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PROCEEDINGS

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Electronic Imaging

SCIENCE AND TECHNOLOGY

28 January 2018 – 1 February 2018 • Burlingame, CA, USA

Human Vision and Electronic Imaging 2018

Editors: **Bernice E. Rogowitz,** Visual Perspectives (United States),
Thrasyvoulos N. Pappas, Northwestern University (United States),
Huib de Ridder, Technische Universiteit Delft (the Netherlands)

These papers represent the program of Electronic Imaging 2018,
held 28 January – 1 February 2018, at the Hyatt Regency San Francisco Airport in Burlingame, CA.

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Human Vision and Electronic Imaging 2018

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Human Vision and Electronic Imaging 2018

Monday, January 29, 2018

Welcome to HVEI 2018 and 30th Anniversary Kick-off

Session Thrasyvoulos Pappas, Northwestern University; and Bernice Rogowitz, Visual Perspectives (United States)

10:40 – 10:50 am
Grand Peninsula Ballroom A

Keynote Session I: Human Vision Approaches to Image Quality for Images, Video and Stereo Applications

Session Chairs: Thrasyvoulos Pappas, Northwestern University; and Bernice Rogowitz, Visual Perspectives (United States)

10:50 am – 12:10 pm
Grand Peninsula Ballroom A

10:50 HVEI-500

The field of view, the field of resolution, and the field of contrast sensitivity (JPI-first), *Andrew Watson, Apple Inc. (United States)*

Dr. Andrew Watson is a senior vision scientist at Apple, with expertise in psychophysics, neuropsychology, and applied psychology. Prior to joining Apple, Dr. Watson was the Senior Scientist for Vision Research at NASA Ames Research Center in California. He is the author of more than 100 papers and six patents on topics in vision science and imaging technology. Dr. Watson is Vice Chair for Vision Science and Human Factors of the International Committee on Display Measurement. In 2007 he received the Otto Schade Award from the Society for Information Display, and in 2008 the Special Recognition Award from the Association for Research in Vision and Ophthalmology. In 2011, he received the Presidential Rank Award from the President of the United States.

11:30 HVEI-501

Perceptual display: Apparent enhancement of scene detail and depth (Invited), *Karol Myszkowski[1], Okan Tarhan Tursun[1], Petr Kellnhofer[2], Krzysztof Templin[1], Elena Arabadzhiyska[3], Piotr Didyk[1,3], and Hans-Peter Seidel[1]; [1]MPI Informatik (Germany), [2]Massachusetts Institute of Technology (United States), and [3]Saarland University (Germany)*

Prof. Karol Myszkowski is a senior researcher at the Max Planck Institut Informatik, Saarbruecken, Germany. In the period from 1986 till 1992 he worked for Integra, Inc. a Japan-based, company specialized in developing rendering and global illumination software. He received his PhD (1991) in computer science from Warsaw University of Technology (Poland). In 2011 he was awarded with a lifetime professor title by the President of Poland. His research interests include global illumination and rendering, perception issues in graphics, high dynamic range imaging, and stereo 3D. He co-authored the book High Dynamic Range Imaging, and participated in various committees and editorial boards. He also co-chaired Rendering Symposium in 2001, ACM Symposium on Applied Perception in Graphics and Visualization in 2008, Spring Conference on Computer Graphics 2008, and Graphicon 2012.

Discussion: Human Vision Approaches to Image Quality for Images, Video and Stereo Applications

Session Chairs: Thrasyvoulos Pappas, Northwestern University; and Bernice Rogowitz, Visual Perspectives (United States)

12:10 – 12:30 pm
Grand Peninsula Ballroom A

12:30 – 2:00 pm Lunch

Plenary Session

2:00 – 3:00 pm
Grand Peninsula Ballroom D

Overview of Modern Machine Learning and Deep Neural Networks - Impact on Imaging and the Field of Computer Vision, *Greg Corrado, Google, Inc. (United States)*

Dr. Greg Corrado, co-founder of Google Brain, principal scientist, and director of augmented intelligence research at Google, provides an overview of modern machine learning and deep neural networks, with particular attention to its impact on imaging and the field of computer vision.

