SMPTE 2018 Symposium

DRIVING THE ENTERTAINMENT REVOLUTION: Autonomous Cars, Machine Intelligence, & Mixed Reality

Monday, 22 October

9:00–9:15 AM — **SMPTE 2018 Symposium Welcome:** San Francisco Room
Host: Michael Zink

9:15–9:45 AM — **Market Overview:** San Francisco Room
With recent advancements in multiple technologies—autonomous cars, machine intelligence, and mixed reality—the mobility sector is poised for significant transformation. This provides great opportunities for media and entertainment companies to develop new experiences for that environment. This first session will provide an overview of the current market along with predictions for the developments over the next few years and will offer a perspective on the opportunities.
Speaker: Richard Merchant

9:45–10:30 AM — **Keynote: Safety Today for the Autonomous Tomorrow:** San Francisco Room
Since the introduction of the first automobile in the late 1800s, car manufacturers have continued working to improve the safety of their vehicles. Cities have implemented a common infrastructure through road signals and lane markings and better illumination to reduce the number of accidents. However, how do we eliminate the fact that over 90% of all accidents are still caused by human error?
Keynote Speaker: Douglas Davies

10:30–11:00 AM — **Coffee Break:** California Ballroom Foyer

11:00 AM–12:15 PM — **Content Applications:** San Francisco Room
Redefining "In-Car Entertainment"—when passengers are no longer focused on driving the car, they have more time to consume entertainment content on the go. With many new technologies progressing at a rapid pace, there are great opportunities to develop very unique experiences only possible within that mobility environment. This session will highlight many innovative ideas for content applications specifically designed for this new environment. Many real-life examples will provide a glimpse of the experiences we can expect more of in the future.
Speakers: Eric Brown, Mike McGee

12:15–2:15 PM — **HPA Women in Post and SMPTE Present the Women in Technology Luncheon:** Hollywood Ballroom

12:15–2:15 PM — **Symposium Lunch**

2:15–3:45 PM — **Entertainment Enablement—Part I:** San Francisco Room
To enable the new content applications, many technological advances are required. This session, in two parts, will highlight some of the most exciting developments in the industry empowering these new experiences. It will feature the latest innovations on materials such as glass and display technologies, communications, and electronics improvements, to leveraging

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cutting-edge biometric sensors. All these components will be used to develop the best consumer experiences of the future.
Speakers: Andrew Hill, Naoki Usui, Hyeok-Jun Kwon, Masao Eriguchi, Douglas Harshbarger

4:00–4:30 PM **Coffee Break: California Ballroom Foyer**

4:15–5:15 PM **Entertainment Enablement—Part II: San Francisco Room**

In addition to the consumer-facing technology advances, there are many underlying technologies required to enable the desired experiences. This session will focus on those foundational technologies, such as communications and electronics improvements, and looking ahead at leveraging cutting-edge biometric sensors. All these components will be used to develop the best consumer experiences of the future.
Speakers: Marcus Kuehne, Abdelrahman Mahmoud, Nakul Duggal

6:00–8:00 PM **Evening Luau Reception: Pool Deck Plaza**

SMPTE 2018 Annual Technical Conference Program

Tuesday, 23 October

7:45–8:45 AM
Morning Coffee
Room: Foyer

8:45–9:00 AM
Welcome
Room: San Francisco

9:00–10:00 AM
Keynote
Room: San Francisco

10:00–10:30 AM
Coffee Break
Room: Foyer

10:30 AM–12:00 PM

Better Pixels: HDR Image Analysis for Effective Storytelling

Room: Sacramento

Chairs: Sally Hattori (Twentieth Century Fox, USA); David Long (Rochester Institute of Technology, USA)

The digital revolutions in television and cinema have placed a spotlight on the pixel. As engineers consider what makes a pixel "better," answers have come in objective physical quantities—there should be more of them on each frame and more of them available each second. They should reconstruct a larger color volume and deliver a wider dynamic range. Beyond the physics and engineering, we must also fully consider the holistic quality of experience for the human observer. This session will emphasize studies of UHD/HDR/HFR/WCG and integrated image quality with an eye to keep future television and cinema inventions focused on delivering truly excellent perceptual experiences.

