

# Cliff Reader, Ph.D.

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## Expertise

- Real-time Processing and Display
  - Video compression (MPEG-HEVC)
  - Imaging/Video Systems Architecture
  - Imaging/Video Chip Architecture
  - Video Compression Algorithms
  - Consumer audio/video
  - Reconnaissance Imaging
  - Medical Imaging
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## Professional Summary

Dr. Reader has over forty years of work experience in digital imaging and digital video and audio. In the 1970's and early 1980's, he was one of the leaders in the digital imaging field, performing extensive work in areas of compression, real-time processing, real-time display, image enhancement, and others. Applications included reconnaissance imaging, medical imaging, earth resources management and videoconferencing. This work anticipated much of the technology being used in contemporary consumer digital video systems. He has in-depth experience of the commercial history and when key parts of technology were first developed and published.

Dr. Reader's career includes technical work in areas of algorithm design, system design, and semiconductor chip design and business development, marketing and sales work in areas of market analysis, product roadmap development and direct sales.

Dr. Reader has held many leadership roles in standards development: US Head of Delegation to MPEG (1991-1993); chief editor of the MPEG1 standard (1991-1993); instigator of the successful effort to make MPEG2 the market standard for digital TV over proprietary competitors in the US and national competitors in Europe and Japan (1992); MPEG4 Subcommittee Chairman (1993-1996); AVS (China) Subgroup Chairman (2003-Present). He is an expert in all major audio-video standards. MPEG audio (Layer I, II, mp3, AAC), Dolby AC3, MPEG video (1, 2, 4), H.264, Windows Media 9 (VC-1), H.265 (HEVC), AVS and AV1. He is also an expert in DVD standards, including formatting, navigation and authoring.

Dr. Reader has extensive experience in patent licensing and patent pools. He was the technical expert for developing the initial list of potentially essential patents for the first MPEGLA patent pool. He is the Co-Director leading the pool formation and license negotiations for the AVS patent pool. Dr. Reader has experience in the valuation of patents and the acquisition and sale of patent portfolios.

Dr. Reader has authored over twenty technical papers, two book chapters and two patents in digital video processing, display, and compression. He is an Adjunct Professor at Peking University, Beijing, China.

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## Employment History

From: 2001      **Independent Consultant**  
To: Present      Escondido, CA  
Provide technical and marketing consulting services in the areas of digital imaging and digital video including:

- consumer video
- real-time processing and display
- image and video and audio compression (specializing in MPEG)
- imaging/video systems architecture
- imaging/video chip architecture
- audio/video transmission, including optical & wireless networks

Over 80 clients including Apple, AT&T, Adobe, Broadcom, China Central TV, Chinese Academy of Sciences, Cisco, Comcast, DirecTV, EchoStar, Fujifilm, Gateway, GE, Haier, Hisense, HP, IBM, Johnson Controls, KAIST, Lenovo, LG, Matsushita, MediaTek, Microsoft, Motorola, Nikon, Nokia, ON2, Philips, Quanta, Riverbed, Samsung, Sharp, Siemens, Sony, Sun Microsystems, Toshiba, TPV, Tyco, US Department of Justice, Verizon, Vizio, Wistron, Yahoo, Zoran and ZTE.

### Personal database of patent analysis:

- Evaluation of all the US patents in the MPEG2, H.264 and H.265 patent pools.
- Evaluation of the US patents and published applications underlying the H.264 and H.265 standards.
- Personal archive of over 2000 audiovisual patents.

### Personal database of audio and video prior art.

- Virtually complete collection of all contributions to the H.26x and MPEGx families of standards from 1985 to today.
- Many hundreds of technical journal and conference articles documenting the first invention of key technologies.
- Work-in-progress book on the history of video compression.
- Historical collection of technical data from the earliest digital video, image processing and real-time image display systems in the 1970s and 1980s.

From: 1999      **nDSP Corporation**  
To: 2001      Campbell, CA  
Title: *Vice President of Marketing and Acting Vice President of Sales*  
Responsible for marketing and sales in a startup company providing high-quality video signal processors to TV manufacturers. Developed product specifications and roadmap. Built and managed sales and marketing team of 6 direct and contractor staff in the US and Japan to provide technical sales, sales support, application engineering, Marcomm and PR. Established distribution in China, Japan and throughout the Far East. Secured first sales as company

moved into production phase with design wins in China, Japan and Europe. Initiated and secured major design wins in emerging Progressive DVD business, with production volumes beginning in 4Q00 at an annualized rate of \$3.5M. Established strategic partnership with Pixelworks in LCD chip business. Pixelworks acquired nDSP in 2001.