Dr. Corrado is a senior research scientist interested in biological neuroscience, artificial intelligence, and scalable machine learning. He has published in fields ranging across behavioral economics, neuromorphic device physics, systems neuroscience, and deep learning. At Google he has worked for some time on brain inspired computing, and most recently has served as one of the founding members and the co-technical lead of Google's large scale deep neural networks project. Prior to joining Google, Dr. Corrado was a staff research scientist at IBM. He received his MS in computer science and PhD in neuroscience from Stanford University.

3:00 – 3:20 pm Coffee Break

Keynote Session II: Human Behavior in Real-World Environments
Session Chairs: Thrasyvoulos Pappas, Northwestern University; and Bernice Rogowitz, Visual Perspectives (United States)
3:20 – 4:40 pm
Grand Peninsula Ballroom A

3:20 HVEI-502
Lighting perceptual intelligence, *Sylvia C. Pont and Huib de Ridder, Delft University of Technology (the Netherlands)*

Prof. Sylvia Pont was appointed Antoni van Leeuwenhoek professor in 2016. She has worked at the faculty of Industrial Design Engineering at TU Delft since 2008. In the light and vision labs, within the Perceptual Intelligence Lab, her group works on studies in design, perception, optics and rendering of light and its interactions with material, shape and space. From September 1999 to 2008 she worked in the Physics of Man group of the department of physics and astronomy of Utrecht University. Her postdoctoral research into 'ecological optics' included studies into reflectance, texture, and light fields. January 2004 she got an appointment as an assistant professor and started her project entitled 'Ecological Plenoptics of Natural Scenes', for which she was granted a 'VIDI Vernieuwingsimpuls' by the Netherlands Organisation for Scientific Research (NWO). This project concerned studies into the description of the appearance of natural materials and natural light fields.

4:00 HVEI-503 [no paper]
Applying insights from visual perception and cognition to the development of more effective virtual reality experiences,
Victoria Interrante, University of Minnesota (United States)

Prof. Victoria Interrante's research focuses on applying insights from visual perception and cognition to the development of more effective virtual reality experiences and the more effective communication of complex information through visual imagery. In this work, she enjoys collaborating with colleagues in a wide variety of fields, from architectural design and neuropsychology to engineering and medicine. Prof. Interrante is a recipient of the 1999 Presidential Early Career Award for Scientists and Engineers, "the highest honor bestowed by the U.S. government on outstanding scientists and engineers beginning their independent careers", and a 2001-2003 McKnight Land-Grant Professorship from the University of Minnesota. At the University of Minnesota, Prof. Interrante is currently serving as the director of the Center for Cognitive Sciences and as a member of the graduate faculty of the Program in Human Factors. In recent years, she has also served as chair of the technical track on Graphics, Animation and Gaming at the 2015 Grace Hopper Celebration of Women in Computing.

Discussion: Human Behavior in Real-World Environments
Session Chairs: Thrasyvoulos Pappas, Northwestern University; and Bernice Rogowitz, Visual Perspectives (United States)
4:40 – 5:00 pm
Grand Peninsula Ballroom A

5:00 – 6:00 pm All-Conference Welcome Reception

HVEI Banquet and Demo Session
Hosts: Thrasyvoulos Pappas, Northwestern University; and Bernice Rogowitz, Visual Perspectives (United States)
6:30 – 10:00 pm
Offsite; details provided with registration

Join us for a celebration of 30 years of HVEI, as we roast and toast the people and events that have shaped this unique, multidisciplinary community. We'll convene over a family-style meal at a local Lebanese/Middle Eastern restaurant.

Bernice Rogowitz and Thrasos Pappas, HVEI conference co-chairs for 30 and 20 years, respectively, will share photos, stories, and artifacts from past conferences. Everyone is welcome to share their experiences and memories as well! We'll also show some fun visual illusions provided by members of the community as we mingle before the Banquet.

