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Education	BA (Mathematics and Computing Science), 1976, from Queen's University, Kingston, Ontario, Canada. PhD (Special Arrangements/Interdisciplinary), 2018, from Simon Fraser University, Burnaby, B. C., Canada, Supervisor, Prof. Brian FUNT.
Books	Digital Video and HD Algorithms and Interfaces , Second edition (Burlington, Mass.: Morgan Kaufmann/Elsevier, 2012); 752 pages. I wrote, designed, illustrated, and typeset this book. Digital Video and HDTV Algorithms and Interfaces (San Francisco: Morgan Kaufmann, 2003). 736 pages. I wrote, designed, illustrated, and typeset this book. Technical Introduction to Digital Video (New York: John Wiley & Sons, 1996; 352 pages). I wrote, designed, illustrated, and typeset this book.
Other publications	I have published extensively; please refer to separate <i>List of Publications</i> .
Lectures, courses, seminars, workshops	I have lectured and taught extensively; please refer to separate <i>List of Presentations</i> .
Media production	Advanced Digital Colour Theory , FXPHD DCT303 (2014). Ten 45-minute episodes for the VFX community. I was writer, graphic artist, and on-screen presenter. Camera Tech and Colour Science , FXPHD DCT301 (2012). Ten 45-minute episodes for the VFX community. I was writer, graphic artist, and on-screen presenter. Basic Color Science and Imaging , IS&T (2008). 16-hour course featuring Dr. R. W. G. HUNT. Distributed on DVD. I was producer and production manager. Chasing Rainbows , CBC and NORTHERNLIGHT AND PICTURE CORPORATION (1988). Producer, Mark BLANDFORD. TV miniseries (14, one-hour episodes), mastered in 1035i HDTV and delivered in NTSC. I was co-producer and technical advisor.
Honours and awards	David Sarnoff Gold Medal, awarded by SMPTE in 1993 for significant contributions toward the integration of digital video and computing technologies. Fellow of the Society of Motion Picture and Television Engineers (SMPTE), 1992.
Patents	US 5 334 998 (iss. 1994-08-02), <i>Method and apparatus for utilizing blanking on both zero setup and pedestal setup display monitors with a conventional computer system</i> (with Curtis PRIEM); assigned to Sun Microsystems, Inc.
Professional and academic service	Co-chair (with Ján MOROVIČ), <i>15th IS&T/SID Color Imaging Conference</i> (Albuquerque, N.M., Nov. 2007). Co-edited <i>Proceedings</i> . Co-chair (with Peter SYMES), <i>138th SMPTE Tech. Conf.</i> (Los Angeles, Oct. 1996) Session chair and panel participant at numerous conferences. Paper reviewer for several journals and numerous conferences.
Licences	I hold a Canadian Private Pilot's Licence (issued prior to my obtaining a driver's licence).

