

Jeffrey J. Rodriguez, Ph.D.

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Overview

Prof. Rodriguez has extensive experience in the field of electrical and computer engineering. His areas of expertise include signal/image/video processing and analysis, biomedical data analysis, communication systems, microprocessor systems, electric circuits, and related software development. At the University of Arizona, he is a faculty member in the Dept. of Electrical and Computer Engineering and Director of the Signal and Image Laboratory (SaIL).

He served as Co-Director of Connection One, a National Science Foundation multi-university research center on communication circuits and systems. In addition to more than 150 publications in the field, he has been very active in professional activities as a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and the IEEE Signal Processing Society.

Prof. Rodriguez served as General Chair of the 2016 IEEE Southwest Symp. on Image Analysis and Interpretation (SSIAI). In addition, during 2005–2011 he served on the IEEE Signal Processing Society Technical Committee on Image, Video, and Multidimensional Signal Processing. He served as General Chair of the 2007 IEEE Intl. Conf. on Image Processing (ICIP), as well as General Chair of SSIAI 2014, General Chair of SSMSD 2003, General Chair of SSIAI 1998, and Vice Chair of SSIAI 2004, as well as positions on numerous other professional committees. From 1996 to 2000, Prof. Rodriguez was Associate Editor of the journal, *IEEE Transactions on Image Processing*.

Expertise

Image processing & analysis (filtering, enhancement, segmentation, pattern recognition, restoration, super-resolution, JPEG, watermarking, inpainting, etc.)

Video processing & analysis (filtering, enhancement, segmentation, pattern recognition, motion estimation, tracking, MPEG, watermarking, etc.)

Signal processing & analysis (speech, audio, filtering, Fourier analysis, etc.)

Biomedical data analysis

Computational photography (deblurring, enhancement, high dynamic range imaging, super-resolution, etc.)

Communication systems (signal conditioning, data compression, image & video communication, etc.)

Microprocessor systems (interfacing, programming, etc.)

Electric circuits (analog and digital)

Software analysis (C, C++, MATLAB, etc.)

Education

Ph.D., The University of Texas at Austin, Electrical Engineering, May 1990

S.M., Massachusetts Institute of Technology, Electrical Engineering, June 1986

B.S., The University of Texas at Austin, Electrical Engineering, May 1984

June 16, 2021

Employment

- 1990–present: The University of Arizona
 - 1997–present, Associate Professor of Electrical and Computer Engineering, with tenure
 - 2017–present, Associate Professor of Biomedical Engineering, with tenure
 - 2000–2003, 2005–2016: Director of ECE Graduate Studies
 - 2002–2017: Faculty member in the Biomedical Engineering Graduate Interdisciplinary Program
 - 2009–2014, Director of Image Analysis, Cancer Imaging Shared Services, Arizona Cancer Center
 - 2003–2008: Co-Director of Connection One, a National Science Foundation industry/university cooperative research center for communication circuits and systems
 - 1990–1997: Assistant Professor of Electrical and Computer Engineering
- 1986–1990: The University of Texas at Austin, Graduate Research Assistant in Dept. of Electrical Engineering
- 1985: Massachusetts Institute of Technology, Graduate Research Assistant in Dept. of Electrical Engineering
- 1982–1985 (summers): IBM Corp. (Austin, Texas) – hardware design and system programming
- 1980–1981 (summers): Texas Instruments, Inc. (Austin, Texas) – software quality assurance

Consulting

Deposed 15 times. Testified in court 5 times.

Confidential U.S. Dist. Ct. Matter

Dates: Dec. 2020 –

In the Matter of Certain Video Processing Devices, Components Thereof, and Digital Smart Televisions Containing the Same, Inv. No. 337-TA-1222

Court: U.S. International Trade Commission

Dates: Nov. 2020 –

Client: LG Electronics Inc. and LG Electronics U.S.A., Inc. (resp.)

Complainant: DivX, LLC

Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.

Technology: Video streaming

Deposed May 2021

Intellectual Tech LLC v. Zebra Technologies Corporation, Case No. 6:19-cv-00628-ADA

Court: U.S. District Court for the Western District of Texas, Waco Division

Dates: Oct. 2020 –

Client: Intellectual Tech LLC (pl.)

Counsel: Cole Schotz, P.C.

Technology: RFID controller system

Deposed Dec. 2020

In the Matter of Certain Electronic Devices, Including Computers, Tablet Computers, and Components and Modules Thereof, Inv. No. 337-TA-1208
Court: U.S. International Trade Commission
Dates: Sept. 2020 – March 2021
Client: Nokia Technologies Oy and Nokia Corporation (compl.)
Respondents: Lenovo, Inc. and other Lenovo companies
Counsel: McKool Smith
Technology: Video coding
Deposed March 10, 2021

Inter Partes Review of Patent No. 7,064,768, Case IPR2021-00434
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Nov. 2020 – Jan. 2021
Client: Samsung Electronics Co., Ltd. (pet.)
Patent Owner: Pictos Technologies Inc.
Counsel: Paul Hastings LLP
Technology: Image processing; image filtering

Inter Partes Review of Patent No. 7,199,821
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Oct. 2020 – Jan. 2021
Client: Apple Inc. (pet.)
Patent Owner: Maxell, Ltd.
Counsel: Erise IP
Technology: Image processing for electronic camera; white balance

Inter Partes Review of Patent No. 6,349,154, Case IPR2020-00479
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: June 2019 – Jan. 2021
Client: Google LLC (pet.)
Patent Owner: Uniloc 2017 LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems

Ex Parte Reexamination of Patent No. 8,339,493
Court: U.S. Patent and Trademark Office
Dates: Nov. 2020 – Dec. 2020
Client: Apple Inc. (pet.)
Patent Owner: Maxell, Ltd.
Counsel: Erise IP
Technology: Image processing for electronic camera; image resolution

Inter Partes Review of Patent No. 7,012,960, Case IPR2020-00757
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: June 2019 – Aug. 2020
Client: Google LLC (pet.)
Patent Owner: Uniloc 2017 LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems

Inter Partes Review of Patent No. 9,769,477, Case IPR2019-01035
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: April 2019 – Aug. 2020
Client: Google LLC (pet.)
Patent Owner: Realtime Adaptive Streaming LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems
Deposed Feb. 2020