10:30 AM — What Are the "Killer Apps" for HDR? Analysis of SDR Assets to Predict the Potential of HDR
Pierre Hugues Routhier (Digital Troublemaker & Creat3 Inc., Canada)

11:00 AM — Using High Dynamic Range Home Master Statistics to Predict Dynamic Range Requirements for Cinema
Ronan Boitard (MTT Innovation & Barco, Canada); Michael D. Smith (Wavelet Consulting LLC, USA); Michael Zink (Warner Bros, USA); Gerwin Damberg and Anders Ballestad (MTT Innovation, Canada)

11:30 AM — Beyond Better Pixels: How HDR Perceptually and Emotionally Effects Storytelling
Aurora Gordon (ArsenalFX Color, USA)

Artificial Intelligence (Part 1): Let's Get Started with AI

Room: San Francisco
Chair: Yvonne Thomas (Arvato Systems, Germany)
Is AI more than automation in our industry? This session will explore why AI algorithms will become a must for any content producer and provider. AI is to become an integrated component in our system landscapes, and therefore, broadcasters and producers can use AI technology to harness previously untapped metadata within new or archived content through automated metadata curation and extraction. One of the most important aspects of AI is machine learning (ML), which brings together several advanced technologies, including high-performance networks, advanced computing power, and cloud and storage solutions. Learn about practical examples of how AI can be used in our media industry and how to create and develop ML practices to ensure the highest quality of metadata.

10:30 AM — The Automated AI Workflow Is Here ... If You Know Where to Look
Jason Perr (Workflow Intelligence Nexus & Intuitive Asset Management Inc., USA)

11:00 AM — Managing the Data Lifecycle for AI and Machine Learning in Media Workflows
Kurt Kuckein (DDN Storage, USA)

11:30 AM — Embracing AI in Real-World Broadcast Operations
Vimalesh Melwani (Prime Focus Technologies, USA)

Will Blockchain Solve All Our Problems in M&E?

Room: San Jose
Chair: Marc Zorn (HBO, USA)
The idea of blockchain is no longer brand new, but have we figured out what to do with it yet? Or, have we found a hammer and are now looking for nails? In this session, we will examine a few use cases to see if there is a practical use for blockchain in media and entertainment.

10:30 AM — Blockchain Application in Media & Entertainment
Shruti Tripathi (Techtel, Australia)

11:00 AM — Is Blockchain and Distributed Compute and Store Right for Post-Production?
Steve Wong (DXC Technology & Hewlett Packard Enterprise/Computer Sciences Corporation, USA)

11:30 AM — Blockchain: The Decentralized Rights Locker
Niels Thorwirth (Verimatrix, Inc., USA)

12:00–2:00 PM
Fellows Luncheon Hollywood Ballroom and Lunch in Exhibit Hall

2:00–3:30 PM

Better Pixels: Production and Distribution Technologies for a Better Pixel Ecosystem

Room: Sacramento
Chairs: Sally Hattori (Twentieth Century Fox, USA); David Long (Rochester Institute of Technology, USA)
The digital revolutions in television and cinema have placed a spotlight on the pixel. As engineers consider what makes a pixel "better," answers have come in objective physical quantities—there should be more of them on each frame and more of them available each second. They should reconstruct a larger color volume and deliver a wider dynamic range. Beyond the physics and engineering, we must also fully consider the holistic quality of experience for the human observer. This session will emphasize studies of UHD/HDR/HFR/WCG and integrated image quality with an eye to keep future television and cinema inventions focused on delivering truly excellent perceptual experiences.

2:00 PM — Development of Full-Featured 8K Recorder
Kodai Kikuchi, Takeshi Kajiyama, and Eiichi Miyashita (Japan Broadcasting Corp., Japan)

3:00 PM — An Assessment of Reference Levels in HDR Content
Erik Reinhard (Technicolor, France); Jurgen Stauder (Technicolor R&D, France); Michel Kerdranvat (Technicolor, France)

Artificial Intelligence (Part 2): Let's Get the Requirements Right for a World Full of AI

Room: San Francisco
Chair: Yvonne Thomas (Arvato Systems, Germany)
If you ask yourself how you can use AI services and what the requirements for your infrastructure are you should join this session to learn from industry experts.

