“Virtual Palette”: Color Matching Software for Art Conservation

Over the past year, I have been conducting research for my master’s thesis related to developing a software application for art conservators to use as a tool in the inpainting process. Much previous research has been done at MCSL regarding the application of instrumental-based color matching to the process of restoring paintings, but the need existed for an accessible and easy-to-use interface with which to perform the color matching. The goal is not to completely automate the inpainting process, but to provide conservators with an additional tool to assist with pigment selection.

The research began with the characterization of the Gamblin Conservation Colors, a set of 43 pigments specially designed for inpainting, in terms of their absorption and scattering properties. Creating the colorant database is an important though time-consuming part of computer colorant formulation, so preloading the data into the software program is expected to be beneficial.

Next, I began to design the graphical user interface. As inspiration, I took a look at existing commercial color matching and spectral analysis software packages and considered which features would be important for inpainting. Software packages designed for industry contain a plethora of features, many of which would not provide much benefit to an art conservation tool. I designed a basic GUI which contained options for inputting target spectra and pigment selection technique, and output the predicted recipe, spectral plots, and color appearance previews.

Practical testing of the software is where the real value lies. In order to gain some preliminary feedback, I visited the Art Conservation department at Buffalo State College to demonstrate my work for students and faculty and to seek their opinions on the potential benefit of this tool. Many paintings conservation students expressed

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interest in having such a tool at their disposal, particularly for difficult pigment selection cases. One paintings conservation student helped me take in situ measurements of a painting she was treating, and we formulated matches using the software; the formulations were a useful starting point for her final mixtures.

An additional goal of the research was to investigate multispectral imaging as a tool in colorant formulation. I experimented with using image-based measurements as input into the color matching software, and results indicate that this is possible although the spectral imaging and estimation must be very accurate if the formulations are to be useful. I presented results of this research at In Situ Technical Imaging in Art and Archaeology a symposium in art conservation at the British Museum this July. Future research could refine the process in order to fully exploit the possibilities multispectral image-based color matching.

I sincerely hope that the art conservation community will take a look at this software, which I chose to call Virtual Palette, and provide their feedback to us. The open-source nature will allow future improvements to be made so that the final product will be a significant benefit to the field. Stay tuned for more information about obtaining the software in the coming months.

-Marissa Haddock

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Alicia Stillwell
I am a recent graduate from the University of Nevada, Reno. I received my Bachelors degree in mathematics, focusing on applied mathematics. Having always been interested in how different disciplines interact and support each other, I was drawn to the color science program for its wide array of topics and disciplines from which it draws. I look forward to working on my masters degree at RIT.

Lin Chen
I am excited and proud as a member of MCSL and I enjoy being here. Before I came here, I received my B. Eng and MA in Industrial Design from Nanjing Forestry University. In the past few years, I focused on the design of products. As I went deeper into these fields, I grew very interested in color modeling, HDR imaging and 3D rendering. This motivates me to pursue a MS degree in color and to become a color scientist in the future.

Rachel Henderson
Before joining MCSL, I received my masters in Geosciences from the University of Arizona. There I focused on light interactions with terrestrial minerals, mainly the Raman spectroscopy of garnet group minerals. I did my bachelors in Geological Science at Indiana University where I also pursued a BA in music. During my study of minerals I have always been fascinated by the wide variations in color which are often due to very minor variations in chemical composition. After my study from a mostly geological and chemical perspective, I came to the conclusion that much is still unknown about color in minerals. I decided to approach this problem from a new angle and thus chose to pursue color in minerals from the color scientists perspective. Most recently I have worked with the Girl Scouts doing science education and I am very passionate about getting girls excited about science. I am excited to pursue my Ph.D. in color science and learn more about light and matter interactions and how they are perceived by the human eye.

Adrià Forés Herranz
I am very happy to start the Ph.D. in Color Science at MCSL. Prior to coming to RIT, I received my B.S. in Computer Science at the University of Girona, Spain and my M.S. in Computer Graphics between the University of Girona and the Polytechnical University of Catalunya, Spain. I have been doing research in the Geometry and Graphics Group at the University of Girona under the supervision of Prof. Xavier Pueyo and Dr. Carles Bosch. Prof. Sumanta Pattanaik also supervised my Master’s Thesis, and later on I had the opportunity to study with him at the University of Central Florida in 2009. Until now, my research has been focused in material appearance. We will see in which new adventures I get involved at MCSL!