Inter Partes Review of Patent No. RE46,777, Case IPR2019-01037
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: April 2019 – Aug. 2020
Client: Google LLC (pet.)
Patent Owner: Realtime Adaptive Streaming LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems

Inter Partes Review of Patent No. 7,386,046, Case IPR2019-01033
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: April 2019 – Aug. 2020
Client: Google LLC (pet.)
Patent Owner: Realtime Adaptive Streaming LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems

Inter Partes Review of Patent No. 8,339,493, Case IPR2020-00597
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Feb. 2020 – July 2020
Client: Apple Inc. (pet.)
Patent Owner: Maxell, Ltd.
Counsel: Erise IP
Technology: Image processing for electronic camera; resolution

Inter Partes Review of Patent No. 6,329,934, Case IPR2020-00448
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: June 2019 – July 2020
Client: Google LLC (pet.)
Patent Owner: Uniloc 2017 LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems

Inter Partes Review of Patent No. 6,329,934, Case IPR2020-00447
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: June 2019 – March 2020
Client: Google LLC (pet.)
Patent Owner: Uniloc 2017 LLC
Counsel: Paul Hastings LLP
Technology: Image and video data compression systems

In the Matter of Certain Infotainment Systems, Components Thereof, and Automobiles Containing the

Same, Inv. No. 337-TA-1119

Court: U.S. International Trade Commission

Dates: Oct. 2018 – June 2019

Client: Broadcom, Limited (compl.)

Respondents: Toyota Motor Corporation, Panasonic Corporation, Denso Ten Limited, Renesas Electronics Corporation, Japan Radio Co., Ltd., et al.

Counsel: Steptoe & Johnson LLP

Technology: Graphics/image/video processing for automobile infotainment systems

Deposed April 5, 2019

Testified and cross-examined at trial, June 4 & 7, 2019

Inter Partes Review of Patent No. 8,508,751

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board

Dates: April 2018 – May 2019

Client: Pathway Innovations and Technologies, Inc. (patent owner)

Petitioners: AVer Information Inc. and iPEVO, Inc.

San Diego IP Law Group LLP

Technology: Document cameras and video processing

Deposed Sept. 20, 2018

Confidential IPR Matter

Dates: July 2018 – Sept. 2018

Confidential ITC Matter

Dates: May 2018 – June 2018

In the Matter of Certain Digital Cable and Satellite Products, Set-Top Boxes, Gateways, and Components Thereof, Inv. No. 337-TA-1049

Court: U.S. International Trade Commission

Dates: July 2017 – Nov. 2017

Client: ARRIS International plc; ARRIS Group, Inc.; ARRIS Technology, Inc.; ARRIS Enterprises LLC; ARRIS Solutions, Inc.; ARRIS Global Ltd. (formerly Pace Ltd.); Pace Americas, LLC; Pace Americas Holdings, Inc.; Pace USA LLC; and Pace Americas Investments, LLC (resp.)

Complainant: Sony Corporation and Sony Electronics Inc.

Counsel: Fish and Richardson P.C.

Technology: Video receiver and video processing

Inter Partes Review of Patent No. 7,720,294

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board

Dates: June 2017 – Sept. 2017

Client: Broadcom Corp. (patent owner)

Petitioner: Advanced Micro Devices, Inc.

Counsel: Swanson & Bratschun, LLC

Technology: Video decoding

Inter Partes Review of Patent No. 7,472,151

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: June 2017 – Sept. 2017
Client: Broadcom Corp. (patent owner)
Petitioner: Advanced Micro Devices, Inc.
Counsel: Swanson & Bratschun, LLC
Technology: Video decoding

In the Matter of Certain Document Cameras and Software for Use Therewith, Inv. No. 337-TA-1045

Court: U.S. International Trade Commission
Dates: May 2017 – Nov. 2017
Client: Pathway Innovations and Technologies, Inc. (compl.)
Respondents: iPEVO, Inc. AVer Information, Inc. and Lumens Integration, Inc.
Counsel: San Diego IP Law Group LLP
Technology: Document cameras and video processing
Deposed Oct. 2017

Inter Partes Review of Patent No. 8,032,919

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: May 2017 – Nov. 2017
Client: ARRIS International plc, ARRIS Group, Inc., ARRIS Technology, Inc., ARRIS Enterprises, LLC, ARRIS Solutions, Inc., ARRIS Global Ltd. and ARRIS U.S. Holdings, Inc. (pet.)
Patent owner: Sony Corporation
Counsel: Fish & Richardson
Technology: Video receiver and video processing

Inter Partes Review of Patent No. 6,467,093

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: May 2017 – Nov. 2017
Client: ARRIS International plc, ARRIS Group, Inc., ARRIS Technology, Inc., ARRIS Enterprises, LLC, ARRIS Solutions, Inc., ARRIS Global Ltd. and ARRIS U.S. Holdings, Inc. (pet.)
Patent owner: Sony Corporation
Counsel: Fish & Richardson
Technology: Video receiver and video processing

Sony Corporation v. ARRIS Global Ltd. and Pace Americas, LLC
(formerly *Sony Corporation v. Pace plc and Pace Americas, LLC*)

Court: U.S. District Court for the District of Delaware
Dates: March 2017 – Nov. 2017
Client: Pace plc and Pace Americas, LLC (bought by ARRIS Group) (def.)
Counsel: Fish & Richardson
Technology: Video communication and encryption

Inter Partes Review of Patent No. 8,147,332

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: March 2017 – June 2017
Client: Broadcom Corp. (patent owner)
Petitioner: Sony Corporation
Counsel: Swanson & Bratschun, LLC
Technology: Video game systems

Broadcom Corp. et al. v. Sony Corp. et al., Case No. 16-cv-1052-JVS-JCG
Court: U.S. District Court for the Central District of California, Santa Ana Division
Dates: Feb. 2016 – June 2017
Client: Broadcom Limited (pl.)
Counsel: Thompson & Knight LLP
Technology: Video processing systems, video game systems