2:00 PM — Maximizing Content With Cloud, Virtualization, and AI
Ray Thompson (Avid, USA)

2:30 PM — Artificial Intelligence for Media Operations
Thomas Gunkel (Skyline Communications, Belgium)

3:00 PM — Automating Metadata Logging Through Artificial Intelligence
Christopher Witmayer (NASCAR, USA)

Exploring Security in New Media Space

Room: San Jose
Chair: Marc Zorn (HBO, USA)
As we venture into new technologies, how can we embed security technologies to meet new threats? We will study broadcast IP-based systems, ponder new avenues for security innovation using blockchain, and consider security threats of virtual reality as a medium (and not just by motivated gamers).

2:00 PM — Security Considerations for Broadcast IP-Based Systems
Leigh Whitcomb (Imagine Communications, Canada); Ed Dengler (eTrans Research, Canada)

2:30 PM — Securing Your Enterprise IPTV Ecosystem
Sergio Ammirata (DVEO, USA)

3:00 PM — A Threat Analysis of Virtual Reality for Media
Eric Diehl (Sony Pictures Entertainment, USA)

3:30–4:15 PM — Coffee Break
Room: Exhibit H

4:15–5:45 PM

Better Pixels: Image Processing Technologies for Better Pixels

Room: Sacramento
Chairs: Sally Hattori (Twentieth Century Fox, USA); David Long (Rochester Institute of Technology, USA)
The digital revolutions in television and cinema have placed a spotlight on the pixel. As engineers consider what makes a pixel "better," answers have come in objective physical quantities—there should be more of them on each frame and more of them available each second. They should reconstruct a larger color volume and deliver a wider dynamic range. Beyond the physics and engineering, we must also fully consider the holistic quality of experience for the human observer. This session will emphasize studies of UHD/HDR/HFR/WCG and integrated image quality with an eye to keep future television and cinema inventions focused on delivering truly excellent perceptual experiences.

4:15 PM — Scene-Light Conversions: The Key to Enable Live HDR Production
Andrew Cotton and Simon Thompson (BBC, U.K.)

4:45 PM — A Survey on 3D Look-Up Tables Performances in 10-bit HDR Rec. 2020
JD Vandenberg (The Walt Disney Studios, USA); Stefano Andriani (Arnold & Richter Cine Technik GmbH, Germany)

5:15 PM — Variable Frame Rate Technology—Change Is Good!
Edward G. Callway (AMD, Canada)

File Workflows

Room: San Jose
Chairs: Massimiliano Gasparri (eCM, USA); Sara Kudrle (Imagine Communications and & SMPTE Education Director, USA)
Managing the seemingly unmanageable file-based workflows continue to evolve and the size and complexity of productions continue to increase. The number of required deliverables has grown exponentially, the choices are complex, content storage requires petabytes, and people are distributed. With the addition of new tools and methodologies, workflows can achieve greater simplification and flexibility that is needed for these dynamic business challenges. Come learn about the new techniques and technologies, either standardized or customizable, for handling even the most complex workflows and discover how to manage the seemingly unmanageable.

4:15 PM — Robust, Repeatable, and Interoperable Workflows Through IMF Output Profile List
Raymond Yeung (Dolby, USA); Arjun Ramamurthy (Twentieth Century Fox, USA)

4:45 PM — Automated Distribution Workflows Based on IMF Metadata
Tomasz Witkowski and Saul Mahoney (Sundog Tools, U.K.); Andrew Dunne (BBC, U.K.); Andrew Andrew Johnston (Rightsline, U.K.)