This banquet—supported by Qualcomm—is hosted by the conference on Human Vision and Electronic Imaging, but is open to everyone interested in the intersection of human vision/cognition, imaging technology, and art.

Tuesday, January 30, 2018

7:15 – 8:45 am Women in Electronic Imaging Breakfast

Fundamental Issues in Visual Detection

Session Chair: Jeffrey Mulligan, NASA Ames Research Ctr. (United States)

9:10 – 10:10 AM
Grand Peninsula Ballroom A

9:10 HVEI-504
How are ocular behaviours affected by central and peripheral vision loss? A study based on artificial scotomas and gaze-contingent paradigm, *Erwan David, Patrick Le Callet, Matthieu Perreira Da Silva, and Pierre Lebranchu; Université de Nantes and Université Hospital, Nantes (France)*

9:30 HVEI-505 [no paper]
Pilot study on the effects of the fixational eye movements on the contrast sensitivity, *Vicent Sanchis-Jurado[1], Álvaro Pons[1], Edward Fry[2], and Sophie Triantaphillidou[2]; [1]University de Valencia (Spain) and [2]University of Westminster (United Kingdom)*

9:50 HVEI-506
A dual channel spatial-temporal detection model, *Albert Ahumada[1], Jihyun Yeonan-Kim[2,3], and Andrew Watson[1]; [1]Consultant, [2]San Jose State University Foundation, and [3]NASA Ames Research Center (United States)*

10:00 am – 7:30 pm Industry Exhibition

10:10 – 10:40 am Coffee Break

Perceptual Issues in High Dynamic Range Imaging

Session Chair: Damon Chandler, Shizuoka University (Japan)

10:40 – 11:40 am
Grand Peninsula Ballroom A

10:40 HVEI-507
Perceived dynamic range of HDR images with no semantic information, *Vedad Hulusic[1], Giuseppe Valenzise[2], and Frédéric Dufaux[2]; [1]LTCI, Télécom ParisTech, Université Paris-Saclay and [2]Laboratoire des Signaux et Systèmes, Université Paris-Sud (France)*

11:00 HVEI-508
The preferred system gamma is primarily determined by the ratio of dynamic range of the original scene and the displayed image, *David Kane[1], Antoine Grimaldi[1], Emin Zerman[2], Marcelo Bertalmio[1], Vedad Hulusic[2], and Giuseppe Valenzise[3]; [1]Universitat Pompeu Fabra (Spain), [2]Telecom ParisTech (France), and [3]CNRS - CentraleSupélec - Université Paris-Sud (France)*

11:20 HVEI-509
Pupillometry of HDR video viewing, *Scott Daly[1], Evan Gitterman[1], and Grant Mullikan[2]; [1]Dolby Laboratories, Inc. and [2]Apple, Inc. (United States)*

Mobile Devices and Perception

Session Chair: Sergio Goma, Qualcomm Inc. (United States)

11:40 am – 12:20 pm
Grand Peninsula Ballroom A

11:40 HVEI-510
Estimating the subjective video stability of first-person videos, *Biao Ma and Amy Reibman, Purdue University (United States)*

12:00 HVEI-511
Viewer-aware intelligent mobile video system for prolonged battery life, *Peng Gao, Mark McCourt, Jinhui Wang, and Na Gong, North Dakota State University (United States)*

12:20 – 2:00 pm Lunch

Plenary Session

2:00 – 3:00 pm
Grand Peninsula Ballroom D

Fast, Automated 3D Modeling of Buildings and Other GPS Denied Environments, *Avideh Zakhor, University of California, Berkeley (United States)*

Professor Avideh Zahkor discusses fast, automated 3D modeling of buildings and other GPS denied environments with examples from her work in 3D reality capture, and visual and metric documentation of building interiors. Dr. Zakhor is a serial entrepreneur with startups in outdoor mapping, indoor mapping, and micro-lithography, currently CEO and founder of Indoor Reality, a Silicon Valley startup with products in 3D reality capture, and visual and metric documentation of building interiors.