Reckitt Benckiser LLC v. Amneal Pharmaceuticals LLC, et al., Civil Action No. 15-2155
(RMB)(JS)(Consolidated)
Court: U.S. District Court for the District of New Jersey
Dates: March 2017 – May 2017
Client: Dr. Reddy's Laboratories (def.)
Counsel: Budd Lerner P.C.
Technology: Image analysis of pharmaceutical tablets
Deposed May 2017
Testified at trial, May 2017

eWatch v. Apple, Inc., et al., Case No. 2:13-cv-01061
Court: U.S. District Court for the Eastern District of Texas
Dates: Nov. 2016 – Jan. 2017
Client: ZTE (USA), Inc. (def.)
Counsel: Pillsbury Winthrop Shaw Pittman LLP
Technology: Cellular camera phones, image transmission over wireless network

Inter Partes Review of Patent No. 7,085,123
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Mar. 2016 – Dec. 2016
Client: Mazda Motor Corp. (pet.)
Patent owner: Power Regeneration LLC
Counsel: DLA Piper LLP
Technology: Power supply circuits

Inter Partes Review of Patent No. 7,558,472
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Jun. 2016 – Nov. 2016
Client: Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung
Telecommunications America, LLC (pet.)
Patent owner: TiVo Inc.
Counsel: Fish & Richardson P.C.
Technology: Video processing hardware and software

Inter Partes Review of Patent No. 8,457,476
Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Jun. 2016 – Nov. 2016
Client: Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung
Telecommunications America, LLC (pet.)
Patent owner: TiVo Inc.
Counsel: Fish & Richardson P.C.
Technology: Video processing hardware and software

Saint Lawrence Communications LLC v. HTC Corporation and HTC America, Inc., Case No. 2:15-cv-00919
Court: U.S. District Court, Eastern District of Texas, Marshall Division
Dates: Apr. 2016 – Nov. 2016
Client: HTC Corporation and HTC America, Inc. (def.)
Counsel: Cooley LLP
Technology: Speech and audio compression

In the Matter of Certain Computing or Graphics Systems, Components Thereof, and Vehicles Containing Same, ITC Inv. No. 337-TA-984

Court: U.S. International Trade Commission
Dates: Feb. 2016 – Nov. 2016
Client: Bayerische Motoren Werke AG, BMW of North America, LLC, BMW Manufacturing Co., LLC, Renesas Electronics Corporation, and Renesas Electronics America Inc. (resp.)
Complainant: Advanced Silicon Technologies Inc.
Counsel: DLA Piper LLP (for BMW), Foley & Lardner LLP (for Renesas)
Technology: Memory controllers for data processing systems

TiVo Inc. v. Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications America, LLC

Court: U.S. District Court for the Eastern District of Texas, Marshall Division
Dates: Dec. 2015 – Mar. 2016
Client: Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications America, LLC (def.)
Counsel: Fish & Richardson
Technology: Video processing hardware and software

Civolution B.V. v. Doremi Labs, Inc., No. 2:14-CV-00962-JAK-RZ

Court: U.S. District Court, Central District of California, Western Division
Dates: Dec. 2014 – Jan. 2016
Client: Doremi Labs, Inc. (def.)
Counsel: Gibson, Dunn & Crutcher LLP
Technology: Video watermarking to detect cinematic copies
Deposed May 2015

e-Watch, Inc. et al. v. LG Electronics et al., No. 2:13-cv-01064

Court: U.S. District Court, Eastern District of Texas, Marshall Division
Dates: Feb. 2015 – Oct. 2015
Client: LG Electronics, Inc., LG Electronics U.S.A., Inc., LG Electronics Mobilecomm U.S.A., Inc. (def.)
Counsel: Fish & Richardson P.C.
Technology: Cellular camera phone, image transmission over wireless network

Invensys Systems, Inc. v. Emerson Electric Co. and Micro Motion Inc. USA, No. 6:12-cv-00799-LED

Court: U.S. District Court, Eastern District of Texas, Tyler Division
Dates: Jan. 2014 – Apr. 2015
Client: Invensys Systems, Inc. (pl. and counter-claim def.)
Counsel: DLA Piper LLP
Technology: Digital controllers for digital flow meters
Deposed Nov. 2014

Inter Partes Review of Patent No. 7,103,380

Court: U.S. Patent and Trademark Office, Patent Trial and Appeal Board
Dates: Sept. 2013 – Dec. 2014
Client: Apple Inc. (pet.)
Patent owner: NetAirus Technologies LLC
Counsel: Sterne, Kessler, Goldstein & Fox
Technology: Wireless communication (cellular and Wi-Fi)

NetAirus Technologies, LLC v. Apple Inc., No. 10-CV-03257-JAK

Court: U.S. District Court, Central District of California
Dates: June 2011 – Dec. 2014
Client: Apple Inc. (def.)
Counsel: Milbank, Tweed, Hadley, & McCloy LLP
Technology: Wireless communication (cellular and Wi-Fi)
Deposed Aug. 2013
Testified and cross-examined at jury trial, Nov. 2013
Jury verdict: no infringement by Apple; NetAirus patent claims are invalid
Affirmed by U.S. Court of Appeals for the Federal Circuit, Dec. 2014

Motorola Mobility, Inc. et al. v. TiVo Inc., No. 5:11-cv-00053-MHS-CMC

Court: U.S. District Court, Eastern District of Texas, Texarkana Division
Dates: Sept. 2012 – June 2013
Client: Motorola Mobility, Inc., General Instrument Corp., Time Warner Cable, Inc. and Time Warner Cable LLC (counter-claim def.)
Counsel: DLA Piper LLP; Quinn Emanuel Urquhart & Sullivan, LLP
Technology: Video processing hardware and software
Deposed April 2013

MedioStream, Inc. v. Microsoft Corporation et al., No. 5:11-CV-2525; transferred from Texas case

MedioStream, Inc. v. Microsoft Corporation et al., No. 2:08-CV-369-CE; merged from *MedioStream, Inc. v. Acer America Corp. et al.*, No. 2:07-CV-376-CE
Court: U.S. District Court, Northern District of California, San Jose Division, transferred from Eastern District of Texas, Marshall Division
Dates: Aug. 2010 – March 2013
Client: Apple Inc. (def.)
Counsel: Milbank, Tweed, Hadley, & McCloy LLP
Technology: Video compression, video format conversion, transcoding