Tools	<p>I read and write code. My main tool for mathematical modelling and simulation is Wolfram <i>Mathematica</i>. I code in <i>Mathematica</i> and MATLAB, in compiled languages including C and Go, and in script languages using classic tools such as <i>bash</i>, <i>awk</i>, <i>sed</i>, <i>grep</i>, and Python. I read the hardware description languages Verilog and VHDL.</p> <p>I pay a great deal of attention to communicating my work, both to my clients (by writing technical reports, proposals, white papers, and the like), and to the wider community (by teaching courses and seminars and by writing articles and books). I execute my own illustrations (using Adobe Illustrator), and typeset my own work (using L^AT_EX, Adobe FrameMaker, and Adobe InDesign, as appropriate).</p>
Teaching experience	<p>I am a highly experienced teacher. For about 25 years, I have taught extensively in academic, conference, and commercial situations. I have taught many seminars and workshops to digital video and HD engineers and technicians; to digital cinema camera and post-production engineers and technicians; and to filmmakers, cinematographers, and colourists across a wide range of experience levels and accomplishment. I have given invited lectures at institutions such as Stanford, Berkeley, and UCLA. Please refer to the separate <i>List of Presentations</i> and <i>Teaching and Research Statement</i>.</p> <p>Ontario College of Art (now Ontario College of Art and Design University, OCAD U), Toronto, Canada, 1976–1978. Faculty member. I inaugurated the full-course <i>Electronics for Art</i>, and taught the course for 2 years. On behalf of OCAD, I purchased their first (micro-) computer.</p>
Work experience Independent contracting, 1996 –	<p>Since completing my first book in 1996, I have been an independent contractor engaged in short-, medium-, and long-term consulting contracts, performed in my office in Toronto, in other cities in Canada, and in Belgium, China, England, Germany, Japan, Korea, The Netherlands, Taiwan, and the United States. My clients have included Adobe Systems, Algolux, Apple, Inc., ARRI, ATI Technologies (now AMD), Autodesk, Avid, Barco, Canon, CBC, c.o.r.e. Digital Productions, Cypress Semiconductor, DCI LLC, Discreet Logic (now Autodesk), Dolby Labs, Dreamworks SKG, ETRI (Korea), Félix & Paul Studios, FLIR, Huawei/HiSilicon, Intel, IMAX, Kodak, National Film Board of Canada, The MathWorks, Microsoft, Microvision, On2 Technologies (later acquired by Google), Philips, Silicon Graphics (SGI), Silicon Light Machines (later acquired by Cypress), Silicon Optix, Snell & Wilcox, Sony, SpectraCal, Teranex (later acquired by Silicon Optix), Texas Instruments, VSCO, Vision Research, Walt Disney, Warner Bros., and Weta Digital.</p> <p>Colour and image science – I have performed contracts to analyze colour specification, calibration, capture, processing, storage, and display systems for digital video/HD/UHD/4K, digital cinema, computer animation, computer generated imagery (CGI/VFX), and broadcast, industrial, and consumer video. I am expert in high dynamic range (HDR) and wide colour gamut (WCG) systems. For three manufacturers of displays for digital cinema, I consulted on colour science, helped to establish image coding standards, and assisted in the development, testing, and evaluation of signal processing algorithms. I have consulted to several film studios on colour characterization, colour calibration, and colour management of their production pipelines. I was responsible for Adobe's introduction of the Adobe RGB (1998) colourspace into digital still photography. I am active within the AMPAS STC ACES initiative.</p>

Algorithm development – I have developed, characterized, modelled, and analyzed algorithms for motion image processing and compression for digital cinema, studio video, and PCs, with implementations in high-level software, firmware, and VLSI. Generally I perform high-level architectural work and deliver algorithms as a combination of textual description, equations, and/or *Mathematica* or MATLAB code. My clients typically implement my algorithms in VHDL or Verilog. For a manufacturer of graphics accelerator chips, I designed filtering algorithms for video decoding and encoding, deinterlacing, reinterlacing, resizing, and frame rate conversion. For a startup company manufacturing very large scale full-colour LED display systems, I designed the colour signal processing architecture including uniformity correction and colour matrixing. For Dolby Labs, I assisted in development of studio display standards adapted to HDR and contributed to the BT.1886 standard.

Technology assessment and forecasting – To assist companies to exercise due diligence with respect to licensing or acquisition, I have undertaken contracts to assess the value of patent portfolios. Sometimes, such activities verge into product planning. For a company designing and manufacturing standard (commercial) integrated circuits, I consulted on the technological aspects of a business strategy to enter the domain of consumer electronics. For a manufacturer of studio video equipment, I evaluated the technology and patent portfolio of a company that was a candidate for acquisition.

Expert witness – I work as an expert witness in intellectual property and patent matters; I read code. For a manufacturer of video equipment, I examined the arguments of an inventor that claimed that his patent had been infringed; my testimony cast doubt on the validity of his argument and an out-of-court settlement in favour of my client ensued. In another case, the developer of an advanced video codec licensed its technology to a foreign entity that subsequently claimed that the developer's code could not be effectively ported to a DSP architecture. At the International Court of Arbitration in London, I testified to the contrary; my client prevailed. I testified as an expert witness concerning misappropriation of trade secrets; I estimated damages of \$7M, and judgement in that amount was awarded by the court. For further information, please refer to separate *Expert Witness Experience and References*.

