned following the guides which will be provided to each contributor.

Papers will be accepted in English, French or German. The preferred language is English.

The International Papers Committee will decide on the final selection of the papers. Authors will be informed of acceptance of their contribution by 1 November 1992.

Authors of papers and posters will receive the Authors Instructions at the same time as the letter of acceptance. The final manuscript in a camera ready form is due by 1 March 1993.

PREPRINTS AND PROCEEDINGS

A preprint of the Conference Proceedings will be handed out to the participants of the COLOUR 93 Congress. It will contain the invited Papers and the extended abstracts. The cost of the Preprint volume will be included in the registration fee.

SOCIAL PROGRAMME

A full social programme will be arranged and participants are invited to bring members of their families with them.

- Pre- and Post Conference Tours will be organized to sites of interest and natural beauty. These programmes will be organized on special request and at extra charge.

Ladies' programmes:

- Guided shopping tour in the downtown area of Budapest.
- Sightseeing tour in the Buda Castle area.
- Traditional cooking party, where participants may learn how to prepare traditional Hungarian dishes.

BUDAPEST

Budapest is the political, cultural, industrial and educational capital of Hungary, with over two million inhabitants. Within its area of 326 square kilometres it encompasses the river Danube, wooded hills and a pleasant combination of the old and new.

TRAVEL and ACCOMMODATION

Budapest, in the Heart of Europe, can easily be reached by air, train and car from all major European cities. A bus service from the airport to Erzsébet tér takes airline passengers every half an hour. From there the Technical University can be reached either by public transport (trams line 47 or 49 or bus line 1) or by taxi.

The participants can select accomodation in hotels of different categories. Accomodation in student residences (in hotel-type rooms) will also be provided. Hotel rooms in Budapest should be booked long in advance whatever the season. (We will give detailed information in the second circular.)

REGISTRATION FEE

The registration fee for participants is expected to be USD 350 (for accompanying persons USD 200), but a firm announcement will be made in the second circular. Registration fee for the Congress includes the Proceedings, light refreshments, welcome reception and conference dinner. Excursion fees and accommodation in Budapest are not included.

This form should be sent to:

Technical University of Budapest
Conference Office
Műegyetem rkp. 3-9.
Building Z. Room 101/b
Budapest Hungary
H-1521
Phone and fax: (36-1)-185-2218

Deadline: 15 March 1992

PRELIMINARY REGISTRATION FORM

7th Congress of the Association Internationale de la Colour at the Technical University of Budapest, Hungary

14-18 June 1993

Please check:

- ☐ I am interested in the above Congress and shall be grateful to receive the second circular with the registration form.
- ☐ I hope to present a contributed paper and will submit a title and extended abstract by 1 August 1992.
- ☐ My individual contribution should be presented in the poster sessions.

Proposed title of the individual contribution .....
.....

I propose to arrive with . . . accompanying person(s).

.....
Family Name, First Name and Initials, Title

.....
Name of Company/Institute, Profession

.....
.....
Address: Street, No., City, (Postal Code), Country

Telephone: .....
Telex: .....
Fax: .....

AIC Interim Conference

COLOUR AND LIGHT

Sydney 1991

The Sydney Opera House was a very appropriate symbol for "Colour and Light '91". The vision behind the Opera House is so grand that it defies criticism.

The Opera House itself, with its spectacular view of Sydney harbour, was the venue for registration and the opening ceremony. Its long wide flight of steps was a perfect stage for the obligatory group photograph (a year's supply of Dulux paint is on offer to the person who can identify everyone in the picture) and at the bottom of the steps was the jetty and the boat waiting to take us on our luncheon cruise. This was all so magnificent it was like a challenge to the rest of the World, but it was also an extremely pleasant day with plenty of time to meet people and renew acquaintances. After that the pace hotted up and the "best laid plans" encountered the human factor.

