

Cliff Reader, Ph.D.

Expertise

- Real-time Processing and Display
 - Video coding (MPEG-HEVC)
 - Audio coding (MPEG-AAC)
 - Imaging/Video Systems Architecture
 - Imaging/Video Chip Architecture
 - Videoconferencing
 - Speech Processing
 - Consumer audio/video
 - Reconnaissance Imaging
 - Medical Imaging
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Professional Summary

Dr. Reader has over fifty years of work experience in digital imaging, digital video & audio and digital speech processing. 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 (MPEG2 video and systems). He is the Co-Director leading the pool formation and license negotiations for the AVS patent pools. 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 taught digital signal processing and image processing at Santa Clara University in the early 1980s and as an Adjunct Professor at Peking University, Beijing, China.

Employment History

From: 2001 **Independent Consultant**

To: Present Escondido, CA

Provide technical and marketing consulting services in the areas of digital imaging, digital video, digital audio and speech including:

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

Over 80 clients including Amazon, Apple, AT&T, Adobe, Broadcom, Canon, China Central TV, Chinese Academy of Sciences, Cisco, Comcast, DirecTV, Dish Network, Disney, EchoStar, ETRI, Facebook, Fujifilm, Gateway, GE, Google, Haier, Hisense, HP, Hulu, IBM, Intel, Johnson Controls, KAIST, Lenovo, LG, Matsushita, MediaTek, Microsoft, Motorola, Netflix, Nikon, Nokia, ON2, OPPO, Peloton, Philips, Quanta, Riverbed, Samsung, Sharp, Siemens, Sony, Starz, Sun Microsystems, Toshiba, TPV, Tyco, US Department of Justice, Verizon, Vimeo, Vizio, Wistron, Xiaomi, 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.

Consulting History

Date 2025 **Undisclosed Client**
To: Present
Duties: Consultant

Date 2025 **Hisense**
To: Present
Duties: Consulting Expert in VideoLabs matter

Date 2025 **Lenovo**
To: Present
Duties: Consulting Expert in Truesight Comm. matter

Date 2024 **Google**
To: Present
Duties: Consulting Expert in ACT matter

Date 2024 **Undisclosed Client**
To: Present
Duties: Consulting Expert on speech processing

Date 2024 **Undisclosed Client**
To: Present
Duties: Consultant

Date 2024 **Comcast**
 To: 2025
 Duties: Consultant

Date 2023 **Amazon**
 To: 2025
 Duties: Consulting Expert

Date 2023 **Intel**
 To: 2025
 Duties: Consulting Expert

Date 2023 **Disney**
 To: 2024
 Duties: Consulting Expert

Date 2023 **Samsung**
 To: 2024
 Duties: Consulting Expert in ACT matter

Date 2023 **Peloton**
 To: 2025
 Duties: Consulting Expert in NEC matter

Date 2023 **Alps Alpine**
 To: 2025
 Duties: Consulting Expert in DivX matter

Date 2022 **Undisclosed Client**
 To: Present
 Duties: Consultant

Date 2023 **Fish & Richardson**
 To: 2024
 Duties: Consultant

Date 2023 **Oppo**
 To: 2024
 Duties: Consulting Expert on speech processing in Nokia matter

Date 2022 **Samsung**
 To: 2023
 Duties: Testifying Expert on speech processing in Jawbone matter

Date 2022 **Asus, Lenovo, MSI**

To: 2023
Duties: Consulting Expert in VideoLabs matter

Date 2022 **Google**
To: 2023
Duties: Consulting Expert on speech processing in Jawbone matter

Date 2022 **Starz**
To: Present
Duties: Consulting Expert in VideoLabs matter

Date 2022 **Meta Platforms (Facebook)**
To: Present
Duties: Consulting Expert in VideShare matter

Date 2022 **Oppo**
To: Present
Duties: Consulting Expert in InterDigital matter

Date 2022 **Apple**
To: 2023
Duties: Consulting Expert on speech processing in Jawbone matter

Date 2021 **Verkada**
To: 2022
Duties: Testifying Expert in Motorola Solutions matter

Date 2021 **Facebook**
To: 2022
Duties: Consulting Expert in EyesMatch matter

Date 2021 **Videoconferencing company**
To: 2023
Duties: Testifying Expert

Date 2021 **Canon**
To: 2022
Duties: Consulting Expert in WSOU Investments/Brazos Licensing matter.