Dr. Zakhor has been faculty member at University of California, Berkeley since 1994 where she holds the Qualcomm Chair in the electrical engineering and computer science department. She co-founded OPC technology in 1996, which was acquired by Mentor Graphics in 1998, and UrbanScan Inc. in 2005, acquired by Google in 2007. UrbanScan created the first fully automated 3D outdoor mapping system for 3D exterior models of buildings in urban environments. She has received a number of best paper awards in 3D computer vision, image processing, signal processing, is an IEEE fellow, and received the presidential young investigator award in 1992. Dr. Zakhor received her BSc in electrical engineering, from the California Institute of Technology (1983), and her MS (1985) and PhD (1987) in electrical engineering and computer science from MIT.

3:00 – 3:30 pm Coffee Break

Special Session: Perceptual Interactions in Material, Color and Illumination

Session Chair: Sylvia Pont, Delft University of Technology (the Netherlands)

3:30 – 5:50 pm
Grand Peninsula Ballroom A

3:30 HVEI-512
Contextual effects in human gloss perception (Invited), *Sabrina Hansmann-Roth[1], Sylvia Pont[2], and Pascal Mamassian[3]; [1]University of Iceland (Iceland), [2]Delft University of Technology (the Netherlands), and [3]École Normale Supérieure (France)*

4:00 HVEI-513
Assessing gloss perception of human facial skin across subject, *Jing Wang[1], Carla Kuesten[2], Gopa Majmudar[2], Jim Mayne[2], and Thrasyvoulos Pappas[1]; [1]Northwestern University and [2]Amway Corporation (United States)*

4:20 HVEI-514
The effect of diffuseness and direction of light on perceived texture visibility (Invited), *Raymond Cuijpers[1], Huihui Wang[1,2], and Lisette S.J. van de Steeg[1]; [1]Eindhoven University of Technology (the Netherlands) and [2]Zhejiang University (China)*

4:50 HVEI-515 [no paper]
Disentangling simultaneous transparency and illumination changes (Invited), *Robert Ennis and Katja Doerschner, Justus-Liebig-University Giessen (Germany)*

5:20 HVEI-516
Quantifying how humans trade off color and material in object identification (Invited), *Ana Radonjić, Nicolas Cottaris, and David Brainard, University of Pennsylvania (United States)*

Symposium Demonstration Session

5:30 – 7:30 pm
Grand Peninsula Ballroom E

HVEI Tuesday Discussion with Wine
5:50 – 7:00 pm
Grand Peninsula Ballroom A

Please join us for a lively discussion of today's presentations. Enjoy a glass of wine and then participate in an interactive, moderated discussion, where key topics and questions are discussed from many perspectives, reflecting the diverse HVEI community.

Wednesday January 31, 2018

Perceptual Approaches to Image Quality

Session Chair: Thrasyvoulos Pappas, Northwestern University (United States)

9:00 – 10:00 am
Grand Peninsula Ballroom A

9:00 HVEI-517
The relation between MOS and pairwise comparisons and the importance of cross-content comparisons, *Emin Zerman[1,2], Vedad Hulusic[1,2], Giuseppe Valenzise[3], Rafal Mantiuk[4], and Frédéric Dufaux[3]; [1]LTCI - Télécom ParisTech (France), [2]Université Paris-Saclay (France), [3]CNRS - CentraleSupélec - Université Paris-Sud (France), and [4]University of Cambridge (United Kingdom)*

9:20 HVEI-518
DeViQ - A deep no reference video quality model, *Steve Göring, Janto Skowronek, and Alexander Raake, Technische University Ilmenau (Germany)*

