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Survey on Mobile Phone Camera Use in Cultural Heritage Documentation

Leah Humenuck; Munsell Color Science Lab Rochester Institute of Technology; Rochester, NY. Sony George; Colourlab Norwegian University of Science and Technology; Gjøvik, NO. Susan Farnand; Munsell Color Science Lab Rochester Institute of Technology; Rochester, NY

Abstract

Mobile phone cameras are imaging tools that are rapidly being adopted by various industries due to their portability and ease of use. Though not currently considered an adopted imaging tool for cultural heritage, there has been increased interest in their potential use within the field. To better understand how cultural heritage professionals considered mobile phone cameras as tools for various types of documentation, a survey was created and administered. A survey was designed and sent to cultural heritage groups involved with imaging with the goal of determining whether these types of cameras are practical imaging devices in circumstances where a studio or a DSLR may not be readily available. Initial results have shown a variety of responses and that mobile phones are being used for various types of documentation.

Introduction

Imaging documentation has become a critical process for cultural heritage (CH) institutions worldwide. When performed, it creates a record to preserve information about the item, allows it to be shared easily for educational purposes, and provides communities another avenue to interact with their significant cultural items [1]. A precise documentation is also important for conservation purposes. However, for smaller CH institutions, communities, or individual projects with collections, there can be barriers to entry for creating imaging documentation with high-end imaging systems. These barriers can include budgetary constraints and lack of access or training for photographic equipment. Mobile phone cameras may provide a solution as they are much more accessible than prosumer cameras in both availability (2021, CIPA reported about 1.4 billion units sold per annum versus traditional digital cameras 8.4 million) [2] and familiarity with the interface. There have been previous efforts to assess mobile phone cameras for CH imaging documentation [3], modification of the cameras for multispectral use [4], while other research aspects have focused on public engagement and interaction, photogrammetry, and other related 3D documentation [5][6][7].

Given the increasing interest, the purpose of this research is to understand the current interactions and thoughts regarding mobile phone cameras for cultural heritage documentation. The goal is to determine whether such cameras are practical imaging devices in circumstances where a studio or a DSLR may not be readily available.

The term CH documentation is a broad definition for the process of recording or monitoring CH items. For this research it pertains a focus on imaging. This broad term encompasses a variety of subdisciplines including for the use of identification, loan documentation, digitization, conservation, photogrammetry, 3D imaging, educational applications, and more.

Methodology

The survey was anonymous, consisting of 13 questions, which were a mixture of multiple-choice and free responses. Participants could skip questions or end the survey at any time. The questions were:

1) age
2) profession
3) years of experience working in cultural heritage
4) location: state or country
5) the type of institution
6) approximate staff size of the institution
7) the approximate size of staff in the participant's department
8) years of experience working in a cultural heritage institution
9) the type of imaging in which the participant has experience
10) if mobile phone cameras have been used previously for any type of cultural heritage documentation and why
11) what are some concerns regarding the use of mobile phone cameras for cultural heritage documentation
12) what are some hopes regarding the use of mobile phone cameras for cultural heritage documentation
13) other thoughts regarding the mobile phone cameras and cultural heritage documentation.

The survey was sent to a variety of CH organizations and community groups around the world, including the American Institute of Conservation, the Institute of Conservation, the International Institute for Conservation, and ImageMuse.

Results

Figure 1. Locations provided by individual participants.