Date 2021 **Axis**
Duties: Consulting Expert

Date 2021 **nVIDIA**
To: 2022
Duties: Consultant

Date	2020	Xiaomi
To:	2021	
Duties:	Consulting Expert in InterDigital matter	
Date	2020	LG
To:	2021	
Duties:	Consulting Expert DivX matter	
Date	2020	Vizio
To:	2023	
Duties:	Consulting Expert VDPP matter	
Date	2020	Netflix
To:	2022	
Duties:	Consultant	
Date	2020	Oppo
To:	Present	
Duties:	Consultant	
Date	2020	IdeaHub
To:	Present	
Duties:	Preparation of declaration for Inter Partes Review proceedings. (Unified Patents matter)	
Date	2019	Google
To:	2021	
Duties:	Preparation of declarations for Inter Partes Review proceedings (PMC matter)	
Date	2019	Google
To:	2021	
Duties:	Consulting Expert (Multiple projects)	
Date	2019	LG
To:	2020	
Duties:	Preparation of declarations for Inter Partes Review proceedings. (Uniloc matter)	
Date	2019	Klarquist, Sparkman
To:	2021	
Duties:	Consulting Expert (Multiple projects)	
Date	2019	Netflix, Hulu
To:	2021	

	Duties:	Preparation of declarations for Inter Partes Review proceedings. (DivX matter)
Date	2019	MediaTek
	Duties:	Consulting Expert in American Patents matter
Date	2019	AT&T
	Duties:	Consulting Expert
Date	2019	KAIST/KBS
To:	2021	
	Duties:	Consulting Expert for Inter Partes Review proceedings. (Unified Patents matter)
Date	2019	Vimeo
To:	2020	
	Duties:	Preparation of declarations for Inter Partes Review proceedings. (BT matter)
Date	2019	Apple
	Duties:	Preparation of declarations for Inter Partes Review proceedings. (Red.com matter)
Date	2019	Adobe
To:	2021	
	Duties:	Preparation of declarations for Inter Partes Review proceedings and consulting expert. (Realtime matter)
Date	2018	Toshiba
To:	2019	
	Duties:	Testifying expert concerning valuation of essential patents for ATSC standards
Date	2018	Hisense
	Duties:	Analysis of essential patents for AAC standards
Date	2018	HTC
To:	2020	
	Duties:	Analysis of essential patents for the H.265 standard
Date	2018	Cisco
To:	2020	
	Duties:	Consulting expert in Realtime matter
Date	2017	Dish Network
To:	2023	

	Duties:	Consulting expert in ClearPlay matter
Date	2017	Apple
To:	2019	
	Duties:	Preparation of declarations for Inter Partes Review proceedings. (Uniloc matter)
Date	2017	Dish Network
To:	2020	
	Duties:	Testifying expert in Realtime matter
Date	2017	CustomPlay
To:	2020	
	Duties:	Preparation of declaration for summary judgment in Amazon case.
Date	2017	Vizio, Funai, LG, MediaTek, MStar
	Duties:	Testifying expert in Broadcom case.
Date	2017	Apple
	Duties:	Preparation of declarations for Inter Partes Review proceedings. (Nokia matter)
Date	2017	Vizio
	Duties:	Preparation of declarations for Inter Partes Review proceeding. (Lightside Technologies matter)
Date	2016	Dell, Riverbed, EchoStar, Dish Network
To:	2019	
	Duties:	Testifying expert in Realtime matter
Date	2016	Sharp, Vizio, ON
To:	2018	
	Duties:	Testifying expert in WiLAN matter
Date	2016	Avid
To:	2017	
	Duties:	Testifying expert in Harmonic matter.
Date	2016	Apple
	Duties:	Testifying expert in PUMA matter.
Date	2016	Vizio
	Duties:	Testifying expert in PMC matter.
Date	2016	US Dept. of Justice, Dept. of Homeland Security, DoD, FBI, NSA, & Others

To: 2021
Duties: Consulting expert in Discovery Patents (3rd Eye Surveillance) matter. Declarations in support of six Inter Partes Reviews.

Date 2015 **ST Micro**
To: 2016
Duties: Consulting expert in Avago matter.

Date 2015 **AT&T**
Duties: Consulting expert in Raniere matter.

Date 2015 **Motorola**
To: 2016
Duties: Consulting expert in PUMA matter.

Date 2015 **TPV**
To: 2016
Duties: Consulting expert in Thomson licensing matter.

Date 2015 **Tyco (Exacq, Johnson Controls)**
To: 2019
Duties: Consulting expert in JDS Technologies matter.

Date 2015 **Tyco**
Duties: Declaration in support of Inter Partes Review petition in Hawk Technology matter.

Date 2015 **Sceptre**
Duties: Expert reports in licensing matter concerning MPEGLA MPEG2 pool patents.

Date 2015 **Samsung**
Duties: Consultant and fact witness in case asserting Samsung patents of which I am a named inventor, against NVidia.

Date 2015 **Nissim**
To: 2016
Duties: Consultant expert for patent holder in 20th Century Fox, MGM, and Paramount cases concerning patents related to DVD navigation. Testified at Markman hearings.

Date 2015 **Nikon**
To: Present
Duties: Consultant.

