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MIT-educated technical and software consultant. Highly experienced expert witness in patent litigation. Areas of expertise include touchscreen and tablet hardware, capacitive touch and proximity sensors, styli/electronic pens, haptics; gestures, user interfaces (UIs), touchscreen graphics, and accessibility user interfaces (blind/visually-impaired); digital rights management (DRM), digital encryption (PKI), and malware detection; programming/coding, source-code analysis, and firmware. Clients include Google, Samsung, Ericsson, Lenovo, Motorola, Nokia, and Lucent Technologies. Granted multiple US patents, additional published patent applications.

Professional Experience

Rueters-Ward Services, Arlington, Massachusetts

2008-present

Consulting/development for multiple clients, including:

- Laboratory information processing for biomedical drug-discovery company.
- Digital audio HW/SW Agile verification automation for massive VOIP technology.
- Consulting/development for TV-band datacasting architecture.
- Technical consulting, review, development for web-based collaborative work systems.
- Prior-art research and source-code analysis in patent litigations (confidential).
- Technical assistance to Boston-area attorney in solo practice (patent prosecution only).

Litigation Support/Expert Witnessing

- Patent analysis / prior art research.
- Source-code analysis / reverse engineering.
- Expert report writing.
- Testimony at deposition and trial.
- Cases involve major high-tech entities such as Google and Samsung
- Matters in both Federal District Court and before the USPTO, State Court (California), and internationally (Australia).

- Bluesocket, Inc., Burlington, Massachusetts** 2007-2008
(Staff) Software development and engineering process (with QA Director and VP Eng.) for a distributed wireless network controller product with integrated security, verification of SSL/TLS and VPN features in multiple hardware devices and SIP mobile phones. Agile/Jira.
- Cylant Security, Burlington, Massachusetts** 2005-2006
(Staff: Principal Engineer) Computer security technology: Multi-platform product for malware/virus detection, including techniques of behavioral analysis. Two patent filings on novel techniques (violation of invariant conditions) for detection of rootkits and malware
- Digimarc, Burlington, Massachusetts** 2003-2004
(Consultant) Application of PKI technology in fabrication and production of secure identity documents and manufactured items. One patent filing regarding PKI signatures to ensure authenticity and track unauthorized issuance of security documents such as passports.
- Independent Consultant (Multiple Projects)** 2002-2003
(Consultant) Three projects involving secure Web development in high-availability/high-performance applications, mobile payments using modified mobile phones, and international certification of a life-critical annunciation system. Prior-art research for two clients: pen-computing hardware and handwriting recognition.
- CertCo Incorporated, Cambridge, Massachusetts** 1999-2002
(Staff: PKI Systems Architect) Development of distributed web applications involving proprietary PKI in e-commerce. Three patent filings regarding PK infrastructure for distributed electronic signing.
- Siemens-Nixdorf USA, LCP Business Unit, Burlington, Massachusetts** 1998-1999
(Consultant) Design and development of cryptographic PKI/security technology for electronic DRM licensing of documents and materials distributed without restriction over the public Internet.
- e-parcel.com, Newton, Massachusetts Division of Mitsubishi Electronics** 1996-1998
(Staff: Development Group Leader) Secure, encrypted document and software delivery systems for automatic dissemination and delivery over the public Internet. Instituted engineering tracking and QA process.
- FAX International, Burlington, Massachusetts** 1995-1996
(Consultant) Automated Email-to-FAX gateway, routing of fax traffic over private TCP/IP network.
- DEC/Digital VXT Division, Marlboro, Massachusetts** 1994-1995
(Consultant) WindowsNT-based graphics/applications terminal product using ALPHA technology.
- DMR Group, Waltham, Massachusetts** 1994
(Consultant) Proprietary application scripting language, associated compilers, debuggers, and tools.
- Phoenix Technologies Ltd., PAGE Division Cambridge, Massachusetts** 1993-1994
(Consultant) Firmware for a multiple-language, multiple-resolution network printer (PostScript/PCL).
- Termiflex Corporation, Merrimac, New Hampshire** 1993
(Consultant) Compiler, linker, interpreter, and related tools for an object-based programming language for applications in hand-held touchpad industrial controller terminals.

Slate Corporation, Newton, Massachusetts 1991-1993
Development of tablet and pen computing applications products for the Microsoft PenWindows and GO/PenPoint pen-computing operating systems.
Company representative and technical co-chair of an industry standardization effort (“JOT”) for electronic ink data format and compression applications.

Wang Laboratories, Lowell, Massachusetts 1989-1991
(Staff: Senior Software Architect) Lead developer for touchscreen digitizer and controller/driver software to provide enhanced functionality to a portable computer as part of the “Freestyle” tablet-digitizer-based computer applications family. Company technical representative to early Pen Windows discussions with Microsoft concerning mobile tablet computers. Hardware design of an electrostatic tablet digitizer/touchscreen for a mobile tablet computer. Patents on novel pen-based UI involving virtual devices.