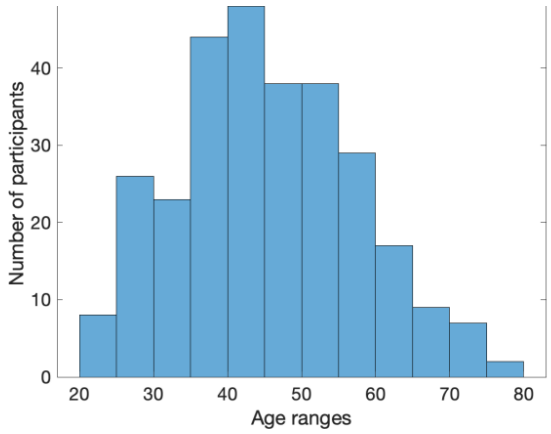

Figure 2. The age distribution of participants

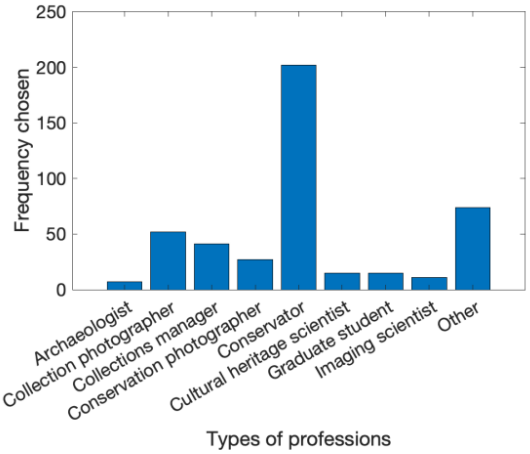

Figure 3. The profession type distribution of participants

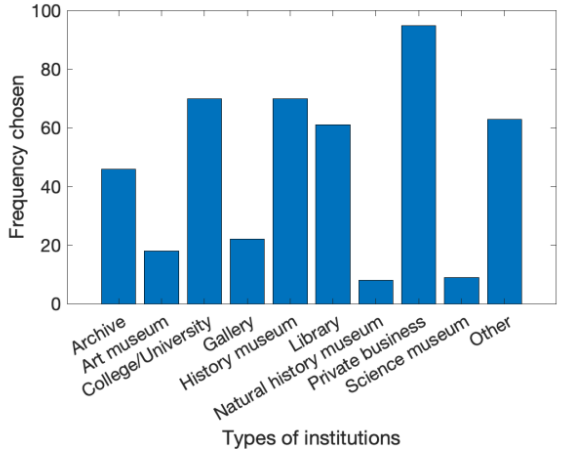

Figure 4. Institution type distribution

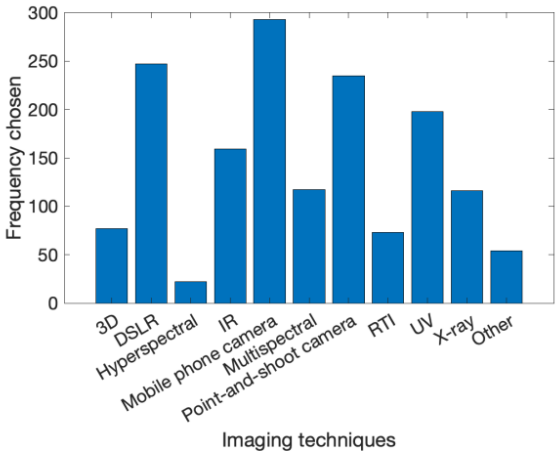

Figure 5. Imaging techniques participants have utilized

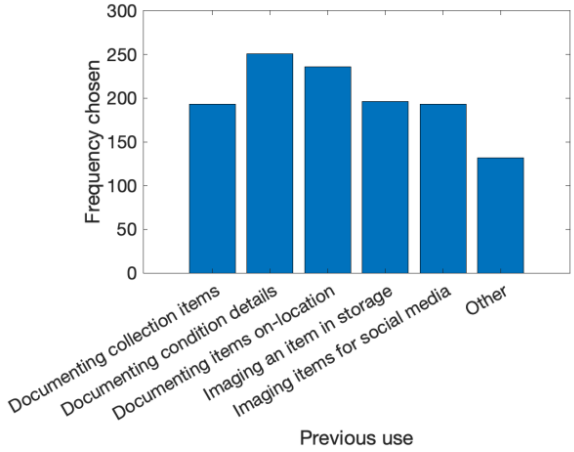

Figure 6. Previous use of mobile phone cameras for various types of cultural heritage imaging

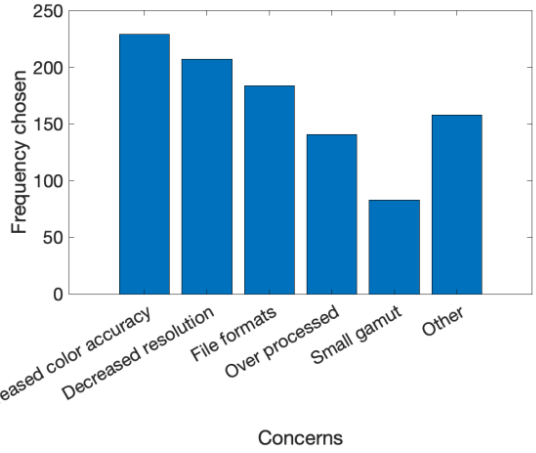

Figure 7. Concerns expressed regarding the use of mobile phone imaging for documentation in cultural heritage