Sun Microsystems Computer Corporation, Mountain View, Calif., 1988–1995.
Staff Engineer.

Colour Management – I conceived and executed the strategy that brought colour management technology to Sun. I investigated colour technology and provided technical leadership to Sun's technical, business and contract teams. I worked with Kodak to define APIs, profile format, and colour data interchange standards. I provided industry leadership to achieve agreement on an industry standard for colour device profiles in the group that was the predecessor to today's International Color Consortium (ICC). I was a key contributor to the inclusion of accurate colour capability in the TIFF 6.0, JPEG, and JFIF image interchange standards (later incorporated into Exif, now ubiquitous in DSC, D-SLR, and cellphone cameras). I contributed to the sRGB and PNG standards. I participated in the development of the BT.709 HD primaries and introduced them to sRGB.

Digital Video and HD Standards – I contributed to standards for digital video, high-definition television (HD), and digital cinema. I was the document editor for the SMPTE ST 274 standard for 1920×1080 studio HD. I was a member of the Working Group on Colorimetry; work in that group led to the ITU-R BT.709 standard. I was founding chairman of SMPTE's Working Group on Digital Pictures; that group developed and standardized the SMPTE ST 268 (DPX) standard for the exchange of digital cinema, widely used for the past 25 years. I introduced "square pixels" to HD and introduced the number "1080" into HD standards (1080*p*60) and subsequently into digital cinema standards (2048×1080 and 4096×2160, "4 K").

High-Definition Television (HDTV) – With Glenn REITMEIER of David Sarnoff Research Center (now SRI), I responded to DARPA's 1989 Request for Proposals for a High Resolution (High-Definition) Workstation. Glenn and I conceived the system architecture, wrote the specification, and provided technological leadership to the design and implementation teams. I wrote HDTV interface standards. I specified the prototype 1920×1080, 72 Hz non-interlaced display that was commercialized as Sony's GDM-W900 and GDM-FW900, 1920×1200 CRT displays. The 1920×1200 display format became a widely used industry standard (adopted by Apple and many other manufacturers).

Northernlight and Picture,
Ottawa, Canada, 1984–1986.
Founder and president.

This television production company undertook co-production, with CBC (with executive producer Mark Blanford), of *Chasing Rainbows*, an \$11M, 14-hour miniseries produced using experimental 1035*i* HDTV equipment assembled, configured, and operated by Charlie PANTUSO. *Chasing Rainbows* was by a very wide margin the largest and most challenging HDTV production of its time.

Poynton Vector Corporation,
Ottawa, Canada, 1982–1988.
Founder and principal.

I performed contracts for the specification, design, development, implementation, testing, and installation of special-purpose studio-quality digital video equipment. I performed contracts for the following companies and organizations:

Ross Video, Ottawa, Canada, 1988. I performed a consulting contract to investigate the feasibility of using DSP and/or RISC computing in pattern generators for digital video production switchers.

Vertigo Computer Imagery, Vancouver, Canada, 1986–1987. I designed and built codec equipment to convert component analog video to component digital video (SMPTE RP 125), to interface Vertigo's computer graphic software and hardware to studio video equipment.

National Research Council of Canada, Ottawa, Canada, 1986. I designed and built interface equipment to capture video from the Space Shuttle's CanadArm into a general-purpose minicomputer, for algorithm development and testing.

Hewlett-Packard Labs, Palo Alto, California, 1985–1987. I performed consulting on the integration of video and computer graphics; I designed an experimental multi-port framestore system.

NASA (Johnston Space Center), Houston, Texas, 1982–1986. I specified and designed – and, with Pierre DEGUIRE, built – digital video processing equipment used at JSC to convert field-sequential video from the Space Shuttle into NTSC; C. R. CAILLOUET, Pierre DEGUIRE, and I commissioned the equipment. This equipment processed Space Shuttle video in real time to prepare it for display at Mission Control (about 50 milliseconds later), and for subsequent processing, recording, and distribution. The equipment was used for Shuttle missions for more than a decade. ■■