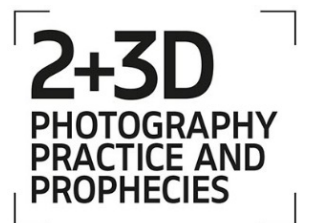


# **2+3D PHOTOGRAPHY**

**PRACTICE PROPHECIES AND BEYOND**

10 11 12 MAY 2017

**RJKS MUSEUM**



## **COLOFON**

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2017

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## WELCOME

The Rijksmuseum is very proud to host its second 2and3D Photography conference titled 2and3D Photography – Practice, Prophecies and Beyond, which will bring together a wide range of professionals in our field of cultural heritage. Photographers, studio managers, museum professionals and scientists from 30 countries and five continents are present today to discuss photography practice, scientific photographic processes, color management, photographic applications, digitization projects as well as future strategies and challenges.

You may have noticed we expanded the title of the 2015 conference on “Practice and Prophecies” to include “Beyond”. It is no surprise to any of us that developments in the implementation of photography are moving so fast that we need to look beyond the near future. Robert Erdmann, senior scientist at the Rijksmuseum and presenter at this conference, expresses it as such: “This is not a moving train; this is a bullet”. These are exciting times, when the photography we create and our photographic expertise is used for the most spectacular scientific applications.

We closed the conference in 2015 with the Amsterdam Principles. These Principles, which were supported by a large majority of the conference attendees, include a number of basic principles for cultural heritage photography. The core concept of the principles is the standardization of photography processes. The impetus for standardization is the growing role that photography now plays in art history and archeological science. Standardization is key to a successful application and to the exchange of each other's photographic material. In my opinion it is also the future of our profession.

Standardization was the reason for the online publication of the *Rijksmuseum Manual for the photography of 2D objects* in 2015 which addresses how we work with the Metamorfoze guidelines in day-to-day studio practice. This year we are publishing online the *Rijksmuseum Manual for the photography of 3D objects* in which we have compiled our own guidelines for the photography of, as the title suggests, 3D objects. These guidelines are a natural outgrowth of the necessity for standardization within the Rijksmuseum. When you have a team of nine photographers and eight studios it is essential that you have a set of agreements that everyone can rely on to create uniformity and in the interest of best practices.

The Rijksmuseum in Amsterdam is the national museum of the Netherlands. Its collection includes one million works of art and objects mostly from and about the Netherlands, originating from the Middle Ages up to and including the 20th century. It truly is a fundamental belief of the management at the Rijksmuseum that sharing is the new having. The works on the website have a Creative Commons –CCO status, which means they can be modified and disseminated in practically any way. That includes exploiting the images for commercial use. The museum encourages experimentation, hosting creative contests and offering tiff files (also for free) to those who want to republish images in large formats. By 2020, the museum

intends to digitize all one million objects in its collection. This is an enormous challenge for the Image Department, which makes the use of the manuals for photographing 2D and 3D objects in our workflow essential.

The 2and3D Photography – Practice, Prophecies and Beyond 2017 conference comprises three days of presentations, workshops, posters, and an inspiration market. On the first two days of presentations, all relevant topics will be reviewed: day-to-day practice and scientific applications of cultural heritage photography, new applications and a futuristic peek into the future. The third day is filled with workshops in Amsterdam and Lelystad that reflect the conference theme: Practice, Prophecies and Beyond. During the intermissions at the business inspiration market throughout the first two days you can find leading representatives of companies that are active in cultural heritage photography, and a number of our colleagues will also be there to present posters about current topics.

In this program booklet you will find practical information about the conference on the: presentations, abstracts, biographies, time schedules, information market, posters, and of course, the location of everything you will need in the Rijksmuseum. We also offer you tips on Amsterdam to make your stay as enjoyable as possible.

If you want to tweet about the conference please use #2and3D, @Rijksmuseum and @AHFAP. A new 2and3D Photography group on LinkedIn was started last month. I would like to invite all of you to join this group and use it as a platform to exchange your experience and knowledge. You can also follow the conference on our online newsfeed. You will always be able to reach us at this email address: 2and3Dphotography@rijksmuseum.nl.

I want to offer my thanks to the members of the program committee and the advisory board for their contribution to the program and to the AHFAP, which has been our loyal partner for the second time in a row. Of course I offer many thanks to the Rijksmuseum Image Department team who dedicated themselves to this conferences along with all of their other tasks and responsibilities.

I would also like to thank the presenters and workshop hosts who guarantee that we have a fantastic program to offer, and the conference project assistants Susanna Huigen, Sandra Pastoor and Sandra Plukker, without whom this conference would not be possible.

Last but not least I want to thank the management of the Rijksmuseum. Their trust and support in granting the opportunity for me and the Image Department to organize this conference, again, has been invaluable.

I wish you three days full of exchanging knowledge and experiences while meeting up with old friends and colleagues.

Cécile van der Harten  
Head Image Department, Rijksmuseum, Amsterdam



# Association for Historical and Fine Art Photography

*...for cultural heritage imaging professionals in the UK & Ireland*

AHFAP provides a forum for photographers, image-makers, conservators and image archivists to share experience and benefit from mutual co-operation.

For more information about us and links to our JISCMail discussion list visit our website:  
**[www.ahfap.org.uk](http://www.ahfap.org.uk)**.

Image: Chinese glazed earthenware figure of an assistant to the Judge of Hell. Ming Dynasty 1522-1620. © Trustees of the British Museum / photographer: Kevin Lovelock



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 **@AHFAP**

**TIMETABLE**

ALL PRESENTATIONS ARE HELD IN THE AUDITORIUM OF THE RIJKSMUSEUM

<b>PRE CONFERENCE</b>		<b>TUESDAY 9 MAY 2017</b>	<b>3:00 – 6:00</b>
	REGISTRATION - ATRIUM		
<b>CONFERENCE DAY 1</b>		<b>WEDNESDAY 10 MAY 2017</b>	<b>9:00 – 5:45</b>
<b>COFFEE &amp; TEA</b>	REGISTRATION - ATRIUM		<b>9:00 – 9:30</b>
OPENING			<b>9:30 – 10:20</b>
	<b>A SHORT INTRODUCTION TO THE CONFERENCE</b> CÉCILE VAN DER HARTEN		
	<b>WELCOME SPEECH</b> ERIK VAN GINKEL, DIRECTOR OF FINANCE AND OPERATIONS		
KEYNOTE	<b>LEAVING HOME, VANISHING CULTURE: THE WORLD UNDER FIRE</b> EDDY VAN WESSEL		
<b>SESSION 1</b>			<b>10:20 – 11:00</b>
INV 1	<b>SHOOTING THE SOUND. A REPORT ON THE RIJKSMUSEUM'S MUSICAL INSTRUMENT COLLECTION PHOTO CAMPAIGN</b> GIOVANNI PAOLO DI STEFANO		
INV 2	<b>SAVE FOR LATER: HOW COOPER HEWITT'S PEN ALLOWS VISITORS TO BRING ITS COLLECTION HOME</b> MICAH WALTER		
<b>COFFEE &amp; TEA</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA		<b>11:00 – 11:40</b>
<b>SESSION 2</b>			<b>11:40 – 12:45</b>
INV 3	<b>LOCATION PHOTOGRAPHY OF LOUIS COMFORT TIFFANY'S ARCHITECTURAL MOSAICS</b> ANDREW FORTUNE		
INV 4	<b>PAINTED ROOM: CHALLENGES IN EVERY CORNER</b> CAROLA VAN WIJK		
INV 5	<b>VISUALIZING SPACES FOR MUSIC: THE BERLIN PHILHARMONIC AND PIERRE BOULEZ SAAL</b> CHRIS EDWARDS		
<b>LUNCH</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA		<b>12:45 – 1:45</b>

<b>SESSION 3</b>		<b>1:45 – 3:15</b>
INV 6	<b>HIGH RESOLUTION MULTISPECTRAL PHOTOGRAPHY</b> ROY BERNIS	
SP 1	<b>MULTISPECTRAL IMAGING WORKFLOW INTEGRATION</b> MEGHAN WILSON	
SP 2	<b>COLOR MANAGEMENT FOR CULTURAL HERITAGE OBJECTS USING RTI</b> PETER FORNARO	
INV 7	<b>THE 3D IMAGE CAPTURE MOONSHOT: MANAGING THE ENERGETICS</b> DON WILLIAMS	
<b>COFFEE &amp; TEA</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA	<b>3:15 – 4:00</b>
<b>SESSION 4</b>		<b>4:00 – 5:45</b>
INV 8	<b>A NEW TARGET WITH A NEW APPROACH FOR THE PHOTOGRAPHY OF 3D OBJECTS</b> HANS VAN DORMOLEN	
SP 3	<b>PHOTOGRAMMETRY AND POSTPRODUCTION WORKFLOW FOR 3D REPRODUCTION OF ARTWORKS: LESSONS LEARNED FROM THE FRENCH MUSEUMS</b> FRANÇOIS BOUGNÈRES	
INV 9	<b>IU AND UFFIZI GALLERY: A VIRTUOUS COLLABORATION TO DIGITIZE IN 3D THE MUSEUM'S ARCHAEOLOGICAL SCULPTURES' COLLECTION</b> CRISTIANA BARANDONI AND BERNARD FRISCHER	
INV 10	<b>INTEGRATING DIGITAL MUSEUM CONTENT INTO CURATORIAL PRACTICE</b> WIM HUPPERETZ	
CLOSURE DAY 1	CÉCILE VAN DER HARTEN	
<b>CONFERENCE DAY 2 THURSDAY 11 MAY 2017</b>		<b>9:00 – 5:45</b>
<b>COFFEE &amp; TEA</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA	<b>9:00 – 9:30</b>
<b>SESSION 1</b>		<b>9:30 – 10:50</b>
	<b>OPENING</b> CÉCILE VAN DER HARTEN	
INV 11	<b>VIDEOGRAMMETRY IN A NUTSHELL</b> MARCO BLOCK-BERLITZ	
INV 12	<b>THE MAKING OF AN ONLINE EXHIBITION: THE LEGACY OF ANCIENT PALMYRA</b> LIZ MCDERMOTT AND FRANCES TERPAK	
INV 13	<b>A CRITICAL REFLECTION ON THE USE OF 3D TECHNOLOGIES FOR THE DOCUMENTATION OF ENDANGERED HERITAGE</b> HENDRIK HAMEEUW	
<b>COFFEE &amp; TEA</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA	<b>10:50 – 11:30</b>



<b>SESSION 2</b>		<b>11:30 – 12:50</b>
INV 14	<b>FROM STORAGE TO SPOTLIGHT: DIGITIZING THE FULL RIJKSMUSEUM COLLECTION</b> HENRIKE HÖVELMANN AND FROUKJE VAN DER MEULEN	
INV 15	<b>UNIQUE OBJECTS AND MASS DIGITIZATION – THE UNIVERSITY OF AMSTERDAM AND GOOGLE BOOKS</b> MARIKE VAN ROON	
SP 4	<b>QUALITY ASSURANCE WORKFLOWS IN MASS DIGITIZATION</b> MARTINA HOFFMANN	
INV 16	<b>IIIF FOR DIGITIZATION PRACTITIONERS: WHY IMAGE INTEROPERABILITY AND OPEN STANDARDS MATTER FOR THE DIGITIZATION STUDIO PROFESSIONAL</b> STUART SNYDMAN	
<b>LUNCH</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA	<b>12:50 – 1:50</b>
<b>SESSION 3</b>		<b>1:50 – 3:00</b>
SP 5	<b>OVERSIZED IMAGING AT STANFORD: THE ŌMI KUNI-EZU TAX MAP, 1837</b> DEARDRA FUZZELL	
INV 17	<b>MAGNIFYING COLOR CALIBRATION: A SCIENTIFIC SYSTEM FOR MICROSCOPE COLOR CALIBRATION AT THE RIJKSMUSEUM – A TEAM EFFORT</b> SUSAN SMELT	
INV 18	<b>FROM PROJECT TO PROGRAMMATIC: INTERNATIONAL STANDARDS AND ADVANCED IMAGING AT THE METROPOLITAN MUSEUM OF ART</b> SCOTT GEFFERT	
<b>COFFEE &amp; TEA</b>	<b>POSTERS, INSPIRATION MARKET</b> FOYER AND PICKNICK AREA	<b>3:00 – 3:45</b>
<b>SESSION 4</b>		<b>3:45 – 5:10</b>
SP 6	<b>THE CAPCAM: WORKFLOWS FOR A NOVEL DIGITAL VIEW CAMERA FOR INTERACTIVE IMAGE COMPOSITION</b> SOFIA GEORGAKOPOULOU	
INV 19	<b>HACKING TECHNOLOGY FOR DOCUMENTING DIFFICULT SPACES</b> CHRIS STRASBAUGH	
INV 20	<b>PUSHING THE BOUNDARIES OF IMAGE PROCESSING AND VISUALIZATION FOR CULTURAL HERITAGE</b> ROBERT ERDMANN	
CLOSURE DAY 2	CÉCILE VAN DER HARTEN	
<b>DRINKS</b>	FOYER AND GROUP PHOTO ATRIUM WEST	<b>5:10 – 5:45</b>