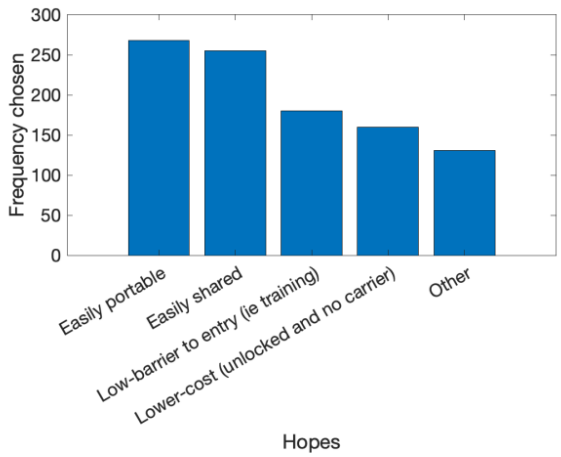

Figure 8. Hopes expressed regarding the use of mobile phone imaging for documentation of cultural heritage

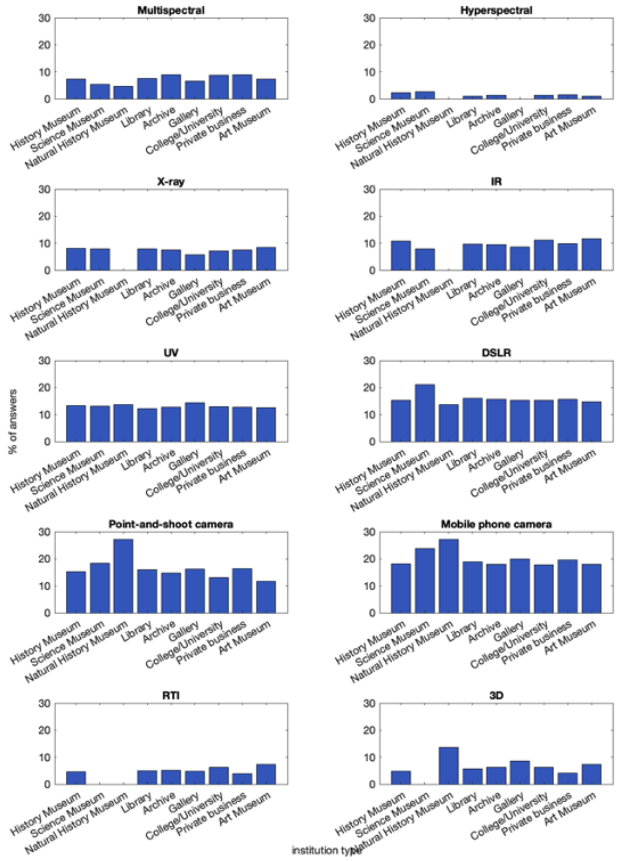

Figure 9. Intersection of imaging technique and institution type

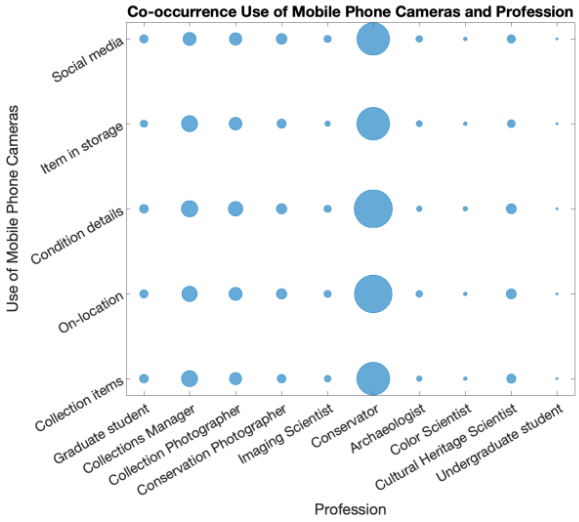

Figure 10. Co-occurrence of profession type and previous use of mobile phone cameras.