Perhaps the conference was a victim of its own success or perhaps we are still under the spell of the tyranny of distance. In any event a no-win situation seems to have arisen. A broad and attractive theme was needed to persuade people to come all the way to Australia. Perhaps "Colour and Light" was too broad for an interim meeting where the AIC rules do not permit parallel sessions; it was certainly attractive since it drew the crowds (141) and a great many proposals for papers. No doubt an extension into a fourth day was not considered because of prohibitive extra costs. This left the option of a very crowded programme with only half an hour for invited speakers and twenty minutes for the rest. As one of the latter I found that time constraint very challenging. And one should not complain since I have heard that twenty minutes is considered by some to be our maximum attention span when exposed to new information. What I don't know is how long our brains need for recovery before the next twenty minutes. In fact we were asked to limit ourselves to fifteen minutes to allow five minutes for questions and that might have worked if everyone had kept strictly to the time table. Enter the human factor. It is not really possible to ask a keynote speaker to begin sharp at nine when the hall is half empty and there is a steady procession of late arrivals. More time was lost in this way after breaks for refreshment and there were also a few speakers who needed more than their allotted time so the sessions were always under pressure. An iron fist was needed for chairing the sessions and Lucia Ronchi set an early standard with her charming demonstration of how to be firm without giving offence. One of my favourite moments came when Bryan Powell himself showed signs of exceeding his time. Alan Robertson, in his warning from the chair, was apologetic but said he was afraid of a complaint from the chairman of the organising committee! It was all a bit like being hurried through a great exhibition with not enough time to look at things properly. It was possible to grasp something of the master plan - the sessions were very well structured with keynote papers followed by shorter papers to deal with different aspects of the theme - but I suspect that the full

richness of the programme will not be revealed until the proceedings are published. (A possible way of taking the pressure off the lecture sessions without disappointing people who wanted to contribute might have been to divert more papers to the poster session.)

Rather than attempt an account of the whole programme I will deal with just one session which I found particularly satisfying and which I was privileged to chair - the session on colour education:

The keynote paper was presented by Roy Berns. Roy is director of the Munsell Color Science Laboratory at Rochester Institute of Technology which offers what is probably the world's leading course in colour science. He described the role of colour science in tackling two kinds of problem. In one situation the task is to produce a material with a colour to match that of a standard in which case metamerism is "evil". In the other situation - reproducing the colours of objects through photography, printing or television - metamerism is the thing which makes it possible. The two situations are coming together with the emergence of computer colour imaging and computer colorant formulation and Roy described how the courses at Rochester, which are concerned with both kinds of problem, are evolving to keep pace with developing technologies and the changing needs of industry. I was pleased to learn that it is not all mathematics, physics and chemistry and that graduates are expected to have some grasp of aesthetics. When Roy mentioned scholarships I noticed a gleam in the eye of at least one member of the audience.

From science the emphasis shifted to design with Eva Fay and Prue Leith. Having softened us up with their demonstration of colour psychology in action (never trust a man who prefers a blue circle to a red square) they beat us into submission with their truly spectacular audio visual presentation of their students' work at the School of Colour and Design. Further evidence of the school's outstanding work was on display at the poster session and in Carol Arthur's designs for the conference. I was struck with the thought: what kind of colour super-hero would we have in someone who had graduated from both the School of Colour and Design and the course in colour science at Rochester!

Lars Sivik spoke about the pioneering work that has been done in the Nordic countries with special emphasis on the perceptual nature of colour and the development of the Natural Color System (NCS). He described the role of the NCS in general education and in the education of architects and designers in Sweden, where it has become a common language for manufacturers and paint companies as well as designers. He also referred briefly to his research and issued an invitation to anyone interested in participating in an international cross- cultural project to investigate the relationships between colours, colour names and colour meaning.

Maria de Matiello described her work at the School of Architecture in Buenos Aires. Art and Science are nicely blended in her colour course and I was particularly struck by the emphasis she places on the subjective aspects; her

students are encouraged to explore personal imagery, fantasy and illusion and thereby make new discoveries and create new experiences.