Teledyne/TAC, Woburn, Massachusetts 1987-1989
(Staff: Dir. of Software Engineering) Software group leader for computer-controlled industrial automation for IC wafer testing.

Pencept Inc., Waltham, Massachusetts 1979-1987
(Staff: Lead Engineer) Group leader for Pencept’s handwriting/gesture recognition and pen-computing digitizer tablets and hardware controllers through three generations of products. Patents related to pen-computing UI (user interface) and pen-computing digitizers.

Dynatron Corporation, Waltham, Massachusetts 1977-1979
(Staff: Senior Engineer/Analyst) Specialized implementation tools for real-time digital audio signal processing and testing. Early work as consultant for Penverter Partners (predecessor to Pencept).

Data General Corp., Westboro, Massachusetts 1974-1977
(Staff: Senior Systems Programmer) Compiler development.

Expert Witness/Litigation Support/Fact Witness

1. Declarations and depositions in support of petitioner Samsung for *Inter Partes* Review of U.S. Patents 8,717,303, 8,743,076, 8,866,785 and 8,878,810 concerning user interfaces and hardware for pressure-sensing capacitive touchscreens (Depositions October 2016, February 2017).
2. Declaration and USPTO interview in support of patent owner Wimo Labs for Reexamination of U.S. Patents 9,092,077 and 8,847,930 concerning styli for capacitive touchscreens. Declaration, PTAB interview September 2016.
3. Declarations and deposition in support of patent owner Ericsson for *Inter Partes* Review of U.S. Pat. RE43931 (6,131,047) concerning touchscreen user interfaces for hand-held radiotelephones (May/June 2016).
4. Declarations and deposition in support of petitioner Samsung for *Inter Partes* Review of U.S. Patent 6,610,917 and related patents 8,743,067, 8,717,303, 8,866,785, and 8,878,810, concerning touchscreen hardware and gestures (February 2016).
5. Expert witness for defendant Google in *ContentGuard Holdings, Inc. v. Google Inc.*, Case No 2:14CV0061, (Eastern District of Texas, Marshall Division), concerning U.S. Patent 8,393,007 and seven related patents on multimedia Digital Rights Management and Secure Systems for mobile devices. (Deposition June 2015, trial September 2015.)

6. Expert witness for plaintiff GO Computer in *GO Computer, Inc. v. Microsoft*, CGC-05-442684 in Superior Court, State of California/San Francisco concerning business practices in California under the Cartwright Act. (Report and Deposition August 2015. Settled September 2015).
7. Expert witness for defendant Lenovo in *MAZ Encryption Technologies LLC v Lenovo Inc.*, Case No. 13-303-LPS (District of Delaware), U.S. Patent 8,359,476 concerning encryption and decryption in conjunction with smartcards. (Report December 2014, Deposition April, 2015).
8. (Non-expert deposition as subpoenaed fact witness in *Flatworld v. Samsung Electronics Co. LTD. et al*, Case No 12-804-LPS, District of Delaware, April 2015.)
9. Declaration/report in support of petitioner Google, Inc. for *Inter Partes* Review of U.S. Patent 6,121,960, concerning rendering of transparency (e.g. alpha blending, screen door transparency, composite video) in graphics images and touch screen user-interface methods (May 2014. Depositions February and May, 2015).
10. Expert witness for defendant Samsung in *Apple, Inc. v Samsung Electronics Co. Limited, Proceeding No. NSD 1243 of 2011, Federal Court of Australia*, concerning multi-touch hardware for mobile devices. Two reports, testimony at trial in Sydney AU (June 2013).
11. (Confidential projects as consulting expert)
 - Patent concerning transparent graphical displays.
 - Patent concerning rotation of window views in touchscreen devices.
 - Two patents concerning touchscreen gestures on a virtual keyboard, and layered display of information.
12. Expert witness for defendant Motorola in *Certain Mobile Devices Incorporating Haptics*, case number 337-2875, in the U.S. International Trade Commission, concerning touch haptics (settled prior to reports due 2012).
13. Expert witness for defendant Motorola in *Motorola Mobility, Inc. v. Microsoft Corporation*, Case No. 10-24063-CIV-MORENO (Southern District of Florida) concerning touchscreen gestures in smartphones. (Two reports, deposition, one affidavit in related re-exam. 2011-2012).
14. Expert witness for defendant Nokia in *Nokia Corporation v. Apple, Inc.*, Case No. C.A. 09-791-GMS, (District of Delaware). Prior art and other research on multiple patents regarding touch user-interfaces, color rendering, touchscreen integration, and development tools for hand-held devices. (Settled shortly before reports due. 2010-2011).
15. Expert witness for plaintiff Lucent Technologies in *Lucent Technologies, Inc., v. Gateway, Inc. et al.*, Case No. 02-CV-2060-B (WMC), consolidated with Case No. 03-CV-0699-B (WMC) and Case No. 03-CV-1108-B (WMC) (S.D. Cal.), concerning gesture user interfaces and hardware integration in tablet-type computers. (Three expert reports, testimony in three depositions and at trial. 2006-2008).
16. Expert witness for defendant in patent case *Anoto AB v. Sekendur*, Case 03-C-4723, Northern District of Illinois, concerning US Patent 5,852,434 for optical (video) stylus digitizer hardware and firmware. (Expert report and deposition. 2004).
17. Expert witness for defendant in *Shumer v. LCS* concerning US Patent 5,768,492 regarding hardware controllers and virtual devices for digitizing tablets and WINTAB industry standard. (One expert report. 2001).