Date 2015 **Humax**

	Duties:	Search and analysis of prior art.
Date	2015	Apple
	Duties:	Analysis of patent portfolio potentially essential for the H.264 standard.
Date	2014	Haier
To:	2018	
	Duties:	Analysis of patent portfolios for smart consumer devices.
Date	2014	Cisco
To:	2021	
	Duties:	Consultant.
Date	2014	ZTE, Sony, LG, Samsung, Nokia, GoPro
To:	2015	
	Duties:	Consulting expert.
Date	2014	Tyco
To:	2015	
	Duties:	Expert reports; declaration in support of Inter Partes Review in Trover matter.
Date	2013	Humax
	Duties:	Consultant.
Date	2014	GE Licensing
To:	2015	
	Duties:	Consultant.
Date	2014	HikVision & Axis
To:	2015	
	Duties:	Declaration in support of Inter Partes Review. Expert reports in Trover matter.
Date	2014	Sharp
To:	2016	
	Duties:	Declaration in support of Inter Partes Review in Wi-Lan matter.
Date	2013	InterDigital
To:	2015	
	Duties:	Consulting expert in support of licensing a patent portfolio.
Date	2013	Apple
	Duties:	Consulting expert in National Cheng Kung University matter.
Date	2013	Acer, ASUS, TPV

To: 2014
Duties: Testifying expert in Florida Atlantic University matter.

Date 2013 **Toshiba**
To: 2014
Duties: Testifying expert in WiLAN matter.

Date 2013 **Grass Valley Group**
Duties: Consulting expert for defense in FastVDO matter.

Date 2013 **TI**
To: Present
Duties: Consulting expert.

Date 2012 **Vizio**
Duties: Consulting expert in Innovus Prime matter.

Date 2012 **Haier & Shandong Provincial Government**
To: 2014
Duties: Foreign expert advisor for developing and acquiring patent portfolios for innovative consumer products. Development of a patent pool for patents essential to standards for wireless power.

Date 2012 **Vizio**
To: 2014
Duties: Consulting expert in MIT matter.

Date 2012 **Nokia**
To: 2013
Duties: Consulting expert.

Date 2012 **TPV & Vizio**
To: 2013
Duties: Testifying expert for defense in Hitachi matter.

Date 2012 **Samsung**
Duties: Consulting expert in Myport matter.

Date 2012 **Verizon Wireless (Cellco) & T-Mobile**
To: 2013
Duties: Testifying expert for defense in Realtime Data matter.

Date 2011 **Apple**
Duties: Consulting expert in Technicolor matter.

Date 2012 **Microsoft**

To: 2014
Duties: Consulting expert for plaintiff in Motorola matter.

Date 2012 **Apple & LG**
To: 2014
Duties: Testifying expert for defense in MPT matter.

Date 2011 **Sanyo & Olympus**
Duties: Consulting expert for defense in FastVDO matter.

Date 2011 **Apple**
Duties: Consulting expert for defense in FastVDO matter.

Date 2011 **Sony**
Duties: Consulting expert for defense in FastVDO matter.

Date 2011 **Philips**
To: 2014
Duties: Consulting expert for licensing essential patents.

Date 2011 **Apple**
Duties: Consulting expert for defense in MobileMediaIdeas matter.

Date 2011 **Video264Innovations**
Duties: Consulting expert.

Date 2011 **Nikon, Fujifilm & Panasonic**
Duties: Consulting expert for defense in FastVDO matter.

Date 2011 **Haier**
To: 2014
Duties: Consultant for standards, patent pools and patent licensing.

Date 2011 **Susman Godfrey**
Duties: Consultant for patent analysis.

Date 2011 **Vizio**
Duties: Testifying expert for defense in MPT matter.

Date 2011 **Tivo**
Duties: Consulting expert.

Date 2011 **Nikon**
To: 2013
Duties: Consulting expert for defense in MPT matter.

Date	2011	Broadcom
Duties:		Consulting expert.
Date	2010	Lionsgate Entertainment
Duties:		Consulting expert in MPEG licensing matter.
Date	2010	Verizon
To:	2012	
Duties:		Testifying expert for defense in ActiveVideo Networks matter.
Date	2010	Lenovo
To:	2011	
Duties:		Consulting expert for defense in licensor matter.
Date	2010	Sonic, Cyberlink & Joint Defense Team
Duties:		Consulting expert for defense in Mediosream licensor matter.
Date	2010	Wistron
To:	2011	
Duties:		Consulting expert for defense in Toshiba licensor matter.
Date	2010	Panasonic, Pioneer
To:	2011	
Duties:		Consulting expert for defense in VES licensor matter.
Date	2010	Zoran
To:	2011	
Duties:		Technical analysis of patents potentially related to video coding standards.
Date	2010	Intravisual
To:	2015	
Duties:		Consulting expert for patent licensing.
Date	2009	Apple
Duties:		Technical analysis of patents potentially related to video coding standards.
Date	2009	SanDisk
Duties:		Consulting expert re Audio and Video coding patents
Date	2009	Lenovo
To:	2011	
Duties:		Consulting expert for defense in MPEGLA licensor matter.
Date	2009	Polycom

To: 2010
Duties: Consulting expert for defense in MPT matter.