TASER International, Inc. Re-Issue Application

Court: U.S. Patent and Trademark Office
Dates: Feb. 2013
Client: TASER International, Inc. (pet'r)
Technology: Electric circuits for stun guns

TASER International, Inc. v. Stinger Systems, Inc.; James F. McNulty, Jr.; and Robert Gruder, No. 2:09-CV-00289-KJD-PAL

Court: U.S. District Court, District of Nevada
Dates: July 2011 – Sept. 2012
Client: TASER International, Inc. (pl.)
Counsel: Perkins Coie LLP
Technology: Electric circuits for stun guns

LSI Corporation v. Vizio, Inc., No. SACV10-01602 AG AJW

Court: U.S. District Court for the Central District of California

Dates: July 2011 – June 2012

Client: LSI Corporation (pl.)

Counsel: Thompson & Knight LLP

Technology: Digital video coding (MPEG) hardware & software

TASER International, Inc. v. Stinger Systems, Inc., No. CV07-0042-PHX-MHM/JHT; also *Motion for Contempt against Karbon Arms LLC and Robert Gruder*

Court: U.S. District Court, District of Arizona

Dates: Aug. 2007 – Jan. 2012

Client: TASER International, Inc. (pl.)

Counsel: Perkins Coie LLP

Technology: Electric circuits for stun guns

Testified and cross-examined at Markman hearing, May 2008

Deposed Nov. 2011

Testified and cross-examined at contempt hearing, Dec. 2011

SanDisk Corp. v. LSI Corp. et al., No. C-09-02727-WHA

Court: U.S. District Court, Northern District of California

Dates: Nov. 2009 – March 2010

Client: LSI Corp. (pl.)

Counsel: Thompson & Knight LLP

Technology: MPEG video and audio data compression

Trover Group, Inc., and Security Center, Inc. v. Diebold, Incorporated, No. 2:06-cv-00445-TJW

Court: U.S. District Court, Eastern District of Texas, Marshall Division

Dates: Oct. 2008 – April 2009

Client: Diebold, Inc. (def.)

Counsel: Thompson & Knight LLP

Technology: Image and video compression, storage, and retrieval in video security/surveillance systems

In Re: Katz Interactive Call Processing Patent Litigation, No. 07-ML-01816 FGK (FFMx) (*Ronald A. Katz Technology Licensing, LP v. American Airlines et al.*, No. CV 07-2196 RGK (FFMx))

Court: U.S. District Court, Central District of California

Dates: Feb. 2008 – May 2008

Client: National Railroad Passenger Corp. (d/b/a Amtrak) (def.)

Counsel: Steptoe & Johnson LLP

Technology: Telephone interface using voice prompts to collect data from caller

TASER International, Inc. v. Thomas G. Watkins III and Jane Doe Watkins, husband and wife, No. CV2005-002509

Court: Superior Court of Arizona, Maricopa County

Dates: May 2006 – Spring 2007

Client: TASER International, Inc. (pl.)

Counsel: Perkins Coie LLP

Technology: Electric circuits for stun guns

Vision BioSystems (USA) Trading, Inc. v. Ventana Medical Systems, Inc., No. 03-CV-10391-GAO; *Ventana Medical Systems, Inc. v. Vision BioSystems, Inc.*, No. 05-CV-10614-GAO
Court: U.S. District Court, District of Massachusetts
Dates: Sept. 2005 – May 2007
Client: Ventana Medical Systems, Inc. (pl.)
Counsel: Wilson Sonsini Goodrich & Rosati
Technology: Instrumentation for automated immunostaining

Forgent Networks, Inc. v. Echostar Technologies Corp. et al., No. 2-05CV-318-LED, transferred to No. 6:06-CV-208-LED
Court: U.S. District Court, Eastern District of Texas, Marshall Division, transferred to Tyler Division
Dates: May 2006 – May 2007
Client: Digeo, Inc. (def.)
Counsel: Perkins Coie LLP
Joint Counsel: Morrison Foerster; Dewey Ballantine LLP; Jones Day
Technology: Video processing systems
Deposed March 2007

Ventana Medical Systems, Inc. v. Biogenex Laboratories, Inc., No. CIV 03-92 TUC RCC
Court: U.S. District Court, District of Arizona
Dates: Aug. 2004 – May 2007
Client: Ventana Medical Systems, Inc. (pl.)
Counsel: Wilson Sonsini Goodrich & Rosati
Technology: Instrumentation for automated immunostaining
Deposed June 2005

Ventana Medical Systems, Inc. v. DakoCytomation California, Inc., No. CIV 04-1522-GMS
Court: U.S. District Court, District of Delaware
Dates: Sept. 2005
Client: Ventana Medical Systems, Inc. (pl.)
Counsel: Wilson Sonsini Goodrich & Rosati
Technology: Instrumentation for automated immunostaining

Kyocera International, Inc. v. Nokia, Inc., No. 04-CV-1992W-JFS
Court: U.S. District Court, Southern District of California
Dates: July 2005 – Aug. 2005
Client: Nokia, Inc. (def.)
Counsel: Jones Day
Technology: Cellular camera phone communications

Active Recognition Technologies, Inc.
Dates: Oct. 2003
Technology: Image processing for automated license plate recognition

Aerotech Laboratories, Inc.
Dates: April 2000
Technology: Image processing for automated recognition of fungal spores

Honors, Awards, and Memberships

Senior Member, Institute of Electrical and Electronics Engineers, IEEE Signal Processing Society

Best Poster Award. Douglas W. Todd, Rohit C. Philip, Maki Niihori, Jeffrey J. Rodriguez, and Abraham Jacob, "High-Throughput Behavioral Zebrafish Assay for Drug Development Targeting Hearing Loss", AOS 149th Annual Meeting, American Otological Society, May 20-21, 2016, Chicago, IL.