Eugene Maxwell Smith is also firmly committed to the marriage of art and science. His must be one of the very few colour laboratories attached to an art school. He has brought colorimetry to bear in his investigation of artists' pigments and has developed a new approach to mixing paints which he calls "colour navigation", inspired by his other passion - the sea.

Peter Day is working with high school students and if his corner of NSW suddenly finds it has a glut of colour scientists or painters and designers with a passion for colour it will be Peter's fault. He described his current project which has involved over 200 students so far: after scouring their neighbourhood for such things as leaves, berries, flowers, tree bark and samples of rock and soils the students match the colours to the colours in a range of house paints (I think they are using Taubmans but Dulux or Wattyl would serve just as well). From this they have developed a "localised environmental colour palette" and are redecorating their school accordingly.

Other sessions at the conference dealt with Lighting for Colour Assessment and Reproduction and Instrumentation for Colour Measurement. There were also three sessions devoted to Colour in the Visual Arts and Architecture so that, overall the arts and sciences received about equal attention.

The interaction of art and science is also very much a theme of the Powerhouse Museum which made it a near perfect venue for the conference. It is exciting enough to have a display of colour atlases and measuring equipment available at a conference but to have a whole museum devoted to design and technology, and a world class museum at that, was another major coup for the organizing committee.

The venue for the conference banquet was the Overseas Passenger Terminal at Circular Quay, another famous Sydney location. Not only was this the conference banquet and the occasion for presenting the Deane B. Judd AIC Award, it was also the occasion for announcing the winners of the Dulux Colour Awards. On the face of it there should be no objections to presenting awards for colour design and for colour science at the same event and one might argue that it is to the AIC's advantage to have some of the country's leading colour designers made aware of our work, but I know that some people objected to the fanfare surrounding the Dulux awards and what they saw as the commercialisation of the AIC banquet. I think we need the partnership of science, design and industry so that we need to get this kind of thing right. If the two award ceremonies are incompatible it is in neither party's interest to combine them but we need to be able to offer the right kind of exposure to companies like Dulux because without their generous support an event like "Colour and Light" would not be possible.

The banquet contained what was, for me, one of the highlights of the conference and that was Stephen Dain's stirring citation for the joint winners of the Deane

B. Judd AIC Award - Hans Vos and Pieter Walraven. This was more than a catalogue of achievements, it was an acknowledgement of fundamental contributions to our understanding of the processes of colour vision from a fellow scientist and I found it strangely moving.

At the very end of the conference came my other favourite moment which also involved Bryan Powell. The Council of the Colour Society of Australia had voted two days before to make Bryan our first honorary life member to be effective immediately. At that stage there were four days remaining to the end of the financial year which meant that Bryan was entitled to a refund for those four days. At the closing session Peter McGinley announced the Council's decision and presented Bryan with his refund - 30 cents! - a very small sum to express a very large sense of gratitude.

Paul Green-Armytage

HANS VOS and PIETER WALRAVEN RECEIVE DEANE B JUDD - AIC AWARD

The Deane B Judd - AIC Award was established in 1975 to recognise work of international importance in the fields of colour perception, colour measurement or colour technology. Funds were provided by Mrs Deane B Judd to establish and administer the Award in memory of her late husband. The Award recognises important work in colour science. The selection committee is given wide latitude and the choice may be made for a single outstanding piece of work, for an on going programme that covers a wide range of co-ordinated studies, for leadership in colour science education or for some other meritorious service in the field of colour science.

Previous recipients of the Award have been:

1975	Dorothy Nickerson
1977	David Wright
1979	Gunter Wyszeckl
1981	Manfred Richter
1983	David L MacAdam
1985	Leo M Hurvich and Dorothea Jamieson
1987	Robert Hunt
1989	Tarow Indow

To these we now add

1991	Hans Vos and Pieter Walraven

The award is given for, and I quote the committee,

".....many contributions to the understanding of the mechanisms of colour vision".

