Rochester Institute of Technology
College of Imaging Arts and Sciences

April 23, 2014

CIAS Research Symposium
Panel Discussion
Research, Scholarship, and Creativity in CIAS

Opening Remarks
Dr. Twyla Cummings
Senior Associate Dean, CIAS

20/20 Presentations

Panel Discussion
Panel Moderator:
Professor Frank Cost
James E. McGhee Professor
School of Photographic Arts and Sciences

Panelists:
Associate Professor David Long
School of Film and Animation

Associate Professor Angela Kelly
School of Photographic Arts and Sciences

Assistant Professor Bruce Myers
School of Media Sciences

Closing Remarks
Dr. Hector Flores
Dean, Office of Graduate Studies

Bruce Leigh Myers, PhD

Assisstant Professor, School of Media Sciences

Instrument Measurement Conditions on Various Samples

What is the practical effect of new ISO measurement conditions with various substrates and colorants? The present research analyzes several measurement devices on ink proofs both with and without Optical Brightening Agents (OBAs) and analyzes change in condition before and after accelerated environmental stress.

Methods: Ink samples are prepared on various substrates; these are then evaluated both qualitatively and quantitatively before and after accelerated aging.

Outcome: Comparison of the new and legacy measurement conditions are recorded, and resulting spectral curves are analyzed both qualitatively and quantitatively. The quantitative evaluation included spectral measurements with several instruments representing new and legacy measurement conditions the instruments utilized to measure the samples are categorized for the legacy and current ISO measurement conditions to ascertain sensitivity to the fluorescing effect of the OBAs.

Reflections: The need for analysis of the practical application of ISO measurement conditions and the effect of OBAs in color reproduction is relevant for industry and ongoing research in this domain.

Subject: CIAS Research, Scholarship, & Creativity Syposium
Date: Tuesday, February 11, 2014 at 10:37:34 AM Eastern Standard Time
From: Robin Cass
To: Jane Shellenbarger, Josh Owen, Keith Howard, Bruce Myers, David L Long, Angela Carter
CC: Twyla Cummings, Frank Cost, Roslyn Goldman
Priority: High

Hello Everyone,

Thank you very much for agreeing to participate in the first CIAS Research, Scholarship, and Creativity Symposium this April!

The goal of your presentations is to explain a little about the nature of research and scholarship in your process within the context of your field. As a presenter and panelist, we ask that you prepare a brief power point presentation consisting of 20 images, which will be shown for 20 seconds each. The advancing of images will be automatic. We understand that this is a challenging format, but hope that it will result in an engaging and educational experience for the audience. Your presentations will be followed by a moderated panel discussion (see details below).

We'd like to meet as a group at least once before the event in order to discuss details and answer questions, **so please keep an eye out for a doodle poll in the coming days.**

Thank you very much!

Robin Cass

Overall Symposium Schedule:

Wednesday, April 16th 5:00-7:00PM
Welcomes & introductions
- 5:10 Robin Cass
- Lorraine Justice
- Ryne Raffaelle
- Twyla Cummings
- 5:30 **Keynote by Jim Reilly of IPI**
- 6:15 closing Jeremy Haefner

Wednesday, April 23rd 5:00-7:00PM
- 5:10 Twyla Cummings intro
  5:15 20/20 presentations (20 images shown for 20 seconds each)
  presenters:
  SOFA David Long (both present and exhibit) dllppr@rit.edu
  SPAS Angela Kelly amkpph@rit.edu
  SMS Bruce Myers - (both present and exhibit) blmppr@rit.edu

- 5:45 panel moderated by Frank Cost
- 6:30 closing Hector Flores

Wednesday, April 30th 5:00-7:00PM

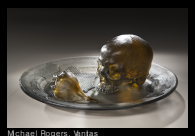
- 5:10 Robin Cass Intro
- 5:15 20/20 presentations (20 images shown for 20 seconds each)
  presenters:
  SOA Keith Howard (both present and exhibit) kjhfaa@rit.edu
  SOD Josh Owen (both present and exhibit) jkofaa@rit.edu
  SAC Jane Shellenbarger (present) jmssac@rit.edu
- 5:45 panel moderated by Roslyn Goldman
- closer – Lorraine Justice

Robin Cass

Chair, School for American Crafts
Professor, Glass Program
College of Imaging Arts & Sciences
Rochester Institute of Technology

http://cias.rit.edu/schools/american-crafts

http://www.robincass.com



Michael Rogers, Vanitas

Research, Scholarship, and Creativity in CIAS
An Exhibition and Symposium

R·I·T | College of Imaging Arts and Sciences

Assistant Professor
Bruce Myers
School of Media Sciences

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An Evaluation of Instrumental Measurement Conditions on Various Samples

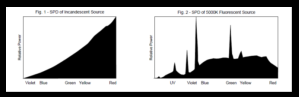
Bruce Leigh Myers, Ph.D.
Rochester Institute of Technology, School of Media Sciences

Introduction

- **Perceived Color of Reflective Objects**
  - *Result of Spectral Reflectance of Object*
  - *Spectral Power Distribution of Illuminant (SPD)*
  - *Sensitivity of Observer*

Background

- **Control of Perceived Color**
  - *CIE Standard Observers Standardization of SPD*
  - **Defined by ISO 3664:2009**