<b>AMSTERDAM</b>		<b>9:30, 11:00, 2:00 and 3:30</b>
<b>WS 1</b>	<b>SERIAL DIGITIZATION OF MUSICAL INSTRUMENTS AND THE MIMO DIGITIZATION STANDARD</b> FRANK BÄR AND STAESKE REBERS	
<b>WS 2</b>	<b>2D PHOTOGRAPHY: DAY-TO-DAY PRACTICE. PHOTOGRAPHING SYSTEMATICALLY WITH THE METAMORFOZE GUIDELINES FOR PRESERVATION PHOTOGRAPHY</b> HENNI VAN BEEK	
<b>WS 3</b>	<b>TEACHING YOU TO FISH: STRATEGIES FOR FADGI/ METAMORFOZE GUIDELINE COMPLIANCE – IT’S NOT THAT DIFFICULT</b> DON WILLIAMS	
<b>WS 4</b>	<b>HIGH-RESOLUTION MULTISPECTRAL PHOTOGRAPHY</b> ROY BERNIS	
<b>WS 5</b>	<b>A NEW TARGET WITH A NEW APPROACH FOR THE PHOTOGRAPHY OF 3D OBJECTS</b> HANS VAN DORMOLEN	
<b>WS 6</b>	<b>A DEEPER DIVE INTO IIIF: WHAT STUDIO PROFESSIONALS SHOULD KNOW ABOUT THE INTERNATIONAL IMAGE INTEROPERABILITY FRAMEWORK</b> STUART SNYDMAN	
<b>WS 7</b>	<b>PUSHING THE BOUNDARIES OF IMAGE PROCESSING AND VISUALIZATION FOR CULTURAL HERITAGE</b> ROBERT ERDMANN	
<b>WS 8</b>	<b>THE MICRODOME, AN INNOVATING TOOL TO MONITOR THE TOPOGRAPHY AND MATERIALITY OF ART OBJECTS (PORTABLE LIGHT DOME SYSTEM)</b> BRUNO VANDERMEULEN	
<b>LELYSTAD</b>		<b>10:00, 11:15, 2:00 and 3:15</b>
<b>WS 9</b>	<b>UNSTRUCTURED LIGHT FIELD RENDERINGS: ENHANCED PHOTOGRAMMETRY USING ON-CAMERA FLASH</b> DAN DENNEHY AND GARY MEYER	
<b>WS 10</b>	<b>PHOTOGRAPHIC LIGHTING TECHNIQUES FOR TRANSPARENT GLASS OBJECTS – A DIALOGUE</b> ANDREW FORTUNE AND FRANS PEGT	
<b>WS 11</b>	<b>360 DEGREES OF QUALITY: PHOTOGRAPHY IN THE ROUND AT THE RIJKSMUSEUM</b> CAROLA VAN WIJK	
<b>WS 12</b>	<b>QUICK AND ACCURATE TILING USING AN EASY-TO-ASSEMBLE PORTABLE CAMERA POSITIONING SYSTEM (FOR LARGE, FLAT OBJECTS)</b> RIK KLEIN GOTINK	

## ABSTRACTS

### KEY

#### LEAVING HOME, VANISHING CULTURE: THE WORLD UNDER FIRE

##### Eddy van Wessel

*Photojournalist, the Netherlands, 1965*

Eddy van Wessel started out as a commercial photographer, but soon started travelling to Asia and switched to photojournalism.

His first conflict photography started with the Balkan Wars and this developed during the Chechen Wars 1994/2003 where he gained a reputation as a conflict photographer working for leading international media. Eddy van Wessel records life during conflict as today's news and realizes that these moments fade into a region's visual history of its people. His goal is to record for historical reasons.

Van Wessel has been focusing on the Middle East since 2003, starting with the Multi-National Force – Iraq. He returned a number of times through the years to witness the changes taking place. He currently covers the struggle against the so-called "Islamic State".

Van Wessel's approach is engaging and close up. He uses black and white images, and panoramic images. He still

uses analog film for most of his work. His goal is to record the emotion of the moment, giving his work a personal signature. Eddy's work focuses sharply on emotion rather than on sharp details.

Eddy van Wessel has received the "Silver Camera award" twice for his work in Iraq. In 2013 he won the prestigious award for his work in Aleppo, Syria, and in 2016 for covering the war against the Islamic State in Iraq. He has also received the "Press photographer of the year" award twice – in 1999 and in 2004 – for his work in Chechnya and Iraq, respectively. His work has recently been collected in a photo book *The Edge of Civilization*. He is currently based in Sweden where he lives with his wife and three children.

**Giovanni Paolo Di Stefano***Curator of musical instruments Rijksmuseum, Amsterdam, The Netherlands*

Like other major international museums, the Rijksmuseum preserves and displays a valuable collection of early musical instruments. In 2014 the Museum started a photo campaign based on the Musical Instrument Museums Online (MIMO) international standards for digital photography of musical instruments. MIMO is a freely accessible online database by eleven collaborating museum partners, and funded through the European Commission's eContentplus program. It provides information and photos of more than 56,000 instruments preserved in some of the main European collections.

Shooting a musical instrument presents many challenges. In the first place, musical instruments – especially those examples which are richly decorated – can combine in one single object virtually any kind of material (woods, metals, glass, paint, textile, leather, paper, ivory, etc.). Second, the shape of a musical instrument often reflects the ergonomic needs of the human body in the conversion of kinetic

expressions into an acoustic output. For this reason, unlike other museum objects – such as paintings, statues, furniture, etc. – musical instruments often do not have a “natural” or “obvious” visualization. The playing position is not always the best for getting a fully readable photograph. At the same time, in many cases it is hardly possible to place the object in an upright position or to achieve a good visualization by just laying the instrument on a flat surface or on a still-life table. Consequently, supports and suspension frames are often necessary to ensure the safety of the object during the photo process and to achieve the desired result. Moreover, the view parameters often depend on conventions and needs which are well-known to musical instrument specialists but place difficult demands to photographers. This presentation gives an overview of the work done in the Rijksmuseum's photo studios and attempts to summarize some of the problems that have been encountered and resolved during the photo campaign.

## SAVE FOR LATER: HOW COOPER HEWITT'S PEN ALLOWS VISITORS TO BRING ITS COLLECTION HOME

*Independent Museum specialist, USA*

But what is a “museum of the future” and what’s involved in making one? Cooper Hewitt knew that in order to survive and in order to flourish as a premier design museum, not only in New York, but around the world, it would have to cater to a new, savvy audience, one which was online by default.

Touch the Objects is about making the collection accessible to everyone. It's about bringing the collection back to its beginnings as a teaching, working collection. And while visitors might not be able to actually "touch the object" the museum will attempt to get them pretty close!

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

**Andrew Fortune***Collections Photography Department Manager, The Corning Museum of Glass, Corning, New York, USA*

The first exhibition to explore Louis C. Tiffany's glass mosaics – an extraordinary but little-known aspect of his artistic production – opens at The Corning Museum of Glass in May 2017. Tiffany's Glass Mosaics will include objects ranging from intimately scaled mosaic fancy goods to large-scale mosaic panels and architectural elements. Many of Tiffany's mosaic murals are still installed in their original settings and will be represented in the exhibition by photographs and through the use of digital displays. In support of this exhibition and the accompanying publication, CMOG's photographers captured mosaic installations in eight locations across New York State, and six more sites in Philadelphia, Baltimore, Princeton, and Chicago. Glass mosaics are difficult to photograph well in any circumstances, but this project presented additional challenges. Most of the large mosaic panels are high above floor level, existing lighting is insufficient, available power is limited, and almost all of the sites are open to the public.

Strategic planning for this project will be examined in this talk, as well as practical solutions which enabled us to adapt to a wide variety of conditions while capturing well-lit, high quality images with consistent color and detail – all within the constraints of a limited budget. Adaptation of studio lighting techniques for highly reflective, often iridescent, glass mosaics on location will be discussed, as well as equipment modified specifically for this project. Images from this project will be presented as part of an immersive digital exhibition experience and will live on in the accompanying publication, but they also serve much a broader purpose as documentation of at-risk cultural treasures. Many of these mosaics had never before been professionally photographed, and the images are being used to promote awareness and appreciation for the various sites, as well as serving as a record of current condition for conservation efforts.

## PAINTED ROOM: CHALLENGES IN EVERY CORNER

*Staff Photographer, Image Department, Rijksmuseum, Amsterdam, The Netherlands*

[illegible][illegible]

## VISUALIZING SPACES FOR MUSIC: THE BERLIN PHILHARMONIC AND PIERRE BOULEZ SAAL

*Imaging and Digital Media Architect, J Paul Getty Trust, Los Angeles, CA, USA*

insight into how its expansive interior was created, however no working or presentation models of Scharoun's Philharmonie are extant. The interior of Hans Scharoun's Berlin Philharmonic, which ranks among the most influential concert hall designs of the twentieth century, is a very complex and multifaceted space. The bold decision made by the GRI's curatorial team to commission a 3D digital and printed model of the Philharmonic interior allows the curators to communicate to gallery visitors the innovative nature of this complex space in a manner much more evocative than photographs alone could convey, making this a truly groundbreaking undertaking.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



## INV 6

### HIGH-RESOLUTION MULTISPECTRAL PHOTOGRAPHY

Roy S. Berns

*Professor, Center for Imaging Science, Rochester Institute of Technology, Rochester, New York*

Spectral data has arrived with the new iccMAX specification. This will lead to significant improvements in multi-ink printing where color separation will be based on spectral matching. It also provides a framework for combining scientific and studio photography for image archiving. Multispectral photography bridges hyperspectral imaging, used in conservation science, and RGB imaging, used in the studio. Two approaches will be described. The first is dual-

RGB where an RGB camera and two colored filters (or lights) combine to form a five-channel multispectral camera. The second is a conventional system consisting of a monochrome camera and filter wheel. This new seven-filter multispectral system was designed with three quality criteria: high color accuracy, moderate spectral accuracy, and low color transformation noise.

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.

## MULTISPECTRAL IMAGING WORKFLOW INTEGRATION

<sup>1</sup>Preservation Specialist, Library of Congress, Heritage Photographer, USA, <sup>2</sup>Heritage Photographer, The John Rylands Library, University of Manchester Library, UK

established methods of operation, but is nonetheless feasible, as demonstrated by the collaboration between the Preservation Research and Testing Division of the Library of Congress (USA) and the digitization labs of The John Rylands Library, University of Manchester (UK).

[illegible]

*Senior researcher, Digital Humanities Lab, University of Basel, Switzerland*

In the project “Digital Materiality”, we applied and enhanced Reflection Transformation Imaging (RTI) enabling this technique to capture artwork that is characterized by surfaces that strongly interact with light. Standard photographic approaches are unable to capture the dynamic component of the light-surface interdependence specific for these kinds of objects. RTI is a promising approach to go beyond the limitations of conventional photography. However, RTI has some drawbacks that are critical in the context of the reproduction of surfaces composed of materials of different kind. Typical RTI images reduce any mixture of materials with an average gloss for the whole surface. Our improvements of the technology

The quality of a RTI rendering can be judged by various parameters. The most important is certainly the photorealism of a specific viewing situation. In photography one of the most important aspects is the visual appearance of color. Proper color transformation and reproduction is in a state-of-the-art digital photography workflow. However, when RTI was first developed color management was not a common process in photography workflows. Therefore, in typical implementations of RTI, color is handled as RGB data without any further explanation about what color primaries are chosen to span a color space. We will show what workflow can be used to optimize color representation in RTIs to enhance photorealism

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

## THE 3D IMAGE CAPTURE MOONSHOT: MANAGING THE ENERGETICS

*Image Science Associates, Williamson, New York, USA*

[illegible]

This is meant more as a provocative and catalyzing talk than necessarily an informative one. We will update the audience on the current strategies for doing such management, and we will describe the underlying complexities of performing spectral gonio-spectroradiometric calibrations and complementary targeting tools to progress the research that has been done to date. There are truly some exciting research efforts on this subject. Some of our best minds are embracing the challenge. Can we do it?