The linking of the names of Vos and Walraven for the award is, of course, most logical and appropriate but they are two people from different backgrounds with other, rather different research interests. It may come as a surprise to many to know that joint papers represent a minority of their publications. It is therefore, the quality of these joint publications which makes them especially memorable.

Dr Vos completed a Master of Science degree in physics at the State University, Utrecht in 1954, his published work from that time shows a mixture of visual and ocular work, which included night vision, glare, the Stiles-Crawford effect and radiation effects on the eye. He completed his PhD at the same university in 1963.

He joined the TNO Institute for Perception in 1953 rising to the Head of the Vision Branch in 1966.

Dr Walraven graduated as an engineer from the Technical University, Delft in 1963 with colour vision as his major field. Colour vision features largely in his publications right from the beginning. He completed his PhD in mechanisms of colour vision at the State University at Utrecht in 1962 and joined TNO in 1964 as Deputy Director of the Institute for Perception rising to Director of the Division for National Defence Research.

Their first joint paper was published in 1962 and related to the Stiles-Crawford effect. Their first joint paper relating to colour appeared in 1963.
Bouman, Vos & Walraven. "Fluctuation theory of luminance and chromaticity discrimination" in The Journal of the Optical Society of America.

Hans Vos maintained research interests in radiation changes to the eye, applied aspects of vision and visual ergonomics amongst many others.

Pieter Walraven proceeded within a wider scope of colour vision issues including the applied and ergonomic aspects of colour vision and colour vision deficiencies.

They continued to come together to develop the work which has its basis in Walraven's PhD thesis "On the mechanisms of colour vision".

It is a two stage colour vision model which is now commonly used as the basis of attempts to explain colour vision phenomena. Walraven's work was published after an opponent colour theory paper of Hurvich and Jameson and he brought together the classical Helmholtz trichomatic theory and the Hering opponent colours theory into one framework when they were seemingly incompatible and contradictory. His work precedes the first introduction of the electrophysiological colour vision works of De Valois, Hubel and Wiesel amongst others. The work also led to the best quantitative analysis of the Bezold-Bucke phenomenon and cone pigment density determinations. The combined approach of Vos & Walraven gave the model its mathematical basis and from the work they derived the foveal receptor primaries, ratios of L-M-& SWS cones and the line element colour discrimination analysis.

At the same time they also continued collaborating with other co-workers and also shared co-authors - a most productive group - not just the two of them.

The most conspicuous part of their work must have been the Helmholtz Memorial Symposium on Colour Metrics in September 1971. Dr Walraven was the chairman of the organising committee and Vos, Fiele and Walraven edited the proceedings. It was a meeting which fell on the 150th anniversary of the birth of Hermann von Helmholtz, although this was a happy coincidence. This was the first in the series now known as AIC intersessionary meetings, of which this Sydney meeting is the most recent. It was intended to be a small specialised limited attendance symposium. Sixty four participants met to hear twenty-five papers . They assembled a magnificent array of participants, provided a vital dialogue and created a proceedings publication which is still used as a reference

book. As an illustration of the standing of the attendees and the effects the symposium must have caused, of the nine recipients of the Deane B Judd - AIC award which I listed, including today's, only Hurvich and Jamieson were not present at that symposium. Including Vos & Walraven themselves, eight of the attendees are here at Colour & Light '91 including four paper presenters. It was clearly a landmark in colour science.

Their own paper at the meeting must now be a citation classic, the diagram of the neural processing model and the receptor primaries must have been made into slides for lectures around the world countless times.

In retrospect, knowing what we know now and having the techniques now available, electro-physiological, morphological, immunochemical as well as psychophysical, it is all too easy to underestimate the contribution of their work.

Like many, if not most eminently successful researchers, they have also made substantial and significant contributions to other areas of colour science, visual science and other fields.

It never ceases to amaze me that so often I find the significant contributors to the field with which I associate them have also achieved prominence in another field. These two are no exception. One of the fascinating things about colour science is the diverse backgrounds the discipline brings together. Here we have the highly productive synergy of an engineer and a physicist, but then we should never confine people by looking at their first degrees.