Date 2009 **DirectTV**
To: 2011
Duties: Consulting expert for defense in MPT matter.

Date 2009 **EchoStar**
To: 2010
Duties: Consulting expert for defense in MPT matter.

Date 2009 **Vizio**
Duties: Consulting expert for defense in Sony matter.

Date 2009 **Vizio**
To: 2010
Duties: Consulting expert for defense in LG matter.

Date 2009 **Vizio, TPV, Amtran**
To: 2010
Duties: Technical report & video presentation to US Customs on design issues related to Funai matter.
Testified in ITC hearing, March 2010.

Date 2008 **Humax (Korea)**
To: 2009
Duties: Audio patent and prior art review.

Date 2008 **IC Media (Canada)**
To: 2009
Duties: Design of digital signage.

Date 2008 **AVS Patent Pool Administration (China)**
To: Present
Duties: Co-Director, leading license negotiations among domestic and multinational licensors.

Date 2008 **DirectTV**
Duties: Prior art search for DirecTV's appeal against Finisar.

Date 2008 **Pure Digital**
Duties: Prior art research and analysis.

Date 2008 **Wragge (UK)**
Duties: Prior art review for two video coding patents.

Date	2008	Microsoft
Duties:		Extensive non-infringement analysis for patents asserted by Multimedia Patent Trust (MPT).
Date	2008	iPotential
To:	2010	
Duties:		Technical analysis of patents potentially related to video coding standards.
Date	2008	Alba (UK) aka Harvard Research
To:	2009	
Duties:		General education on essential patents, licensing, prior art related to the MPEG2 video standard.
Date	2008	Philips (Holland)
Duties:		Review of patents for essentiality.
Date	2008	Proview
Duties:		Prior art search for TV display features.
Date	2008	Nissim
To:	2014	
Duties:		Consultant expert for plaintiff in Time-Warner case concerning patents related to DVD navigation.
Date	2008	Comcast
Duties:		Technical analysis of MPEG2 systems, DSM-CC, and carousel operation in the cable TV network environment. Contribution to expert's report in Comcast's successful litigation against Finisar.
Date	2007	Sun Microsystems
To:	2009	
Duties:		Chief architect of royalty-free video codec: OMS Video. Extensive supporting patent analysis and technical publication analysis for prior art review.
Date	2008	SanDisk
Duties:		Technical analysis of patents and prior art searching for audio coding.
Date	2008	Stammberger (Munich)
Duties:		Technical analysis of patents potentially related to video coding standards.
Date	2008	Trigem America Liquidating Trust
Duties:		Preparation of expert reports concerning litigation between Toshiba and Trigem.

Date: 2007 **Susman-Godfrey**
Duties: Technical analysis of patents potentially related to video coding standards.

Date: 2007 **Wong-Cabello**
Duties: Technical analysis of patents potentially related to video coding standards.

Date: 2007 **Sisvel**
Duties: Technical assistance in licensing audio patents to a third party.

Date: 2007 **Quanta**
Duties: Technical assistance in litigation related to DVD.

Date: 2006 **CCTV (China Central TV)**
Duties: Technical analysis of patents potentially related to MPEG2, H.264, AVS and VC-1 video coding standards and MPEG-AAC and Dolby audio coding standards.

Date: 2006 **MediaTek**
Duties: Technical analysis of MediaTek patents potentially related to video coding standards.

Date: 2006 **Alcatel**
Duties: Technical analysis of Alcatel patents potentially related to video coding standards.

Date: 2006 **Motorola**
Duties: Analysis of technologies contributed to the H.264 standard.

Date: 2005 **Nokia**
Duties: Analysis of technologies contributed to the H.264 standard.

Date: 2005 **Avid**
Duties: Technical analysis of patents potentially related to coding standards.

Date: 2005 **IBM**
Duties: Analysis of technologies contributed to the H.264 standard.

Date: 2005 **HP**
Duties: Analysis of selected audio coding patents.

Date: 2005 **ComVentures**
Duties: Due diligence review of a start-up company in the video semiconductor business.

Date: 2005 **nVidia**
Duties: Prior art search for a set of third-party patents.

Date: 2004 **Microsoft**
Duties:

- Working with a major financial services company, developed a procurement model for managing licensing costs.
- Assisting development of non-infringement positions for a set of patents. (Not in suit).

From: 2004 **SAGEM (France)**
To: 2005
Duties: Technical analysis of potential infringement by SAGEM of a set of third-party patents.

From: 2004 **Polycom Inc.**
To: 2005
Duties: Technical analysis of Polycom patents potentially related to video coding standards.