## A NEW TARGET WITH A NEW APPROACH FOR THE PHOTOGRAPHY OF 3D OBJECTS

*Imaging & Preservation Imaging (HIP), Haarlem, The Netherlands*

having a technical target strongly connected to uniform lighting conditions and clearly described camera settings as is the case with technical targets in 2D imaging. Quality, stability and repeatability are connected. The benefit of using this target is that once a perfect match between light, camera position and tonal capture settings is met, this situation can be repeated over and over again. This makes it possible to photograph objects in a structured and well-defined way based on the photographer's goals and decisions.

During the work shop I'll demonstrate the target and explain how to use it.

For more information go to [www.preservationimaging.com](http://www.preservationimaging.com).

Special thanks goes to Cecile van der Harten, Carola van Wijk and Henni van Beek for their inspiring support and confidence

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



**IU AND UFFIZI GALLERY: A VIRTUOUS COLLABORATION TO DIGITIZE IN 3D MUSEUM'S ARCHEOLOGICAL SCULPTURES' COLLECTION****Cristiana Barandoni<sup>1</sup> Bernard Frischer<sup>2</sup>***<sup>1</sup>IU-Uffizi Project Manager, Indiana University, USA, Uffizi Gallery, Italy, <sup>2</sup>Professor, Department of Informatics, School of Informatics, Indiana University, Indiana, USA*

After experimenting for two years the use of QR Codes the Department of Classical Antiquity of the Uffizi Gallery has taken another step forward. Thanks to an international agreement with the Indiana University (Bloomington, IN) the Archaeological Collection is currently undergoing photogrammetric scans to acquire 3D models of each statue and archaeological fragments. One section of this project, managed by the archaeologist Cristiana Barandoni, is to combine two areas – investigation and rendering – to create digital models which can be accurate and incontrovertible from a scientific point of view, but which are also approachable, understandable, and at museum

audience's disposal. This presentation introduces the IU-Uffizi Project and its potential to turn museums into comfortable places where the public can learn about new topics and co-create its content. The IU-Uffizi Project trains students in the techniques of 3D data capture, digital modeling and interactive online publication. It creates a limited number of 3D restoration models of sculptures in need of fast restoration which are ultimately published on several online sites including the Italian Ministry of Culture's internal conservation database, the Uffizi's public website and a special website which will collect all the metadata and the 3D models.

**INV 10**  
**INTEGRATING DIGITAL MUSEUM CONTENT INTO CURATORIAL PRACTICE**

**Wim Hupperetz**

*Director, Allard Pierson Museum, Amsterdam, The Netherlands*

The impact of digitalization and information technology over recent decades can primarily be seen in digital storage and conservation of collection data and image files. Visitors see that heritage collections are increasingly being opened up online with a great deal of work conducted mainly behind the scenes. In exhibitions, digitalization can be seen in the form of screens showing digital information, interactive applications and serious games. For the past decade sensor technology has been growing strongly, and this is increasingly being linked up to the Internet of Things. The impact of sensor technology or image recognition software is still relatively limited within the domain of the museum, if we compare it with other domains, such as retail, logistics and domotics — the application of electronics and household networks for the automation of processes in and around the home. With the Internet of

Things, not only data and people are linked in a digital network, but also locations and objects. This is taking place as a result of the fact that a direct digital link is being set up via integrated computer chips that are becoming steadily smaller, more powerful and cheaper, and which can be installed in any given device, comparable with our mobile phones. So it is technically possible for objects in museums to be an immediate component of the Internet of Things and to link them to information that is available online. Naturally this has major consequences for traditional museum praxis, where the curator takes on the role of selecting the objects and information on behalf of the museum visitor. We need to investigate the yet uncertain impact of digitalization on the museum domain, and more specifically the influence of the Internet of Things on the curator's day-to-day work.



**Marco Block-Berlitz<sup>1</sup>, Benjamin Dücke<sup>2</sup>**

<sup>1</sup>Professor, Faculty of Informatics/Mathematics, University of Applied Sciences, Dresden, Germany <sup>2</sup>Independent researcher, Germany

Archaeologists benefit immensely from progress in camera technology. The photogrammetric approach, in particular to capture single objects or in combination with UAVs (Unmanned Aerial Vehicles) to document complete excavation areas, is an easy-to-use alternative to traditional spatial sensing methods and currently evolves towards becoming the standard documentation method. The strategy of using expensive cameras producing images with high resolution is prevalent. Since 2012, we have been using an alternative strategy which is called *videogrammetry*. The videogrammetric approach to 3D reconstruction (i.e. using frames extracted from video streams instead of single-shot image series) was successfully introduced to aerial 3D reconstruction using UAVs in the project “Archaeocopter”. Instead of using images with 24 megapixels resolution or higher, we use an Action Cam like the GoPro with a resolution of 1080p. This

may sound curious, but after 15 minutes of recording at 30 fps, we produce a set of 27,000 images. In situations where accurate overlapping and positioning are required, we are guaranteed to have enough suitable images. Our software is able to select the best keyframes for reconstructing the 3D model. The results of several campaigns have shown that videogrammetry is a fully viable approach to reconstruct single objects as well as complete archaeological areas. In 2015, the 3D reconstruction scope was extended to underwater archaeology and the project “Archaeonautic” was initiated. The miniature UUV Eckbert-II – equipped with GoPro cameras, additional lights and a flexible taring system – was successfully deployed to document different excavation stages of a shipwreck off the coast of Veruda, Croatia and the UNESCO World Heritage Site “See” at lake Mondsee in Austria.

**Liz McDermott<sup>1</sup>, Frances Terpak<sup>2</sup>**

*<sup>1</sup>Head of Web & New Media, <sup>2</sup>Curator of Photographs, Getty Research Institute, Los Angeles, USA*

The first online exhibition from the Getty Research Institute (GRI), The Legacy of Ancient Palmyra, highlights two rare collections from the GRI documenting an important archeological site that has recently undergone destruction amid the Syrian war. These collections include the first photographs of the ancient monuments of Palmyra, including many destroyed in 2015 and 2017 by ISIS. Because the GRI's two collections are not accessible together anywhere else, the exhibition team sought to make these materials freely available with accompanying scholarly interpretation to anyone with Internet access.

The GRI's 100 etchings of Palmyra by artist Louis François Cassas were recorded during his late-18th century journey through the Ottoman Empire. The second collection comprises 29 photographs by sea captain, Louis Vignes, who documented Palmyra, as a side trip during an 1864 scientific expedition to the Dead Sea. The online exhibition takes advantage of the comparisons presented by these two

collections to dive deeper into the archaeological and art-historical context of this site.

Taking fourteen months to develop, the project considered how to take a visitor's gallery experience – such as looking closely at an image and then standing back from a different perspective – and to translate this to desktop, tablet, and mobile devices. How could we evoke, but also move beyond a gallery experience? How might we offer an online exhibition that brings highly detailed 18th-century prints and 19th-century photographs into a 21st-century digital environment? A primary goal sought to build – through a responsive design – a site that would capture wayfinding and a narrative progression in a digital experience without forcing viewers onto a single “path” through the exhibition. This talk describes how the curators and the digital team addressed these challenges and how they informed decisions about design, layout, technical features, and image presentation.

**Hendrik Hameeuw***Research fellow, University of Leuven, Leuven, Belgium, Royal Museums of Art and History, Brussels, Belgium*

In a few thousand years, 99% of the physical material of our cultural heritage we try to preserve today will be lost. An inconvenient fact for all stakeholders involved in the preservation of the actual objects which testify to the richness of our past; most will end up as undefinable dust. Destruction is omnipresent: earthquakes, tsunamis, fires, volcanos, time, hostile environments, flashlights, war, neglect, vandalism, collateral damage, and deliberate violations. Concerning the last, whether it is the destruction of heritage sites to make place for the Olympics in Beijing, the dynamiting of the Buddha's of Bamiyan statues, the burning of the Timbuktu manuscripts or the demolishing of mausoleums of holy men in Syria and Iraq, people always seem to come up with justifying reasons. Our modern cities are built on the foundations of destructive progress. Strategies to overcome this must be formulated. The seven

wonders of the world of which only the Giza Pyramids survived, have taken a central position in our understanding of great architectural accomplishments which were lost, to be remembered only thanks to ancient writings. Today the odds are more favorable. Over the last 150 years, architects, engineers, illustrators and archaeologists produced technical drawings of many heritage sites and artefacts. Digitalization projects and efforts are ongoing everywhere and imaging techniques allow reconstructions unthinkable up until recent times. But what to do with them? What is their accuracy? Do we have complete datasets linked with metadata? What is to be considered as a complete dataset? What has not been registered? Templates, protocols and standards should be developed to ensure their sustainability. When all of that is settled, if the original is lost, what gets preserved digitally, and what does not?

**Henrike Hövelmann<sup>1</sup>, Froukje van der Meulen<sup>2</sup>**

*<sup>1</sup>Projectmanager Printroom Online, <sup>2</sup>Accountmanager Image Department, Rijksmuseum, Amsterdam, The Netherlands*

After the extensive renovation of the Rijksmuseum – which resulted in its reopening in 2013 – the museum is now ready for the next step in preserving the collection for the future.

In 2019 the external museum depot is expected to move into a new sustainable collection center shared with three partner institutions. Therefore, a new project was started to prepare moving 60,000 objects to the new site. This project includes preventive conservation, and registration checks as well as making digital photographs of all objects. Previously, the Rijksmuseum started the digitization of its collection of works on paper within the project “Print room online” to make the light-sensitive objects generally accessible to a wider public. The prospects of these two projects gave the museum the opportunity to dream of a fully digitized museum collection.

The Rijksmuseum has high-quality standards for registration, art handling and digitizing, which is one of the reasons why most of the digitizing activities are run by its own photographers in the Rijksmuseum studios.

But how do you digitize a diverse collection of approximately one million objects within a few years, while regular museum activities such as loans, acquisitions, exhibitions and the preparation of catalogues keep going?

This presentation gives you an impression of the diverse collection of the Rijksmuseum. We will provide you with a number of persuasive examples of different studio solutions for different object groups comprising glass, metalwork, works on paper, paintings, textile, porcelain, tapestries and furniture, among other things.

Furthermore, we would like to offer you an overview of how museum professionals tend to collaborate with each other. Cataloguers, art handlers and photographers as well as project managers, curators and conservators have been working increasingly closer together throughout this ambitious project.

**Marika van Roon***Head curator Special Collections, University of Amsterdam, The Netherlands*

Museums, libraries and archives have been digitizing their collections in recent decades. They have been striving for the best quality and highest resolution of their images. Their ambition is to digitize all their collections according to ambitious requirements. However, a lot has changed since the first digitization projects started about 20 years ago. One of the most important changes is the differentiation in digitization processes.

The first digitization projects of the Special Collections Department of the University of Amsterdam, dating from around the year 2000, were very ambitious as well. Costs were high, production was low, managing the digital collection was labor intensive. Many projects were started to lower the costs, increase the production, improve the accessibility and simplify the management of the digital collection, with more or less success. Eventually the decision was made to work together with Google and the National Library of the Netherlands for the digitization of Dutch printed books. Without this cooperation the digitization of all the public domain printed works from the Netherlands would have been unachievable.

Mass digitization requires clear decisions and strict guidelines. Actions must be simplified and limited to the minimum during the digitization process, otherwise the process will be delayed significantly. The selection criteria, the workflow, and the quality of the digitization have to be decided. This has led to the exclusion of certain collections and to limited research options, but it has also led to a large production. Within two years 130,000 books of the University of Amsterdam were digitized. The scans and texts can be found in Google Books and Delpher, the Dutch national text database. This is hugely important for research, but it doesn't mean we are done with digitization. Not only do we still need to digitize the excluded collections, the project has provided profound awareness of all the physical characteristics of printed books that are not represented by the simple scans produced by mass digitization nor by metadata or machine readable texts. The digitization strategy of every organization must take into account the form and composition of the original material and the foreseeable function and use of the digitized material. Differentiation in digitization processes is required.

*Senior Production Manager Digitization, National Library of the Netherlands (KB), The Hague, The Netherlands*

Our projects involve up to seven different internal and external parties that deal with unique fragile material originating from approximately 900 CE to 1950 CE. Some originals came from the former colonies of the Netherlands and were shipped several times in the past. Due to poor storage conditions or excessive handling, the physical state

The senior digitization production manager of the archival section is responsible for implementing, improving and carrying out the quality control workflow. She also has to ensure that the public can find and use the output generated in the course of those digitization projects. In order to create our QA workflow we need to answer many questions: What is my input? What requirements do we have for long-term preservation? Do we need long-term preservation or should we produce access copies? What image quality do we want? What level do we need? When do we need it?