Best Paper Award. Abhinav K. Jha, Matthew A. Kupinski, Jeffrey J. Rodriguez, Renu M. Stephen, and Alison T. Stopeck, "Evaluating Segmentation Algorithms for Diffusion-Weighted MR Images: A Task-Based Approach," in *Image Perception, Observer Performance, and Technology Assessment*, David J. Manning and Craig K. Abbey, Eds., Proc. of SPIE, vol. 7627, pp. 76270L-1 to 76270L-8. Presented at SPIE Medical Imaging 2010, San Diego, CA, Feb. 13–18, 2010.

IEEE/HKN Outstanding Teaching Award, 1992

Andersen Consulting Outstanding Faculty Award, 1992

Honor societies: Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi, Sigma Xi

National Science Foundation Graduate Fellowship, 1985–1988

Teaching Experience

Courses taught in the Dept. of Electrical and Computer Engineering and the College of Optical Sciences:

- Digital Image Analysis (ECE/OPTI 532)
- Digital Image Processing (ECE/OPTI 533)
- Digital Signal Processing (ECE 429/529)
- Advanced Digital Signal Processing (ECE 528)
- Signals and Systems (ECE 340)
- Electric Circuits (ECE 320A)

University Service Activities

- University Fellows Program, Phys/Math/CS/Engr Award Selection Panel, Spring 2021
- Dept. of ECE Graduate Studies Committee, 1997, 2000-2004, 2005-2016, 2019-present
- Dept. of ECE Graduate Recruiting and Awards Committee, 2001–2003, 2005–2018
- Director of ECE Graduate Studies, 2000–2003, 2005–2016
- Dept. of ECE Executive Committee, 2001–2003, 2005–2016
- Dept. of ECE Annual Performance Review Committee, Spring 2015
- Dept. of ECE Committee on Committees, 2013-2016
- Chair, Dept. of ECE Faculty Search Committee, 2013
- BME Faculty Search Committee, 2008
- Search Committee for the Dean of the Eller College of Business and Public Administration, 2003–2004
- Chair, College of Engineering Graduate Studies Committee, 2001–2003
- Co-Chair, Dept. of ECE Student/Faculty Interaction Committee, 2001–2002
- Dept. of ECE Undergraduate Mentoring Committee, 2001–2002
- College of Engineering Advisory Committee, 1998–2002
- Faculty co-advisor for Eta Kappa Nu chapter (electrical engineering honor society), 1994–2002
- Chair, Dept. of ECE Instructional Equipment and Software Planning Committee, 1998–2001

- Faculty Co-Advisor, Dept. of ECE Graduate Student Activities Committee (GSAC), 1995–2000
- Dept. of ECE Teaching Load Committee, Fall 2000
- Dept. of ECE Annual Performance Review Committee, Fall 2000
- Search Committee for Head of Dept. of ECE, 1996–1997
- Dept. of ECE Computer Policy Committee, 1994–1997
- Dept. of ECE Student Recruiting Committee, 1995–1996
- Small Grants Peer Review Panel, U.A. Office of Vice President for Research, April 1993
- Dept. of ECE Subcommittee on Computer Programming Curriculum, 1992
- Dept. of ECE Seminar Series Committee, 1991–1992

Professional Service Activities

Panelist, NSF Panel, Division of Computing and Communication Foundations (CISE/CCF), 2020
 Treasurer, 2020 IEEE Southwest Symp. on Image Analysis and Interpretation
 Treasurer, 2018 IEEE Southwest Symp. on Image Analysis and Interpretation
 Technical Program Committee, 2018 IEEE Southwest Symp. on Image Analysis and Interpretation
 Session Chair, 2016 IEEE Intl. Conf. on Image Processing
 Technical Program Committee, 2016 IEEE Intl. Conf. on Image Processing
 General Chair, 2016 IEEE Southwest Symp. on Image Analysis and Interpretation
 Chair, Steering Committee, IEEE Southwest Symp. on Image Analysis and Interpretation, 2007–present
 Technical Program Committee, 2014 IEEE Intl. Conf. on Image Processing
 General Chair, 2014 IEEE Southwest Symp. on Image Analysis and Interpretation
 Reviewer, 2013 IEEE Intl. Conf. on Image Processing
 Finance Chair, 2012 IEEE Southwest Symp. on Image Analysis and Interpretation
 Reviewer, 2012 IEEE Intl. Conf. on Image Processing
 Program Committee, 2012 IEEE Southwest Symp. on Image Analysis and Interpretation
 Finance Chair, 2010 IEEE Southwest Symp. on Image Analysis and Interpretation
 Program Committee, 2010 IEEE Southwest Symp. on Image Analysis and Interpretation
 Reviewer, 2010 IEEE Intl. Conf. on Image Processing
 Reviewer, 2010 IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing
 Awards Subcommittee, IEEE Signal Processing Society Technical Committee on Image, Video, and
 Multidimensional Signal Processing (IVMSP), 2008–2010
 Program Committee, 2009 IASTED Intl. Conf. on Signal Processing, Pattern Recognition and Applications
 (SPPRA)
 IEEE Signal Processing Society Technical Committee on Image, Video, and Multidimensional Signal
 Processing (IVMSP), 2005–2011
 Reviewer, 2008 IEEE Intl. Conf. on Image Processing
 Program Committee, 2008 IEEE Southwest Symp. on Image Analysis and Interpretation
 Member, IEEE Signal Processing Society Technical Directions Board, 2007
 IEEE Signal Processing Conference Board, 2006–2008
 Reviewer, NSF Industry/University Cooperative Research Program, 2007

General Chair, 2007 IEEE Intl. Conf. on Image Processing
Program Committee, 2006 IEEE Intl. Conf. on Image Processing
Program Committee, 2006 IEEE Southwest Symp. on Image Analysis and Interpretation
Program Committee, 2005 IEEE Intl. Conf. on Image Processing
Reviewer, 2005 IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing
Vice Chair, 2004 IEEE Southwest Symp. on Image Analysis and Interpretation
Program Committee, 2004 IEEE Intl. Conf. on Image Processing
Special Editor, Integrated Computer-Aided Engineering, 2003–2004
General Chair, 2003 IEEE Southwest Symp. on Mixed-Signal Design
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Associate Editor, IEEE Trans. on Image Processing, 1996–2000
Vice Chair, 2000 IEEE Southwest Symp. on Image Analysis and Interpretation
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Publications Chair, 1999 IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing
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Area Program Chair, 1999 IEEE-CS Conf. on Computer Vision and Pattern Recognition
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- [92] Jeffrey J. Rodriguez, "An Improved Bit-Reversal Algorithm for the Fast Fourier Transform," *IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, vol. 3., New York, NY, 1988, pp. 1407–10.
- [93] Jeffrey J. Rodriguez, Jae S. Lim, and Elliot Singer, "Adaptive Noise Reduction in Aircraft Communication Systems," *IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, vol. 1, Dallas, Texas, 1987, pp. 169–72.