It is appropriate, therefore, that this award is for their ".....many contributions to the understanding of the mechanisms of colour vision"

I believe it was Newton that said "If I have seen further, it is because I have stood on the shoulders of giants".

I have no doubt Hans Vos & Pieter Walraven would say the same.

To them we, in turn, say - there are lots of people now standing on your shoulders.

Stephen Dain
Visual Science Unit
School of Optometry
University of New South Wales
PO Box 1
Kensington
NSW 2033

Access to material supplied by the AIC Committee is gratefully acknowledged.

AIC - Interim Symposium

INSTRUMENTATION FOR COLOUR MEASUREMENT

Berlin 1990

"What's a person like you doing at a meeting like this?"

This was a reasonable question for a scientist to ask a designer at a meeting on "Instrumentation for Colour Measurement". I might have answered that I was there in my capacity as a member of the AIC executive and editor of the newsletter; it is certainly true that I would not otherwise have made the journey from Australia. And it is certainly true that many of the papers were too technical for my limited understanding. However I found the Symposium immensely stimulating. Once again I was grateful that colour is such an excellent passport which opens the door to so many different disciplines.

The Symposium was well planned. Each day began with an invited paper. Contributed papers were presented in the second half of the morning and instruments were demonstrated after lunch.

As an outsider it seems to me that there are now two main frontiers for scientists working in the field of colour measurement, one at the micro level, as it were, and the other at the macro level. At the micro level : perhaps there can be no such thing as the perfect colour difference formula just as we may never find a single entity in the universe which is not itself made up of smaller bits. In Berlin the emphasis was on the macro level and current efforts to extend the reach of colour measurement beyond simple light sources and matte surfaces.

For each day of the symposium the focus was on a different problem area with invited papers to set the theme. The speakers not only managed to make the technical problems accessible to non-technical people like me but also conveyed something of the excitement of what it means to be at the cutting edge of science.

Dietrich Gundlach, in his paper on "Colorimetry for Standard Conditions (including fluorescence)", spoke about the problems of defining "standard conditions" and the difficulties associated with the measurement of fluorescent samples, especially the difficulty of finding suitable light sources.

Allan Rodrigues introduced the magic world of metallic and perlescent pigments. Metallic paints can reduce the apparent bulk of an object like a motor car by accentuating the contours. One of the most memorable images of the Symposium was Rodrigues' slide which slowed a cylinder of uniform diameter painted in bands of matte, glossy and metallic paint. In the slide it looked like a stack of three separate cylinders of different diameters, the smallest, painted metallic, on top. (He has promised to bring the original cylinder to the next AIC meeting in Sydney!) Perlescent paints are even more extraordinary. A perlescent painted car can look yellow from one angle and blue from another.

AIC 25th Anniversary

ISCC 61st Annual Meeting

Princeton, NJ, U.S.A.
June 21 - 24, 1992

Computer Color Formulation

The International Colour Association (AIC) was founded at a meeting in Washington, DC, U.S.A. in 1967. It will return to the United States in 1992 to celebrate its 25th Anniversary with a two-day international symposium on Computer Color Formulation. This meeting will be held on June 23 - 24 on the campus of Princeton University, easily accessible from New York. It will be preceded by the ISCC Annual Meeting on June 21 - 22. The meetings will include discussions on a wide range of topics related to color and appearance, working sessions of an ISCC project committee, social functions to get to know your fellow-workers in color, visits to nearby places of interest, an "open house" at a major color instrument manufacturer, the symposium, and a banquet celebrating the AIC Silver Jubilee. You are invited to both parts of this meeting as well as the preceeding CIE Divisions I and VI meetings and the ASTM E-12 (Optical Properties) meeting following. All three meetings will be on the Princeton University campus.