5:15 PM — Good Things Come in Small Packages—Microservices for Media
Christopher J. Lennon (MediAnswers, USA)

Advances in Display Technology

Room: San Jose
Chair: Peter H. Putman (ROAM Consulting LLC, USA)
You may not realize it, but many recent advances in video and film production like high dynamic range (HDR) and Ultra HDTV are being driven by display technology. And there's no slowing down: factories in Asia are already gearing up to manufacture 8K televisions this year. Brighter illumination sources such as quantum dots are in wide-

spread use to reproduce HDR and wide color gamut images in consumer televisions. Fine pitch light-emitting diodes (LEDs) may reinvent consumer TV and kill off cinema projection along the way. Even traditional concepts of displays are being challenged by light-field technology, virtual reality, and LED cinema screens. This session will explore new ways to format and show electronic images in the home and at the cinema (and perhaps even in your head!). We'll take a deeper dive into all of these questions in this thought-provoking session. (Warning—you may never "look" at your television the same way again.)

4:15 PM — Influence of Ambient Chromaticity on Portable Display Color Appearance
Trevor Canham (Rochester Institute of Technology, USA & Universitat de Pompeu Fabra, Spain)

4:45 PM — Black Level Visibility as a Function of Ambient Illumination
Scott Daly (Dolby, USA); Pavel Korshunov (Idiap Research Institute, Switzerland); Touradj Ebrahimi (Ecole Polytechnique Fédérale de Lausanne, Switzerland); Timo Kunkel (Dolby, USA); Robert Wanat (Dolby, USA)

5:15 PM — New Standards for Immersive Storytelling Through Light-Field Displays
Peter Ludé (Mission Rock Digital, USA)

Wednesday, 24 October

8:00–9:00 AM
Morning Coffee
Room: Foyer

9:00–10:30 AM

IP (Part 1)—Practical Implementation of ST 2110

Room: Sacramento
Chairs: Thomas Edwards (Fox Networks Engineering and Operations, USA); Hans Hoffmann (European Broadcasting Union, European Union)
As media companies begin to have real installations of ST 2110, there are some key elements required to ensure practical implementation. This session looks at these implementation issues such as latency, the move to software solutions, and testing of ST 2110.

9:00 AM — Designing a Low-Latency ST 2110 System
Leigh Whitcomb (Imagine Communications, Canada)

9:30 AM — Bridging the Gap Between Software and SMPTE ST 2110
Jean Lapierre and Marcom Marcom (Matrox, Canada)

10:00 AM — An Open-Source Software Toolkit for Professional Media Over IP
Levgen Kostiukevych (European Broadcasting Union, Switzerland); Pedro Ferreira (Bisect Lda, Portugal); Willem Vermost (EBU, Switzerland)

Cloud (Part 1): Cloud Potential & Reality

Room: San Francisco
Chair: Willem Vermost (EBU, Switzerland)
Cloud providers offer a basic toolkit for many users by means of a massive amount of storage, CPU cycles, and services ready to be used. With the availability of machine learning, media services are becoming available and getting mature. Examples like: image recognition, speech to text, translation, etc., will help to increase the production and searchability of media assets. The cloud promises to bring flexibility, scalability, and share ability to media production. This year's ATC papers offer a wide range of applications that will make use of the cloud. Learn how the building blocks of our video/film industry are moving from being dedicated 19-in. equipment in your rack toward a dematerialized version into the cloud.

9:00 AM — Cloud Media Asset Management: Overview, Migration, and Challenges
Jack Wenzinger (Amazon Web Services, USA)

9:30 AM — Editing in the Cloud
Karsten Schragmann and Ulrich Ening (Arvato Systems S4M GmbH, Germany)

10:00 AM — Moving to the Cloud: One Year Later—Will Significant Deployment Barriers Persist Indefinitely?
Julie McDonald (Nimble Collective, USA)

Encoding: The Never-Ending Story

Room: San Jose
Chair: Scott Barella (PESA, USA)
Rust never sleeps, and neither do codec developers. Just when we think we've got it all figured out, along come new wrinkles like UHD, streaming, HDR, and mezzanine compression, as the tug-of-war between bandwidth, bit rate, and buck$ continues. Catch up on the latest technical developments from the "front lines" of encoding in this intriguing session!

