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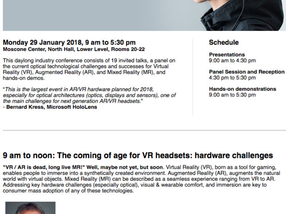
The Moscone Center
San Francisco, California, United States
**27 January - 1 February 2018**

## VR, AR, MR One-Day Industry Conference and Demo




**Monday 29 January 2018, 9 am to 5:30 pm**
**Moscone Center, North Hall, Lower Level, Rooms 20-22**

This daylong industry conference consists of 19 invited talks, a panel on the current optical technological challenges and successes for Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), and hands-on demos.

*"This is the largest event in AR/VR hardware planned for 2018, especially for optical architectures (optics, displays and sensors), one of the main challenges for next generation AR/VR headsets."*
**- Bernard Kress, Microsoft HoloLens**

### Schedule

**Presentations**
9:00 am to 4:30 pm

**Panel Session and Reception**
4:30 pm to 5:30 pm

**Hands-on demonstrations**
9:00 am to 5:30 pm

## 9 am to noon: The coming of age for VR headsets: hardware challenges

**"VR / AR is dead, long live MR!" Well, maybe not yet, but soon.** Virtual Reality (VR), born as a tool for gaming, enables people to immerse into a synthetically created environment. Augmented Reality (AR), augments the natural world with virtual objects. Mixed Reality (MR) can be described as a seamless experience ranging from VR to AR. Addressing key hardware challenges (especially optical), visual & wearable comfort, and immersion are key to consumer mass adoption of any of these technologies.

**9:00 am**
**Opening: Introduction to hardware challenges in VR / AR**
Bernard Kress*,
Conference Chair and Partner Optical Architect at Microsoft HoloLens

**9:20 am**
**Four challenges facing VR/AR/MR displays**
Ronald Azuma,
Principal Engineer and Research Manager, Intel Labs.

**9:40 am**
**VR at HTC**
Vivek Rangaiyan,
Executive Director, VR @HTC VIVE, Tech Strategist and Advisor

**10:00 am**
**VR at Google**
Jerry Ganitsky,
Optical Architect at Google

**10:20 am**
**Computational Displays at Oculus Research**
Douglas Lanman,
Director of Computational Imaging at Oculus Research

**10:40 am**
**Photonics and the low power future of AR/VR**
Fan Shuai,
Director AR/VR/MR, Corporate Technology Strategy, Huawei USA

**11:00 am**
**Infrared mirrors for eye-tracking application**
Timothy L. Wong,
Electronics Materials Solutions Division, 3M

**11:20 am**
**Optical sensors for human-computer interaction in AR/VR and beyond**
Yiwen Rong,
VP, Product Development of uSens

**11:40 am**
**High performance, low-cost, lightweight near eye display in glasses form factor allowing ophthalmic correction**
Hend Ghaieb, TriCentis

**12:00 pm**
**How LCOS (Liquid Crystal on Silicon) technology addresses AR glass issues**
Po-Kang Lo,
VP of Marketing & Sales, LCOS display at Himax Display

## 1 pm to 4 pm: Visual comfort for immersive see through displays

**1:00 pm**
**Smart glasses and AR headsets**
John Haddick,
CTO at Osterhout Group (ODG)

**1:20 pm**
**Mixed reality headsets and gesture sensing**
Karl Guttag,
CTO at Meta Vision

**1:40 pm**
**Monocular waveguide combiners for AR**
Jonathan Waldern,
Founder, Chairman & CTO at DigiLens

**2:00 pm**
**Optimizing Head-mounted light field displays for quality and comfort**
Hong Hua,
Professor at University of Arizona, College of Optical Sciences

**2:20 pm**
**3D vision cues challenges for AR and VR**
Marty Banks,
Professor of Vision Science at UC Berkeley

**2:40 pm**
**Near-eye light field displays**
Gordon Wetzstein,
Assistant Professor, Electrical Engineering and Computer Science, Stanford University



**3:00 pm**
**Light field displays for flat panels**
David Fattal,
Founder & CEO at LEIA

**3:20 pm**
**Light field AR headset**
Ed Tang,
Founder and Chief Technology Officer at Avegant

**3:40 pm**
**The real destination of "augmented reality" is not the phone, but smartglasses MR**
Robert Schultz,
Head of Optics Research and Development at Vuzix



**4:00 pm**
**'Holograms' in the Wild: Ethnography, data, and design**
Mooli Tregaskes,
Engineer, AR and AI at Electric Power Research Institute (EPRI)

## 4:30 pm to 5:30 pm Panel Session and Reception

Listen and interact with some of the biggest names in VR, AR, and MR. Panelists include pioneers in VR, smart glasses, cryptography and more. Grab a beverage, prepare questions, and be part of this interactive panel discussion.

**Moderators**



**Bernard Kress**
Microsoft HoloLens

**Leo Baldwin**
Amazon

**Panelists: The Pioneers**

Jaron Lanier
A pioneer in the field of virtual reality, as well as a computer philosophy writer, computer scientist, visual artist, and composer of classical music.



Ronald Azuma
A pioneer and innovator in augmented reality, visualization, and mobile applications at HRL Labs, Nokia Research Center, and Intel Labs.



Thad Starner
Early smart glasses pioneer. Founder and director of the Contextual Computing Group at Georgia Tech's College of Computing.



Mark Boles
A VR pioneer that helped jumpstart the technology. Now at Microsoft working on the "vision strategy" for Microsoft's Mixed Reality platform

Marty Banks
Vision specialist for head-mounted displays, studying the effects emerging technology, screens, and virtual reality headsets have on our eyes.



David Chaum
AR hardware developer, recognized as the inventor of digital cash and other fundamental innovations in cryptography, including privacy technology and secure election systems



Jim Melzer
One of the pioneers for defense and military head mounted displays. He is currently the Technical Director at Thales Visionix.

## Hands-on VR, AR, MR headset Demo Sessions

Take this opportunity to test-drive the hottest new headset that are currently on the market—or, are about it be.

**Reservation times are all full.** Monday 29 January ONLY. Please go to Moscone North, Lower Level, Room 20 to enquire about the "wait-list"

**Participating companies**
Microsoft, Oculus, Google, Sony, Avegant, Digilens, HTC, Lumus, Meta Vision, ODG, uSens, Vuzix.

## Related courses, events, and conferences

- **Course**: Head-Mounted Displays for Augmented Reality Applications
- **Course**: Optical Technologies and Architectures for VR, AR, MR Head Mounted Displays
- **Course**: Introduction to VR, AR, MR and Smart Eyewear--Market Expectations, Hardware Requirements and Investment Patterns
- **Course**: Designing and Specifying Digital Cameras
- **Special Event**: Student Optical Design Challenge for VR, AR and MR at Photonics Europe, Strasbourg, France
- **Conference**: Digital Optics for Immersive Displays (DOD/D18) at Photonics Europe, Strasbourg, France

## Participating companies

oculus · amazon · Google · HUAWEI · 3M · Microsoft HoloLens · ODG · VIVE · AVEGANT · intel · DIGILENS · Meta · Leia Inc. · Berkeley · ARIZONA · Stanford University

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