From: 2004 **Sony Corp.**
To: 2006
Duties:

- Technical analysis of potential infringement by Sony of a set of third-party patents. The parties settled without litigation.
- Analysis of a third-party patent per Sony's direction.

Date: 2004 **On2 Inc**
Duties: Delivery of the comprehensive set of reports on IPR potentially related to the emerging H.264 standard.

Date: 2004 **Matsushita Avionics**
Duties: Technical analysis of potential infringement of Matsushita patents by a third party.

Date: 2004 **Connex Inc.**
Duties: Teaching the details of key complex algorithms in the H.264 standard.

Date: 2004 **DoCoMo (Japan)**
Duties: Delivery of the comprehensive set of reports on IPR potentially related to the emerging H.264 standard.

From: 2004 **DivX Inc.**
To: 2006
Duties: Analysis of technologies contributed to the H.264 standard

Date: 2004 **Cues, Inc**

- Duties: Assisted evaluation of infringement by Cues' products of a patent asserted by a third party. The parties settled without litigation.
- From: 2003 **GE Licensing**
 To: 2004
 Duties: Working with a major financial services company, developed a business, market and financial model for valuation of a portfolio of patents through their expiration.
- From: 2003 **Institute of Computing Technology, Chinese Academy of Sciences**
 To: Present
 Duties:
 - Preparation of IPR Report for IPR potentially related to the AVS Video standard. This effort involved review of over 2500 abstracts and over 450 patents.
 - IPR Subgroup Chairman of AVS. Formed an IPR Experts group to establish a legal foundation for AVS IPR. This group comprised approximately 20 attorneys and business development managers from eight multinational companies representing the PC, consumer, semiconductor and communication industries. (Broadcom, IBM, Intel, Matsushita, Microsoft, Nokia, Sony, Sun Microsystems). The group drafted a member agreement, bylaws and a formal IPR policy governing licensing commitments, disclosure obligations, and protection of license holder rights. AVS Members approved these documents in September 2004.
 - Co-Director of AVS Patent Pool. Leading the drafting and negotiation of patent pool management and licensing agreements.
 - Adjunct Professor, supervising a graduate student project on deinterlacing algorithm development.
- Date: 2003 **Yahoo**
 Duties: Prior art search to provide background information per Yahoo's request.
- Date: 2002 **Gateway, Inc.**
 To: 2007
 Duties: Extensive prior art search and assistance with claim construction in a litigation matter with Lucent Technologies.
- From: 2002 **Apple Computer**
 To: 2007
 Duties:
 - Technical analysis of Apple patents potentially related to H.264.
 - Prior art search for various patents per Apple's request.
- Date: 2002 **Siemens (Germany)**
 Duties:
 - Technical analysis of Siemens patents potentially related to H.264.
 - Delivery of the comprehensive set of reports on IPR potentially related to the emerging H.264 standard.

Date: 2002 **JVT Committee (Apple, Cisco, Nokia, Polycom, Sun Microsystems, Tandberg, Teles, Texas Instruments, UBVideo, VideoLocus)**
Duties: Developed a comprehensive set of reports on IPR potentially related to the emerging H.264 standard. The reports included a technical review of legacy and new patents for video coding, and analysis of the patent statements provided by all companies whose contributions were adopted into H.264.

Date 2002 **Intervideo**
Duties: Advised on market opportunities in the emerging MPEG4 marketplace.

Date: 2001 **Proskauer Rose LLP**
Duties: Provided background support in MPEGLA's (successful) effort to license MPEG2 to the major PC manufacturers.

Date 2001 **Pixonics**
Duties: Developed marketing plan and marketing support materials for this incubator-stage company.

Date 2001 **Eltron, (Taiwan)**
Duties: Provided overview of the digital video semiconductor market.

Date 1999 **nDSP Corporation**
Duties: Drafted the sales and marketing plan for this early-stage company. Joined nDSP full-time.

Date: 1998 **IBM Corp.**
Duties: Assisted with participation in the ATSC DASE (datacasting) standard.

Date 1998 **Spruce Technologies**
Duties: Assisted with transition of Cagent MPEG encoder product after it was sold to Spruce.

From: 1997 **Samsung Advanced Institute of Technology**
To: 1999
Duties: Supported Samsung researchers in MPEG4 standard development. Led effort to provide error-resilient 3D-mesh coding.

Date 1997 **MPEGLA LLC**
Duties: Review of opportunity for an MPEG4 patent pool

From: 1993 **CableLabs**
To: 1994
Duties: Teamed with a patent attorney to develop the initial essential patent list for MPEG2. Reviewed approximately 10,000 abstracts and 1,000 patents

for the MPEG2 Video and MPEG2 Systems standards. This effort led to the MPEGLA patent pool.