9:00 AM — MPEG-I Future Directions
Walt Husak (Dolby, USA); Jill Boyce (Intel, USA)

10:00 AM — Analysis of Emerging Video Codecs: Coding Tools, Compression Efficiency, and Complexity
Julien Le Tanou, Mederic Blestel, and Michael Ropert (Ericsson Media Solutions, France)

10:30–11:00 AM
Coffee Break
Rooms: Exhibit Hall, Foyer

11:00 AM–12:30 PM

IP (Part 2)—Timing and Documentation of IP Plants

Room: Sacramento
Chairs: Thomas Edwards (FOX Networks Engineering and Operations, USA); Hans Hoffmann (European Broadcasting Union, European Union)
Accurate timing is a requirement for ensuring the proper composition of ST 2110 elementary media flows into a coherent media program. ST 2059 provides the guidance for the use of Precision Time Protocol to deliver an accurate timing clock over the network for ST 2110. This session addresses issues of resiliency, redundancy, and testability of ST 2059 solutions.

11:00 AM — Building Resilient Hybrid Plant Master Synchronization Systems Using SMPTE 2059 and PTP
Paul E. Briscoe (Televisionary Consulting & SMPTE, IEEE, Canada)

11:30 AM — Enhanced Redundancy of ST 2059-2 Time Transfer Over ST 2022-7 Redundant Networks
Nikolaus Kerö (Oregano Systems, Austria); Thomas Kernen (Mellanox, Switzerland)

12:00 PM — Documenting Complex Systems in the IP Era
James Snyder (Library of Congress, USA)

Cloud (Part 2): Streaming Cloud Solutions

Room: San Francisco
Chair: Willem Vermost (EBU, Switzerland)
There are no coaxial cable connectors in the cloud, thus IP is a natural fit for moving live media in and to/from the cloud. The combination of the flexibility of IP media streaming with the scalability of the cloud opens up the potential for new and innovative workflows. This session's papers show how streaming media works with cloud for production, contribution, and distribution.

11:00 AM — A Location-Free Commentary Adding System for Live Streaming Using a Cloud Infrastructure
Naruaki Kato (Japan Broadcasting Corp., Japan)

11:30 AM — Cloud Contribution
Christopher Witmayer (NASCAR, USA); Shawn Carnahan (Telestream, USA)

12:00 PM — Massively Parallel Open Source Encoding for Adaptive Streaming
Alex Giladi (Comcast, USA)

Image Quality (Part 1)

Room: San Jose
Chair: Kylee Peña (Netflix & Blue Collar Post Collective, USA)
As brighter displays, immersive visual experiences, and high dynamic range become the norm for how we experience motion pictures, the methods by which we evaluate image quality continue to evolve. Not only do we need to engineer baselines for calibrations and ambient light, but we'll also need to come to a consensus on perception, which may mean not coming to a consensus at all. This session will explore the theoretical and the actual in the current state of image quality, from perceptual reproduction quality assessment to monitoring viewing experiences of adaptive bitrate streams, and new methods for estimating the Opto-Electronic Camera Function (OECF) of an electronic motion picture camera for more efficient encoding of camera exposures into post-production workflows.

11:00 AM — Visual Perceptual Entropy Measure
François Helt (Self-Employed, France)

11:30 AM — ABR Quality Monitoring: State of the Art
James Welch (IneoQuest Technologies, USA)

12:00 PM — Bayesian Methods for Radiometric Calibration in Motion Picture Encoding Workflows
Rui Li and Ricardo Figueroa (Rochester Institute of Technology, USA)

12:00–2:30 PM
Lunch and Section Leadership Event

2:30–3:30 PM

Artificial Intelligence (Part 3): Let's Take AI in Real Life

Room: Sacramento
Chair: Yvonne Thomas (Arvato Systems, Germany)
This session will give you hands on experience on how AI will help to improve live production workflows and distribution as well as where and when to best place your ads.

