

Charles Poynton

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- Books**
- Digital Video and HDTV Algorithms and Interfaces* (San Francisco: Morgan Kaufmann, 2003). I wrote, designed, illustrated, and typeset this book, which is currently in its third printing. It reached rank 3,339 on Amazon.com.
- A Technical Introduction to Digital Video* (New York: John Wiley & Sons, 1996). I wrote, designed, illustrated, and typeset this book; it reached fifth printing.
- Book chapters**
- "Color in Digital Cinema," chapter 3 in *Understanding Digital Cinema: A Professional Handbook*, edited by Charles Swartz (Burlington, Mass.: Focal Press, 2004).
- "The Current State of High Definition Television," chapter 2 in *The New TV: A Comprehensive Survey of High Definition Television*, edited by Lou CasaBianca (Westport, Conn.: Meckler, 1994).
- "High Definition Television and Desktop Computing," chapter 18 in *Multimedia Systems*, edited by John F. Koegel (New York: ACM Press/Addison-Wesley, 1994). Also published in *Proceedings of International Technical Workshop on Multimedia Technologies in the HDTV Age*, IEEE CES Tokyo Chapter, July 20, 1993.
- Publications and presentations**
- I have published and taught extensively; please refer to separate list.
- Awards**
- David Sarnoff Gold Medal, awarded by SMPTE in 1993 for significant contributions to the integration of digital video and computing technologies.
- Professional memberships**
- Fellow of the Society of Motion Picture and Television Engineers (SMPTE), 1992–.
- Honorary Fellow of BKSTS, The Moving Image Society, 1999–.
- Special duties**
- In 2001 and 2003, I juried the OCAD *Sumo Robot Wrestling* competition.
- Education**
- B.A. (Mathematics and Computer Science) from Queen's University at Kingston, Ontario, Canada, 1976.
- Accepted into the Ph.D. program at Simon Fraser University, 2006–.
- Work experience**
- Free lance contracting**, 1996–
- Since completing my first book in 1996, I have been an independent contractor engaged in short-term and long-term consulting contracts. My clients have included ATI Technologies, Bellcore, Connex Technology, c.o.r.e. Digital Productions, Cypress Semiconductor, Discreet Logic, Dreamworks SKG, iFire Technology, Intel, Kodak, The MathWorks, Microsoft, On2 Technologies, Philips, Pinnacle Systems, S3, Silicon Graphics (SGI), Silicon Light Machines (SLM), Silicon Optix, Snell & Wilcox, Sony, Stream Processors, Teranex (later acquired by Silicon Optix), Texas Instruments, Walt Disney, Warner Bros., and Zilog. I have performed contracts in Belgium, Canada, England, Japan, Korea, Netherlands, and U.S.A.

Tools – My main tools for mathematical modelling and simulation are Mathematica, MATLAB, and Simulink. I occasionally write conventional compiled code in C. When necessary, I write scripts using classic tools such as *cs*h and *bash*; *awk*, *sed*, and *grep*; and lately in Python. I am familiar with source control using P4.

Communication – I pay a great deal of attention to communicating my work, both to my clients (by writing technical reports, proposals, analysis documents, and the like), and to the wider community (by teaching courses and seminars and by writing books). I execute my own illustrations (using Adobe Illustrator), and typeset my own work (using Adobe FrameMaker).

Colour and image science – I have performed contracts to analyze colour specification, calibration, capture, processing, storage, and display systems for digital cinema, computer animation, computer generated imagery (CGI), and broadcast, industrial, and consumer video. For two manufacturers of emerging 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 establishing image coding standards, and helped to introduce colour characterization, colour calibration, and colour management into their production pipelines.

Algorithm development – I have developed, characterized, modelled, and analyzed algorithms for motion image processing at quality levels from digital cinema, through studio broadcast, down to PCs, with implementation technologies from high-level software, through microcode, to commercially available VLSI. Generally I perform high-level architectural work, and deliver algorithms as some combination of textual description, equations, and/or Mathematica or MATLAB code. Sometimes I have provided bit-accurate C-code. My clients typically implement my algorithms in VHDL or Verilog. (I read these languages, but do not write them.) For a startup company developing revolutionary new film scanning technology, I assisted in colour characterization of their highly unusual device, and in the development of unique image signal processing algorithms. For a manufacturer of graphics accelerator chips, I designed filtering algorithms for NTSC decoding and encoding, deinterlacing, reinterlacing, resizing, and frame rate conversion.

Technology assessment and forecasting – I have assessed the value of intellectual property, to assist companies to exercise due diligence with respect to licensing or acquisition. I have assessed how technological developments in digital video, compression, HDTV, and accurate colour technology are likely to affect companies. Sometimes, this verges into product planning. For a company that designs and manufactures standard (commercial) integrated circuits, I consulted on the technological aspects of a business strategy to enter the domain of consumer electronics. For a large manufacturer of studio video equipment, I assisted in the evaluation of the technology of a company that was a candidate for acquisition.

Sun Microsystems Computer Corporation, Mountain View, California, 1988–1994. 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 closely 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 the International Color Consortium (ICC). I was a key contributor to the inclusion of accurate colour capability in the TIFF 6.0, JPEG, JFIF image interchange standards. I participated in the development of the sRGB and PNG standards.

Digital Video Standards – I was a key contributor to SMPTE standards for digital video, high-definition television (HDTV), and digital cinema. I was the document editor responsible for the SMPTE 274M standard for 1920×1080 high definition television – the HDTV studio standard. I was a member of the Working Group on Colorimetry, where I worked to establish standards for colour image exchange in HDTV, video, and print. I was founding chairman of SMPTE's Working Group on Digital Pictures; under my leadership, the group developed and standardized the SMPTE 268M (DPX/Cineon) standard for the exchange of digital film.

High-Definition Television (HDTV) – Along with Glenn Reitmeier of David Sarnoff Research Center, I responded to DARPA's 1989 Request for Proposals for a High Resolution (High-Definition Television) Workstation. Glenn and I conceived the system architecture and wrote the specification. We 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 evolved into commercial Sony 1920×1280 CRT monitors (GDM-W900).

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.

Ross Video, Ottawa, Canada, 1988.

I performed a consulting contract to investigate the use of DSP and RISC computing in pattern generators for digital video production switchers.

Vertigo Computer Imagery, Vancouver, Canada, 1986–87.

I designed and built codec equipment to convert component analog video to component digital video (SMPTE RP 125), to interface Vertigo's hardware to broadcast video plant 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.

Hewlett-Packard Labs, Palo Alto, California, 1985–87.

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, 1982–86.

I specified, designed, and built the digital video processing equipment used at JSC to convert field-sequential video from the Space Shuttle into NTSC for processing, recording, and distribution. This equipment processed Space Shuttle video about 50 milliseconds before it was displayed at Mission Control.

Digital Video Systems, Toronto, Canada, 1979–1981. Hardware/Software Engineer. (DVS was subsequently acquired by Scientific Atlanta.)

I designed and wrote microcode to control the highly successful DPS-1 framestore synchronizer. I applied DSP theory to characterize the adaptive comb filter and chroma decoder used in that product.

Teaching experience

Ontario College of Art (now Ontario College of Art and Design, OCAD), Toronto, Canada, 1976–1978. Faculty member.

I inaugurated the full-course *Electronics for Art*, and taught the course for 2 years.