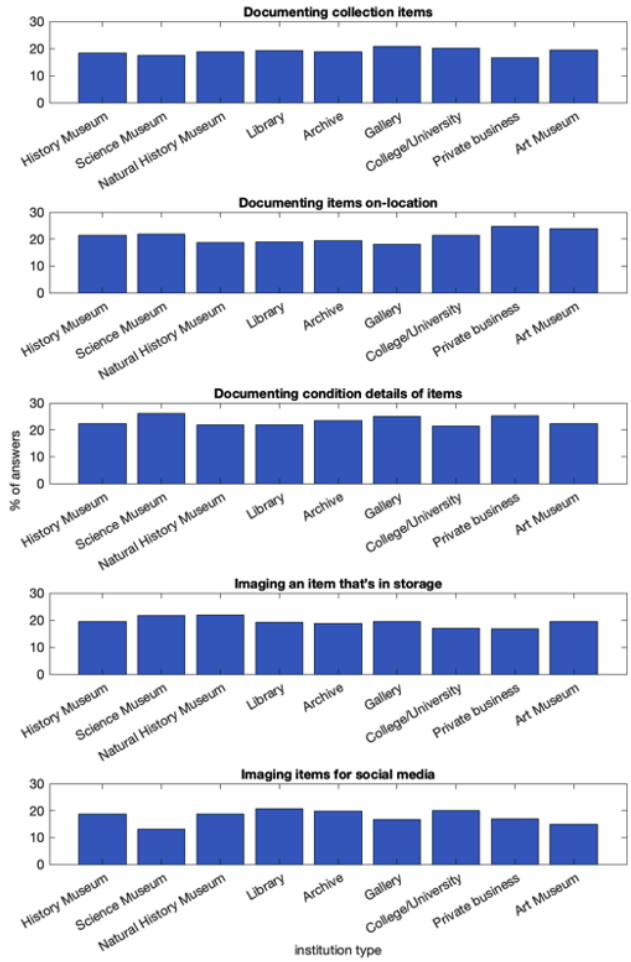

Figure 11. Institution type and percentage of answers to previous use of mobile phone cameras

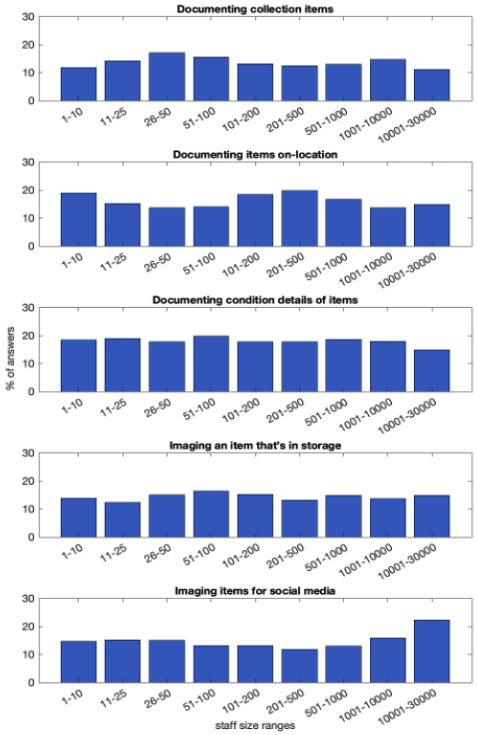

Figure 12. Staff size and percentage of answers to previous use of mobile phone cameras

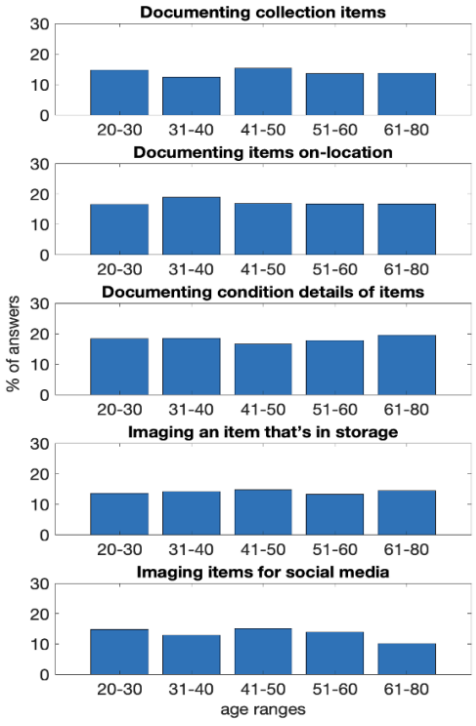

Figure 13. Age ranges and percentage of answers to previous use of mobile phone cameras