Patent

- [1] U.S. Patent No. 10,204,413, entitled "System and Method That Expands the Use of Polar Dynamic Programming To Segment Complex Shapes," with named inventors José Rosado-Toro, Jeffrey J. Rodriguez, Ryan Avery, and Aiden Abidov, issued on February 12, 2019.

Other Publications

- [1] Mohammad Sadegh Majdi, Mahesh Bharath Keerthivasan, Natalie M. Zahr, Jeffrey J. Rodriguez, and Manoj Saranathan, "Automated Segmentation of Thalamic Nuclei Using Convolutional Neural Networks" (abstract), ISMRM 27th Annual Meeting & Exhibition, Intl. Society for Magnetic Resonance in Medicine, May 11-16, 2019, Montreal, Canada.
- [2] Ramaprasad Kulkarni, Jeffrey J. Rodriguez, and Markus Tuller, "Semi-Automated Multiphase Segmentation of 4-D Micro-Computed Tomography Data of Porous Media" (abstract), ASA-CSSA-SSSA Intl. Annual Meeting, Soil Science Society of America, Tampa, FL, Oct. 22-25, 2017, doi: 10.2136/vzj2011.0082.

- [3] Ramaprasad Kulkarni, Marcel G. Schaap, Jeffrey J. Rodriguez, and Markus Tuller, "Synthesis of Sphere Packings for Evaluation of Image Segmentation Algorithms" (abstract), ASA-CSSA-SSSA Intl. Annual Meeting, Soil Science Society of America, Phoenix, AZ, Nov. 6-9, 2016, doi:10.13140/RG.2.2.16825.98403.
- [4] Ramaprasad Kulkarni, Jeffrey J. Rodriguez, and Markus Tuller, "Improved Surface Area Estimation Based on Surface Curvedness" (abstract), ASA-CSSA-SSSA Intl. Annual Meeting, Soil Science Society of America, Phoenix, AZ, Nov. 6-9, 2016, doi:10.13140/RG.2.2.30247.75684.
- [5] Douglas W. Todd, Rohit C. Philip, Maki Niihori, Jeffrey J. Rodriguez, and Abraham Jacob, "High-Throughput Behavioral Zebrafish Assay for Drug Development Targeting Hearing Loss" (abstract), AOS 149th Annual Meeting, American Otological Society, May 20-21, 2016, Chicago, IL. **Best poster award.**
- [6] José A. Rosado-Toro, Ryan Avery, María I. Altbach, Aiden Abidov, and Jeffrey J. Rodríguez, "Semi-Automated Segmentation of the Right Ventricle in 4-CH MR Images" (abstract), ISMRM 24th Annual Meeting & Exhibition, Intl. Society for Magnetic Resonance in Medicine, May 7-13, 2016, Singapore.
- [7] Sundaresh Ram, Stephen J. Howerton, Forest L. Danford, Urs Utzinger, Jeffrey J. Rodriguez, and Jonathan P. Vande Geest, "Racioethnic Differences in Biomechanical Environment of the Lamina Cribrosa" (abstract), *Investigative Ophthalmology & Visual Science*, vol. 57, no. 12, Sept. 2016, p. 3555. Presented at ARVO 2016 Annual Meeting, Assn. for Research in Vision and Ophthalmology, May 1-5, 2016, Seattle, WA.
- [8] José A. Rosado-Toro, Tomoe Barr, Jean-Philippe Galons, Marilyn T. Marron, Alison Stopeck, Cynthia Thomson, Patricia Thompson, Danielle Carroll, Eszter Wolf, María Altbach, and Jeffrey J. Rodríguez, "Automatic Segmentation of Breast Images Using Clustering and Dynamic Programming" (abstract), presented at the ISMRM 23rd Annual Meeting & Exhibition, Intl. Society for Magnetic Resonance in Medicine, May 30 – June 5, 2015, Toronto, Canada.
- [9] Srinivas L. Naik, Jeffrey J. Rodriguez, Nishant Kalra, and Vincent L. Sorrell, "Tricuspid Annular Plane Systolic Excursion (TAPSE) Revisited Using CMR," *Journal of Cardiovascular Magnetic Resonance*, 2012, vol. 14, suppl. 1, Feb. 1, 2012, p. 299, doi:10.1186/1532-429X-14-S1-P299. Presented at the Society for Cardiovascular Magnetic Resonance (SCMR) 15th Annual Scientific Sessions, Orlando, FL, Feb. 2-5, 2012.
- [10] Phillip A. Mlsna and Jeffrey J. Rodriguez, "Gradient and Laplacian Edge Detection," in *The Essential Guide to Image Processing, 2nd ed.*, Al Bovik, ed. San Diego, CA: Elsevier, 2009, Ch.19, pp. 495–524 (book chapter).
- [11] Narendhran Vijayakumar, Lars Ewell, and Jeffrey J. Rodriguez, Baldassarre Stea, "Inferior Brain Lesions Monitored Using Diffusion Weighted Magnetic Resonance Imaging" (abstract), presented at the Sino-American Network for Therapeutic Radiology and Oncology (SANTRO) Symp., August 28-30, 2008, Beijing, China.
- [12] Phillip A. Mlsna and Jeffrey J. Rodriguez, "Gradient and Laplacian Edge Detection," in *Handbook of Image and Video Processing, 2nd ed.*, Al Bovik, ed. San Diego, CA: Academic Press, 2005, Sect. 4.13, pp. 535–553 (book chapter).
- [13] Cynthia M. Smith, Helen Y. S. Chen, Jeffrey J. Rodriguez, Jennifer K. Barton, Stuart K. Williams, and James B. Hoying, "Three Dimensional Analysis of Mural Cell Coverage in Microvascular Collagen Gels," *FASEB Journal* (Federation of American Societies for Experimental Biology), vol. 17, no. 4, supplement, p. 500 (abstract). Presented at Experimental Biology 2003, San Diego, CA, April 2003.
- [14] David Galbraith, Shiva Murthi, Sundararajan Sankaranarayanan, and Jeffrey Rodriguez, "Digital Flow Cytometry: An Improved Scheme for Pulse Capture and Cell Sorting" (abstract), in *Cytometry*, vol. 47, suppl. 11, 2002.