2:30 PM — Artificial Intelligence for the Automation of Robotic Cameras in Live Sports
Johan Vounckx (EVS, Belgium); Floriane Magera (University of Liege & EVS, Belgium)
This session will give you hands on experience on how AI will help to improve live production workflows and distribution as well as where and when to best place your ads.

3:00 PM — Exploring Creative Frontiers of AI in M&E Production and Distribution
Rick Singer (Singer Media Engineering, LLC, USA); Gary Olson (GHO Group, LLC, USA)

OTT 1: The Global Impact of OTT

Room: San Francisco
Chair: John E. Ferder (Consultant, USA)
This session examines in depth the explosion of internet users worldwide and the development of OTT penetration in the world's largest markets. We'll also discuss the approaches needed to sustain this growth and expand opportunities for content providers.

2:30 PM — Leading the OTT Charge: What We Can Learn From China's Massive OTT Deployment
Reza Rassool (RealNetworks, USA)

3:00 PM — OTT Audio and Video: The Next Evolution for Telcos
Moreshwar Salpekar (ST Microelectronics, India)

Image Quality (Part 2)

Room: San Jose
Chair: Kylee Peña (Netflix & Blue Collar Post Collective, USA)
Continuing our discussion of the present and future of image quality and its impact on the motion picture industry, the afternoon session delves into deeper issues of perception and evaluation of images. This session will address the various issues at stake for the present and future of image quality, including a look at visibility thresholds of chromatic noise introduced as sensors evolve and improved understanding of solutions for denoising, as well as a proposal to improve upon average peak luminance (APL) as a method for characterizing the overall brightness of professional content.

2:30 PM — Determining Visibility Thresholds for Spatial and Spatiotemporal Chromatic Noise
Catherine Meininger (Rochester Institute of Technology, USA)

3:00 PM — Quantitative Evaluation and Attribute of Overall Brightness in a High Dynamic Range World
Stelios Ploumis (University of British Columbia, Canada); Ronan Boitard (MTT Innovation & Barco, Canada); Gerwin Damberg (MTT Innovation, Canada); Jean-Philippe Jacquemin (Barco n. v., Belgium); Anders Ballestad (MTT Innovation, Canada); Panos Nasiopoulos (The University of British Columbia, Canada)

3:30–4:15 PM
Coffee Break
Room: Exhibit Hall

4:15–5:45 PM

IP (Part 3)—Higher Level IP Functionality

Room: Sacramento
Chairs: Thomas Edwards (Fox Networks Engineering and Operations, USA); Hans Hoffmann (European Broadcasting Union, European Union)
ST 2110 is just the base media transport layer of a professional networked media solution. Higher level functionality is required for an actual working IP media solution Presentations in this session address the discovery and registration of AMWA IS-04, connection management of AMWA IS-05, and how complex IP systems can be properly documented.

4:15 PM — Systemization of SMPTE 2110 Environments Using AMWA IS04 & IS05 Control Protocols
John Mailhot (Imagine Communications, USA)

4:45 PM — Scalability and Performance of the NMOS IS-04 and IS-05 Specifications for Networked Media
Robert Porter and Gareth Sylvester-Bradley (Sony Europe Ltd., U.K.)

5:15 PM — Fast Extensible Metadata (FMX) for the SMPTE ST 2110 Standards Suite
Paul E. Briscoe (Televisionary Consulting & SMPTE, IEEE, Canada)

OTT 2: I Want My OTT! Meeting the Growing Demand for OTT Services

Room: San Francisco
Chair: John E. Ferder (Consultant, USA)
As the demand for higher quality content delivered seamlessly and error-free grows, so do the designs, strategies, and topologies for meeting that demand. These presentations will describe the latest approaches and innovations for the improvement of delivery of OTT content to the ever-growing number of subscribers.