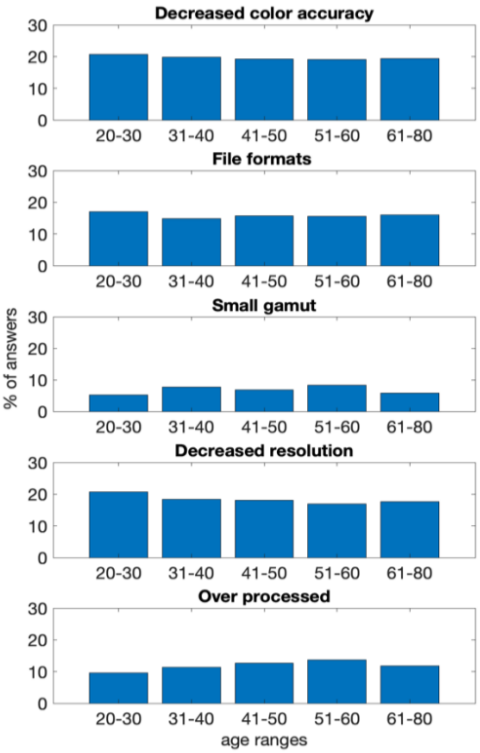

Figure 14. Age ranges and percentage of answers to concerns of the use of mobile phone cameras

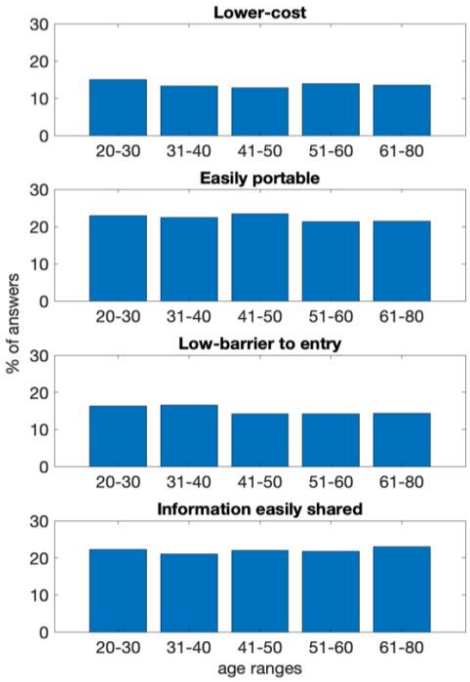

Figure 15. Age ranges and percentage of answers to hopes of the use of mobile phone cameras

Discussion

The survey received 324 participants from all over the world, ranging in age from 20s to 70s (see Fig. 2). Forty countries and all continents except Antarctica were represented (see Fig. 1). The survey was distributed to a variety of museum and professional groups including some that were focused on conservators, which is why conservators accounted for the largest number of professional occupations (see Fig. 3). The distribution of institution types where participants worked and the types of imaging techniques that they use are shown in Figures 4 and 5, respectively. In the frequency of responses for imaging techniques (Fig. 5), mobile phone imaging was chosen most of all the techniques. This question was followed by how mobile phones have been used, shown in Figure 6.

At the end of the survey, the final few questions addressed concerns (Fig. 7) and hopes (Fig. 8) about the use of mobile phone cameras. The greatest concern about the use of mobile phone cameras was the decreased color accuracy. Mobile phone cameras are well known for their preference processing on default imaging modes of the camera apps. Research conducted at the Norwegian University of Science and Technology, Norway, in autumn 2024 is currently exploring this topic to understand the suitability of mobile phone camera images for color accuracy in CH documentation.

The hopes expressed for mobile phone camera use point to the usefulness of an imaging device that is easily portable and shares images quickly, as the two top responses. These attributes allow for greater flexibility as to where imaging can occur and how collaboration can happen. The increased speed and accessibility can also lead to an increase in productivity, depending on the type of project and documentation required. The initial responses accrued from this question provide the initial evidence that there is widespread use of mobile phone cameras for a broad range of CH documentation. However, it is the intersections of these fields and the free response question that bring the most interesting analysis.

To better understand the overall use of imaging techniques among the institution types, the percentage of responses for each type was plotted and compared (see Fig. 9). This showed that UV, DSLR, point-and-shoot, and mobile phone cameras were used the most and were used comparably across all professions. However, mobile phone cameras consisted of the highest percentage of all responses for all institution types except for the comparable use of point-and-shoot cameras for natural history museums. The responses to this intersection show areas of potential future research. This could lead to researching imaging techniques for collection-specific applications.

To better understand how mobile phone cameras are being used by different institution types, these were compared in Figure 11. Documenting collection items, items on location, and condition details were the most popular of responses, while social media was the lowest of all categories. Other fill-in responses were not included here because of the variety of responses.

In order to better understand if mobile phone cameras were being used more often by one group of professions or more for one task by a group of professions, the co-occurrence between these two variables was plotted (see Fig. 10). This showed that mobile phone cameras were being used for various tasks nearly equally among the professions of participants.