Technical Sessions:

18-June-92	CIE Division I
19-June-92	CIE Division I and VI
20-June-92	CIE Division VI
21-June-92	ISCC Project Committee "Uniform Color Solid"
	Poster Paper Session
	Interest Group on Art, Design and Psychology
22-June-92	Interest Group on Appearance, Vision and Modeling
	Interest Group on Color Education
	Interest Group on Measurement and Colorimetry
23-June-92	Symposium on "Computer Color Formulation"
24-June-92	Symposium on "Computer Color Formulation"
	Formulation Systems Exhibit
	ASTM E-12 (Optical Properties) Executive & Planning Meetings
25-June-92	ASTM E-12
26-June-92	ASTM E-12

Social Functions:
Wine and Cheese Reception
ISCC Awards Luncheon
Picnic and "Open House" at Datacolor International
AIC Silver Jubilee Banquet
Accompanying Persons tour of Ellis Island and the Statue of Liberty
Daily continental breakfasts and coffee breaks for informal discussions

Place of Meeting:
All conference sessions will be held on the campus of Princeton University in Princeton, New Jersey. Princeton is located about 50 miles (80 km.) from New York City and 45 miles (70 km.) from Philadelphia. Ground transportation is available from all New York airports, and the Trenton, New Jersey AMTRAK train station. From JFK and Newark airports, the Princeton Airporter (ph: 01-609-587-6600) offers convenient service to Princeton. Fares are approximately $20 from Newark and $30 from JFK. Continental Airlines is the official meeting carrier and offers discount fares of 45-50% off normal coach or 5% off the lowest published fare. Continental flies into Newark Airport from many cities in the USA and from London's Gatwick airport. Local travel arrangements are supplied by Revere - American Express travel services (01-800-325-3314, Fax 01-908-463-3396).

Multi-passenger vans will be on call during the meeting for use in transportation between the hotel and the campus for handicapped attendees. All facilities have handicapped access.

Accommodations:
The headquarters hotel for the meeting will be the Nassau Inn, adjacent to the Princeton University campus. Rooms are $95 for one bedded single or double occupancy, $135 for two queen-size beds double occupancy. There are state and local taxes added, currently 7%. Make your reservations directly with the Nassau Inn, Palmer Square, Princeton, NJ 08542 (phone: 01-609-921-7500).

Both more expensive as well as less expensive hotels and bed-and-breakfast accommodations are available within a few miles of the campus. Bed & breakfast inns can be booked through Bed & Breakfast of Princeton (01-609-924-3189).

Campus dormitory rooms (no air-conditioning) will also be available for participants ($15). The list of additional housing, information on ground transportation and an area map can be obtained from Dr. Danny Rich, Datacolor International, 5 Princess Road, Lawrenceville, NJ 08648 (Fax: 01-609-895-7461).

Accompanying Persons:
There is no fee for registration of accompanying persons. They are invited to the Sunday wine & cheese reception and the Monday picnic at Datacolor International at no charge. There is a fee if they wish to attend the Awards Luncheon, the AIC Banquet, or the Ellis Island Tour.

Most immigrants to the USA between 1892 and 1924 entered through Ellis Island. The museum dedicated to these immigrants allows a computerized search of ones relatives. A short distance away by boat, is the Statue of Liberty. A gift of France, it is the eternal symbol of liberty, hope, freedom and democracy. An accompanying persons tour of these attractions will depart from the hotel by bus at 9:45 am on Tuesday, June 23, returning by 4:30 pm. The $40 fee includes transportation, admissions, and a box lunch.

AIC President: Dr. Alan Robertson National Research Council, Ottowa, Canada K1A OR6.
ISCC President: Mr. Hugh Fairman Armorguard Products, P. O. Box 215, Andover, NJ 07821
Program Chairman: Mr. Ralph Stanziola Industrial Color Technology, 410 Clover Court, Neshanic Station, NJ 08853 Ph. or Fax: 01-908-369-8736
Meeting Chairman: Dr. Allan Rodrigues E. I. Du Pont, P.O. Box 2802, Troy, MI 48007-2802, U.S.A. Ph: 01-313-583-8245 Fax: 01-313-583-8479

Symposium on Computer Color Formulation
June 23 - 24, 1992

Invited Papers:

Hugh R. Davidson - Davidson Colleagues
The Origin and Development of Instrumental Color Matching.