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- [16] Jeffrey J. Rodriguez, David W. Galbraith, Bo Xia, Kusnadi, Timothy A. Yopp, Shiva Murthi, and Sundararajan Sankaranarayanan, "Digital Data Acquisition System for Flow Cytometric Analysis," in *Cytometry* (abstract). Presented at the XX Intl. Congress of the Intl. Society for Analytical Cytology (ISAC), May 20–25, 2000, Montpellier, France.
- [17] Jeffrey J. Rodriguez and David W. Galbraith, "Digital Data Acquisition System for Flow Cytometry" (abstract), Ninth Cytometry Development Workshop (Asilomar, CA), Oct. 1999.
- [18] Heidi Leising, Joseph M. Miller, John E. Greivenkamp, Kendel McCarley, Jeffrey J. Rodriguez, and David L. Guyton, "Quantification of the Brückner Test for Strabismus," *Investigative Ophthalmology & Visual Science*, vol. 35, no. 4, supplement, March 15, 1994, p. 2202 (abstract). Presented at the 1994 meeting of the Association for Research in Vision and Ophthalmology, Sarasota, FL.
- [19] Nick A. Zilmer, Jeffrey J. Rodriguez, Timothy A. Yopp, Georgina M. Lambert, and David W. Galbraith, "Digital Flow Cytometry," *Cytometry*, suppl. 7, 1994 (abstract). Presented at the 1994 Intl. Congress of the Intl. Soc. for Analytical Cytology (ISAC).
- [20] Jeffrey J. Rodriguez, "Vector-Based Techniques for Color Image Processing" (abstract), OSA Symp. on Multidimensional Image Processing (Toronto, Canada), Oct. 1993 (invited presentation).
- [21] Jeffrey J. Rodriguez, *Terrain Matching Using Image Sequence Analysis*. Ph.D. dissertation, Dept. of Electrical Engineering, The University of Texas at Austin, 1990. Also available as pub. no. 90–31700, UMI Dissertation Services, Ann Arbor, MI.
- [22] Jeffrey J. Rodriguez, *Adaptive Noise Reduction in Aircraft Communication Systems*. M.S. thesis, Dept. of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, 1986. Also available as tech. report 756, M.I.T. Lincoln Laboratory, Lexington, MA, 1987.

Keynote/Plenary Presentations

- "Image Analysis Applications in Microscopy," Plenary Speaker, 2008 IEEE Southwest Symp. on Image Analysis and Interpretation, Santa Fe, NM, March 26, 2008.
- "Texture Analysis for Automated Classification of Digital Images," Keynote Speaker, Seventh IASTED Intl. Conf. on Signal and Image Processing, Honolulu, HI, August 15, 2005.

Other Presentations without Proceedings

- Shaun Pacheco, Basel Salahieh, Guoan Zheng, Thomas D. Milster, Jeffrey Rodriguez, and Rongguang Liang, "Reflective Fourier Ptychography" (presentation), in *Design and Quality for Biomedical Technologies IX*, Proc. SPIE 9700 (Ramesh Raghavachari and Rongguang Liang, eds.), 97000P, doi:10.1117/12.2236358. Presented at SPIE BIOS, San Francisco, CA, Feb. 13-18, 2016.
- "Video Processing System for Zebrafish Behavioral Assay," Invited Speaker, Arizona Cancer Center Collaborative Cancer Grand Rounds, Tucson, AZ, Sept. 18, 2015.
- "Automated Detection and Segmentation of FISH Spots," Invited Speaker, 2011 Arizona Imaging and Microanalysis Society Annual Meeting, Tucson, AZ, March 24, 2011.
- "Color Image Enhancement and Coordinate Systems," Invited Speaker, IEEE Signal Processing Society Phoenix Chapter, May 1992.
- "Digital Image Processing," Tutorial Speaker, IEEE Intl. Phoenix Conf. on Computers and Communication, April 1992.
- "Color Image Enhancement Techniques," Invited Speaker, Dept. of Computer Science, University of California at Santa Barbara, April 1991.