Litigation Support Experience

Quinn Emanuel Urquhart & Sullivan, LLP, San Francisco, CA
Case: Motorola Solutions vs. Verkada, Investigation No. 337-TA-1281
Project: Expert report, deposition and trial testimony on invalidity of Motorola patents.
Status: Final determination found Verkada not infringed
Filed: August, 2021
Location: United States International Trade Commission, Washington DC

Orrick, Herrington & Sutcliffe, LLP, New York, NY
Case: ClearPlay vs. Dish Network & EchoStar Technologies, Case No. : 2:14-cv-00191
Project: Expert report, deposition and trial testimony on invalidity of ClearPlay patents.
Status: ClearPlay patents not infringed
Filed: March 13, 2014
Location: United States District Court for the District of Utah

Akin Gump, Fish & Richardson, Finnegan, Baker Hostetler, Washington, DC
Case: Broadcom vs. Vizio, LG, Funai, MediaTek, MStar, Investigation No. 337-TA-1047
Project: Expert report and deposition on non-infringement of Broadcom's patent.
Status: Final Determination in favor of Respondants.

Jones Day, Cleveland, OH
Case: Avid Technology vs. Harmonic, Case No. C.A. No. 12-627-GMS
Project: Expert reports and deposition on infringement of Avid's patent.
Status: Parties settled before trial.

Haynes and Boone, Dallas, TX
Case: Realtime vs. Riverbed, Case No. 6:1S-CV-463-RWS-JDL
Project: Expert report, deposition and trial testimony (E. District Texas) on invalidity of Realtime patent.
Status: Jury found Realtime patent invalid at trial.

Akin Gump, LLP, Irvine, CA
Case: Personalized Media Communications "PMC" vs. TPV et al, Case No.

2:15-cv-01366-JRG-RSP

Project: Declaration in support of claim construction brief.
Status: Parties settled.

Feinberg, Day, LLP, Menlo Park, CA

Case Parthenon Unified Memory Architecture “PUMA” vs. Apple, Case No. 9:12-cv-80701

Project: Expert report and deposition concerning unified memory architecture.
Status: Trial stayed at request of PUMA. Parties settled.

Carey, Rodriguez, LLP, Miami

Case *Twentieth Century Fox Home Entertainment, LLC, Paramount Pictures Corp., vs. Nissim Corp., Case No. 14-81349/813450-cv-MARRA

Project: Expert witness for patent owner in counterclaims for infringement.
Declaration and expert testimony at Markman Hearings concerning DVD standards essential patents.

Status: Parties settled before trial.

*Nissim asserted its patents against Twentieth Century Fox and Paramount. The latter filed a complaint seeking a declaratory judgment of non-infringement and invalidity.

TechKnowledge Law Group, Turner Boyd LLP & O’Melveny & Myers LLP, Los Angeles,

Case Florida Atlantic University Research Corporation vs. Acer, ASUS & TPV, Case No. 9:12-cv-80701

Project: Expert testimony at Markman Hearings concerning scan converter design. Expert reports and deposition testimony.

Status: Parties settled before trial.

Finnegan, Henderson, Farabow, Garrett & Dunner, LLP

Case WiLAN vs. Toshiba, Case No. 1:12-Civ-23744

Project: Expert reports & deposition testimony concerning digital television design.

Status: Parties settled before trial.

O’Melveny & Myers LLP, Los Angeles & Akin Gump LLP, Dallas

Case Hitachi vs. TPV, Case No. 2:10-CV-260-JRG

Project: Expert reports, depositions & trial testimony (E. District Texas) concerning digital television design.

Status: Jury found no infringement of Hitachi’s patents by TPV and found Hitachi’s patents invalid. (Partially reversed by JMOL)

Fish & Richardson P.C. San Diego

Case Multimedia Patent Trust vs. Apple & LG, Case No. 10-cv-2618 H

Project: Expert report, & deposition testimony concerning development of technology, standards and patents for video coding.

Status: Jury found no infringement of MPT's patents and found MPT's patents invalid.

Gibson Dunn LLP, Palo Alto

Case Realtime Data vs. Verizon Wireless & T-Mobile, Case No. 6:10-cv-00493-LED

Project: Expert reports, depositions and testifying expert in jury trial (E. District Texas) concerning infringement and validity of patents related to data transmission.

Status: Jury found no infringement of Realtime Data's patents by T-Mobile, and found Realtime Data's patents invalid.

O'Melveny & Myers LLP, San Francisco

Case MobileMediaIdeas vs. Apple, Case No. 10-258-SLR

Project: Expert reports and deposition, concerning infringement and validity of patents related to MPEG Audio Layer III ("mp3") coding.

Status: Trial bifurcated.

Jones Day, Cleveland

Case Multimedia Patent Trust Vs. Vizio, Case No. 09-CV-0278-H (CAB)

Project: Expert report, concerning infringement of patents related to H.264 video coding. (Slated for deposition and jury trial)

Status: Parties settled on the day before my deposition.