4:15 PM — Design and Implementation of a New Fully Decentralized Digital Content Fabric
Michelle Munson (Eluvio, USA)

4:45 PM — Mass Market Live Event Streaming: Will It Work?
Jason Friedlander (Verizon Digital Media Services, USA)

5:15 PM — A Queueing Network Approach for Modeling Dynamic Adaptive Streaming Over HTTP
Pietro Camarda (Politecnico di Bari, Italy)

Storage: From Production to Archiving

Room: San Francisco
Chair: Massimiliano Gasparri (eCM, USA)
Since the introduction of digital content, the M&E industry has kept a front row seat in the theater of digital storage evolution. From capturing content—to post—to archiving, storage has become a critical industry component. Higher

resolution, greater frame rates, multicamera setup are now breaking boundaries of storage solutions. This session will present case studies, survey results, trends, and insights on the future of digital storage for the entertainment industry.

4:15 PM — Nine Years of Media and Entertainment Digital Storage Surveys
Thomas Coughlin (Coughlin Associates, USA)

4:45 PM — Next-Generation Software-Defined Archives
Brian Campanotti (Cloudfirst.io, Canada)

5:15 PM — Hyperscale and HPC Techniques and Technologies Necessary to Modern Media and Broadcast Workflows
Björn Kolbeck (Quobyte, USA)

Thursday, 25 October

8:00–9:00 AM
Morning Coffee
Room: Foyer

9:00–10:00 AM

Innovating People: Management, Culture, and Inclusion

Room: Sacramento
Chairs: John McCoskey (Eagle Hill Consulting, USA); Kylee Peña (Netflix & Blue Collar Post Collective, USA)
People are the lifeblood of every media and technology organization, but we often overlook the importance of understanding, caring for, feeding, and growing our most important resource. Adapting our management to welcome new and different generations of professionals is vital to the future of organizations like SMPTE and to future innovations in motion picture and television engineering. Groups of people with varying backgrounds and perspectives are better for business and lead to more successful projects; however, technology-oriented organizations continue to struggle with recruiting and retaining a diverse workforce. This session will explore the roles of culture, core values, and inclusivity as tools to help understand and address these issues.

9:00 AM — The Corporate Integrity Implosion: Strategies for Technology, Media, & Entertainment Organizations
John McCoskey (Eagle Hill Consulting, USA)

9:30 AM — Where Are the Women? The Importance of Visibility in Achieving Inclusivity
Krystle Penhall (Freelancer, Australia)

Living in a Virtual World

Room: San Jose
Chair: Siegfried Foessel (Fraunhofer IIS, Germany)
New immersive technologies like omnidirectional videos or augmented scene displays mandate new forms of storytelling. Singular viewpoint and linear narration are no longer viable. Stories diverge at the mercy of interaction so that user experience channels the story. This session highlights observed user behavior in omnidirectional videos and gives guidance for immersive virtual world experiences.

9:00 AM — Analysis of User Exploration Patterns During Scene Cuts in Omnidirectional Videos
Dmitrii Monakhov and Deepa Naik (Tampere University of Technology, Finland); Igor Curcio (Nokia, Finland)

9:30 AM — Immersive Media Experiences—What Do We Need to Move Forward?
Andrew Perkis (Norwegian University of Science and Technology, Norway); Asim Hameed (University of Science and Technology (NTNU), Norway)

10:00–10:30 AM
Coffee Break
Rooms: Exhibit Hall, Foyer

10:30 AM–12:00 PM

IP (Part 4)—Advances in IP

Room: Sacramento
Chairs: Thomas Edwards (Fox Networks Engineering and Operations, USA); Hans Hoffmann (European Broadcasting Union, European Union)
Presentations in this session look at how to move beyond the status quo with professional media networking, including elements such as improving networks, going to 8K over IP, and how to move IP media effectively over unmanaged networks.

10:30 AM — Nonblocking Multicast Networks for Transporting Stream Media
Takeshi Shimizu (Media Links Co., Ltd., Japan)

11:00 AM — Implementation of 8K Vision Mixer That Transports 8K Image as Multiple 2K SMPTE ST 2110-20 Flows
Tomofumi Koyama, Junichiro Kawamoto, and Masahiro Kawaragi, Takuya Kurakake, Kyoichi Saito [Japan Broadcasting Corp., (NHK), Japan]

11:30 AM — Contribution and Distribution Using Unmanaged Networks: A Coming of Age
Martin Holmes (Rohde & Schwarz, USA)

OTT 3: Rollin' on the OTT River: Avoiding the Rocks and Shoals in Your Content Delivery Stream

Room: San Jose

Chair: John E. Ferder (Consultant, USA)

This session explores new techniques in monitoring, transmission schemes, and piracy prevention to provide consistent, safe, and secure content delivery to subscribers.