Background

- **Visible Spectrum ≈ 380 – 700 nm**
- **Near-UV Range < 380 Can Influence Color Fluorescence**
  - *Absorb in UV range and re-emit in visible range*
  - *In substrates & colorants fluorescence is result of Optical Brightening Agents (OBAs)*
- **Effect Dependent Upon Amount of OBAs Present and UV Component of the Illuminant**

Background

- Instrumentation: Characteristic of SPD Needs to Be Recognized
  - *If Uncontrolled, Inconsistencies in Instrumental and Visual Assessments Can be Realized*
  - ISO 13655 Refines Measurement Conditions
    - *M1: Close Match to D50, Including UV Portion*
    - *M0: 'Legacy' Condition, Illuminant A (2,856 K), Lessened UV Component*

Objective

- Assess the Difference in M0 and M1 Measurement Conditions
  - *Utilize Various M0 and M1 + M0 Instruments*
  - *Utilize Substrates of Varying OBAs*
  - *Utilize Lithographic Colorants*
    - *Measure Both Absolute and Difference*
    - *Refine Methodology for Comparison*

Methodology

- Instruments:
  - Eight M0, Three M1 Instruments

	M0	M1
Legacy	5	
M1 + M0	3	3
Total	8	3

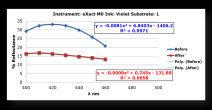
- Substrates:
  - Four Different Papers with Varying Amounts of OBA
- Colorants
  - *Eight Different Lithographic Inks Proofed on Each Substrate at Typical Lithographic Ink Film Thicknesses Using Little Joe Press*

Methodology

- *Prepared Samples Subjected to Accelerated Aging Process in Q-Sun Xenon Test Chamber (consistent with Lind, Stack & Everett, 2004)*
  - 420nm, 40%RH, Daylight Filter, 198 Hours
    - *Spectral Readings Before and After Accelerated Aging*

Methodology

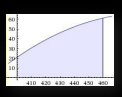
- Analysis Metric
  - *Area Under Spectral Curve in 400 – 460 nm Region*
    - Area where OBA effect most prevalent
  - Curves Generated in Excel
    - Fit with trend lines using second order polynomials: Goal $R^2 > 0.95$
    - Third-order polynomials utilized if $R^2 < 0.95$



Methodology

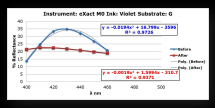
- Areas Under Curves Calculated with Riemann Sums Trapezoidal Method
  - *Validity of Method Tested*
    - Definite Integral Calculated Using WolframAlpha
    - Compared to Trapezoidal Method, Results Reasonably Close

$$\int_{400}^{460} \left(-0.0056x^2 + 5.485x - 1277\right) dx = 2665.8$$



Methodology

- Where the Spectral Curves Before and After Accelerated Aging Crossed
  - *WolframAlpha utilized to determine the point of intersection by setting the curve equations equal to each other*
- Differences in area under curves calculated accordingly

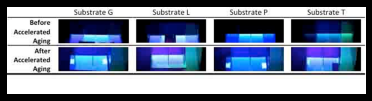


Qualitative Analysis

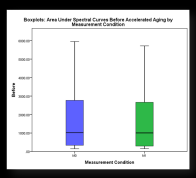
- Ink & Substrate Samples
- Before Accelerated AgingAfter Accelerated Aging

Qualitative Analysis

- GTI SCV *Evaluate OBAs Before and After Accelerated Aging*



Results Readings Prior to Accelerated Aging, All Samples by Measurement Condition

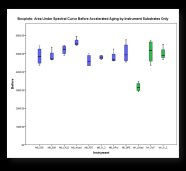


Results Readings Prior to Accelerated Aging, Substrates Only by Measurement Condition

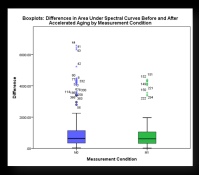
- Requisite Similar Distributions Not Met
  - Analysis of Central Tendency and Range Conducted

Measurement Condition	Median	Range
M0	4880	1612
M1	4739	2807

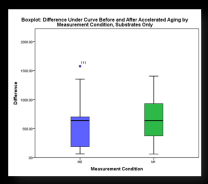
Substrate	Median	Range
G	4811	2088
L	4751	2487
P	5428	3040
T	4692	2211



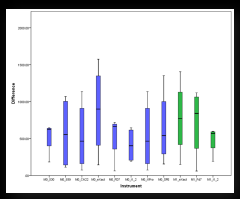
Results: Difference Readings Post Accelerated Aging, All Samples by Measurement Condition



Results: Difference Readings Post Accelerated Aging: Substrates Only by Measurement Condition



Results: Difference Readings Post Accelerated Aging: Substrates by Instrument



Limitations

- Only three M1 instruments
- Is area under the curve sufficiently sensitive as a metric?

Discussion: Required Diligence

- Metrological:
  - e.g.: Instrument Geometry, Aperture Size, Model, Measurement Procedure
- Colorimetric:
  - e.g.: Illuminant, Observer, Tolerancing Method, Parametric Values
- *Range in M0 Instruments*

Thank you.
Please join us for

20/20 Presentations and Panel Discussions
April 30th, 2014

Panel Moderator:
Roslyn Bakst Goldman

Panelists:
Associate Professor Josh Owen, SOD
Associate Professor Keith Howard, SOA
Assistant Professor Jane Shellenbarger, SAC

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