Kellog, Huber, et al, Washington, DC

Case Active Video Vs. Verizon, No. 2:10-cv-00248-RAJ-FBS; 2011

Project: Expert report, deposition and testifying expert in jury trial concerning infringement of patents related to video-on-demand

Status: Jury finding of infringement with significantly reduced damages and no finding of willful infringement.

Jones Day, Washington, DC

Case Funai Vs. Vizio, et al, ITC Investigation No. 337-TA-617; 2010

Project: Expert report, deposition and testifying expert in ITC hearing concerning infringement of a patent related to ATSC broadcast standards

Status: Parties settled after the hearing following reports adverse to complainant.

Wilson Sonsini, Goodrich and Rosati, Palo Alto, CA.

Case Terayon vs. RGB Networks; 2007

Project: Expert report for defendant in a contract dispute alleging violation of a non-compete agreement.

Status: Mediation hearing resolved the dispute to the satisfaction of both parties.

Wilmer Cutler Pickering Hale and Dorr, Boston, MA

Case Qualcomm Inc. vs. Broadcom Corp. No. 05 CV 1958 B (BLM); 2007

Project: Expert report and deposition on behalf of Broadcom against assertions of infringement of patents concerning video encoding and decoding, and on Qualcomm's compliance with the policies and procedures for IPR policy in the H.264 standards committee (JVT of ITU-ISO/IEC).

Status: Broadcom found not guilty of infringing Qualcomm's patents. The patents were determined to be not essential for implementing the H.264 standard. Qualcomm found guilty of inequitable behavior in the manner of their participation in the H.264 standards committee. Qualcomm's patents held unenforceable against H.264.

Greenberg Glusker Fields Claman Machtinger & Kinsella.

Case DTS vs. MediaTek; 2005

Project: Expert report for defendant in a contract dispute related to hacking into semiconductor chips to enable functionality for which a license fee was payable.

Status: Mediation hearing resolved the dispute to the satisfaction of both parties. The Mediator personally thanked me for the clarity of my report, which covered technical, business and licensing issues.

Arvay Finley Barristers, Victoria, BC, Canada.

Case AVT Audio Visual Telecommunications vs. University of British Columbia; 2005

Project: Expert report and testimony on behalf of AVT in a contract dispute related to mobile video communication including failure to disclose intellectual property.

Status: Arbitration hearing resulted in adverse ruling to AVT.

Thelen Reid & Priest, San Jose, CA.

Case Toshiba Corp. vs. Trigem Computer Inc. & Trigem America Corp. Case No. CV-03-4558-GHK(AJWx); 2005

Project: Expert report on behalf of Trigem regarding invalidity of patents relating to video and sub-picture data in multimedia computer systems.

Status: Suspended due to insolvency of Trigem.

Morrison & Foerster LLP, San Francisco, CA.

Case Tivo Inc. vs. Echostar Communications Corp., Echostar DBS Corp., Echostar Technologies Corp., & EchoStar LLC, Case No. 2-04CV-01; 2005

Project: Expert report and deposition on behalf of Echostar against assertions of infringement of a patent concerning personal video recorders (PVR).

Status: Adverse ruling to Echostar.

Pinsent Curtis Biddle, Leeds, UK

Case Thomson Licensing S.A. and Deutsche Thomson Brandt GmbH vs. Pace Micro Technology PLC. Case No. HC 2000 No. 1584; 2001

Project: Expert report and slated to testify on behalf of Pace arguing invalidity of patent and defending against assertions infringement of a patent concerning interlaced video coding.

Status: Parties agreed to settlement on the second day of trial. Settlement terms were very favorable to defendant, and shortly after the trial, Thomson joined the MPEGLA patent pool.

Education

1974	University of Sussex, England	Ph.D., Applied Sciences (EE/CS) Thesis on “Orthogonal Transform Coding of Still and Moving Pictures”. All research performed in residence at the Image Processing Institute, USC Los Angeles, CA.
1970	University of Liverpool, England	Bachelor of Engineering with Honours, Physical Electronics

Publications (Partial List)

C Reader, “Orthogonal Transform Coding of Still and Moving Pictures”, Ph.D. thesis, U. Sussex, England, 1973.

C. Reader, “Intraframe and Interframe Adaptive Transform Coding.” SPIE Vol. 66, pp. 108-117, *Efficient Transmission of Pictorial Information* (1975).

C. Reader, W.H. Chen, “Local Retransmission of Compressed Imagery Data”, SPIE Vol. 149 pp. 196-204, *Applications of Digital Image Processing* (1978).

L. Hubble, C. Reader, “State of the Art in Image Display Systems”, SPIE Vol. 199, pp 2-8, *Advances in Display Technology* (1979).

C. Reader, W. D. Flanagan, “Design Considerations for Real-Time Image Processing”, SPIE Vol. 180, *Real-Time Signal Processing II*, (1979).