9:40 HVEI-519
The role of structure and textural information in image utility and quality assessment tasks (JPI-first), *Suiyi Ling[1], Patrick Le Callet[1], and Zitong Yu[2]; [1]Polytech Nantes/Université de Nantes and [2]University of Nantes (France)*

10:00 am – 4:00 pm Industry Exhibit

Human Vision and Electronic Imaging 2018 Interactive (Poster) Papers Oral Previews

Session Chair: Scott Daly, Dolby Laboratories (United States)

10:00 – 10:30 am
Grand Peninsula Ballroom A

In this session interactive poster authors will each provide a brief oral preview of their poster presentation, which will be presented fully in the Human Vision and Electronic Imaging 2017 Interactive Papers Session at 5:30 pm on Wednesday.

10:00 HVEI-520 [no paper]
A tutorial on correcting for multiple tests, *Christopher Tyler, Smith-Kettlewell Eye Research Institute (United States)*

10:05 HVEI-521
Optimum space-frequency partition in subband image coding with human visual sensitivity and region-of-interest, *Haruhiko Miyazaki and Masashi Kameda, Iwate Prefectural University (Japan)*

10:10 HVEI-522 [no paper]
Predicting learning difficulty based on gaze and pupil response, *Saurin Parikh[1,2] and Hari Kalva[1]; [1]Florida Atlantic University (United States) and [2]Nirma University (India)*

10:15 HVEI-541
Colorizing color images, *Ligeng Zhu and Brian Funt, Simon Fraser University (Canada)*

10:20 HVEI-540
Storyboard of thoughts: Using photography and illustration to visualize the mind, *Mónica López-González, La Petite Noiseuse Productions (United States)*

10:25 HVEI-542
Investigating potential human tetrachromacy in individuals with tetrachromat genotypes using multispectral techniques, *Vladimir A. Bochko[1], and Kimberly A. Jameson[2]; [1]University of Vaasa (Finland) and [2]University of California Irvine (United States)*

10:30 – 10:50 am Coffee Break

Special Session: Perceptual Image Quality for Virtual and Augmented Reality Systems

Session Chair: Kjell Brunnstrom, RISE Acreo AB (Sweden)

10:50 am – 12:30 pm
Grand Peninsula Ballroom A

10:50 HVEI-523
Towards subjective quality assessment for panoramic video (Invited), *Zhenzhong Chen and Yingxue Zhang, Wuhan University (China)*

11:10 HVEI-524
A framework for adaptive delivery of omnidirectional video (Invited), *Christian Timmerer[1,2], and Ali C. Begen[3,4]; [1]Alpen-Adria-Universität Klagenfurt (Austria), [2]Bitmovin (Austria), [3]Ozyegin University (Turkey), and [4]Networked Media (Turkey)*

11:30 HVEI-525
Comparison of subjective quality evaluation methods for omnidirectional videos with DSIS and modified ACR (Invited), *Ashutosh Singla[1], Werner Robitza[1,2], and Alexander Raake[1]; [1]Technische Universität Ilmenau and [2]Telekom Innovation Laboratories, Deutsche Telekom AG (Germany)*

11:50 HVEI-526
Quality of experience for a virtual reality simulator (Invited), *Kjell Brunnström[1,2], Mårten Sjöström[2], Muhammad Imran[2,3], Magnus Pettersson[3], and Mathias Johanson[4]; [1]RISE Acreo AB, [2]Mid Sweden University, [3]HIAB, and [4]Alkit Communications AB (Sweden)*

12:10 HVEI-527
Exploring the effects of subjective methodology on assessing visual discomfort in immersive multimedia (Invited), *Jing Li[1], Junle Wang[2], Marcus Barkowsky[1], and Patrick Le Callet[1]; [1]Université de Nantes and [2]Ars Nova Systems (France)*

12:30 – 2:00 pm Lunch

Plenary Session

2:00 – 3:00 pm
Grand Peninsula Ballroom D

Ubiquitous, Consumer AR Systems to Supplant Smartphones, *Ronald T. Azuma, Intel, Corp. (United States)*

Dr. Ronald T. Azuma, researcher and augmented reality pioneer, shares his vision for achieving ubiquitous, consumer AR systems. Recent large investments in augmented reality reflect the commercial interest in its inherent potential to replace current smartphone technology, but much remains to be done. In his talk, Dr. Azuma gives a vision for achieving this goal, which requires not just solving numerous technical challenges but also determining new, compelling AR experiences that will establish AR as a new platform and novel form of media.

