

COLOR RESEARCH AND APPLICATION IN THIS ISSUE, August 2015

Before I begin talking about the articles in this issue, I have the sad duty to tell you that we lost one of our original Editorial Board members, Janos Schanda, in March. More about Janos can be found in this issue.

Our first two articles are about color in the printing industry. First, Mathieu Hebert and Roger David Hersch provide a “Review of spectral reflectance models for halftone prints: principles, calibration, and prediction accuracy.” In their experiments, the prediction accuracy of the different models was tested using several sets of printed colors on different supports, with different printing systems, different inks and different halftoning methods. They found that the performance and model parameters vary by printing setups.

Traditionally printers have used a proofing chart with a large number of printed patches to evaluate the gamut of the printing device. However, Kiran Deshpande, Phil Green, and Michael Pointer wondered if the evaluation can be effective with a significantly smaller number of printed patches. Their study evaluated several spectral printer models using a 7-color printing process. In the article “Gamut evaluation of an n-colour printing process with the minimum number of measurements” they report that a combination of the Kubelka-Munk (KM) and YNSN models performed well with the fewest input measurements. This procedure can significantly reduce the time and cost of printing and materials for n-color printing.

Moving on to the field of imaging we have two more articles. Shoji Tominaga, Daisuke Nishioka, and Takahiko Horiuchi introduce “An Integrated Spectral Imaging System for Producing Accurate Color Images of Static and Moving Objects.” The CIE-XYZ display involves synchronizing a programmable light source with a high-speed monochrome camera and a display device to produce tristimulus images of both static and moving objects in real time. In their article in this issue they not only describe the system, but also examine its performance.

The use of multispectral imaging has spread from initial applications in the fields of astrophysics and remote sensing to fields such as medicine, biometrics, environmental sciences, pharmacology, food and agriculture. In recent years it has also become a valuable tool for use in cultural heritage and artwork conservation. In “Artwork imaging from 370 nm to 1630 nm using a novel multispectral system based on LEDs” Jorge Alexis Herrera, Meritxell Vilaseca, Francisco Javier Burgos, Lúdia Font, Rosa Senserrich, and Jaume Pujol report on the use of an LED-based multispectral system for imaging of paintings. In order to show the potential of the system they describe the methods used for spectral reconstruction as well as the metrics for performance evaluation.

“Do the short-wave cones signal blueness?” that is the question that Sungmi Oh and Katsuaki Sakata investigate in our next article. Current theories of vision suggest that the cones in the observers eye i.e., the first stage response do not represent the spectral composition of the stimulus. The spectral definition begins in the second stage where the outputs of the cones are compared, and the response is transmitted in two chromatic channels: red-green and yellow-blue. The short-wavelength sensitive (S) cone has traditionally been thought to mediate the sensation of blueness via the S-cone driven, “blue-yellow” chromatic pathway. However, this has been questioned more and more

recently. In their study, Drs. Oh and Sakata made measurements of color appearance in order to identify a direct correspondence between S-cone excitation and perceived hue strength. Their results showed that blueness did not increase monotonically with increasing S-cone excitation, and thus it was impossible to conclude that blueness is determined in a simple way by the level of S-cone excitation.

Renzo Shamey, Weethima Sawatwarakul, and Fu Sha ask a different question: “Does Hue Affect the Perception of Grayness?” It has been known that subjects tend to select a slightly bluish or slightly blue-greenish white as the preferred white. Also an earlier article in this journal examined the effect of hue on the perception of blackness and found that the preferred black is a colorimetrically slightly bluish black. These earlier findings inspired the current experimentation with middle grays. Weakly bluish-green gray samples were selected as “most” gray by the majority of subjects in this study.

Our next article adds another language to those studied to determine the number of basic color names. Saeideh Gorji Kandi, Mohammad Amani Tehran, Nargess Hassani, and Amir Jarrahi carried out a study of the Persian color names in the cities of Tehran, Isfahan, Mashhad, Yazd, Rasht and Shiraz all in Iran. While they found a high level of agreement with Berlin & Kay’s 11 basic terms in English, some cities used deviations of one or more basic color terms that included colors such as Cream, Navy, and Quince flower. Four of the cities had 11 basic terms and the other 2 had 10. For the complete report see “Color Naming for the Persian Language.”

In our next article we see how the naming of colors and their interaction is crucial in color-based image retrieval. When the images are complex and colorful the chromatic contrast between the focus colors and background plays an important role. Xiaohong Wang Gao, Yuanlei Wang, Yu Qian, and Alice Gao developed a new color model including the chromatic contrast. The model, designated CAMcc, focuses more on foreground color and maintaining the balance between both foreground and background colors. In “Modelling of chromatic contrast for retrieval of wallpaper images,” the authors describe their model and the results of testing it as compared to CIECAM02, HSI, and RGB models for the retrieval of wall-papers when querying by color.

Enlarging our focus from wallpaper to other color selection in a person’s house, next we have a study of color preferences for interior design in the home as a function of personal background of the occupant. Mahshid Baniani and Sari Yamamoto organized a study, which spans the globe by involving three populations: native Japanese students, foreign students living in Japan, and Iranian students living in Iran. They report on the results of their work in “A Comparative Study on Correlation between Personal Background and Residential Color Preference.”

For our final study in this issue we move from the environmental color of individuals to the color of commodities that people purchase. Manufacturers have long known that color can influence the sale of various items from cars to kitchen appliances, but it also provides an important first impression. The color has to feel right to be effective. What feels right depends on the person’s background and environment, i.e., the culture. The culture involves unique ethnic characteristics, ethnic fusion, historical evolution and transformation over time. The culture of a group has its own development potential in terms of its artifacts or commercial products. In “A Study on the Application of an Artificial Neural Algorithm in the Color Matching of Taiwanese Cultural and Creative Commodities” Shih-Wen Hsiao, Ming-Feng Wang, Dai-Jung Lee,

and Chien-Wei Chen explore the colors of culture assist the designer to develop products with Taiwanese cultural and creative elements.

We close this issue with a News item about the International Colour Association (AIC) Study Group on the Language of Colour.