C. Reader, L. Hubble, “Trends in Image Display Systems”, Proc. IEEE, Vol. 69, No. 5, pp. 606-614, (1981).

J. Adams, C. Patton, C. Reader, D. Zamora, “Hardware for Geometric Warping”, *Electronic Imaging*, April 1984.

Digital Image Processing Techniques (Computational Techniques), Michael P. Ekstrom (Editor), Chapter describing hardware for real-time image processing and display systems, Academic Press, 1984, pp. 289-360.

C. Reader, et al, "A New Architecture for Real-Time Image Processing," SPIE Vol. 534, pp. 72-78, *Architectures and Algorithms for Digital Image Processing II* (1985).

Reader C, Weiner L, Searing S, Address Generation And Memory Management For Memory Centered Image Processing Systems, SPIE Vol. 757, 1987

B. Thacker, R. Rinaldi, C. Reader, "Multiwindow Displays of Text, Graphics and Images", SPIE Vol. 757, pp. 104-110, *Methods of Handling and Processing Imagery* (1987).

Keynote opening speech at IEEE Conference on Image Processing, 1994.

C. Reader, "MPEG4: Coding for Content, Interactivity, and Universal Accessibility," *Optical Engineering*, Vol. 35, No. 1 pp. 104-108 (1996).

C. Reader, P. Schirling, A. Puri, MPEG Tutorial paper at IEC – NCF/Infovision '97.

O. Avaro, P.A. Chou, A. Eleftheriadis, C. Herpel, C. Reader, J. Signes, "The MPEG4 Systems and Description Languages: a Way Ahead in Audio Visual Information Representation", *Signal Processing: Image Communication*, Vol. 9, No. 4, pp. 385-431 (1997).

C Reader, "What MPEG-4 means to me", *Sig. Proc.: Image Comm.* 9(4): 467, 1997

MPEG Video Compression Standard, Edited by Mitchell, Pennebaker, Fogg, Le Gall. Chapman & Hall, 1997. Chapter describing the process of establishing the MPEGLA patent pool, Chapter 16, *MPEG Patents*, pp.357-362.

W Gao, C Reader, F Wu, Y He, L Yu, H Lu, S Yang, T Huang, X Pan, "AVS - The Chinese Next-Generation Video Coding Standard", *Proc. NAB Conf.*, 2004.

C Reader, "Origins of the performance of H.264/AVC: an account of the development of H.263 and H.264 coding tools", SPIE Vol. 5909, pp59090W-1-8 *Applications of Digital Image Processing XXVIII* (2005).

C Reader, "AVS Intellectual Property Rights (IPR) Policy, *J. Comput. Sci. & Technol.*, Co. 21, No. 3 (May 2006).

Q Huang, W Gao, D Zhao, C Reader, "A Real-Time Video Deinterlacing Scheme for MPEG-2 to AVS Transcoding", *Advances in Multimedia Information Processing - PCM 2006*, Vol. 4261/2006, Springer Berlin / Heidelberg.

W Gao, S Ma, C Reader, “An End-to-End Application System of AVS: AVS-IPTV in China”. PCM 2007: 50-57

C Reader, “Technical design & IPR analysis for royalty-free video codecs”. PCS 2010: 102-105

J Chen, F Xu, Y He, J D Villasenor, Y Han, Y Xu, Y Rong, C Reader, J Wen, “Efficient Video Coding Using Legacy Algorithmic Approaches”. IEEE Trans. Multimedia 14(1): 111-120 (2012)

W Gao, T Huang, C Reader, W Dou, X Chen, "IEEE Standards for Advanced Audio and Video Coding in Emerging Applications", Computer, vol.47, no. 5, pp. 81-83, May 2014.

Ma S, Huang T, Reader C, Gao W, AVS2-Making video coding smarter [Standards in a Nutshell], IEEE Signal Processing Magazine, vol. 32, no. 2, pp. 172 - 182, 2015.

Wang R, Huang T, Park S-H, Kim J-G, Jang E S, Reader C, Gao W, The MPEG Internet Video-Coding Standard [Standards in a Nutshell], IEEE Signal Processing Magazine, Vol. 33, No. 5, pp. 164-172, Sep. 2016.

Reader C, Patent Landscape for Royalty-Free Video Coding, SPIE Vol. 9971, Sep., 2016

Patents

<u>Patent Number</u>	<u>Date Issued</u>	<u>Title</u>
6,192,073	2000	Methods and apparatus for processing video data
5,845,112	2000	Method for performing dead-zone quantization in a single processor instruction.

Academic Positions

Taught “early bird” classes at Santa Clara University in Image Processing and Digital Signal Processing

Adjunct Professor of the National Engineering Laboratory for Video Technology, in the Computer Science Department at Peking University, Beijing, China.

Professional Associations and Achievements

- ISO/IEC Certificate of appreciation for development of the MPEG4 standard.
- Senior Member IEEE.
- Member SPIE.
- Member ACM.

- Member AES.
 - Member SMPTE.
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