The answers to these questions determine our workflow, which contains three major steps carried out by the National Library and one carried out by collection owners.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

**Stuart Snyderman***Associate Director for Digital Strategy, Stanford University Libraries, USA*

The means by which digital images are delivered to users on the web are inextricably linked to the methods by which the image is captured or produced in the first place. As digitization studio professionals we take extraordinary care to reproduce priceless cultural artifacts at high resolutions with accurate color, all in the service of offering users an authentic experience with a digital facsimile. Most of our users encounter the images we produce on the web, delivered (and often decoded) from an image server, and rendered in the browser in a feature-rich viewer that allows the user to zoom, pan, rotate and sometimes manipulate the image on screen.

Given the great care and precision involved in producing the original image, aren't you interested in the journey it takes from the camera to the user?

The International Image Interoperability Framework (<http://iiif.io>) is an open standards-based technology framework that an increasing number of cultural

institutions around the world are using to deliver images on the web. Adopted by scores of museums, national libraries, academic libraries, archives, galleries, commercial image databases and image aggregators, IIIF has become foundational technology infrastructure in our field. IIIF-compatible software is being used to present the images you are producing to users.

This presentation will introduce and explain IIIF from the perspective of the digitization studio professional. We'll discuss what the studio professional needs to know so that their digital productions can be optimally rendered in the IIIF-powered online environment. You will see demonstrations of how IIIF enables new ways of presenting, comparing, analyzing, and annotating images, and even virtually reuniting image sets or objects that have been dispersed from their original form. We will speculate on the future of IIIF as it relates to computational imaging and 3D captures.

**SP 5**  
**OVERSIZED IMAGING STANFORD: THE OMI KUNI-EZU TAX MAP, 1837**

**Deardra Fuzzell**

*Cartographic Technology Specialist at Stanford Libraries, Stanford University, CA. USA*

Stanford University has been actively digitizing its map holdings since 2008. To date, they have imaged approximately 90,000 maps and pages of map-related text. Given their oversized format, maps are often challenging cultural heritage artifacts to digitize. This presentation will explore the processes and techniques used to image the Ōmi Kuni-ezu 近江國絵圖 Japanese Tax Map from 1837. Undertaken in partnership with the Department of History

at Stanford, the project pushed the limits of the digitization team's technical expertise and resourcefulness, especially as its great size and fragility made it impossible to photograph in the imaging studio. This case study will highlight the current limitations of 2D imaging technology, ongoing problems of digitizing paper and cloth items of a certain size and fragility, and the important role of cultural heritage imaging in research, teaching and learning.



*Junior paintings conservator, Rijksmuseum, Amsterdam, The Netherlands*

A team effort: Robert Erdmann, Carola van Wijk, Rik Klein Gotink, Henni van Beek

The Rijksmuseum Amsterdam is currently engaged in a large project to make an online database of its extensive collection of cross-sections from paintings, frames, and sculptures. This project is one of the first of its kind in the world. As part of this process, digital photomicrographs are collected from each of the 2700 embedded paint samples. To enhance the scientific value of these images, it is important that a standardized imaging technique is used and that color accuracy of the images is ensured. In the

absence of an existing solution for reflected light microscopy color management, we developed a modular multi-step system for producing an input color profile for a given microscope digital camera and a set of standardized lighting conditions. Additionally, we developed a simple drag-and-drop web-based tool with which raw digital images from our microscope can be instantly processed to produce calibrated TIFF files expressed in an industry-standard color space (ECI RGBv2).

[illegible]

## FROM PROJECT TO PROGRAMMATIC: INTERNATIONAL STANDARDS AND ADVANCED IMAGING AT THE METROPOLITAN MUSEUM OF ART

*Senior Imaging Manager, The Photograph Studio, The Metropolitan Museum of Art, New York, USA*

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

develop best practice leveraging international standards. Scott will highlight recently published international standards and will discuss new standardization efforts for cultural heritage imaging.

**Sofia Georgakopoulou***Postdoctoral researcher, Digital Humanities Lab, University of Basel, Switzerland*

The CAPcam is a novel digital view camera that takes advantage of the Scheimpflug principle and the capabilities of the traditional view camera, and integrates them to the current digital technologies. Thanks to its dedicated software, the CAPcam can be completely operated by computer. The photographer can select a focal plane and the software will drive the camera to the correct configuration and capture the image. The process of selecting a specific focal plane and photographing objects with an unprecedented sharpness and precision requires only a few minutes.

Its ability to stay perfectly in focus at open apertures provides the opportunity to obtain incredibly sharp images over a large area of the photograph, which would be impossible to achieve with a traditional lens configuration. The closed aperture needed to obtain maximum depth of field will always translate as a loss of the captured detail

due to diffraction. With an open aperture, light can pass through essentially unobstructed, making the diffraction effects unnoticeable. When the aperture is closed, the amount of light that hits the aperture walls and gets distorted is no longer insignificant. The bent light rays cause a number of surrounding diffraction rings and interference known as “the Airy disk”. When the Airy disk is more than half the Circle of Confusion (caused by the inevitable lack of a perfect focus), we have significantly reduced resolution. This loss of detail due to diffraction at closed apertures cannot be compensated by any other means, making the Scheimpflug principle the method that can achieve the sharpest photographs possible today. The CAPcam is the only digitally enhanced camera that supports this method. Using the paradigm of the CAPcam we will also investigate the shift in the workflows from an analogue to a digital photographic process.

*Digital Library archivist and Curator, Knowlton School of Architecture, Landscape Architecture, and City and Regional Planning,  
The Ohio State University, Columbus, OH, USA*

Faculty and students spent an immense amount of time creating these model spaces adding figures for scale and experimenting with lighting sources to give the viewer an accurate view of their vision for the structure. However, the

Whether digitizing student work at The Ohio State University or photographing ancient vases at the Kenchreai excavations in Greece, I've found there are always problems that require creative solutions. This project demonstrates how tech tools are exponentially more powerful when driven by the power of community. No one had created exactly what I needed, but by grabbing parts from work shared by others, I've been able to create tools with applications beyond architectural models.

[illegible]

**Robert Erdmann***Senior Scientist, Rijksmuseum, Amsterdam, The Netherlands*

Modern digital photography and scientific imaging provide unparalleled opportunities for art historians, conservators, scientists, and the general public to better understand, appreciate, and preserve our cultural heritage. However, the imagery for a single object is often drawn from several sources and captured from several viewpoints, resulting in data sets sometimes exceeding tens or hundreds of gigabytes for a single object. These large data sets can be very difficult to process and visualize using traditional techniques, so their utility and accessibility are severely limited.

Several new image-processing and interactive web-based technologies developed at the Rijksmuseum and for the award-winning Bosch Research and Conservation Project aim to help solve this problem. Data is fused through co-registration across imaging modalities and viewpoints, after

which additional image processing can be used to perform deeper tasks such as virtual repairs, anomaly detection, microstructural analysis, and iconographic analysis. The resulting analyses and registered imagery can then be explored using a variety of novel visualization strategies, each carefully designed to facilitate comparisons across scales, viewpoints, and wavelengths, with the ultimate goal of sparking meaningful insights. By utilizing open and standard web technologies, these strategies work across different browsers and devices, from mobile phones to dedicated desktop servers. Objects from the Rijksmuseum and the Bosch Project provide strong motivation for the new techniques, including the recently acquired Bacchant sculpture by Adriaen de Vries, the Hartogh Plate, and many works by Bosch, Rembrandt, Hercules Segers, and Vermeer.

## WORKSHOPS

### WS 1

#### SERIAL DIGITIZATION OF MUSICAL INSTRUMENTS AND THE MIMO DIGITIZATION STANDARD

**Frank P. Bär<sup>1</sup>, Staeske Rebers<sup>2</sup>**

*<sup>1</sup>Curator musical instrument collection, head Research services and Photo department Germanisches Nationalmuseum, Nürnberg, Germany, <sup>2</sup>Staff Photographer, Image Department Rijksmuseum, Amsterdam, The Netherlands*

Photographing musical instruments with their large variety of materials, shapes, sizes and surfaces is a big challenge, especially if the target is the digitization of an entire collection within a reasonable timeframe. For inter-institutional research purposes, it is of utmost importance to make images from different collections comparable, which is no small task at all since, unlike paintings or sculpture, they have a multitude of possible positions and angles of view.

One of the major outcomes of the EU-funded project Musical Instrument Museums Online (MIMO), which started in 2009, was the collaborative creation of a digitization standard for musical instruments. The workshop shows how this standard was created, which role it plays in a photographer's daily working life, how to devise workflows for a large number of difficult objects and some showcases of lighting and photographing objects.

### WS 2

#### 2D PHOTOGRAPHY: DAY-TO-DAY PRACTICE. PHOTOGRAPHING SYSTEMATICALLY WITH THE METAMORFOZE GUIDELINES FOR PRESERVATION PHOTOGRAPHY

**Henni van Beek**

*Staff Photographer Printroom Online, Rijksmuseum, Amsterdam, The Netherlands*

We are engaged in photographing cultural heritage at the Rijksmuseum Amsterdam every day; we are deeply indebted to the Metamorfoze guidelines for preservation photography. In this workshop I would like to provide deeper insights into these guidelines while also doing justice to our day-to-day practice. In other words, by no means can we always conform. Sometimes very different requirements are laid out for us and we must navigate through a different course using that new information.

I will address cross-polarization between Metamorfoze and the book cradle we developed at the Rijksmuseum. This will be followed by an open discussion among professional photographers, managers, and perhaps also the purchasers of photography on the topic of What is quality?

### WS 3

#### TEACHING YOU TO FISH: STRATEGIES FOR FADGI/ METAMORFOZE GUIDELINE COMPLIANCE – IT’S NOT THAT DIFFICULT

**Don Williams<sup>1</sup>, Peter Burns<sup>2</sup>**

*<sup>1</sup>Image Science Associates, Williamson, New York, USA, <sup>2</sup>Consultant digital imaging system and service development, USA,*

Both the FADGI and Metamorfoze guidelines are beginning to merge under the international ISO effort of JWG 26: Imaging system capability qualification for archival recording and approval. Having developed and coached others on meeting these imaging performance guidelines we offer our experiences and suggestions to the audience. We offer this as a true workshop with hands-on usage of

software and camera setups as feasible. Rather than simply lecturing to the participants we will have a selection of test images for the audience to choose from and execute available software options to test these images for compliance to the existing international guidelines. The audience is encouraged to bring their own images of test targets for evaluation and possible remediation.

### WS 4

#### HIGH-RESOLUTION MULTISPECTRAL PHOTOGRAPHY

**Roy S. Berns**

*Professor Color Science, Appearance, and Technology, Rochester Institute of Technology, USA*

Spectral data has arrived with the new iccMAX specification. This will lead to significant improvements in multi-ink printing where color separation will be based on spectral matching. It also provides a framework for combining scientific and studio photography for image archiving. Multispectral photography bridges hyperspectral imaging, used in conservation science, and RGB imaging, used in the studio. Two approaches will be described. The first is dual-

RGB where an RGB camera and two colored filters (or lights) combine to form a five-channel multispectral camera. The second is a conventional system consisting of a monochrome camera and filter wheel. This new seven-filter multispectral system was designed with three quality criteria: high color accuracy, moderate spectral accuracy, and low color transformation noise.

## WS 5

### A NEW TARGET WITH A NEW APPROACH FOR THE PHOTOGRAPHY OF 3D OBJECTS

#### Hans van Dormolen

*Imaging & Preservation Imaging (HIP), Haarlem, The Netherlands*

During the conference I presented a new target that makes it possible to measure white balance, correct exposure and gain modulation while shooting 3D objects. It is designed for non-uniform lighting conditions and provides information on the tonal capture conditions under which the image was shot. This target requires the photographer to use new skills and craftsmanship as well as the traditional, familiar ones.

The photographer decides from which viewpoint the object has to be shot, where to put the camera, how to frame the image and how to illuminate the object in the best possible way, the way it has always been with photography.

The new skills and craftsmanship needed to work with this target entail deciding where to have correct white balance, exposure and gain modulation in the image. The photographer chooses where to place the target and how to

use it. And, to do so, he needs to have full understanding of the benefits of correct tonal capture.

The interesting part of this target is that its use is connected to the photographer's goal, which is totally different from having a technical target strongly connected to uniform lighting conditions and clearly described camera settings as is the case with technical targets in 2D imaging.

Quality, stability and repeatability are connected. The benefit of using this target is that once a perfect match between light, camera position and tonal capture settings is met, this situation can be repeated over and over again. This makes it possible to photograph objects in a structured and well-defined way based on the photographer's goals and decisions.

During the work shop I'll demonstrate the target and explain how to use it and I will explain how to use it in a practical and daily repeatable way.