Dr. Azuma leads a team in Intel Labs that designs and prototypes novel experiences and key enabling technologies to enable new forms of media. These technology areas include computational imaging and photography, computational displays, and head-worn displays. Dr. Azuma is recognized as a pioneer and innovator in augmented reality, and has held prominent leadership roles in that research area, including leading and implementing research projects and demonstrations in areas such as AR, visualization, and mobile applications. Dr. Azuma received his BSc (1988) in electrical engineering from University of California, Berkeley, and MS (1990) and PhD (1995) in computer science from University of North Carolina, Chapel Hill. Prior to joining Intel, he was a research leader at Nokia Research Center Hollywood, and a senior researcher at Hughes Research Laboratories.

3:00 – 3:30 pm Coffee Break

Physiological Measurements for Vision and Image Quality Research

Session Chair: Bernice Rogowitz, Visual Perspectives (United States)

3:30 – 4:30 pm
Grand Peninsula Ballroom A

3:30 HVEI-528
Statistical identification of fixations in noisy eye movement data, *Jeffrey Mulligan, NASA Ames Research Ctr. (United States)*

3:50 HVEI-529
Measuring video quality by eye response, *Deepti Pappusetty and Hari Kalva, Florida Atlantic University (United States)*

4:10 HVEI-530
Quantifying visually induced motion sickness (VIMS) during the stereoscopic 3D viewing using temporal VIMS rating (JIST-first), *Alex Hwang[1], Hongwei Deng[1,2], Zhongpai Gao[1,3], and Eli Peli[1]; [1]Harvard Medical School (United States), [2]Shenzhen Eye Hospital of Jinan University (China), and [3]Shanghai Jiao Tong University (China)*

HVEI Wednesday Discussion with Wine
4:30 – 5:30 pm
Grand Peninsula Ballroom A

Please join us for a lively discussion of today's presentations. Enjoy a glass of wine and then participate in an interactive, moderated discussion, where key topics and questions are discussed from many perspectives, reflecting the diverse HVEI community.

Symposium Interactive Papers (Poster) Session

5:30 – 7:30 pm
The Grove

Meet the Future: A Showcase of Student and Young Professionals Research

5:30 – 7:30 pm
The Grove

Thursday, February 1, 2018

The Neuroscience and Experience of Multisensory Integration

Session Chair: Thrasyvoulos Pappas, Northwestern University (United States)

9:10 – 10:10 am
Grand Peninsula Ballroom A

9:10 HVEI-531
Theoretically automated conversations: Collaborative artistic creativity for autonomous machines, *Mónica López-González, La Petite Noiseuse Productions (United States)*

9:30 HVEI-532
Haptic aesthetics in the blind: A behavioral and fMRI investigation, *A.K.M. Rezaul Karima[1,2,3], and Lora T. Likova[1], [1]Smith-Kettlewell Eye Research Instituite (United States), [2]Envision Research Institute(United States), and [3]University of Dhaka (Bangladesh)*

10:10 – 10:50 am Coffee Break

Art and Perception: Representation, Experience, and Understanding

Session Chair: Bernice Rogowitz, Visual Perspectives (United States)

10:50 am – 12:30 pm
Grand Peninsula Ballroom A

10:50 HVEI-533
Art changes our way of cognitive and affective processing! But how to ecologically validly measure such processes?, *Claus-Christian Carbon, University of Bamberg, Research group EPÆG (Ergonomics, Psychological Aesthetics, Gestalt), and Bamberg Graduate School of Affective and Cognitive Sciences (BaGrACS) (Germany)*