10:30 AM — Broadcast and OTT Monitoring: The Challenge of Multiple Platforms

Jeff Herzog (Verizon Digital Media Services, USA)

11:00 AM — A Subjective Comparison of Broadcast and Unicast Transmission Impairments

Brahim Allan (British Telecommunications PLC, U.K.); Mike E. Nilsson (British Telecommunications plc, U.K.)

11:30 AM — Stopping Geolocation Fraud via "Rented" Residential IPs to Protect Territorial Content Rights

Artur Pawlak and Randy Halischuk (GeoGuard, Canada)

12:00–2:00 PM

Lunch

Room: Exhibit Hall

2:00–3:00 PM

Production and Post-Production

Room: Sacramento

Chair: Renard Jenkins (PBS, USA)

2:00 PM — Berlin Leichtathletik-EM: Lessons From a Live, HDR, HFR, UHD, and an Object-Based Audio Sports Event

Paola Sunna and Frans de Jong (EBU, Switzerland); Simon Thompson (BBC, U.K.); Dagmar Driesnack (IRT, Germany); Matthieu Parmentier (FranceTelevisions, France); Andrew Mason (BBC Research and Development, U.K.)

2:30 PM — Case Study—The Mother of All Tests for UHD Introduction at the Canadian Broadcasting Corp.

Jonathan Dupras (CBC/Radio-Canada, Canada); Pierre Hugues Routhier (Digital Troublemaker & Creat3 Inc., Canada)

The Future of: Time and Space

Room: San Jose

Chair: William Redmann (Technicolor, USA)

There is a fifth dimension, beyond that which is known to man. It is a dimension as vast as space and as timeless as infinity. Rod Serling, The Twilight Zone, Season 1, 1959 Time. Do you know what day it is? The year? How long is a video program? How tight can synchronization be? Space. How big is a broadcast facility? And how many fit onto the head of a pin?

2:00 PM — Beyond SMPTE Timecode - The TLX Project

Peter D. Symes (Symes TV Consulting, LLC, USA); Hugh Reynolds (Courtyard Electronics Ltd., U.K.)

2:30 PM — Broadcast Channel Origination as a Service—From Concept to Operational Implementation

John McCoskey (Eagle Hill Consulting, USA); Ron Clifton (Clifton Group International Ltd., USA); Mark Janke (South Carolina ETV, USA)

3:00–3:30 PM

Coffee Break

Room: Foyer

3:30–4:30 PM

Image Acquisition

Room: Sacramento

Chair: Renard Jenkins (PBS, USA)

3:30 PM — In-Camera, Photorealistic Style Transfer for On-Set Automatic Grading

Itziar Zabaleta Razquin and Marcelo Bertalmío (Universitat Pompeu Fabra, Spain)

4:00 PM — Creative Grading—Or Why a New Way of Broadcast Camera Control Is Needed

Klaus Weber (Grass Valley, A Belden Brand, Germany)

The Future of: Light and Sound

Room: San Jose

Chair: William Redmann (Technicolor, USA)

You're traveling through another dimension, a dimension not only of sight and sound but of mind. A journey into a wondrous land whose boundaries are that of imagination. Rod Serling, The Twilight Zone, Season 2, 1960 Sound Is Everywhere. Light. Walls of Color and Texture. Literally.

3:30 PM — Sound and Fury: Bringing Dolby Atmos to the NHRA

Michael Babbitt (Dolby, USA)

4:00 PM — Architectural and Engineering Considerations for Direct View LED as Applied to the Cinema

David Richards (Moving Image Technologies, USA)

(This Program Is Subject to Change)