Dr. Henry Hemmendinger - Hemmendinger Color Lab
Formulation to a Numerical Color Specification

Contributed Papers:

Donald S. Andrade - DSA Consulting, Inc.
In Pursuit of Absolute K&S Values for Use in Kubelka's Hyperbolic Equations

Dr. Roy S. Berns - Rochester Institute of Technology
A Generic Approach to Mathematically Modeling Color Systems

Roland L. Connelly, Sr.- Shelyn, Inc.
How to make Formulation Really Work - Special Techniques for the Textile Industry

James T. De Groff - Colortec Associates, Inc.
Automation of Computer Color Formulation Systems for the Paint Point-of-Purchase Market

Dr. N. S. Gangakhedkar - Compute Spectra Color Pvt. Ltd.
Computer Color Matching: Indian Experience

Dr. Robert Hirschler - SENAI/CETIQT
Spreading the Light: A Colorimetry and Colour Matching Centre for the Brazilian Textile Industry

- SENAI/CETIQT
Evaluating Dyeing Strength Formulae by Colour Matching

Tibor Illés - Eötvös Loránd University
A Non-Linear Programming Approach to the Color Matching Problem

William R. Mathew - Americhem, Inc.
Measuring Refractive Index - A Photometric Approach

Dr. Leonhard Oberascher - University of Salzburg
Gravure Printing - Will Computer Color Formulation be able to help?

Dr. Danny C. Rich and Jocelyn Jalijali - Datacolor International
Numerical Standards: Are the Materials ready?

Dr. Daniel Spitzer - Akzo Coatings
Innovations in Industrial Colorimetry of Paints

David L. Spooner - Du Pont Imaging Systems
A Technique for Matching Colors with Three and Four Color Process Printing

AIC 25th Anniversary
ISCC 61st Annual Meeting

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REGISTRATION FORM

(One registrant per form - please copy if you need more forms)

Dr.
Mr.
Ms. _____
(Last name) (Given name)

Company _____

Postal Address _____

_____

Tel. No. (Inc International code) _____ Fax No. _____

Accompanying Person(s):

Mr./Mrs./Ms. _____

Mr./Mrs./Ms. _____

Mr./Mrs./Ms. _____

Is this the first ISCC meeting you have attended? Yes No

ISCC Membership Status: ISCC Delegate from _____
Individual Member Retired Member Hon. Member Student Guest
If guest, are you a member of other national organization? _____ (Name)
Would you like ISCC Membership information? Yes No

Registration Fees

ISCC Meeting only (June 21-22) (Includes Wine & Cheese, Awards Luncheon, Datacolor visit)	$160_____
AIC Meeting only (June 23-24) (Includes Datacolor visit, Silver Jubilee Banquet)	$160_____
Full meeting registration (All of the above)	$200_____
Students (Includes Wine & Cheese, Datacolor visit)	$ 40_____
Accompanying persons: Awards Luncheon	$ 20_____
AIC Silver Jubilee Banquet	$ 45_____
Ellis Island Tour	$ 40_____
Total enclosed	$ _____

Registration must be received by May 31, 1992 to guarantee participation. Tickets are to be picked up at the registration table - NO CONFIRMATIONS WILL BE MAILED. Make checks payable in US $ to ISCC and return by mail to the Arrangements Chairman:

James E. Grady, 7187 White Pine Drive, Bloomfield Hills, MI 48301, U.S.A.

Hotel reservations must be made directly with the Nassau Inn. If you wish information on other hotels, or to stay in campus housing, contact ISCC Secretary, Dr. Danny Rich, Datacolor International, 5 Princess Road, Lawrenceville, NJ 08648. Phone: 01-609-895-7427. Fax: 01-609-895-7461

Campus Housing preferred? Yes No Arrival date: _____ Departure date: _____