From: 1997      **CagEnt Technologies, Inc. (wholly owned by Samsung)**  
To: 1998      Santa Clara, CA  
Position: *Vice President of Sales, Digital Video Products*  
Responsible for a line of PC-based real-time MPEG2 and Dolby Digital encoders. Established distribution agreements for third-party DVD authoring software. Secured OEM contracts for the products. Built the sales channel worldwide. Built sales to break-even point in 9 months leading to sale of the product line.

From: 1993      **Samsung Semiconductor, Inc.**  
To: 1997      San Jose, CA  
Position: *Director of Marketing, Digital Media Products;*  
*Acting Director of Software Engineering*  
Developed business plans for digital audiovisual semiconductor chips. Managed team of over 50 software engineers in US and Korea for development of a media processor. Established strategic partnerships with Microsoft and IBM for media processor

From: 1990      **Cypress Semiconductor, Inc.**  
To: 1993      San Jose, CA  
Position: *Business Development Manager*  
Founding member of new business unit chartered to develop a “video DSP”. Jointly developed a complete business plan, and personally initiated and developed relationships with Philips, Sun Microsystems, Apple Computers and IBM. Chief architect for this early media DSP design, capable of complete MPEG1 decode in real time. (Fully validated by cycle-accurate simulation). Managed R&D team of 10 hardware and software engineers.

Head of US Delegation to MPEG, 1991 to 1992. Chief Editor of the MPEG1 standard. Technical Expert for establishing the MPEGLA Patent Licensing Pool.

From: 1988      **Sun Microsystems, Inc.**  
To: 1990      Mountain View, CA  
Position: *Program Manager*  
Developed requirements and specifications for real-time imaging system. Managed a team of 20 engineers to develop the architecture and high-level design. Interfaced with two key customers – Philips

Medical Systems and Lockheed. Developed design for single-board real-time medical and reconnaissance image display.

From: 1981 **International Imaging Systems, Zoran, Virtual Imaging**  
To: 1988 Design and development of real-time image processing and display systems. Details available on request.

From: 1975 **Ford Aerospace & ESL (A Division of TRW)**  
To: 1981 Details available on request.

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## Consulting History

Date	2019	<b>MediaTek</b>
To:	Present	
Duties:		Consulting Expert in American Patents matter
Date	2019	<b>AT&amp;T</b>
To:	Present	
Duties:		Consulting Expert in Uniloc matter
Date	2019	<b>KAIST/KBS</b>
To:	Present	
Duties:		Consulting Expert for Inter Partes Review proceedings. (Unified Patents matter)
Date	2019	<b>Vimeo</b>
To:	Present	
Duties:		Preparation of declarations for Inter Partes Review proceedings. (BT matter)
Date	2019	<b>Apple</b>
To:	Present	
Duties:		Preparation of declarations for Inter Partes Review proceedings. (Red.com matter)
Date	2019	<b>Adobe</b>
To:	Present	
Duties:		Preparation of declarations for Inter Partes Review proceedings. (Realtime matter)
Date	2018	<b>Toshiba</b>
To:	Present	
Duties:		Testifying expert concerning essential patents for ATSC standards
Date	2018	<b>Hisense</b>

	Duties:	Analysis of essential patents for AAC standards
Date	2018	<b>Leading smartphone company</b>
To:	Present	
	Duties:	Analysis of essential patents for the H.265 standard
Date	2018	<b>Cisco</b>
	Duties:	Consulting expert in Realtime matter
Date	2017	<b>HEVC Advance</b>
To:	Present	
	Duties:	Consulting expert for HEVC essential patent analysis
Date	2017	<b>Dish Network</b>
To:	Present	
	Duties:	Consulting expert in ClearPlay matter
Date	2017	<b>Apple</b>
	Duties:	Preparation of declarations for Inter Partes Review proceedings. (Uniloc matter)
Date	2017	<b>Dish Network</b>
To:	Present	
	Duties:	Testifying expert in Realtime matter
Date	2017	<b>CustomPlay</b>
To:	Present	
	Duties:	Preparation of declarations for summary judgment and claim construction in Amazon case.
Date	2017	<b>Vizio, Funai, LG, MediaTek, MStar</b>
	Duties:	Testifying expert in Broadcom case.
Date	2017	<b>Apple</b>
	Duties:	Preparation of declarations for Inter Partes Review proceedings. (Nokia matter)
Date	2017	<b>Vizio</b>
	Duties:	Preparation of declarations for Inter Partes Review proceeding. (Lightside Technologies matter)
Date	2016	<b>Dell, Riverbed, EchoStar, Dish Network</b>
To:	2019	
	Duties:	Testifying expert in Realtime matter
Date	2016	<b>Sharp, Vizio, ON</b>
To:	2019	
	Duties:	Testifying expert in WiLan matter

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