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## WS 6

### A DEEPER DIVE INTO IIIF: WHAT STUDIO PROFESSIONALS SHOULD KNOW ABOUT THE INTERNATIONAL IMAGE INTEROPERABILITY FRAMEWORK

#### Stuart Snyderman

*Associate Director for Digital Strategy Stanford University Libraries, USA*

The means by which digital images are delivered to users on the web are inextricably linked to the methods by which the image is captured or produced in the first place. As digitization studio professionals we take extraordinary care to reproduce priceless cultural artifacts at high resolutions with accurate color, all in the service of offering users an authentic experience with a digital facsimile. Most of our users encounter the images we produce on the web, delivered (and often decoded) from an image server, and rendered in the browser in a feature-rich viewer that allows the user to zoom, pan, rotate and sometimes manipulate the image on screen.

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institutions around the world are using to deliver images on the web. Adopted by scores of museums, national libraries, academic libraries, archives, galleries, commercial image databases and image aggregators, IIIF has become the foundational technology infrastructure in our field. IIIF-compatible software is being used to present the images you are producing to users.

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## WS 7

### PUSHING THE BOUNDARIES OF IMAGE PROCESSING AND VISUALIZATION FOR CULTURAL HERITAGE

#### **Robert Erdmann**

*Senior Scientist, Rijksmuseum, Amsterdam, The Netherlands*

Modern digital photography and scientific imaging provide unparalleled opportunities for art historians, conservators, scientists, and the general public to better understand, appreciate, and preserve our cultural heritage. However, the imagery for a single object is often drawn from several sources and captured from several viewpoints, resulting in data sets sometimes exceeding tens or hundreds of gigabytes for a single object. These large data sets can be very difficult to process and visualize using traditional techniques, so their utility and accessibility are severely limited.

Several new image-processing and interactive web-based technologies developed at the Rijksmuseum and for the award-winning Bosch Research and Conservation Project aim to help solve this problem. Data is fused through co-registration across imaging modalities and viewpoints, after

which additional image processing can be used to perform deeper tasks such as virtual repairs, anomaly detection, microstructural analysis, and iconographic analysis. The resulting analyses and registered imagery can then be explored using a variety of novel visualization strategies, each carefully designed to facilitate comparisons across scales, viewpoints, and wavelengths, with the ultimate goal of sparking meaningful insights. By utilizing open and standard web technologies, these strategies work across different browsers and devices, from mobile phones to dedicated desktop servers. Objects from the Rijksmuseum and the Bosch Project provide strong motivation for the new techniques, including the recently acquired Bacchant sculpture by Adriaen de Vries, the Hartogh Plate, and many works by Bosch, Rembrandt, Hercules Segers, and Vermeer.

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## WS 8

### THE MICRODOME, AN INNOVATING TOOL TO MONITOR THE TOPOGRAPHY AND MATERIALITY OF ART OBJECTS (PORTABLE LIGHT DOME SYSTEM)

#### **Bruno Vandermeulen<sup>1</sup>, Lieve Watteeuw<sup>2</sup>**

*<sup>1</sup>Head of Digitization and Document Delivery, University Library, University of Leuven, Leuven, Belgium, <sup>2</sup>Professor Illuminare, University of Leuven, Leuven, Belgium*

The Portable Light Dome is an integrated, multi-directional and portable acquisition system with an overhead camera and LEDs covering the dome's inside surface. The Microdome has been specifically adapted to monitor books and manuscripts

The Multispectral Microdome has LEDs emitting in five different spectra: UV, blue, red, green and IR. After processing, the Photometric Stereo algorithm allows extraction of genuine 3D, shading, metric and reflectance information.

The associated viewer allows for virtual relighting, enhancements, measurements, shifting through the individual spectra and viewing of false color images which can be applied in an interactive, real-time manner. In the workshop we will work with the Multispectral Microdome, look at the base principles, the capture and processing software and examine different objects and materials in the viewer. Advanced features such as the measurement tool or reflection maps will also be covered. For more information, visit [portablelightdome.wordpress.com](http://portablelightdome.wordpress.com).

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**Dan Dennehy<sup>1</sup>, Gary Meyer<sup>2</sup>**

<sup>1</sup>Senior Photographer and Head of Visual Resources, Minneapolis Institute of Art, <sup>2</sup>Associate Professor, Department of Computer Science and Engineering, University of Minnesota, Minneapolis, MN, USA

This workshop will demonstrate the use of image based rendering software that can be used to obtain a dynamic three dimensional representation of an artifact; the method preserves the photorealism of the original images that were used to produce the model and permits the object to be relighted using arbitrary lighting setups. The software works in conjunction with photogrammetry software such as Agisoft PhotoScan, but it provides a far more realistic and flexible rendition of the object than is possible with this and other similar commercial tools. When it is used to record a single static lighting setup, the software simply interpolates amongst the photographs that were taken. In this case the lighting is “baked into” the photographs and cannot be changed in the computer graphic rendition. If relighting is desired, the object is photographed using a camera mounted strobe light. By cleverly selecting and blending

these flash photographs the software is able to create a real time playback in which the lighting can be altered.

In this workshop we will lead the participants through the steps that are necessary to photograph the object, process the images, and display and relight the results on a laptop. The software has been developed in a collaboration between the Minneapolis Institute of Art and the University of Minnesota, and it has been tested as part of the typical photographic workflow at the museum. Participants will learn how this approach can be used to acquire, at one time, all of the imagery that is necessary to document an artifact and produce novel renditions of it, now or in the future. They will also see how simple the method is to apply, particularly for museums that do not have a professional photographic staff.

**Andrew Fortune<sup>1</sup>, Frans Pegt<sup>2</sup>**

<sup>1</sup>Collections Photography Department Manager, The Corning Museum of Glass, New York, USA; <sup>2</sup>Staff Photographer Image Department Rijksmuseum, Amsterdam, The Netherlands

Lighting transparent glass objects for photography is always a matter of controlling contrast. Sometimes you need less contrast and sometimes you need more, but you always need to be able to control it. This is because the way we perceive glass is the result of how the glass itself transmits, refracts, reflects, and distorts light. Unlike most any other material, it is not possible to fully separate our perception of the glass itself from our perception of what we see through the glass. As museum photographers, we are trained to photograph objects on flat, neutral backgrounds (e.g. LAB 80 gray), and yet that approach creates incredible challenges when trying to capture subtle details such as engraving, tooling marks, optic ribbing, among other things. Often, it appears as if all detail and “glassiness” disappears once the object is placed on the background. This phenomenon occurs because every variation of thickness,

every curve, every bit of engraving – really every change in the surface – in transparent glasses acts as a lens, however imperfect, and distorts the view through the glass. The field of view of each of these “lenses” must include a contrast of highlight and shadow and also be at a sufficient distance from the “lens” to resolve properly. If there is little contrast seen through the “lenses,” then there will be little contrast visible in the glass itself. Likewise, reflections in the glass must be carefully controlled in order to reveal, rather than obscure detail.

In this workshop, we will present several lighting setup examples and discuss various approaches taken by The Rijksmuseum and The Corning Museum of Glass, with the emphasis on lighting solutions vs. multiple exposures and post-capture imaging.

## WS 11

### 360 DEGREES OF QUALITY: PHOTOGRAPHY IN THE ROUND AT RIJKSMUSEUM

#### Carola van Wijk

*Staff Photographer Image Department, Rijksmuseum, Amsterdam, The Netherlands*

We took no risks once it was decided to purchase a turntable that would provide us the opportunity to accurately photograph a variety of objects in 360 degrees. The platform had to fulfill the new requirements for the scientific implementation of photography in advanced applications. Carola van Wijk and Frans Pegt, staff photographers at the Rijksmuseum, searched several companies with senior scientist Robert Erdmann. Carola and Frans also saw the Photobot, the preferred choice, in

action while at the Metropolitan Museum in New York before the decision to purchase it was finalized. The Photobot was delivered in January this year.

In this workshop, Carola van Wijk, will demonstrate and discuss the steps necessary, before you can even turn on the camera. One of the main issues is centering your object. There is a lot of preparation before you press start. Once you have conquered that, the robot does the rest....

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## WS 12

### QUICK AND ACCURATE TILING USING AN EASY-TO-ASSEMBLE PORTABLE CAMERA POSITIONING SYSTEM (FOR LARGE, FLAT OBJECTS)

#### Rik Klein Gotink

*Staff Photographer Image Department, Rijksmuseum, Amsterdam, The Netherlands*

Quick and accurate tiling using an easy to assemble portable camera positioning system. And the use of a large rig for photographing large format tapestries and similar objects.

To get very high resolution images it's necessary to stitch a set of close-up images of an object. But how can you be sure all photographs are aligned? Why doesn't it have to take forever to align the camera before every shot?

Obviously, the better the photos are aligned, the better the stitch will come out.

And, which software is best for stitching?

In this workshop there will be a demonstration of two systems to do this. One for vertical objects up to 2 × 3m, typically for paintings. And one with the camera looking down from overhead for objects like tapestries, other textiles, and paintings that have been stored rolled up.

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## POSTERS

### P 1

#### VICTORIA & ALBERT MUSEUM PHOTOGRAPHIC STUDIO ARCHIVE 1857 TO PRESENT

##### Ken Jackson

*Manager Digitisation Archives and Collections, Victoria & Albert Museum, London, UK and Co-director Cultural Heritage Digitisation Ltd, UK*

I have been employed as a photographer all my working life and am currently Manager for Digitisation of Archives and Collections (formerly Chief Photographer) at the Victoria & Albert Museum London (1972 to present).

I am a Co-director of Cultural Heritage Digitisation Ltd with my business partner James Stevenson, formed in 2013.

My Poster Presentation looks at the photography archive of the V&A Photographic Studio since 1857 when the Studio was founded.

I look at one specific object – The Eltenburgh Reliquary acquired in 1861.

Of particular interest is the number of times this object has been photographed over the last 140 years and how this shows the history of both the photographic process and the management of photographic production.

### P 2

#### COLOR ACCURATE REPRODUCTION OF ORIGINAL ARTWORK USING CUSTOM PROFILES IN ADOBE CAMERA RAW

##### Franz Herbert<sup>1</sup>, Christopher Campbell<sup>2</sup>

*<sup>1</sup>Vice President R&D at basiCColor GmbH, Germany, <sup>2</sup>artist and photographer, USA*

It has been common practice to create custom ICC profiles for digital cameras used in fine art reproduction. However, many photographers use Adobe Camera Raw (ACR) in Photoshop or Lightroom as their main acquisition and image correction/editing tool. In ACR, a special type of profile, a “Digital Camera Profile” (DCP) – also known as DNG or Raw profile – is automatically used. The default profiles were not created for the subtleties of art reproduction, but rather for getting pleasing color in typical images with green grass and blue skies. No other

application supports the use of custom DCP profiles, so we at basiCColor therefore decided to create custom profiles from a variety of targets to finely optimize the reproduction of works of art. To show the flexibility of this approach, we are presenting the work of artist and photographer Christopher Campbell with two types of subject matter, photographs of paintings on display in various museums using available light, as well as photographs of Christopher’s own work using a controlled copy set-up.

### P 3

#### QUANTITATIVE MONITORING OF WORKS OF ART ON PAPER WITH SPECTRAL IMAGING

Roberto Padoan, M. E. Klein, L. Stefani, I. Shevchuk, H. Mahgoub, R.G. Erdmann.  
*Fellow Researcher, Migelien Gerritzen fellowship, Rijksmuseum, Amsterdam, The Netherlands*

The goal of this research is to determine potentials and limits of UV-VIS-NIR Spectral Imaging for the non-destructive quantitative monitoring of spectral changes that may occur in historical papers and writing media during exhibitions e.g. at the Rijksmuseum.

Four spectral imaging instruments in Europe, with different technical specifications, have been used on the same set of reference targets and on samples that will be light aged at different humidity levels using the same LED illumination as

is present in the exhibition rooms of the Rijksmuseum. The samples include: a historical blue paper, a light sensitive pastel, papers with foxing and metal intrusions, a sanguine (red chalk) and the Blue Wool Standard grade 1. All of them will be recorded a second time after accelerated ageing in order to assess the monitoring sensitivity. This research project is made possible by the Migelien Gerritzen Fund/Rijksmuseum Fund.

### P 4

#### THE RIJKSMUSEUM DAM, HOW WE GOT THERE AND WHERE WE'RE GOING

Iris Labeur

*Accountmanager, Rijksmuseum, Amsterdam, The Netherlands*

This poster presentation looks at the transition of the Rijksmuseum Image Department archives over the last 15 years. It will give a brief look at how the archive developed from almost exclusively analogue at the start of this millennium to digital today. What were the challenges and successes along the way, how did the analogue legacy shape our digital archive and what are our goals, wishes and challenges for the future.