11:10 HVEI-534
Meaningful-engagements with online museum collections for children with chronic health conditions, *Eliron Salomon, Online Museum for Self Improvement (OMSI) (Israel)*

11:30 HVEI-535
Rational approaches to correcting for multiple tests, *Christopher Tyler, Smith-Kettlewell Eye Research Institute (United States)*

11:50 HVEI-536
Beurs' historical recipe and material perception of grapes in Dutch Golden Age still-lifes, *Francesca Di Cicco, Maarten Wijntjes, and Sylvia Pont, Delft University of Technology (the Netherlands)*

12:10 HVEI-537
Saliency-based artistic abstraction with deep learning and regression trees (JIST-first), *Hanieh Shakeri, Michael Nixon, and Steve Dipaola, Simon Fraser University (Canada)*

12:30 – 2:00 pm Lunch

Keynote: Visual Representation in Art, Imaging and Visualization with Tim Jenison of Tim's Vermeer Fame
Session Chair: Claus-Christian Carbon, University of Bamberg (Germany)
2:00 – 2:40 pm
Grand Peninsula Ballroom A

HVEI-538 [no paper]
Capturing reality, *Tim Jenison, NewTek, Inc. (United States)*

Tim Jenison founded Texas-based computer software and hardware producer NewTek, specializing in tools for the gathering and editing of desktop video media. Following the formation of the company in Topeka, Kansas, alongside the late Paul Montgomery, NewTek went on to become renowned for the creation of the Commodore Amiga video tools DigiView and DigiPaint, which were highly popular applications at the time. Jenison later appeared as the subject of the feature documentary "Tim's Vermeer" (2014), about his efforts to digitally recreate the painting technique of the Dutch baroque painter Johannes Vermeer. In his early life, Jenison took inspiration from his electrical engineer father, and a lot of his own early work came as a result of his obsession with music; as a youth he played in rock bands, although his main love was customizing and improving their instruments and studio equipment. Among his successes with NewTek were the Video Toaster for the Amiga and later Windows, a product which won the 1993 Emmy Award for Technical Achievement, and latterly animation system LightWave 3D, live broadcast system TriCaster, and slow motion replay system 3PLAY. A casual art fan himself, Jenison was inspired by the writings of artist David Hockney and art historian Philip Steadman to see whether rumoured primitive photographic techniques in Vermeer's paintings were possible. "Tim's Vermeer," directed by magician Teller and featuring his partner, Jenison's friend Penn Jillette, documented his artistic process. The film earned an Oscar nomination for Best Documentary Feature in 2014.

2:40 – 3:30 pm
Grand Peninsula Ballroom A

Panel: Visual Representation in Art, Imaging and Visualization with Tim Jenison of Tim's Vermeer fame
Panel Moderator: Claus-Christian Carbon, University of Bamberg (Germany)
Panelists: Thrasyvoulos Pappas, Northwestern University (United States); Sylvia Pont, Delft University of Technology (the Netherlands); Bernice Rogowitz, Visual Perspectives (United States); David Stork, Rambus Labs (United States); and Christopher Tyler, Smith-Kettlewell Eye Research Institute (United States)

3:30 – 4:00 PM Coffee Break

HVEI Closing Discussion and Celebration
3:30 – 4:30 pm
Grand Peninsula Ballroom A

Please join us for a lively discussion of today's presentations. Enjoy a glass of wine and then participate in an interactive, moderated discussion, where key topics and questions are discussed from many perspectives, reflecting the diverse HVEI community.

SFMOMA Museum Visit & Dinner

4:30 – 10:00 pm
Offsite - details provided with registration

Join your HVEI colleagues for an excursion to the SFMOMA and for a late dinner after the museum visit. Depart from the HVEI conference room at 4:30 pm. Visit SFMOMA 5:30 - 8:00 pm. Gather informally for dinner at 8:00 pm.