Published Patent Applications (Known, may not include some foreign counterparts)

1. US Published Patent Application 20070169192, June 19, 2007
"Detection of system compromise by per-process network modeling"
2. US Published Patent Application 20070067623, March 22, 2007
"Detection of system compromise by correlation of information objects"
3. US Published Patent Application 20050132194, June 16, 2005
"Protection of identification documents using open cryptography"
4. European Patent Application Publication EP1421464 A1, May 26, 2004
"System and method for trust in computer environments"
5. US Published Patent Application 20030163686, August 28, 2003
"System and method for ad hoc management of credentials, trust relationships and trust history in computing environments"
6. European Patent Application EP693724A1, January 24, 1996,
"A method of reconfiguration of a simulated keyboard device in a computer system",

Granted Patents (Known, may not include foreign counterparts)

1. US 5,491,495 "User interface having simulated devices"
2. US 5,148,155 "Computer with tablet input to standard programs"
3. US 4,608,658 "Method and apparatus for removing noise at the ends of a stroke caused by retracing"
4. US 4,562,304 "Apparatus and method for emulating computer keyboard input with a handprint terminal"
5. US 4,534,060 "Method and apparatus for removing noise at the ends of a stroke"

Publications

"Annotated Bibliography in On-line Character Recognition, Pen Computing, Gesture User Interfaces and Tablet and Touch Computers," published and revised on-line 1999-present at <http://www.ruetersward.com/biblio.html>

"Under the Hood: Digitizer Technology and Pen Computing", BYTE Magazine, January, 1993.

"Pen computing -- fad or revolution?," Information Display, pp. 14-19, March 1992.

"History of Pen-Based Computing - March 1992, Jean Renard Ward", recording of presentation given to Boston Computer Society regarding pen/touchscreen computing from 1914 to 1992, available at http://www.youtube.com/watch?v=4xnqKdWMa_8 (Posted 2013 by Dan Bricklin, <http://bricklin.com>)

"The 'How to' of Electronic Ink: Tablet Error Mechanisms and Performance Analysis for Handwriting Capture" (with Robert Kabel of Scriptel), Research Report, Wang Laboratories, July 1990.

"One view of outstanding problems in handwriting recognition systems," Proc. 3rd International Symposium on Handwriting Recognition and Applications, pp. 101-108, Montreal, Quebec, April 1990.

"A model for variability effects in hand-printing, with implications on the design of on-line character recognition systems", IEEE Trans. on Systems, Man, and Cybernetics, May 1988.

"Digitizer technology: Performance characteristics and the effects on the user interface", IEEE Computer Graphics and Applications, April 1987.

"UNIX as a development tool for a non-UNIX microprocessor", CommUNIXations, Vol. V No. 5, August/September 1985.

"Interactive Recognition of Handprinted Characters for Computer Input", IEEE Computer Graphics and Applications, Vol. 5 No. 9, September 1985.

Presentations/Presentation Organizing

Session chair and instructor

Society for Information Display (professional society: SID.org)

"Tutorial seminars on integration of touchscreen/pen interfaces and digitizer technology with graphics displays at the 1992 (Boston) and 1993 (Seattle) annual conferences for the Society for Information Display. Consultant to various clients on digitizer technology and pen computing interfaces 1991-1993.

Panel organizer

"Issues in the validity of testing protocols and criteria for on-line recognition of handwritten text," presented at the 1st International Symposium on Handwriting and Applications, Montreal, Canada, July 1987.

Organizer for multi-company presentation

PHIGS standardization committee on pen computing and gesture-recognition input devices, Boston, 1986.

Professional/Academic Society Memberships

Associate Member, IEEE (Institute of Electrical and Electronics Engineers) (current: 2006-Present)

Member, ACM (Association for Computing Machinery) (current: 2008-Present)

Member, SID (Society for Information Display) (current: 2012-Present)

Member, VIBUG (Visually-Impaired/Blind User Group: regional technical group)

Education

S.B. in Computer Science and Electrical Engineering

Massachusetts Institute of Technology, Cambridge, Massachusetts 1974

Independent Study, **Philipps-Universität**, Marburg, Germany 1972

Other

Familiarity with accessibility technology for visually-impaired/blind.

Fluent in German.