## BIOGRAPHIES

### **BÄR, FRANK P.**

*Serial digitization of musical instruments and the MIMO digitization standard (WS 1)*

Frank P. Bär holds a Ph.D. in musicology and has been curator of the musical instrument collection of Germanisches Nationalmuseum since 1997. Furthermore, he is head of the research services and photo departments. He was responsible for coordinating the digitization of 45,000+ musical instruments in public collections for the European community funded project Musical Instruments Museums Online (MIMO), and is now member of the MIMO Core Management Group which cares for the sustainability and enhancement of the service. Currently he is directing two DFG-funded research projects on 3D-computed tomography and a collector's archives. In 2016 he was elected vice president of ICOM-CIMCIM.

### **BARANDONI, CRISTIANA**

*IU and Uffizi Gallery: A Virtuous Collaboration to Digitize in 3D the Museum's Archaeological Sculptures' Collection (INV 9)*

Cristiana Barandoni is an archaeologist with a double specialization in Archaeoseismology and Digital Strategy Content Developer. Since 2014 she has been collaborating as scientific advisor with the Department of Classical Antiquities of the Uffizi Gallery in Florence where she has been curator of two projects: "Gold Unveiled" and "UffiziArcheologia". She has been an assistant researcher for Professor Bernard Frischer, Director of the Virtual World Heritage Laboratory at Indiana University in Bloomington, Indian since May 2016 when she also became a member of the Scientific Committee and Project Manager of the IU-Uffizi Project in Florence. In that same year, 2016, she became a Member of the Scientific Committee of MUSINT II (Section of Educational and Digital Contents) the Interactive virtual Museum on Aegean archaeology, whose collections belong to the National Archaeological Museum of Florence and to The Luigi Pigorini National Museum of Prehistory and Ethnography of Rome. She also works for other important archaeological Italian museums as international project manager.

### **BEEK, HENNI VAN**

*2D Photography: day-to-day practice. Photographing systematically with: Metamorfoze guidelines for preservation photography (WS 2)*

Sketchbooks from the 19th century were the objects in the Metamorfoze-financed project Henni van Beek conducted for the Rijksmuseum. He collaborated in the development and realized a custom-made book cradle – dedicated specifically to these sketchbooks – in collaboration with the restauration department and a technical construction company. Since 2007, he has been working as photographer for the Project PK online which aims to digitize, and present on the web, all the prints and sketches in the Rijksmuseum collection. He is co-author of the Instruction manual for 2D objects for the Rijksmuseum and involved in the implementation of the guidelines for digitalization that serve as the standard for all photography in the museum.

Henni van Beek gives advice about technical specifications when outsourcing diverse projects, and he is also digitalization advisor for the Metamorfoze ABC project at the National Archive in The Hague. In addition to this he gives courses on digitization and the evaluation of scans to new co-workers at the National Archive. Further, he has given a workshop on the technique of modern photography reproduction at an AHFAP conference in London.

### **BERNS, ROY S.**

*High-Resolution Multispectral Photography (INV 6, WS 4)*

Dr. Roy S. Berns is the Richard S. Hunter Professor in Color Science, Appearance, and Technology within the Program of Color Science at Rochester Institute of Technology, USA where he developed both M.S. and Ph.D. degree programs in Color Science. He received his B.S. and M.S. degrees in Textiles from the University of California at Davis and a Ph.D. degree in Chemistry from Rensselaer Polytechnic Institute (RPI). Berns has received scientific achievement awards from the Inter-Society Color Council, the Society of Imaging Science and Technology, the Colour Group of Great Britain, and the International Association of Colour. He directs the Andrew W. Mellon Studio for Scientific Imaging and Archiving of Cultural Heritage. Berns' main research focus is using color and imaging sciences for the visual arts, particularly paintings, including: 3D imaging and computer-graphics rendering; spectral-based imaging, archiving, and reproduction; pigment mapping; and digital reconstructions of faded and darkened artwork.

### **BLOCK-BERLITZ, PROF. DR. MARCO**

*Videogrammetry in a Nutshell (INV 11)*

Marco Block-Berlitz received both his first diploma in Computer Sciences (2004) and his Ph.D. degree (2009) from Freie Universität Berlin, Germany (Department of Artificial Intelligence). From 2009 to 2012 he taught Game Design and Development at Berlin's Mediadesign Hochschule. Since 2012 he is a full professor for Computer Graphics and Artificial Intelligence at the Department of Computer Science and Mathematics of the University of Applied Sciences in Dresden, Germany. As a computer scientist with a passion for archaeology and cultural heritage, Marco Block-Berlitz is committed to research on UAVs, UUVs and 4D data management ([www.archaeocopter.de](http://www.archaeocopter.de)), with a focus on low-cost and efficient 3D

reconstruction. He has participated in several international excavation and survey projects, cooperating with a range of international professionals and institutions. Marco Block-Berlitz has served as a committee member for several international conferences, including ICAISC, CHNT, CONCIBE, CGAMES, GAMEON-ARABIA, CGAT, GHTCE, CV, CGIM, AIA, CI, ICDS, ICCE-Berlin, ICCVE, ISIEA, GHTCE, ICCSII, ICCE, and IBERAMIA, among other conferences, and he is reviewer for international journals, including IJHCI, IMS, MVA, NCA, ITSMC, Autosoft Journal, e-gnosis, and IARIA, among other journals. He received best paper awards at CONCIBE 2008, ICDS 2009 and CAA-DE 2016 and a best video award at CHNT 2014.

#### **BOUGNÈRES, FRANÇOIS**

*Photogrammetry and Postproduction Workflow for 3D Reproduction of Artworks: Lessons Learned from the French Museums (SP 3)*

François Bougnères is a strategy manager at the Réunion des musées nationaux – Grand Palais in Paris since 2010. He graduated in management from EM Lyon business school in 2004 after an entrepreneurship program at the University College of Arts, Crafts and Design and the Stockholm School of Economics. With dual American and French citizenship he started working for a financial startup in New York before returning to Paris and joining the Réunion des musées nationaux in 2010 just before the merger with the Grand Palais. Curiosity-driven and passionate about developing the positive impacts of cultural diffusion through virtualization, innovation and new media technologies, he raised funding from the Caisse des Dépôts and Consignations and initiated France Collections 3D to develop photorealistic 3D reproductions of the French national museums artworks collections.

#### **DENNEHY, DAN**

*Unstructured Light Field Rendering: Enhanced Photogrammetry Using On-Camera Flash (WS 9)*

Dan Dennehy is the Senior Photographer and Head of Visual Resources at the Minneapolis Institute of Art (MIA) where he leads a department responsible for collection imaging, digital asset management and image distribution. He is a member of the museum's Media and Technology Division, a creative team dedicated to finding innovative ways of bringing our collections and communities together. After ten years at the Walker Art Center, he came to MIA to transition the photo studio to a digital workflow and to adopt enterprise asset management. He serves as adjunct faculty at the Minneapolis College of Art and Design and on the board for the PLUS Coalition. A graduate of the University of Connecticut, he has received grants from the Bush Foundation, the Polaroid Corporation and the Minnesota State Arts Board. He is the current chair of the Digital Imaging SIG for the Museum Computer Network.

#### **DORMOLEN, HANS VAN**

*A new target with a new approach for the photography of 3D objects (INV 8, WS 5)*

Hans van Dormolen is the founder of Hans van Dormolen Imaging & Preservation Imaging (HIP). He is working as an independent imaging consultant in the cultural heritage community. He was working as a researcher for the National Library of the Netherlands. He is the author of the Metamorfoze Preservation Imaging Guidelines and author and co-author of several other Metamorfoze guidelines. Hans is a member of ISO TC42 JWG26 and IS&T. He received an IS&T Service Award for his work in objective capture practices for cultural heritage imaging in 2014.

#### **DUCKE, DR. BENJAMIN**

*Videogrammetry in a Nutshell (INV 11)*

Benjamin Ducke studied archaeology and computer sciences at Berlin's Freie Universität, where he graduated with a master's thesis on "GIS-based sediment transport and predictive models for heritage management" in 2003. Following a one-year Ph.D. grant (by the German Gerda Henkel Stiftung) at University College London, he worked as a lecturer in computational archaeology at Christian-Albrechts-Universität in Kiel (Germany), where he also received his Ph.D. degree in natural sciences for his thesis on "spatio-temporal analysis of archaeological data". Currently, Benjamin Ducke is an independent researcher, software developer and consultant in the field of GIS-based data analysis for multiple fields of research and application, including digital site recording, image-based 3D reconstruction ([www.archaeocopter.de](http://www.archaeocopter.de)) and geophysical data analysis. He is the lead developer of the free and open source desktop GIS "gvSIG CE" ([www.gvsigce.org](http://www.gvsigce.org)). His professional experience to date includes development and research of IT solutions for Oxford Archaeology and the German Archaeological Institute (DAI), several land-use related missions to Kosovo for the European Commission, lectureships in spatial crime statistics, work for the alternative energies sector and, of course, archaeological excavations and survey projects around the globe.

**EDWARDS, CHRIS**

*Visualizing Spaces for Music: The Berlin Philharmonic and Pierre Boulez Saal (INV 5)*

Chris Edwards is the Imaging and Digital Media Architect for the J Paul Getty Trust. In this role oversees, coordinates, and facilitates all digitization and media creation at the Getty. Prior to this, Chris was employed as the Head of Digital Services at the Getty Research Institute. Chris received a BA in Photography from Bard College.

**ERDMANN, ROBERT**

*Pushing the Boundaries of Image Processing and Visualization for Cultural Heritage (INV 20, WS 7)*

Prior to earning his Ph.D. from the University of Arizona in 2006, Robert Erdmann started a science and engineering software company and worked extensively on solidification and multiscale transport modeling at Sandia National Laboratories. He subsequently joined the faculty at the University of Arizona in the Program in Applied Mathematics and the Department of Materials Science and Engineering as Assistant Professor and then Associate Professor, where he worked on multiscale material process modeling and image processing for cultural heritage. In 2014, he moved to Amsterdam to focus full-time on combining materials science and computer science to help the world access, understand, and preserve its cultural heritage. He is currently Senior Scientist at the Rijksmuseum, and he holds the Rijksmuseum Chair in Conservation as a Professor at the University of Amsterdam.

**FORNARO, PETER**

*Color Management for Cultural Heritage Objects Using RTI (SP 2)*

Peter Fornaro is electrical engineer and he has a degree in scientific photography and a Ph.D. in physics. He has been working in the interdisciplinary field of digital humanities since 2004.

The main topics of his research are digital imaging, dissemination strategies and digital preservation. The three fields do have a large overlap and the knowledge in all fields enables him to find new approaches for the life-cycle management of digital objects, with relevance for arts and culture. Due to the fact that he has a strong background in applied sciences, photography and many years of work experience in the humanities, he is able to deliver new results in this interdisciplinary field of research. In multiple industrial projects he had to prove that he can keep projects on track and milestones reached. Fornaro has guided the process of a start-up company and he has filed a patent in digital imaging (PCT/ EP2016/067045). He is well accepted in the community of Cultural Heritage Preservation and Digital Imaging.

**FORTUNE, ANDREW**

*Location Photography of Louis Comfort Tiffany's Architectural Mosaics (INV 3)*

*Photographic Lighting Techniques for Transparent Glass Objects – A Dialog (WS 10)*

Andrew Fortune is the Collections Photography Department Manager at The Corning Museum of Glass, home to the world's most comprehensive collection of glass, tracing 35 centuries of glassmaking history, artistry and technology. Andrew joined the museum in 1996 as a photography assistant and, after becoming hooked on the challenges of photographing glass, he has subsequently held increasing positions of responsibility in the department before assuming his current position in 2015. Previously Andrew worked at The Rockwell Museum, as well as the Goldie Paley and Levy Galleries at Moore College of Art and Design. He holds a Bachelor of Arts in Art History and Psychology from Swarthmore College.

**FRISCHER, BERNARD**

*IU and Uffizi Gallery: A Virtuous Collaboration to Digitize in 3D the Museum's Archaeological Sculptures' Collection (INV 9)*

Bernard Frischer is a leading virtual archaeologist and the author of ten printed and electronic books, and dozens of articles on virtual heritage, classics, and the survival of the Classical world. He has held professorships in Classics and Art History at UCLA and the University of Virginia. Since 2013 he has been professor of Virtual Heritage in the School of Informatics at Indiana University, where he is also Director of the Virtual World Heritage Laboratory. In 2005 Bernard Frischer was given the Pioneer Award of the International Society on Virtual Systems and Multimedia. In 2009, he was the recipient of the Tartessus Lifetime Achievement Prize from the Spanish Society of Virtual Archaeology.