Grants and Contracts

- National Institutes of Health / National Institute of Biomedical Imaging and Bioengineering, Grant No. 1UH2EB022623-01, "Low-Cost Mobile Oral Cancer Screening for Low Resource Setting," co-investigator (with R. Liang), 9/1/2016 – 8/31/2018.
- The Sensor Group LLC, "Automated Analysis of Images of Electric Power Equipment," principal investigator, 5/23/2016 – 8/22/2016.
- National Institutes of Health / National Eye Institute, Grant No. R01EY020890, "Extracellular Matrix Organization and Biomechanics of the Lamina Cribrosa and Peripapillary Sclera," co-investigator starting Jan. 2015 (with J. P. Vande Geest), Aug. 2011 – July 2016.
- National Institutes of Health / National Heart, Lung, and Blood Institute, Grant No. T32HL007955, "Cardiovascular Biomedical Engineering Training Grant," participant starting July 2014 (with J. Barton, PI), May 2000 – June 2016.
- Google Inc., "Computational Depth-Based Restoration Technique for Full-Focus Imaging," co-investigator (with R. Liang), 9/1/2014 – 9/1/2015.
- National Institutes of Health / National Cancer Institute, Grant No. CA023074, "Cancer Center Support Grant," principal investigator (with D. S. Alberts and other principal investigators), July 2009 – June 2014.
- University of Arizona Technology Research Initiative Fund, TRIF Imaging Fellowship for student (R. Kulkarni), "Multiphase Segmentation of 3-D CT Images of Porous Materials," co-investigator (with M. Tuller), Aug. 2013 – May 2014.
- Split Engineering LLC, "Image Analysis for Rock Particle Segmentation," principal investigator, May 2012 – May 2013.
- NSF I/UCRC Connection One, "Content-Adaptive Improved Error Concealment Method for H.264/AVC Encoded Video Streaming," principal investigator, Jan. 2008 – June 2008.
- National Institutes of Health / National Institute of Biomedical Imaging and Bioengineering, "Graduate Training in Biomedical Imaging and Spectroscopy," Grant No. 5T32EB000809-05, participant (with A. Gmitro et al.), May 2003 – April 2008.
- National Institutes of Health, "Advanced Intravital Microscope," participant (with U. Utzinger et al.), April 2007 – March 2008.
- National Institutes of Health / National Cancer Institute, "Diagnosis of Ovarian Cancer by Confocal Microendoscopy," Grant No. 5R01CA115780-03, co-investigator (with A. F. Gmitro), July 2005 – June 2009.
- National Science Foundation Industry/University Research Center (I/UCRC), "Connection One: Communication Circuits and Systems Center," Grant No. EEC-0333046, principal investigator, July 2003 – June 2008.
- Texas Instruments, NSF I/UCRC Connection One Membership, Aug. 2005 – June 2008.
- Analog Devices, NSF I/UCRC Connection One Membership, July 2003 – June 2008.
- Raytheon, NSF I/UCRC Connection One Membership, July 2003 – June 2008.
- BAE Systems, "Modeling and Simulation of MANET, IPv6 Interfaces and Optical Switching Architectures for Advanced Mobile Network-Centric Platforms," co-investigator (with K. M. McNeill), Oct. 2003 – Sept. 2007 (my involvement began July 2005).
- NSF I/UCRC Connection One, "Integrated Management/Control Plane Architecture with VoIP Application," principal investigator, Aug. 2005 – Aug. 2006.

BAE Systems, NSF I/UCRC Connection One Membership, Jan. 2004 – June 2006.

Cisco Systems, NSF I/UCRC Connection One Membership, July 2003 – June 2006.

NSF I/UCRC Connection One, “Adaptive Voice Quality Enhancement Mechanisms for VoIP,” coinvestigator (with K. M. McNeill), Aug. 2004 – Aug. 2006.

NSF I/UCRC Connection One, “Integrated Management Control Plane Architecture for Heterogeneous Networks,” co-investigator (with K. M. McNeill), Aug. 2003 – July 2005 (my involvement began July 2005).

State of Arizona Prop. 301 Information Technology Committee, “Connection One: Communication Circuits and Systems Center,” principal investigator, July 2003 – June 2006.

National Science Foundation, “Planning Grant for NSF I/UCRC Connection One: Communication Circuits and Systems Center,” Grant No. EEC-0245729, principal investigator, Feb. 2003 – Jan. 2004.

The University of Arizona Prop. 301 Small Grants Program in Imaging and Image Science, “Automated Analysis of Chromosome Images for Cytogenetic Applications,” principal investigator, Jan.–Dec. 2002.

UA Office of the Dean of Students, “Student/Faculty Interaction Program,” principal investigator (with J. D. Carothers), Aug. 2001 – Dec. 2002.

National Institutes of Health, “Wavelet Analysis of Flow Cytometric Information,” co-investigator (with D. W. Galbraith), Sept. 1998 – Sept. 2001.

National Science Foundation, “Flow Cytometry: Digital Processing of Molecular Information,” Grant No. BIR-9604929, co-investigator (with D. W. Galbraith), Feb. 1997 – Jan. 2001.

UA College of Engineering, Arizona Software Institute, “A Software Toolbox for Multimedia Indexing and Retrieval,” principal investigator, July 1999 – Feb. 2000.

Hughes Missile Systems Company, “Signature Prediction of Targets Given 2–D Views,” principal investigator, Nov. 1996 – June 1997.

National Science Foundation, “Flow Cytometry: Digital Processing of Molecular Information,” Grant No. BIR-9513602, co-investigator (with D. W. Galbraith), March 1996 – Feb. 1997.

Hughes Missile Systems Company, “Reference Generation with Gray Shade Signature Overlay,” principal investigator, Feb. 1996 – June 1997.

Motorola, Inc. (SSTG), “Telecommunications Analysis,” co-investigator (with J. D. Carothers and I. Widjaja), Aug. 1996 – Dec. 1996.

Motorola, Inc. (GSTG), “Optimization for Data Visualization,” co-investigator (with J. D. Carothers and I. Widjaja), Jan. 1996 – Dec. 1996.

Motorola, Inc. (GSTG), “Optimization for Data Visualization,” co-investigator (with J. D. Carothers), Feb. 1995 – Jan. 1996.

National Science Foundation, “Flow Cytometry: Digital Processing of Molecular Information,” Grant No. BIR-9116067, co-investigator (with D. W. Galbraith), July 1992 – Dec. 1995.

Motorola, Inc. (GSTG), “Optimization for Data Visualization,” co-investigator (with J. D. Carothers and M. K. Liu), Jan. 1995 – Dec. 1995.

AT&T Foundation, “Digital Retrieval and Visualization of 3–D Magnetic Resonance Images,” principal investigator, Oct. 1994 – Oct. 1995.

Hughes Missile Systems Company, “Reconstruction of 3–D Geometry of Objects from Limited Views,” principal investigator, July 1994 – July 1995.

Texas Instruments, Inc., software donation, TMS320C30 C-compiler/assembler/linker package, April 1995.

Motorola, Inc. (GSTG), "Multidimensional Algorithms for Biomedical Image Analysis," principal investigator, May 1994 – Feb. 1995.

National Science Foundation, "Digital Image Archiving and Viewing Station," Grant No. CDA- 9212524, co-investigator (with R. A. Schowengerdt and R. N. Strickland), Sept. 1992 – Aug. 1994.

University of Arizona, Office of Vice President for Research, "Coordinate Systems for Processing Digital Color Images," principal investigator, Jan. 1992 – Dec. 1992.

National Science Foundation, "Color Image Enhancement and Segmentation for Computer Vision," Grant No. IRI-9112350, principal investigator, July 1991 – Sept. 1992.