In order to better understand potential differences of use of mobile phones, the staff size of the institution was compared with previous use of mobile phone cameras (see Fig.12). The hypothesis that potentially smaller institution sizes may be utilizing the technology more than larger ones proved not to be the case. It was found that there was no distinct difference in percentage of use overall, except for social media where the largest institution staff size bracket showed a distinct difference.

In order to better understand if there was a bias in the answers due to age, that may have results if only comparatively younger age groups were answering these questions, age and previous use, age and concerns, and age and hopes were all analyzed (see Fig. 13-15, respectively). It was found that the percentage of responses for all age groups was similarly engaged in answering these questions.

The final free response question of “other thoughts regarding the mobile phone cameras and CH documentation” provided the most interesting results. Of the 324 participants, 126 free responses were provided. These responses ranged in their views of the use of mobile phone cameras for cultural heritage documentation. In these responses, more than 30% asked for or mentioned the absence of guidelines for the use of mobile phone cameras for cultural heritage. More than 50% shared how they were using mobile phones for their profession. These uses included the following: item identification, loan documentation, teaching, and various types of close-up imaging, citing the low-cost and easy use of lens accessories for mobile phone cameras. For conservation, some were being used for during-treatment and others for the full treatment (which includes before and after images), 3D, in situ imaging, and RTI. Additionally, other responses included allowing researchers to take their own photos of items using museum-owned mobile phone cameras (saving time and expense for an item to go to a studio). More than 50% mentioned the ease-of-use, fast imaging time, portability, and efficiency of these devices. Some brought up concerns regarding the potential loss of photography skills if mobile phones are used too much. Others brought up that they did not have formal photography skills and mobile phone cameras allowed them to capture images well. Additionally, for some, it introduced them to photography with a tool that they already possessed. Some mentioned that mobile phone camera technology is advancing faster than prosumer cameras and generally at a lower price point. Some were interested in the modification for UV or IR imaging. It should be noted that multispectral imaging is already being included in the future generation of mobile phone cameras [8]. Other topics that were brought up multiple times were performing color calibration with these cameras, file types of the images depending on the type of phone, and mentioning the opacity of the imaging pipeline. Some participants mentioned interest in an imaging app for cultural heritage. One surprising topic that was brought up multiple times, was the assumption that a mobile phone camera being used for CH documentation would inherently be a personally owned device. This led to further details about the use of personal devices for work. The issues of data security and ethics, if a mobile phone is connected to a service provider or a cloud, was also discussed. One final topic that was brought up by participants was the ease of use of mobile phones to train others involved in CH sector, particularly in marginalized areas. The lower price point, portability, and low barrier-to-entry were cited as benefits of this imaging device.

Conclusion

The engagement and results from this survey show that there is already an established use of mobile phone cameras for different types of cultural heritage documentation worldwide. Many different institution types, professions, and age ranges are employing their use for a variety of reasons. The strengths of ease-of-use, prevalence, efficiency, portability, low barrier-to-entry, lower cost, and quickly improving technology were cited as useful to the majority of participants. It is hoped that the results from this survey inspire the need for guidelines to be established as this technology continues to spread and evolve. The deliberate outreach for guidelines on use shows the need to bring best practices or general standardization as these imaging devices increase in use.

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Author Biography

Leah Humenuck is a PhD candidate in Color Science at the Munsell Color Science Laboratory at Rochester Institute of Technology. Leah's research interests are in imaging, reproduction, and lighting for cultural heritage. She is also a book and paper conservator, which informs her color science research of archival items. Leah holds a BS in Chemistry from Sweet Briar College and an MA with honors in Conservation from West Dean College of Arts and Conservation.

Sony George, PhD, Professor at the Colourlab, Norwegian University of Science and Technology (NTNU), Norway. His research interests include imaging in general, and with more specialization in multi/hyper spectral imaging, imaging applications in cultural heritage. He has been involved in several national and EU projects related to cultural heritage imaging, including H2020 MSCA CHANGE-ITN.

Susan Farnand is the Graduate Program Director of, and an Associate Professor in, the Program of Color Science at the Rochester Institute of Technology (RIT). Her research interests center around human color vision and perception including individual color vision differences, visual attention, color imaging, image quality metrics, 3D printing, and archiving. She holds a BS in Engineering from Cornell University, an MS in Imaging Science, and a PhD in Color Science from RIT. Dr. Farnand is the current IS&T President.