**FUZZELL, DEARDRA**

*Oversized Imaging at Stanford: The Ōmi Kuni-ezu Tax Map, 1837 (SP 5)*

Deardra Fuzzell is the Cartographic Technology Specialist for Stanford University Libraries, where she coordinates the digitization of maps and oversized materials for Stanford. With the 2016 opening of the David Rumsey Map Center, she has taken on an additional role supporting their programming, collections and technology. Deardra has worked in the cultural heritage imaging field for nine years, beginning in 2008 as a Visual Resources Curator. She also teaches ceramics classes at Stanford University for the Arts Intensive Program and holds a B.A. in Studio Art from the College of Wooster in Northeastern Ohio.



**GEFFERT, SCOTT**

*From Project to Programmatic: International Standards and Advanced Imaging at the Metropolitan Museum of Art (INV 18)*

Scott Geffert has spent his entire career in and around photography and has been advising on digital imaging solutions well before the introduction of Adobe Photoshop. This long-term experience has allowed Scott to stay on the leading edge of advances in imaging technology.

Scott's interests and involvement in imaging have evolved over the years from supporting users worldwide to taking an active role in helping steer the industry via advocacy of international standards and involvement in the IS&T, ISO and CIE organizations. These efforts have directly led to improvements in cameras, software and best practices.

Long term experience in color management especially within the cultural heritage community has led to innovative patented work in the field of multispectral LED lighting technology enabling precision tunable illumination for viewing and digitizing artworks.

Scott joined the Met Museum Imaging Department in 2012 as senior imaging manager.

**GEORGAKOPOULOU, SOFIA**

*The CAPcam: workflows for a novel digital view camera for interactive image composition (SP 6)*

Dr. Sofia Georgakopoulou is a physicist with a focus on programming and modelling, and an interest in enhancing research methodologies and practices. She did her PhD at the Vrije Universiteit in Amsterdam on field of biophysics and on particular spectroscopic methods and computer calculations in photosynthetic organisms in 2005. She moved to the University of Basel in 2006 to perform spectroscopic studies in proteins, but after a Master of Advanced Studies in Computer Aided Design at the ETH Zurich, she returned her focus to programming, this time in the area of humanities studies. Since 2014, she has been researching solutions that will modernize and improve the dissemination of scientific knowledge, and she became co-founder and director of the non-profit organization Science Publication Network. Currently she holds a postdoctoral position at the Digital Humanities Lab in the University of Basel. There, she works on the development of a web-based infrastructure for the long-term preservation and dissemination of data in the Humanities (SALSAH and KNORA projects). Additionally, she is involved in novel photographic research projects: Bridging the Digital Materiality and SALSAH projects, as well as finalizing and promoting the digital view camera CAPcam. Finally, she is developing a new project on color profiling and management.

**HAMEEUW, HENDRIK**

*A critical reflection on the use of 3D technologies for the documentation of endangered heritage (INV 13)*

Hendrik Hameeuw is a research fellow at the University of Leuven and at the Belgian Federal Scientific Institute of the Royal Museums of Art and History, Brussels. He graduated as archaeologist (2003) and Assyriologist (2002) and has since specialized himself in the use of new imaging techniques for cultural heritage artifacts and archaeological sites. He has participated in archaeological excavations in Syria for many years and has conducted imaging missions in Egypt, Turkey and multiple places in Europe & the US. Hendrik is member of the steering committees of the Digital Humanities of his university and of Dariah-FED in Belgium. In collaboration with the department of Electric Engineering (ESAT) at the University of Leuven Hendrik was from the start involved in the development of the Portable Light Dome (PLD) system; the first fully operable multi-light/direction reflectance system using the principles of photometric stereo (PS). He has also used RTI,  $\mu$ CT and photogrammetry techniques on museum objects and in the field on rock art sites in Sweden and Egypt. Currently he coordinates a project for the development of a new multi-light system which includes the automated acquisition and visualization of UV, Blue, Green, Red & IR light spectra and a project on the sustainable consultation of interactive 2D data-sets on future platforms.

To see Hendrik Hameeuw's research, visit [Kuleuven.academia.edu](http://Kuleuven.academia.edu) or [Research gate](https://www.researchgate.net/profile/Hendrik-Hameeuw).

**HERBERT, FRANZ**

*Color accurate reproduction of original artwork using custom profiles in Adobe Camera Raw (P 2)*

Franz Herbert has been developing color technologies for 30 years; one of his special interests is profiling digital cameras. He has been the main developer of basICColor input 3 with many customers being museums. He is also responsible for the algorithms in the brand new basICColor input 5 featuring custom profiles for Adobe Camera Raw and Capture One. He holds four patents relating to his color management work.

**HOFFMANN, MARTINA**

*Quality assurance workflows in mass digitization projects (SP 4)*

Martina Hoffmann is the Senior Digitization Production Manager at the National Library in the Netherlands for the archival section of Metamorfoze. She was the quality control operational manager of digitized products in the National Archives in the Netherlands. She co-designed several quality assurance workflows for different mass digitization projects in the Netherlands. She started with QA processes specifically for image quality, but her main focus now is QA processes involving several fields of expertise from metadata to long-term preservation.

**HUPPERETZ, WIM**

*Integrating digital museum content into curatorial practice (INV 10)*

Prof. Dr. Wim Hupperetz (1966) studied Ancient History and Provincial Roman Archaeology at Radboud University in Nijmegen. In 2004 he defended his PhD thesis at the University of Tilburg – on The memory of a street – Eight hundred years of living in the Visserstraat in Breda. Promotors were Prof. Dr. G.W.J. Rooijakkers and Prof. Dr. A.J. Bijsterveld.

In 2009 he was appointed as director of the Allard Pierson Museum, the archaeology museum of the University of Amsterdam. He is Professor by Special Appointment of the History of Dutch Culture, in particular the study of objects, in the Faculty of Humanities at the Vrije Universiteit in Amsterdam. The chair was established in 1990 on behalf of the Royal Antiquarian Society (Koninklijk Oudheidkundig Genootschap, KOG).

His research focuses on objects and collections as cultural and historical source, with special focus on the institutional and scientific developments in the arts, culture and heritage sector. This leads to scientific publications and exhibitions. You can read his research by on the website of The Museum as Medium of Memory on the Biography of Heritage Collections.

He participated in and initiated several international and EU funded projects on digital heritage:

Virtual Museum Transnational Network

Material EncounterS with digital Cultural Heritage [MESCH]

Connecting Early Medieval European Collections [CEMEC]

Allard Pierson Collection Research

Wim Hupperetz's publications can be found at [uva.academia.edu/WimHupperetz](http://uva.academia.edu/WimHupperetz).

**HÖVELMANN, HENRIKE**

*From storage to spotlight: digitizing the full Rijksmuseum collection (INV 14)*

Henrike Hövelmann studied art and book history. She received her degrees from the University of Amsterdam and the University Erlangen-Nuremberg (Germany). She started her career at the University Library Amsterdam and the Royal Library in The Hague where she worked on cataloguing rare books and manuscripts. In 2008 she joined the Rijksmuseum as a cataloguer of prints. Currently she holds the position of project manager at the Rijksmuseum's digitization project for works on paper "Print room online". The project includes conservation, registration and digitization of approximately 700,000 objects: prints, drawings, and photographs.

**JACKSON, KEN**

*Victoria & Albert Museum Photographic Studio Archive 1857 to Present (P 1)*

Ken Jackson has been employed as a photographer all of his working life and is currently Manager for Digitisation of Archives and Collections (formerly Chief Photographer) at the Victoria & Albert Museum London, (1972 to present).

He is a Co-director of Cultural Heritage Digitisation Ltd with my business partner James Stevenson, formed in 2013.

**KLEIN GOTINK, RIK**

*Quick and Accurate Tiling Using an Easy-to-Assemble Portable Camera Positioning System (For Large, Flat Objects) (WS 12)*

Rik Klein Gotink studied photography on the Institute of the Arts (ARTEZ) Enschede. Prior to that, he studied Applied Physics for two years at the University of Twente. The combination of photography, becoming more and more technical, and physics proved to be very effective in his career. With his skills as a semi-physicist, he has developed several tools to improve the photographic workflow.

Since 1987 he worked as an artist and fine art photographer. Around 1992 he decided to shift his practice exclusively to cultural heritage and architecture photography for museums, art institutions and artists.

He has been a part-time Staff Photographer for the Rijksmuseum since 2005. From 2010 to 2016 he was a freelance photographer involved in the Bosch Research and Conservation Project, which is a collaboration of the Noordbrabant Museum, Den Bosch, the Radboud University, Nijmegen and Queens University, Kingston, Canada. The photography was done at an extreme resolution, in visible and IR photography and IR reflectography.

**LABEUR, IRIS**

*The Rijksmuseum DAM system, how we got there and where we're going (P 4)*

Iris Labeur is Account Manager at the Image Department of the Rijksmuseum. She first started working at here in 1998 when the majority of photography done at the Rijksmuseum was still analogue. Over the years she has seen the department develop from analogue to fully digital.

Iris is the Image Department's "super user" of the DAM system and has worked closely together with the IT department on the recent upgrade of the system. She is currently working on a plan to incorporate the large collection of non-object related images created at other departments, such as the Press office, Events and the Public & Education Department, into the DAM system.

**MCDERMOTT, LIZ**

*The Making of an Online Exhibition: The Legacy of Ancient Palmyra (INV 12)*

Liz McDermott is Head of Web & New Media at the Getty Research Institute (GRI) in Los Angeles, where she oversees the development and publication of all content for the GRI's website, in-gallery mobile tours, and social media platforms.

The GRI is one of the four programs of the J. Paul Getty Trust, which is the world's largest cultural and philanthropic organization dedicated to the visual arts.

**MEULEN, FROUKJE VAN DER**

*From storage to spotlight: digitizing the full Rijksmuseum collection (INV 14)*

Froukje van der Meulen is Accountmanager at the Image Department of the Rijksmuseum and as project coordinator she is actively involved in the preparations for relocating the stored collections to the Collection Centre in the city of Amersfoort currently under construction. The project, known as "V.O.I.L.A.", includes digitizing all stored objects. Froukje holds master degrees in Art history (Utrecht University) and Heritage studies (University of Amsterdam). Before she joined the Rijksmuseum she conducted research with the British National Trust, and worked with several arts and heritage organizations (cultural publishing house Matrijs, and the European Ceramics Work Centre).

**MEYER, GARY**

*Unstructured Light Field Rendering: Enhanced Photogrammetry Using On-Camera Flash (WS 9)*

Gary Meyer is an Associate Professor in the Department of Computer Science and Engineering at the University of Minnesota. He has also been a member of the Computer Science faculty at the University of Oregon and a Member of Technical Staff at Bell Telephone Laboratories. Meyer received his bachelor's degree from the University of Michigan, his master's degree from Stanford University, and his Ph.D. Degree from Cornell University. His research interests include the synthesis of color and appearance in computer graphic pictures, perceptual issues related to synthetic image generation, and color reproduction and color selection for the human-computer interface. Professor Meyer's research centers around the role of color in computer graphics, with a focus on the accurate and efficient reproduction of color in synthetic images, leading to improvements in techniques used to create computer graphic imagery.

**PADOAN, ROBERTO**

*Quantitative Monitoring of Works of Art on Paper with Spectral Imaging (P 3)*

Roberto Padoan has thirteen years of experience as book and paper restorer/conservator at the Secret Vatican Archive and the Nationaal Archief (National Archives of the Netherlands). Together with his work he has carried out academic studies obtaining a B.A. in "Methods and Technologies for the Conservation and Restoration of Library Heritage" at the University of Rome Tor Vergata, Italy, followed by a research master (Mres) in Heritage Science at the Institute for Sustainable Heritage, UCL in London.

In September 2016 Roberto was granted with the Migelien Gerritzen Fellowship and he is now conducting a research at the Rijksmuseum on the "Quantitative Monitoring of Works of Art on Paper with Imaging Spectroscopy (IS)".

**PEGT, FRANS**

*Photographic Lighting Techniques for Transparent Glass Objects – a Dialogue (WS 10)*

Frans Pegt has been working as a staff photographer at the Rijksmuseum since 2007. He is responsible for photography of 3D objects and paintings from the museum's collection in the Rijksmuseum depot in Lelystad. He considers it a challenge to photograph fine art objects using standardized guidelines, and he strives for the highest quality possible. He is fascinated by the use of photography as an instrument in a creative process and by making an object and its story shine.

Among the publications in which his photographs have appeared are *Paris 1650-1900: Decorative Arts in the Rijksmuseum*, R. Baarsen, 2012, Yale University Press; *Art Nouveau In Het Rijksmuseum*, J.D. van Dam & J.J. Heij, Rijksmuseum, 2010; and *Kakiemon Porcelain*, M. Fitski, 2011, Leiden University Press, Leiden, Rijksmuseum, Amsterdam. He worked closely with the responsible authors and curators for these publications.

In addition to his ongoing work in the Lelystad studios, Frans Pegt developed a workflow for the photography of sick glass in collaboration with the glass conservation department. With the knowledge he gained from that experience, he spent the past year giving lessons to students at the Conservation Glass, Ceramics and Stone of the University of Amsterdam.

#### **REBERS, STAESKE**

*Serial digitization of musical instruments and the MIMO digitization standard (WS 1)*

Staeske started working as a photographer at the Image Department of the Rijksmuseum in 2006.

She has a background in history of arts and holds a degree in photography from the Gerrit Rietveld Academy.

Before she joined the Rijksmuseum photography staff she worked as a documentary photographer, making reports on landscape architecture, fashion and special events.

At the Rijksmuseum she is responsible for the photography of the decorative and fine art objects from all areas of the wide and varied collections. She recently worked with curator Giovanni Paolo di Stefano on the photography of the musical instrument collection.

#### **RICHARDS, TONY**

*Multispectral Imaging Workflow Integration (SP 1)*

Tony Richards is a graduate of the University of Northumbria at Newcastle upon Tyne. A photographer in the Heritage Sector since 2001, he is currently a Heritage Photographer at The John Rylands Library, University of Manchester Library.

#### **ROON, MARIKE VAN**

*Unique Objects and Mass Digitization – The University of Amsterdam and Google Books (INV 15)*

Dr. Marike van Roon (1963) is Head Curator of the Special Collections Department of the University of Amsterdam. This department is responsible for the heritage collections of the University Library, ranging from rare and valuable books, manuscripts, prints, maps and atlases, photographs, instruments, models, objects of art and more. With internationally renowned collections on the history of books, Jewish culture, church history, cartography, literature, graphic design and zoology, this is one of the large heritage libraries in Europe.

Marike van Roon is specialized in textile history. In 2010 she received her Ph.D. in art history with a thesis on church textiles in the Netherlands between 1830 and 1965. As an art historian and head curator of an important collection she is thoroughly aware of the importance of digitization and OCR for research. Van Roon has contributed to most digitization projects of the University Library since 2000. She was partly responsible for the decision of the University Library to work together with the Google Books project.

#### **SMELT, SUSAN**

*Magnifying color calibration. A scientific system for microscope color calibration at the Rijksmuseum – a team effort (INV 17)*

Susan Smelt is a junior paintings conservator at the Rijksmuseum. She graduated in 2012 from the University of Amsterdam with an MA and Professional Doctorate in Conservation and Restoration of Paintings. During the two-year post-initial phase she worked at the Stichting Restauratie Atelier Limburg (SRAL) and the Mauritshuis in The Hague. She also holds BA and MA degrees in Art history from the University of Groningen. After graduation, Susan participated in different conservation and restoration projects at the Mauritshuis. She was involved in the study and restoration of paintings belonging to the eighteenth-century 'Golden Room' by G.A. Pellegrini. She also participated in the examination, treatment and exhibition of *Saul and David* by Rembrandt. Since 2014 she worked at the Rijksmuseum on the Paint Sample Database, where she is developing a database in which all of the paint sample research will be digitalized. A user-friendly system has been developed to gain color accurate photographs of cross-sections. At the moment Susan is engaged in the research and conservation of the portraits of Marten Soolmans and Oopjen Coppit painted by Rembrandt.

**SNYDMAN, STUART**

*IIIF for Digitization Practitioners: Why Image Interoperability and Open Standards Matter for the Digitization Studio Professional* (INV 16)

*A Deeper Dive into IIIF: What Studio Professionals Should Know About the International Image Interoperability Framework* (WS 6)

For over 15 years Stuart Snyderman has worked at the Stanford University Libraries (SUL) to advance a vision of the library of the future through digitization and open source software development. As Associate Director for Digital Strategy, Stuart directs SUL's digital library access program, overseeing development of its various discovery and delivery services. He also helps steer the library's digitization program, directing the operations of its digital imaging labs and 3D capture program. Stuart is the Co-Head of the Center for Interdisciplinary Digital Research (CIDR), SUL's digital humanities and computational social sciences research and development group, working with faculty to leverage digital technologies to advance their research. Stuart helped found the International Image Interoperability Framework, was an editor on the first version of the IIIF Image API, and currently serves on the IIIF Coordinating Committee with a focus on outreach to the library, museum and archive communities.

**STEFANO, GIOVANNI PAOLO DI**

*Shooting the Sound. A Report on the Rijksmuseum's Musical Instrument Collection Photo Campaign* (INV 1)

Giovanni Paolo Di Stefano is curator of musical instruments at the Rijksmuseum Amsterdam. Furthermore, since 2007, he has been teaching History and Technology of Musical Instruments at the University of Palermo in Italy. He studied at the University of Palermo and University of Rome "La Sapienza" where he earned his Ph.D. in Musicology in 2007. From 2008 to 2012 he was a post-doctoral fellow at the University of Palermo and worked as a freelance consultant for museums and collections of musical instruments. In 2014, he received the Italian National Scientific Habilitation to Associate Professor of Musicology and History of Music. Since 2016, he has been a member of the advisory executive board of ICOM-CIMCIM (the International Committee for Museums and Collections of Music and Musical Instruments).

His writings on the history and technology of musical instruments have been published in museum catalogues, conference proceedings, encyclopedias, miscellanies and international journals such as *Early Music*, *The Galpin Society Journal*, *Musique Images Instruments*, *Journal of the Violin Society of America*, among other journals.

**STRASBAUGH, CHRIS**

*Hacking Technology for Documenting Difficult Spaces* (INV 19)

As photographer, art historian, and now digital curator, Chris Strasbaugh has always been driven to document and preserve cultural heritage. His work as a Digital Library Archivist and also as Curator at the Knowlton School of Architecture, Landscape Architecture, and City and Regional Planning at The Ohio State University is a perfect mix of his passions in preservation, photography, emerging technology, open access, metadata specialist, and general jack-of-all-trades with a masters in Art history. He works with an archive of unique work, documenting the history of our various programs as well as highlighting new work that showcases our students. Strasbaugh's passion for all things digital also transfer into his work with the Visual Resources Association as the Vice President of Conference Programming, as well as into his work as a member of the Online Learning Taskforce.

**TERPAK, FRANCES**

*The Making of an Online Exhibition: The Legacy of Ancient Palmyra* (INV 12)

Frances Terpak is Curator of Photographs at the GRI, where she has built the photographic and optical devices collections. The GRI is one of the four programs of the J. Paul Getty Trust, which is the world's largest cultural and philanthropic organization dedicated to the visual arts.

**VANDERMEULEN, BRUNO**

*The Microdome, an innovating tool to monitor the topography and materiality of art objects (Portable Light Dome system)* (WS 8)

Bruno Vandermeulen (University of Leuven) is Head of Digitization and Document Delivery at the University Library and member of CS Digital, Faculty of Arts.

Apart from the digitization of the KU Leuven library heritage, he is also involved in research projects on imaging such as the development of the Microdome within the framework of the RICH project (Reflectance Imaging for Cultural Heritage), FINGERPRINT (on the graphic works by Pieter Bruegel the Elder) and ARTGARDEN (fragile historic mixed media object).

**WALTER, MICAH**

*Save for Later: How Cooper Hewitt's Pen Allows Visitors to Bring Its Collection Home (INV 2)*

Micah Walter is a technologist, writer, photographer and programmer. He was recently the Director of Digital & Emerging Media at Cooper Hewitt, Smithsonian Design Museum in New York City. Micah's work has spanned the areas of digital content strategy, management and infrastructure planning, programming and development of web applications utilizing a wide variety of languages, systems and technologies. With a heavy emphasis on the user, Micah's work within the Cooper Hewitt Labs focused primarily on developing empathetic systems through the use of sensible strategies.

Before joining the Cooper Hewitt Micah received an MFA in Photographic and Electronic Media from Maryland Institute College of Art and worked as a freelance photojournalist in the Washington, D.C. and in the Middle East. As a photojournalist, Micah traveled extensively to cover news around the world for clients like TIME, The New York Times and more.

Prior to his work as a photojournalist Micah received a Bachelor of Science from the Rochester Institute of Technology, where he received a B.S. in Imaging and Photographic Technology. Shortly after graduating from RIT, he worked as an Imaging Specialist at the University of Rochester's Lab for Laser Energetics.

Presently Micah lives near beautiful Prospect Park in Brooklyn, New York with his dog Molly and lovely fiancé, Amanda.

**WIJK, CAROLA VAN**

*Painted room: Challenges in every corner (INV 4)*

*360 degrees of quality: photography in the round at Rijksmuseum (WS 11)*

Carola van Wijk has been working as a staff photographer at the Rijksmuseum since 2007. She is responsible for the photography of 3D objects and paintings and for the museum's conservation photography. Together with Henni van Beek, she is responsible for the implementation of the Metamorfoze guidelines. They wrote a practical manual to establish a shared standardized workflow.

She is one of the initiators of the Manual photographing 3dimensional objects for the Rijksmuseum, that will be published during 2and3D Photography 2017.

The photographic work of Carola van Wijk for the Rijksmuseum has, amongst others, been published in *Costume & Fashion*, Bianca M. Du Mortier, Rijksmuseum 2016, *Paris 1650-1900: Decorative Arts in the Rijksmuseum*, R. Baarsen, 2012, Yale University Press, and *Art Nouveau In Het Rijksmuseum*, J.D. van Dam & J.J. Heij, Rijksmuseum, 2010. She worked closely together with the responsible authors and curators for these publications.

In addition to ongoing work for the Conservation Department, Carola van Wijk is involved in the photography of musical instruments and the photography of the costumes in the Rijksmuseum collection. This work, in close collaboration with conservators and curators, will be published in collection books.

**WILLIAMS, DON**

*The 3D Image Capture Moonshot: Managing the Energetics (INV 7)*

*Teaching You to Fish: Strategies for FADGI/ Metamorfoze Guideline Compliance – It's Not That Difficult (WS 3)*

Don Williams is the founder of Image Science Associates (ISA), a consulting group of imaging practitioners for digital and traditional imaging challenges related to the cultural heritage sector. They concentrate on imaging performance metrology, imaging quality control targets, software and practices, as well as imaging standard's protocols and their adoption into digitizing workflows. He has provided guidance on establishing ISO and science based practices for image digitizing. In that capacity, he frequently contributes to the Federal Agencies Digitization Guideline Initiative.

Before founding ISA, Don worked as a research imaging scientist for 25 years at Eastman Kodak Co. where he worked on both digital and traditional imaging. He frequently teaches and has published extensively on both technical and policy matters as they relate to digital image fidelity and metrology.

He is the editor for ISO 12233, 2nd edition, Spatial Resolution Measurements, Digital Still Cameras and has acted as co-leader for equivalent performance standards on reflection and film scanners. He received both undergraduate and graduate degree in Imaging Science from Rochester Institute of Technology.

**WILSON, MEGHAN**

*Multispectral Imaging Workflow Integration (SP 1)*

Meghan Wilson is a Preservation Specialist in the Preservation Research and Testing Division at the Library of Congress with a degree from the Maryland Institute College of Art. She has worked extensively on multiple spectral imaging programs around the world and specializes in operation, training, quality control, and data management of this imaging technology.



The Competence Center Cultural Heritage Digitization at Fraunhofer IGD develops technologies for documenting, annotating, and virtually reproducing cultural objects. We focus on 3D scanning technologies that enable us to capture objects efficiently. Our automated and high-speed procedures are easy to use and significantly reduce scanning costs. The objects are reproduced true to the original and with micrometer precision. In doing so, we continuously expand the state-of-the-art.

## COMPETENCE CENTER CULTURAL HERITAGE DIGITIZATION AT FRAUNHOFER IGD

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#### **MICROBOX GMBH**

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In 1985 a group of photographers, based in national museums in London, met with the aim to share knowledge and information and formed AHFAP. The association held its first conference in 1986 at the British Museum and since that time, its membership has grown to over 330, with members throughout the UK and now Ireland. We are also building links with cultural heritage specialists within university departments in the UK.

After 30 years and as many conferences, including its first international conference in 2011, this is a story of how collaboration can and does benefit our profession. We are now in an age of continually evolving technologies and methodologies, such as scientific, hyper-spectral and 3d imaging; the need for national or regional associations like AHFAP to help disseminate knowledge seems more pressing than ever before.

#### **Association for Historical and Fine Art Photography**

*...for cultural heritage imaging professionals in the UK & Ireland*

**Richard Everett**  
AHFAP: Chair

## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



